



European Perspective on Specific Types of Territories

Applied Research 2013/1/12

Final Scientific Report | Version 20/12/2012



This report presents the draft final results of an Applied Research Project conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON Programme and projects can be found on www.espon.eu

The web site provides the possibility to download and examine the most recent documents produced by finalised and ongoing ESPON projects.

This basic report exists only in an electronic version.

© ESPON & University of Geneva, 2012.

Printing, reproduction or quotation is authorised provided the source is acknowledged and a copy is forwarded to the ESPON Coordination Unit in Luxembourg.

List of authors

Erik Gløersen, Jacques Michelet, Clément Corbineau and Frédéric Giraut
(Department of Geography, University of Geneva, Switzerland)

Diana Borowski and Martin Price (Centre for Mountain Studies, Perth
College, University of the Highland and Islands, United Kingdom)

Marta Pérez Soba, Michiel van Eupen, Laure Roupioz and Rini Schuiling
(Alterra, Wageningen UR (University & Research Centre), the Netherlands)

Gordon Cordina, Jana Farrugia, Stephanie Vella and Alexia Zammit
(E-Cubed Consultants, Malta)

Ioannis Spilanis and Thanassis Kizos (University of the Aegean, Greece)

Alexandre Dubois and Johanna Roto (Nordregio, Sweden)

Hugo Thenint (Louis Lengrand et associés, France)

Christophe Sohn, Olivier Walther and Nora Stambolic (CEPS/INSTEAD)

Monika Meyer and Jan Roters (Leibniz Institute of Ecological and Regional
Development – IÖR, Germany)

Kathrin Kopke and Aidan O'Donoghue (Coastal & Marine Resources
Centre, Environmental Research Institute, University College Cork,
Ireland)

Wolfgang Lexer and Gebhard Banko (Federal Environment Agency,
Austria)

Thomas Stumm (Eureconsult, Luxembourg)

Table of contents

List of abbreviations	15
1.1 Policy context	16
1.2 Objectives of the project and principles for the analysis of GEOSPECS categories	18
1.3 Project organisation	25
2. Introduction	29
2.1 A spatial reference framework for the analysis of GEOSPECS categories	29
2.2 Analyses based on LAU2 data: the notion of potentials	33
2.3 Delineation of urban areas	37
2.4 Analytical matrix	42
2.5 Compilation of data	42
3. Conceptual understanding and delineation of GEOSPECS categories	48
3.1 GEOSPECS categories as social, cultural and political constructs	48
3.2 Conceptual understandings and delineations of the GEOSPECS categories	52
3.2.1 Mountains	52
3.2.2 Islands	63
3.2.3 Sparsely Populated Areas	73
3.2.4 Coastal areas	87
3.2.5 Border areas	106
3.2.6 Outermost Regions: Conceptualisation and delineation	135
3.3 Cross-analysis of delineations	148
4. Quantitative analyses	157
4.1 Quantitative characterisation of areas with geographic specificities	157
4.1.1 Mountain areas	157
4.1.2 Islands	175
4.1.3 Sparsely Populated Areas	189
4.1.4 Coastal areas	204
4.1.5 Border areas	221
4.1.6 Outermost Regions	233
4.2 Synthesis of quantitative findings	264
5. Case studies	270
5.1 Overview of case studies	270
5.2 Case study reports	272
5.2.1 Mountains: Case study reports	272
5.2.2 Islands: Case study reports	284
5.2.3 Sparsely populated areas: Case study reports	300
5.2.4 Coastal areas: Case study reports	313
5.2.5 Border areas: Case Study Reports	324
5.2.6 Outermost regions: Case study reports	341
5.3 Synthesis of findings from case studies	353
6. Transversal themes	363
6.1 Overview of transversal themes	363
6.2 Transversal theme reports	364

6.2.1	Economic vulnerability and resilience – Strategies of territories in the face of globalization	364
6.2.2	Accessibility and services of general interest.....	373
6.2.3	Role of Information and Communications Technologies (ICT).....	381
6.2.4	Residential attractiveness	394
6.2.5	Biodiversity and protected areas as factors of development	405
6.2.6	Ecosystem Services.....	415
6.2.7	Natural Resource Exploitation.....	422
6.2.8	Vulnerability of human-environment systems to climate change	437

Figures

Figure 1	The three dimensions to be put into coherence for the exploitation of territorial development opportunities	19
Figure 2	Analytical dimensions of the GEOSPECS project	26
Figure 3	Comparison of the ESPON map kit and EuroBoundaryMap maps.....	31
Figure 4	Calculation of potentials	34
Figure 5	Method for the calculation of potentials.....	36
Figure 6	Different approaches of urban areas and urban endowment: MUA, FUA and PUSH.....	41
Figure 7	Comparison of geographic extent of the three Small Island States of the ESPON area...	69
Figure 8	Basic patterns of socio-economic relations existing in border areas & non-border areas	131
Figure 9	Proportion of population and area covered by various types of geographic specificities (EU27).....	149
Figure 10	Population and area within various types of geographic specificities (ESPON space)...	150
Figure 11	Proportions of population living in LAU2 within 45 minutes from the coast in the four classes of coastal regions of the ESPON typology.....	152
Figure 12	Identification of most relevant overlapping categories.....	154
Figure 13	Patterns of employment.....	165
Figure 14	Accessibility to airports.....	171
Figure 15	Protected areas in mountainous border areas.....	175
Figure 16	Relationship between the proportion of young and old people in the Sparse Territories and in their respective countries.	192
Figure 17	Population change in various sizes of sparse settlement in the largest Sparse Territories in 2006-2011 (ES 2001-2006)	193

Figure 18	Economic specialisation of the Sparse Territories	198
Figure 19	Percentage of population and area in coastal SPA municipalities	206
Figure 20	Percentage of population aged 60 and over in coastal LAUs (country and regional sea) and in the entire country.	219
Figure 21	Factor analysis of the sector-specific employment in border areas	226
Figure 22	Structure of employment in the Outermost Regions.	241
Figure 23	Percentage of each Outermost Region designated as protected areas.	245
Figure 24	Number of airline connections from Spanish and Portuguese ORS.....	248
Figure 25	Birth rates and life expectancy on Caribbean islands and in France	254
Figure 26	GDP per capita (US\$) on Caribbean islands and in France	254
Figure 27	Imports and exports on Caribbean islands and in France	254
Figure 28	Birth rate and life expectancy, Guyana Shield and France.....	256
Figure 29	GDP per capita (US\$), Guyana Shield and France.....	256
Figure 30	Birth rate and life expectancy: Indian Ocean area and France.....	257
Figure 31	GDP per capita (US\$): Indian Ocean area and France.....	258
Figure 32	Imports and exports: Indian Ocean area and France.....	259
Figure 33	Birth rate and life expectancy, Eastern Atlantic area, Portugal and Spain.....	260
Figure 34	GDP per capita (US\$): Eastern Atlantic area, Portugal and Spain.....	261
Figure 35	Imports & exports: Eastern Atlantic area, Portugal and Spain.....	262
Figure 36	Accessibility indicators in Highland	273
Figure 37	Nexus model: Highland, Scotland.....	277
Figure 38	Nexus model: Jura massif	283
Figure 39	Sicily: Nexus model.....	291
Figure 40	Outer Hebrides: nexus model	299
Figure 41	Torne Valley nexus model.....	306
Figure 42	Central Spain nexus model	312
Figure 43	Nexus model Belgian coast	318
Figure 44	Irish Sea nexus model	323
Figure 45	Nexus model: Czech-German-Polish border	326

Figure 46	Nexus model: Polish-Ukrainian border	328
Figure 47	Geneva: nexus model	331
Figure 48	Geneva: nexus model	334
Figure 49	Map of the Canary Islands	341
Figure 50	Migration balance in the Canary Islands.....	344
Figure 51	Canary Islands nexus model.....	346
Figure 52	Map of French Guyana.....	347
Figure 53	French Guyana nexus model.....	352
Figure 54	Model of socio-economic processes in areas with a 'linear' geographic specificity: example of the Geneva CBMR	360
Figure 55	Model of socio-economic processes in areas with a 'linear' geographic specificity: example of the Belgian coast.....	361
Figure 56	Labour-market profiles in mountain areas	371
Figure 57	Households with broadband access by degree of urbanisation, 2009.....	391
Figure 58	Policy Approach.....	404
Figure 59	Protected Areas per GEOSPECS category: percentage.....	414
Figure 60	Ecosystem services: categories and values	415
Figure 61	Onshore and offshore wind energy project on the Belgium Coast.....	432
Figure 62	Natural Resource management in SPA and cross- border region of Torne Valley.....	433
Figure 63	Hotspots of employment in the mining industry in an SPA of Central Spain	434
Figure 64	Overall potential vulnerability to climate change	437

Maps

Map 1	Boundaries of LAU units compiled for the GEOSPECS project.....	30
Map 2	Time distances to the nearest urban core area	38
Map 3	PUSH2 areas around urban core areas associated with a FUA of more than 100 000 inhabitants.....	40
Map 4	Mountainous LAU2 units in Europe, enclaves and exclaves	60
Map 5	Massif areas in the ESPON space.....	61

Map 6	Preliminary identification of insular areas – excluding Island States	71
Map 7	Delineation of islands and of regions and municipalities with a significant insular component.....	72
Map 8	Sparsely populated and poorly connected areas.	80
Map 9	LAU2s with more than 90% of the total area covered by SP Areas.	81
Map 10	LAU2 and NUTS3 regions with low population potential.....	83
Map 11	Sparse Territories: clusters of Sparsely Populated and Poorly Connected LAU2s	84
Map 12	Degree of urbanisation and sparsely populated and poorly connected LAU2	86
Map 13	Goods transported (inwards and outwards) in the EU coastal zone in 2007 (source: Eurostat).....	95
Map 14	Port passengers for the EU coastal zone in 2007.....	96
Map 15	Main seas border ESPON space and corresponding coastlines	98
Map 16	Average travel times to the coast from LAU2 units.....	105
Map 17	Classification of national land borders in the ESPON space.....	112
Map 18	Maritime boundaries of the EU	114
Map 19	Types of natural obstacles existing along EU-borders	115
Map 20	Types of natural obstacles existing along EU-borders	116
Map 21	Gross domestic product (purchasing power parity) per capita, 2007.....	119
Map 22	Current situation of labour market integration along different borders of the ESPON space	129
Map 23	Travel time distances to internal EU borders.....	133
Map 24	Travel time distances to external EU borders	134
Map 25	Proportion of children in mountain massifs.....	158
Map 26	Proportion of children in mountain municipalities	159
Map 27	Mountain municipalities and PUSH.....	162
Map 28	Massifs and PUSH.....	163
Map 29	Employment structure by massif.....	167
Map 30	Zoom on municipal employment in the Carpathians	168
Map 31	Zoom on the importance of tourism in Alpine municipalities.....	169
Map 32	Access to main urban cores from Sparsely Populated Areas	190

Map 33	Population Change in SPAs, 2001-2006	194
Map 34	Employment structure by three main sectors in sparsely populated and poorly connected areas	197
Map 35	Location of activities included in the European Pollutant Release and Transfer Register in the four main European regions with SPA	200
Map 36	Proportion of agricultural and artificial land, and protected areas in Sparsely Populated Areas	201
Map 37	LAU2 within 45 minutes and 90 minutes travel distance from the coastal and contiguous to the coastline.....	205
Map 38	Population density and large cargo ports	212
Map 39	Artificial surfaces in Mediterranean and North Sea coastal area	213
Map 40	Hotspots of employment in the service industry in Baltic Sea Coast of Germany.....	215
Map 41	Percentage of the population aged 60 in the North Sea Coastal areas of Germany and the French Mediterranean Coastal area.	218
Map 42	Predominant land cover pattern in core border areas	223
Map 43	Typology of functional urban areas in border areas.....	228
Map 44	Population densities of the Outermost Regions.....	234
Map 45	Percentage of population below 15 in the Outermost Regions	236
Map 46	Outermost Regions: people without a diploma as a proportion of the total population.....	238
Map 47	Outermost Regions: income per household.....	239
Map 48	Profile of employment in the French Outermost Regions.	242
Map 49	Profile of employment in the Canary Islands.	243
Map 50	Profile of employment in the Portuguese Outermost Regions	244
Map 51	Land cover and protected areas on the Portuguese Outermost Regions.	246
Map 52	Land cover and protected areas on the Canary Islands.	247
Map 53	Outermost Regions: numbers of doctors per 1000 inhabitants	251
Map 54	Overview of case studies	271
Map 55	Jura massif	278
Map 56	Case study area: Belgian coast	313
Map 57	Case study area: Irish Sea	319
Map 58	Population Density	399

Map 59	Yearly Sunshine Duration.....	400
Map 60	Employment in the Tourism Sector	401
Map 61	Air Connectivity.....	402
Map 62	Nature parks in the “Grande Région”	409
Map 63	Reserves for Nature and Landscape Protection in the border triangle between Germany, Poland and the Czech Republic.....	410

Tables

Table 1	Principles used to delimit GEOSPECS areas.....	21
Table 2	Conceptual and methodological interpretation of GEOSPECS areas	21
Table 3	Division of responsibilities for GEOSPECS categories within the TPG.....	27
Table 4	Division of responsibilities for transversal themes within the TPG	28
Table 5	Delineation methods and related material.....	32
Table 6	Defining features by GEOSPECS category	49
Table 7	Overview of mountainous areas in Europe.....	62
Table 8	Population densities in coastal areas and the inland in ESPON space ¹	91
Table 9	Population densities in coastal areas and the inland in the European Union	91
Table 10	Population densities in coastal areas (LAU2 at less than 45 minutes from the coast or contiguous to the coast)	92
Table 11	General typology of border effects	126
Table 12	Geographical constraints of Outermost Regions.....	143
Table 13	Characteristics of remoteness of Outermost Regions	144
Table 14	Area and population of Outermost Regions	145
Table 15	Overlaps between GEOSPECS categories (areas)	155
Table 16	Overlaps between GEOSPECS categories (population).....	156
Table 17	Proportion of persons over 59 y.o. in mountain municipalities.....	160
Table 18	Mountain/border overlaps (only countries with at least 20,000 km ²)	172
Table 19	Mountain/coast overlaps (only countries where at least 10% of national area overlaps)	173
Table 20	Geographical analysis	177

Table 21	Accessibility analysis.....	179
Table 22	Demographic analysis.....	181
Table 23	Economic analysis.....	183
Table 24	Land use analysis.....	186
Table 25	Sparse areas: percentage of their respective national land area and population in 2006.	191
Table 26	Population densities in coastal areas and the inland in ESPON space.....	204
Table 27	Population densities in coastal areas (LAU2 at less than 45 minutes from the coast or contiguous to the coast).....	207
Table 28	Proportion of coastal areas in commuting distance from PUSH	209
Table 29	Artificial surfaces in coastal municipalities	211
Table 30	Proportion of employment in tourism.....	216
Table 31	Example: Highland Council area	357
Table 32	Example: Geneva CBMR.....	359
Table 33	Characterisation of the accessibility and provision of SGI in areas with geographic specificities	380

Annexes to the Scientific report

- 1** Analytical matrix
- 2** Overview of data collection
- 3** The European nation-building process and its negative effects on border regions
- 4** The dimensions of the globalisation process & their potential influence on changing the nature of European borders
- 5** Border concepts and their overall analytical focus
- 6** “International political borders” in Europe - A map-based representation according to the main forms of existing supranational co-operation & integration
- 7** Main drivers contributing to a further “tightening” of the external EU-borders
- 8** A mapping of various other examples for “economic discontinuities” which exist at European borders
- 9** Ethnic communities in Europe and the revival of ethnic nationalism
- 10** Languages in Europe
- 11** Extensive version of the general typology of border effects
- 12** Efficiency of customs clearance processes along European
- 13** EU-wide analyses of the situation of cross-border workers & problems associated to data gathering
- 14** Current scope & focus of cross-border commuting in the EU27
- 15** Long-term development of the right of EEC & EC nationals / EU citizens to work in other EU Member States
- 16** Labour market integration within the EEA and between EU Member States and Switzerland
- 17** The current status of labour market integration between the EU27 and other Third Countries
- 18** The specific status of cross-border workers
- 19** Main obstacles to commuting in EU27/EEA/EFTA cross-border areas
- 20** Obstacles to cross-border mobility existing in the five Nordic countries
- 21** The EU external border regime
- 22** Multilingual borderlands in Europe
- 23** Outermost Regions - related policy documents
- 24** Case Study Highland Council area, Scotland
- 25** Case Study Jura massif
- 26** Case Study Sicily
- 27** Case Study Outer Hebrides
- 28** Case Study Torne Valley

- 29** Case Study SPAs in central Spain
- 30** Case Study Belgian Coast
- 31** Case Study Irish Sea
- 32** Case Study border triangle Germany-Poland-Czech Republic
- 33** Case Study Polish-Ukrainian
- 34** Case Study Geneva CBMR
- 35** Case Study Luxembourg CBMR
- 36** The cross-border intra-firm networks in the Greater Region
- 37** Case Study Werra-Meissner-Kreis
- 38** Case Study Parkstad
- 39** Case Study Canary Islands
- 40** Case Study French Guyana
- 41** "Additional case" Tatra mountains
- 42** "Additional case" West Stara Planina
- 43** "Additional case" Saaremaa
- 44** "Additional case" North-Eastern Turkey
- 45** Table: Synthesis of case studies
- 46** Vulnerability of human-environment systems to climate change: synthesis
- 47** Difference between proportion of employment in selected sectors in coastal areas and national average
- 48** Core border areas where a border is reached within 45 minutes
- 49** Core border areas where 45-minutes or more are needed to reach a border
- 50** The difference between "land cover" & "land use" and approaches to assess the "degree of naturalness" for a given territory
- 51** Individual mapping of selected land cover categories
- 52** Weighted distance between border areas belonging to the same border within the matrix of the factor analysis
- 53** Definition of the urban potential & classification procedure
- 54** Resident population in core border areas (2006)
- 55** Population change in core border areas (2001-2006)
- 56** Sparsely populated areas
- 57** Mountain areas in Kiruna municipality

List of abbreviations

CBMR	Cross-Border Metropolitan Region
CSF	Common Strategic Framework
EAFRD	European Agricultural Fund for Rural Development
EEA	European Environment Agency
EFF	European maritime and Fisheries Fund
ERDF	European Regional Development Fund
ESF	European Social Fund
FUA	Functional Urban Area
GDP	Gross Domestic Product
GRP	Gross Regional Product
ICT	Information and Communication Technologie
IP	Inner peripheries
LAU	Local Area Unit
MUA	Morphological Urban Area
NUTS	Nomenclature Unifiée des Territoires Statistiques
OR/OMR	Outermost Regions
PCA	Poorly Connected Areas
PUSH	Potential Urban Strategic Horizon
SGI	Services of General Interest
SPA	Sparsely populated areas
TFEU	Treaty on the Functioning of the European Union
TPG	Transnational Project Group

1.Introduction

1.1 Policy context

Regions with specific territorial features have received increasing attention in recent years. Most significantly, article 174 of the Treaty on European Union (TFEU) reads as follows:

“In order to promote its overall harmonious development, the Union shall develop and pursue its actions leading to the strengthening of its economic, social and territorial cohesion.

In particular, the Union shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions.

Among the regions concerned, particular attention shall be paid to rural areas, areas affected by industrial transition, and regions which suffer from severe and permanent natural or demographic handicaps such as the northernmost regions with very low population density and island, cross-border and mountain regions.”

Additionally, Article 349 of the TFEU states that specific measures shall be adopted to take account of the structural social and economic situation of the Outermost Regions, which is compounded by “remoteness, insularity, small size, difficult topography, climate and economic dependence on a few products”. Consequently, the Council shall adopt specific measures for these regions.

Thus, in policy terms, regions with territorial specificities are currently approached as a subset of disadvantaged and least favoured regions, and thus their specificities are described as “handicaps”. They are primarily identified as part of efforts to reduce disparities between European regions. The significant number of sparsely populated, insular, border and mountainous regions whose economic and social performance levels are around or above European average values are therefore not targeted by this provision.

The Territorial Agenda adopts a similar approach, as it only deals with specific types of territories by referring to “areas with specific geographic challenges and needs (e.g. structurally weak parts of islands, coastal

zones and mountainous areas)” and otherwise considers coastal zones and mountainous areas from a natural risk management perspective.

The Green Paper on Territorial Cohesion, published by the European Commission in 2008, takes a different angle. The subtitle of the document, “Turning territorial diversity into strength”, suggests that geographic specificities could also represent a chance for the concerned regions and for Europe. The first examples of this diversity – “the frozen tundra in the Arctic Circle”, “the tropical rainforests of Guyane”, “the Alps” and “the Greek islands” – are sparsely populated, outermost, mountainous and insular areas, respectively. The Green Paper furthermore defines territorial cohesion as “a means of transforming diversity into an asset that contributes to sustainable development of the entire EU”. However, the section entitled “regions with specific geographical features” introduces mountainous, insular, sparsely populated, coastal and outermost regions as areas that “face particular development challenges”, even if their subsequent description emphasises their combined assets and handicaps and the coexistence of positive and negative development trends. The ambivalent understanding of Europe’s extensive and diverse geographic specificities, as an asset (trends and current situation) as well as a source of territorial development challenges, shapes the political context for the present study.

In the working paper “Territories with specific geographical features” published by DG REGIO in 2009, Philippe Monfort calculated performance indicators for mountain, island, sparsely populated, border and outermost regions. He concluded that while these regions are “by nature, [...] less accessible and on average services are more distant from their population”, “each category includes a wide variety of situations”. Therefore, “specific regional development programmes” for these categories of regions are likely to be “ineffective” (Monfort, 2009).

The European Commission’s legislative proposals for the EU Cohesion Policy 2014-2020 include an additional allocation for outermost and sparsely populated regions of 926 million Euros and the possibility of modulating co-financing rates from the Funds to a priority axis to take account of “areas with severe and permanent natural or demographic handicaps” defined as “island Member States eligible under the Cohesion Fund, and other islands except those on which the capital of a Member State is situated or which have a fixed link to the mainland”, “mountainous areas as defined by the national legislation of the Member State” and “sparsely (less than 50 inhabitants per square kilometre) and very sparsely (less than 8 inhabitants per square kilometre) populated

areas” (European Commission, 2012)¹. These provisions were identical for the 2007-2013 Structural Funds programming period.

Among the innovative measures for the 2014-2020 period, the renewed focus on Community-led Local Development is particularly relevant for GEOSPECS areas. Building on, for example, existing LEADER action groups and the URBAN pilot project, the Commission wishes to fund programmes for capacity building, local public private partnerships, networking and exchange of experience. The focus is on specific sub-regional territories that can be urban, rural, coastal, cross-border, mountainous but that must be implemented by the local community. Considering that geographic specificities are factors of territorial identity around which local and regional actors coalesce, they may play an important role in the further bottom-up process leading to the definition of Community-led Local Development projects.

1.2 Objectives of the project and principles for the analysis of GEOSPECS categories

The GEOSPECS approach of geographic specificities can feed into these types of discussions, as it focuses on identifying possible effects of geographic specificity on regional and local development processes.

Its objectives are:

- to develop a coherent perspective on territories with geographic specificities;
- to identify development opportunities in these parts of Europe;
- to assess the extent of socio-economic diversity within each category;
- to explore how one could facilitate the achievement of strategic targets of the European Union and of European countries by taking better account the diversity of development preconditions linked to geographic specificities;
- to identify the potential role of territorial cooperation and partnership and assess the need for targeted policies for

1

http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/pdf/2014/proposals/regulation/general/general_proposal_en.pdf

GEOSPECS areas, focusing on the identification of the appropriate administrative level.

This analysis faces multiple challenges:

- First, all territorial development issues and processes are potentially relevant, insofar as they *may* be influenced by geographic specificity. The scope of enquiry is therefore *a priori* unlimited.

- Second, the identification of the “GEOSPECS areas” requires a conceptualisation of each category of geographic specificity. This conceptualisation needs to consider that each category has been constructed in order to organise the perception of territories and facilitate communication. None of the GEOSPECS categories are in other words “given”.

- Third, the extensive overlaps between the various types of geographic specificities and the fact that they can be found in European regions with contrasted development levels imply that a benchmarking of GEOSPECS areas against European target values and/or average performances is not meaningful.

- Fourth, the focus on development opportunities leads to complex questions on why these have not already been realised. In other words, an “opportunity” is a situation where a critical factor prevents local and regional stakeholders from taking advantage of an identified resource or asset. Drawing on ESPON TeDi, GEOSPECS has sought to systematise the analysis of these situations by considering that unexploited opportunities result from a lack of local coherence between natural resources, human capital and the institutional context (see Figure 1).

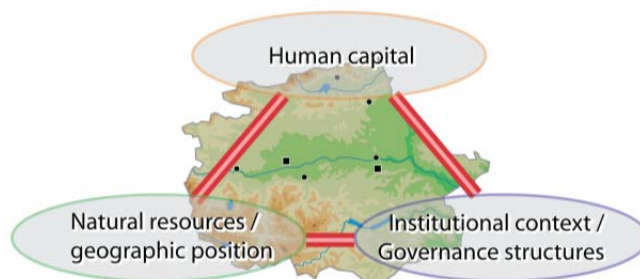


Figure 1 The three dimensions to be put into coherence for the exploitation of territorial development opportunities

Project process

The GEOSPECS project was undertaken by a consortium of research institutes: the “Transnational Project Group” (TPG) with specialist

competence for specific GEOSPECS categories. Three of the TPG members also had a coordination role (see Table 3 p. 27).

Following agreement on the conceptual understanding of each category, the TPG carried out delineations at the LAU2 level, corresponding to municipalities in most European countries. Data were then compiled at this scale to characterise the GEOSPECS areas, and 15 case studies were carried out to further investigate interactions between factors.

To take due consideration of the opinions and policy demands of key stakeholders, the project included two stakeholder consultations. The first took the form of a written questionnaire which was sent out to, and answered by, stakeholders specifically concerned with the different geographic specificities. The second consultation was a stakeholder conference, which took place in Brussels on 8 December 2011, bringing together about 30 representatives of geographic specificities. Both processes enquired into the stakeholders' views on policy needs for "their" areas. The stakeholder conference focused particularly on the Commission's proposal for a future (2014-2020) Cohesion Policy.

The TPG has previously delivered an inception report, an interim report and a draft final report. Responses to comments on these reports from the ESPON Coordination Unit and Monitoring Committee members have been incorporated in the present report. This report only presents key policy-relevant findings; the complete findings can be found in the Final Scientific Report and its annexes.

GEOSPECS areas and categories

The first task for the TPG was to specify principles and characteristics for the delineation of each category, as specified in Table 1 and 2. Following the conceptualisation of each category, hypotheses on their possible socio-economic effects were formulated so as to circumscribe the scope of enquiry. In other words, the enquiry focuses on identifying hypothetical causal connections between the different concepts of geographic specificity and socio-economic performance. Quantitative analyses guide this reflection, as they help to identify socio-economic patterns and trends that may constitute a challenge or, in contrast, a potential lever of growth and development. However, quantitative evidence can neither confirm nor invalidate the existence of a "disadvantage" or "advantage" in GEOSPECS areas, considered the high probability of spurious correlations when comparing geographically specific areas to the rest of Europe.

Table 1 Principles used to delimit GEOSPECS areas

<i>Nature of extension for GEOSPECS areas</i>	Outermost	Islands	Mountains	Sparsely populated	Border	Coastal
	◊ ← →	○	↔ ↔	↔	◊ ← I →	(◊) ← I →
	Designated politically as a part of Europe situated in a non-European geographic context	Defined as territories surrounded by bodies of water, irrespective of context	Defined on the basis of topographic contrasts with immediate neighbourhood	Defined on the basis of local population potentials, irrespective of wider geographic context	Defined on the basis of distance to a politically defined borderline	Defined on the basis of proximity to a maritime space, which in some respects is politically delimited

Legend for symbols:		
◊ = Politically designated	I = Line	→ = Delimitation of GEOSPECS areas
○ = Unequivocally delineated	→ / ↔ = Contextual parameters used for the delineation at local scale (LAU2 or daily mobility area) scale or considering a wider regional context	

Table 2 Conceptual and methodological interpretation of GEOSPECS areas

<i>Category of GEOSPECS area</i>	Outermost	Islands	Mountains	Sparsely populated	Border	Coastal
<i>Delineation principle</i>	Given		Based on threshold values		Based on distances to a line	
<i>Nature of specificity</i>	Defined politically, as a response to an inherited situation	Categories designated on the basis of specific physical characteristics		Categories designated on the basis of specific settlement patterns	Categories designated because they act as an interface and/or are situated on the rim of Member States	
<i>Data used for delineation</i>	Not applicable		Topography	Population potential	Time-distance, Euclidian distance, topological distance (e.g. contiguity)...	
<i>Most relevant territorial context</i>	Macro-regional context		Buffer zone with mutual influence	Macro-regional context	Buffer zone with mutual influence	

hypotheses on their possible socio-economic effects so as to circumscribe the scope of enquiry. In other words, the enquiry focuses on identifying hypothetical causal connections between the different concepts of geographic specificity and socio-economic performance. Quantitative analyses guide this reflection, as they help to identify socio-economic patterns and trends that may constitute a challenge or, in contrast, a potential lever of growth and development. However, quantitative evidence can neither confirm nor invalidate the existence of a “disadvantage” or “advantage” in GEOSPECS areas, considered the high probability of spurious correlations when comparing geographically specific areas to the rest of Europe.

These considerations imply that it is not possible to use the NUTS3-based definitions of some GEOSPECS categories, as provided in the Fifth Cohesion Report and in the ESPON typology, for the present project. Also GEOSPECS does not aim to benchmark GEOSPECS areas against European average values. Rather, the project seeks to understand how each type of specificity may influence socio-economic development processes, and potentially lead local and regional stakeholders to formulate development objectives that are different from those prevailing at the European and national levels. For these purposes, delineations that, for example, neither distinguish highland areas from their respective piedmont, nor make it possible to consider phenomena such as double insularity, are not operational. Furthermore, delineations that deviate substantially from local and regional understandings of the different GEOSPECS categories may not function in a project that investigates how identities and geographic specificities interact. All delineations are therefore based on LAU2 units, as this is considered to be the scale at which delineations meeting the criteria described above may be met.

The TPG has nonetheless sought to maintain the greatest possible congruence between the LAU2 delineations and the ESPON typology. However, the focus on conditions for economic and social development has induced some significant differences in the approach.

First, GEOSPECS categories need to be separated in two groups:

- Mountain areas, islands, sparsely populated areas, Outermost Regions are “areal notions”, defined on the basis of the properties of parts of the European territory;
- Borders and coasts are linear notions. Associating areas to these “lines” requires hypotheses on the types of proximity that can be relevant from the point of view of socio-economic development.

These types of questions are not addressed in the ESPON typology, in which participation in cross-border cooperation programmes in the 2007-

2013 programming period is the defining feature for border regions. Coastal regions are defined on the basis of the proportion of the NUTS 3 population living in municipalities within 10 km from the coast; a justification of this distance threshold has not been provided.

The delineations of the “areal notions” of geographic specificity have been based on the following principles:

Mountains: The delineation builds on previous studies (Nordregio, 2004 and EEA, 2010). It is based on the GTOPO30 Digital Elevation Model, which records the average elevation of the Earth’s land surface in a 1km² grid. To define mountainousness, different thresholds of terrain roughness and slope were applied at different levels of altitude, up to 2500m, above which all areas are considered as mountains. The starting point is therefore the same as for the ESPON typology.

However, this set of grid cells with mountainous topography was approximated to municipal boundaries by considering that LAU2 units with more than 50% mountainous terrain should be considered to be mountainous. Mountain exclaves of less than 100 km² were excluded in the mountain delineation, and non-mountainous enclaves of less than 200 km² surrounded by mountains were included. The hypothesis is that mountainousness becomes socio-economically relevant when it is the predominant feature within the boundaries of a local community and extends over a certain area.

Islands: As a starting point, all territories that are physically disjoint from the European mainland and, because of their large population, the main islands of the British Isles (UK and Ireland) have been considered as insular, including parts of municipalities, but excluding inland islands. On this basis, a typology of islands was established. Firstly, islands with a fixed connection to the mainland are considered as a separate category. Secondly, a multilevel approach is used (NUTS 0 to LAU2), as the socio-economic impact and political significance of insularity is considered to be different depending on whether it occurs at the national, regional or local scale.

However, insularity cannot only be considered to be socio-economically relevant only when it concerns an entire region, as is the case in the ESPON typology.

Sparsely Populated Areas (SPA): The delineation of SPA is traditionally based on population density. The ESPON typology considers regions with less than 12.5 inhabitants per km² as sparse. This threshold value is drawn from paragraph 30(b) of the Guidelines on national regional aid for

the period 2007-2013, which defines low population density regions as “areas made up essentially of NUTS 2 geographic regions with a population density of less than 8 inhabitants per km², or NUTS 3 geographic regions with a population density of less than 12.5 inhabitants per km²”. However, this paragraph allows for some flexibility in the designation of these areas, as “NUTS III parts” with a population density of less than 12.5 inhabitants per km² may be added under certain conditions.

These complex “swapping rules” reflect the fact that delineations of SPA based on population density are imperfect. Capital cities of regions with large uninhabited areas may be defined as sparse, while rural areas with few settlements may not qualify. From the perspective of the TPG, the critical parameter is the number of persons that can be reached within daily commuting distance, i.e. within a distance of 50 km or 45 minutes travel time. The threshold of 100,000 persons has been used, as it corresponds to a population density close to 12.5 inhabitants per km² within a radius of 50 km from a point. In a second step, localities (LAU2 level) have been defined as sparsely populated if 90% of their area is covered by SPA as defined above. Lastly, the TPG considers a NUTS 3 region as sparsely populated if the region contains at least one sparsely populated locality.

Outermost Regions (OR): As OR are defined on an institutional basis, their delineation is given.

However, the GEOSPECS TPG considers that the way of analysing and depicting ORs does not provide an appropriate basis for the analysis of their development challenges and potentials. Firstly, in ESPON maps, OR are depicted as European isolates, without a geographic context. Consequently, it is not possible to analyse how they relate to neighbouring territories, e.g. in terms of flows, differences in development levels and wider economic production systems. Secondly, the scale currently used means that it is not possible to observe their internal territorial structures. GEOSPECS proposes new ways of presenting ORs.

For “border areas” and “coastal zones”, the TPG does not consider it meaningful to produce a general delineation, insofar as the ranges of mobility and interaction associated with the different types of coastal and border effects are different. However, the 45-minute travel distance plays a key role, as a proxy for the maximum generally accepted commuting and daily mobility distance.

Within border areas, *Cross-Border Metropolitan Regions (CBMR)* have been identified. These are “metropolitan regions” (i.e. which include one or more urban centres which are part of globalised economic networks

and exert an influence over their regional or national area) and have a significant cross-border dimension (i.e. each "side" of the border contains no less than 10% of the population of the CBMR).

The analysis of *Inner Peripheries (IP)* concluded that this category should not be considered as a geographic specificity. The literature review and exchanges with local and regional stakeholders showed that the defining feature of this category is demographic and economic decline. The term 'peripherality' does not primarily refer to being in the outer margins of any given territory. It is more often used to describe territories that are considered to be "out of the loop" and whose socio-economic performance is below average in a region. Inner peripheries can consequently not be delineated on the basis of quantitative criteria. For these reasons, it was decided that Inner Peripheries should be addressed in a separate report.

1.3 Project organisation

The construction of a coherent European perspective regarding Europe's specific types of territories presupposes that these two types of approaches are more explicitly connected and integrated. However, it also requires that the significance of each category of "geographical specificity" in a territorial cohesion perspective is understood and defined. In this regard, GEOSPECS adopts a wide and exploratory approach, incorporating a wide range of geographic specificities and covering numerous territorial development issues such as demographic and economic polarisation, accessibility and transport infrastructure, energy provision, connectivity, territorial cooperation and partnerships.

Figure 2 synthesises the three analytical dimensions of the GEOSPECS project:

- First, coherent delineations of different categories of geographic specificities, based on a common spatial reference framework. Numerous areas are characterised by multiple geographic specificities. Inner peripheries are in a specific position, as the TPG found that they should not be considered as a geographic specificity and could not be delineated on the basis of quantitative criteria. Quantitative analyses were primarily carried out as part of the first dimension. Second, analyses of a selection of transversal themes help to identify cross-cutting issues for geographically specific areas. These transversal themes are subdivided in three categories: economic development conditions, social processes, and natural resources and risks. They were primarily based on qualitative

analyses. However, some quantitative evidence was also produced in this context.

- Third, the unique regional combinations of geographic specificities create systems of challenges and opportunities. These combinations can be formalised as “nexus models” (see nexus models in case study report, section 5.2). When possible, the TPG has also sought to develop synthetic nexus models for individual GEOSPECS categories, or subgroups within categories.

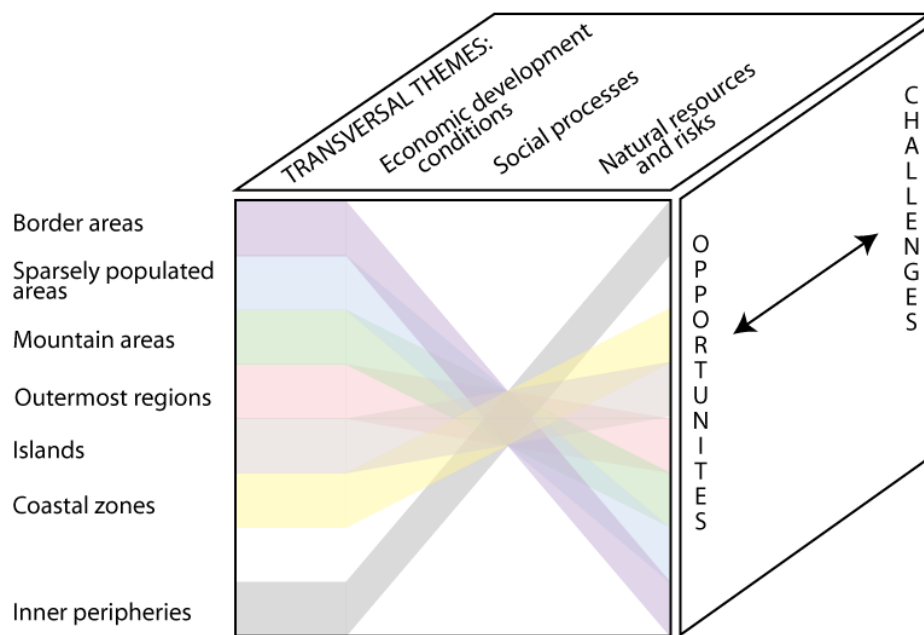


Figure 2 Analytical dimensions of the GEOSPECS project

To guide the work on these three dimensions, an analytical matrix was produced in which research questions and hypotheses were proposed for each geographic specificity within each transversal theme (see Annex 1). The production of this matrix was coordinated by the Centre for Mountain Studies, Perth College, University of the Highlands and Islands.

The conceptualisation of each GEOSPECS category was conducted by the TPG member in charge of that specificity, as specified in Table 3. The delineations were made by Alterra on the basis of these conceptualisation in cooperation with the University of Geneva. Quantitative analyses of each GEOSPEC category were carried out by the responsible on the basis of maps partly produced by the University of Geneva. Cross-analyses of delineations were produced by the University of Geneva.

Table 3 Division of responsibilities for GEOSPECS categories within the TPG

GEOSPECS category	Responsible partner
Mountain areas	Centre for Mountain Studies, Perth College, University of the Highlands and Islands, UK
Islands	E-Cubed Consultants, Malta
Sparsely populated areas	Nordregio, Sweden
Outermost regions	Louis Lengrand et associés, France
Border areas	Eureconsult, Luxembourg CEPS/INSTEAD, Luxembourg Leibniz Institute of Ecological and Regional Development, Germany
Coastal zones	Coastal & Marine Resources Centre, Environmental Research Institute, University College Cork, Ireland
Inner periphery	Alterra, Wageningen University & Research Centre the Netherlands

The compilation of LAU2 data was one of the main challenges of the project. This task was coordinated the University of Geneva (see section 2.2). Alterra produced all GIS calculations based on time-distance, including population potentials and access to services of general interest (e.g. airports). Alterra also produced land cover data for LAU2 units on the basis of grid data, and complemented 2006 population figures from Eurogeographics for the UK, Portugal, Lithuania, European Union candidate countries and potential candidate countries. The University of Geneva compiled European LAU2 figures from existing sources (e.g. 2001 national census figures compiled by GISCO, figures from the Nordregio 2004 Mountain Study complemented for non-mountainous countries for the ESPON 2006 programme). Additionally, LAU2 employment figures by NACE category were compiled from national sources with support from the TPG members.

Consultations with stakeholders and work on case studies were coordinated by the Centre for Mountain Studies. Perth College, , University of the Highlands and Islands with support from the University of Geneva. The case studies were produced by the TPG members on the basis of templates distributed by the Centre for Mountain Studies. In this template, elements of the analytical matrix that were considered most relevant for each case study were selected. For each case study area, a nexus diagram was produced. When possible, evidence from the case studies, the quantitative analysis, and the delineation of each category was synthesised in one or multiple nexus diagrams for each GEOSPECS category.

Table 4 Division of responsibilities for transversal themes within the TPG

Transversal theme	Responsible partner
Economic vulnerability / robustness facing globalisation	Nordregio, Sweden
Accessibility, connectivity, services of general interest	Alterra, Wageningen University & Research Centre the Netherlands
Role of Information and Communication Technologies	Louis Lengrand et associés, France
Residential attractiveness - Selective attractiveness	E-Cubed Consultants, Malta
Protected areas and biodiversity as factors of development	Centre for Mountain Studies, Perth College, University of the Highlands and Islands, UK
Natural resource exploitation	Coastal & Marine Resources Centre, Environmental Research Institute, University College Cork, Ireland
Ecological vulnerability / climate change	Umweltbundesamt Österreich, Austria

The analysis of transversal themes was carried out by the TPG members specified in Table 4. The project partner produced guidance notes on transversal themes to help partners relate to them in each case study. Evidence from case studies was then compiled. However, the transversal themes are also based on literature reviews and more theoretical considerations on the different ways in which GEOSPECS areas may be considered to face specific opportunities and challenges within each theme.

2.Introduction

2.1 A spatial reference framework for the analysis of GEOSPECS categories

Given the need to approach GEOSPECS categories from the point of local communities and their preconditions for growth and balanced development, GEOSPECS needed to use the LAU2 level as a starting point for its analyses. It is the first ESPON project to base all its analyses on data and delineations at the LAU2 level.

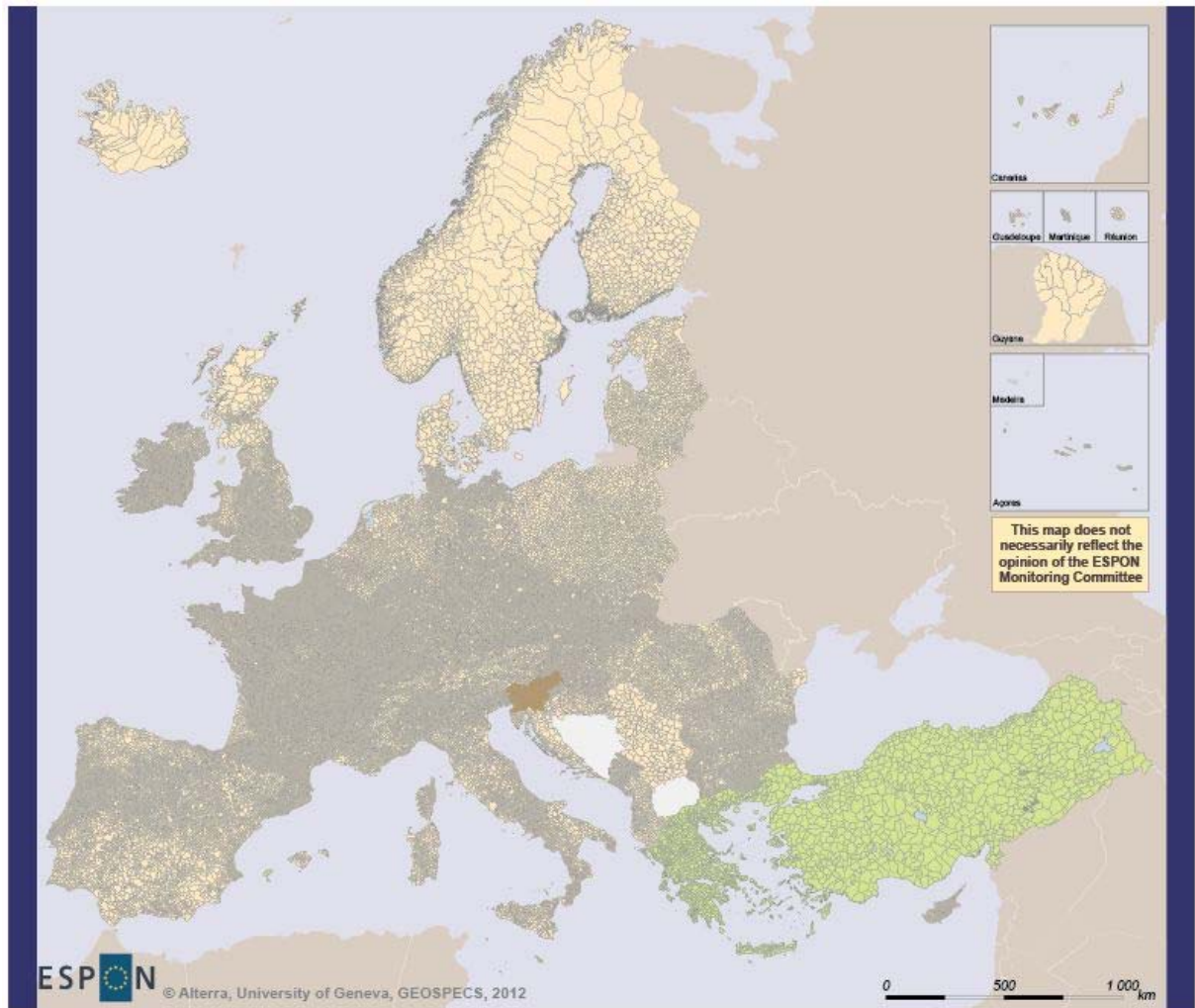
Therefore, ESPON map templates, tools for data compilation and data supply and available mapping files had to be revised to fit the project's needs.

The analyses were based on the Eurogeographic EuroBoundaryMap v4.0 delineation of European Local Area Units (LAU) in 2008². This map included LAU2 units for all countries except Greece (LAU1) and Slovenia (Settlement, below LAU2). Furthermore, this map did not cover countries of the Western Balkans and Turkey. Digital boundary maps of LAU2 units for Croatia, Albania and Montenegro were collected from national sources by the University of Geneva; a corresponding map of LAU1 units for Turkey was collected by Nordregio. In addition, the Eurogeographic EuroBoundaryMap v5.0, made available in February 2011, contained delineations of LAU2 units in Serbia. All additional boundary maps were adapted so that the external borders of each country would fit seamlessly³ and so that their coastlines would fit with the Eurogeographic world coastline.

The level of detail of this map was important, as the GEOSPECS TPG would overlay it with grid layers with calculations of distances to borders and coasts; with road network models to distinguish between islands with and without fixed links; and with other types of geographic information. As illustrated by Figure 3, the GEOSPECS map has a considerably higher spatial resolution than the regional delineation maps used in the ESPON map kit, making overlays with other types of data possible.

² Except for municipal borders within Serbia, which were based on the Eurogeographic EuroBoundaryMap v5.0.

³ A limited number of LAU2 units of the Western Balkans could not be adapted to fit seamlessly.



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Administrative subdivisions

LAU2 boundaries (2008)

LAU1 boundaries (2008)

Settlement (subdivision of LAU2 boundaries) (2008)

Countries for which the ESPON GEOSPECS project could compile neither LAU2 nor LAU1 boundaries

Non-ESPON space

Map 1 Boundaries of LAU units compiled for the GEOSPECS project

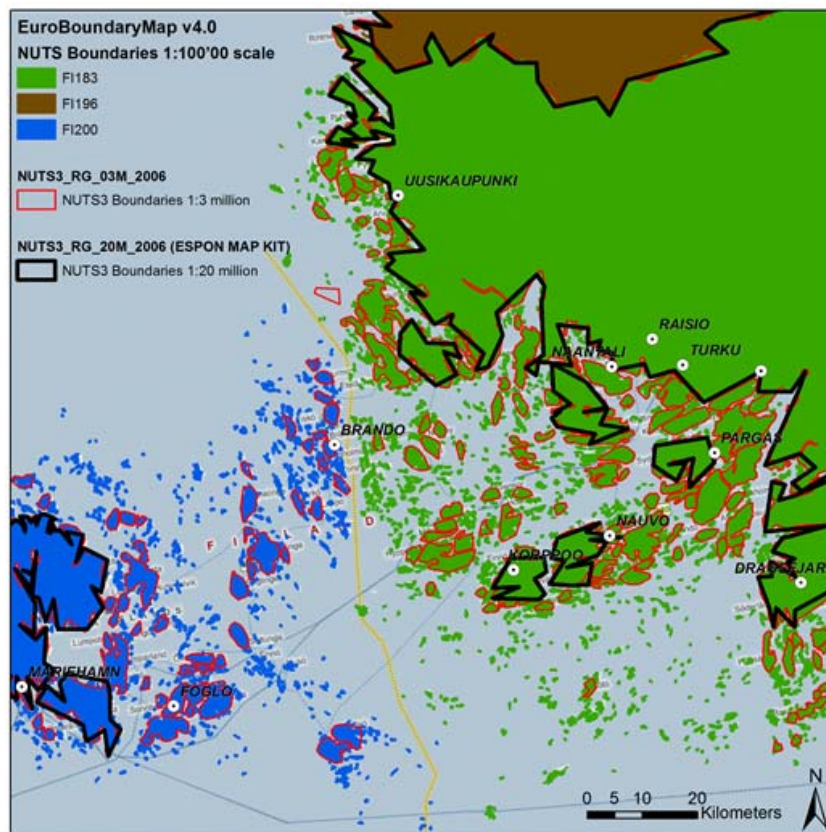


Figure 3 Comparison of the ESPON map kit and EuroBoundaryMap maps

Only two countries of the ESPON space could not be covered: Bosnia and Herzegovina and Macedonia. The remaining 36 countries (including Kosovo) are subdivided into 125,049 administrative units. The delineation of all GEOSPECS categories and the subsequent quantitative analyses were entirely based on this subdivision in LAU units. For simplicity, these are referred to as LAU2 units in the report, as the administrative subdivisions correspond to this level for 33 out of 36 countries.

Additionally, the ESPON map kit did not allow for overlays of administrative boundaries of Outermost Regions with other types of geographic information, because the boundaries had been moved so as to appear “above Russia” in the map template. For GEOSPECS, this had to be corrected: in the alternative map template, each Outermost Region is mapped in a separate map layer. The only effect on the final maps

Table 5 Delineation methods and related material

	Material	Essential methodological assets
Topography	Coastline	Two complementary models of coastline must be coupled to cover the GEOSPECS space. The EEA CLC2006 coastline offers detailed descriptions of the environment and type of coastal areas. Related material includes "Eurosion DB" on coastal erosion trends and factors. It covers most of the GEOSPECS space except for the Outermost Regions, Iceland, Norway, Montenegro and Turkey. For these countries, the coastline will be completed by the worldwide Eurogeographic COAS2006 .
	Elevation model	Based on GTOPO30, the EEA model is composed of 1*1 km cells with attributes such as: altitude, slope and relative scores according to neighbouring cells. The definition of mountain areas is based on a combination of those attributes, together with thresholds.
Time-distance	Road network	The Eurogeographic road network is fundamental for GEOSPECS. The Western Balkans, Bulgaria and Turkey are added from OpenStreetMap.
	Reference grid and friction surface	Measures of time-distance are based on the "friction surface" of cells (grids from 250*250m to 5*5km). Friction is defined by the average travel time required to cross a cell in all directions, taking into account road and off-road travel speeds. Time-distance and the resulting "isochrone areas" covering the entire GEOSPECS space are used for the characterisation of diverse territorial categories. They help the TPG to explore the socio-economic significance of proximity to borders and coasts. They are also used in the calculation of topologic population potentials (cf. below)
Demography	Population potentials	The TPG has calculated two types of population potentials: Euclidian and Topologic. In order to calculate topologic population potentials, the TPG has overlain a population grid with the friction grid (both are 5*5km and developed by the TPG). The method consists of looping over all unique value cells and, for each cell, calculating the population potential by: <ul style="list-style-type: none"> defining a reachable zone of cells by calculating the cost distance based on the friction grid and a travel time of 45 minutes calculating the total population within the zone, by summarizing all population grid values assigning the total population value to the base cell from the unique value grid Population potential is directly used for the definition of sparsely populated areas.

produced is a marginal difference in the appearance and orientation of the Outermost Regions due to the application of correct projection systems for each of them⁴.

Maps of NUTS 3, NUTS 2 and NUTS 0 boundaries were constructed on the basis of this digital LAU2 map, in order to allow for overlays with data at these geographical scales and for multi-scalar GIS analyses (e.g. proportions of NUTS 3 regions with geographic specificities).

A number of other geographic datasets were used to delineate and characterise GEOSPECS categories, as described in Table 5. The coastline and digital elevation model are essential for the topographic characterisation of each territory, while road network models and settlement data are used to describe the demographic context, transport infrastructure, and relative positions of individual territories.

2.2 Analyses based on LAU2 data: the notion of potentials

The objective of the TPG was initially to use potentials to compare data from different sources and years, using different geometries. Because of technical difficulties with the processing the local data, only potentials of 2006 population could be produced within the framework of the project. The TPG has, however, demonstrated the feasibility of producing potentials based not only on Euclidian distance, but also network distance along the road network, for the entire ESPON space.

The general logic of potential is illustrated in Figure 4. The underlying idea is that individual municipalities should not be considered in isolation from each other when considering development opportunities and challenges. It is more relevant to consider areas of interaction around each point. In this respect, areas of daily mobility play a particularly important role. The threshold of 45 minutes has been chosen as a threshold for maximum generally accepted daily mobility. This threshold is based both on empirical and normative considerations. The TPG has not been able to identify Pan-European studies of commuting patterns. However, in its 2004 survey on living conditions of households, the Swedish Institute of Statistics observed that over 90% of the employed population had a place of abode situated at less than 45 minutes from their workplace. A

⁴ Canary islands and Madeira: WGS 1984, UTM Zone 28; North, Azores: WGS 1984, UTM Zone 25 North, French Guiana, Guadeloupe and Martinique: WGS 1984, UTM Zone 22 North; Réunion: WGS 1984, UTM Zone 40 South

corresponding study in 1967 found the same relationship. However, the study notes that travel-to-work distance varies between regions. In the Stockholm region, the proportion of people commuting 30 to 45 minutes each way is twice higher than in Sweden as a whole (20.2% against 9.8%). However, the proportion of people living within 45 minutes of their workplace was only seven points lower than the national average (84.2% against 91.2%). Similarly, according to the 2004 American Community Survey (ACS) sponsored by the National Association of Realtors and Smart Growth America, "a commute of less than 45 minutes is the most important factor in deciding where to live for 79 percent of Americans" (Anari, 2006)⁵. There is therefore empirical evidence that the 45-minute threshold is significant.

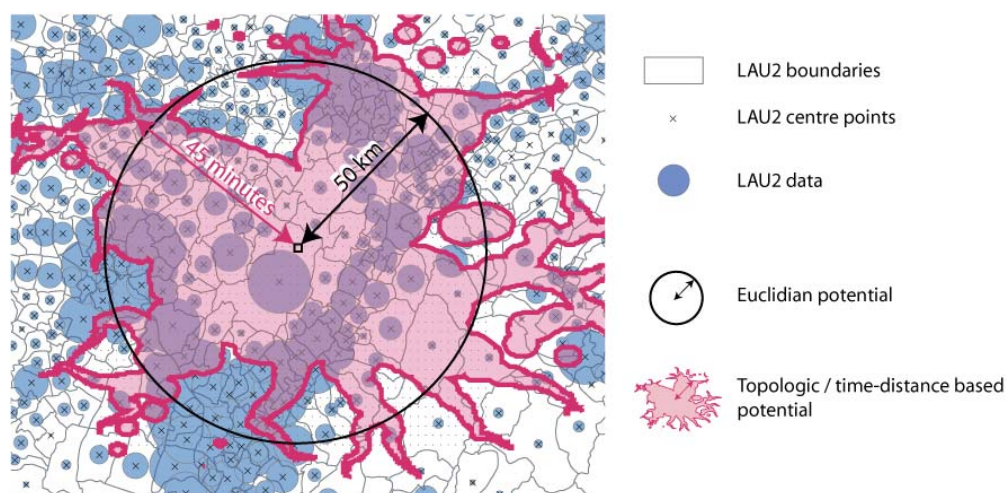


Figure 4 Calculation of potentials

Data associated with all LAU2 of which the centre point falls within the 50 km circle or area accessible within 45 minutes are summarised; this sum is the "potential". This means that the same data are taken into account as many times as they are associated to LAU2 units that are part of the potential functional neighbourhoods of the points of measurement. The GEOSPECS TPG has measured potentials for the centres of 5x5 km grid cells across Europe.

There are also normative arguments in favour of choosing a 45-minute threshold. In the Norwegian National Transport Plan, so-called "labour market, housing and service provision regions" are delineated on the basis of 45-minute travel times to a settlement of over 2,000 inhabitants. This is considered as the maximum travel time to preserve a good quality of life, which in turn is a necessary condition for "robust" regional development. Similarly, for the UK, in a study entitled "Health of People

⁵ Anari, Ali (2006) Need for Speed – Commute Time Influences Homebuyers, Tierra Grande, Journal of the Real Estate Center at Texas A&M University, Vol. 13, No. 3.

who Travel to Work: The Effect of Travel Time and Mode of Transport on Health”, Palmer (2005)⁶ analyses the results of the Kent and Medway Health and Lifestyle Survey, which focussed on the health of people commuting to London and those working elsewhere who were travelling for more than 45 minutes each way every day.

Admittedly, other thresholds could also be used as proxies for daily commuting. One main objective of GEOSPECS is to demonstrate the added method of this way of analysing local socio-economic data. As illustrated by the two previous paragraphs, the selection of thresholds can be based on both empirical consideration, i.e. on the range of observed mobility and interaction, and normative choices, i.e. what mobility ranges are considered desirable. These normative choices are not to be made by researchers, but should result from political choices.

A limitation of this type of approach is that mobility ranges vary according to gender, wealth, and social groups⁷. This needs to be taken into account when interpreting results on analyses based on potentials using a single travel time threshold.

The process of producing population potentials is relatively complex, as illustrated by Figure 5. For LAU2 units composed of multiple parts (e.g. coastal LAU2 with islands), it is first necessary to estimate the population in each of their components. These populations per part of LAU2 are then transferred to a grid. Time-distances are calculated on the basis of an “impedance grid”: the time needed to cross each grid cell is estimated on the basis on the roads going through it, land cover, topography (terrain roughness), rivers and railroads. The two latter parameters are interpreted as potential obstacles⁸.

The population potential for each LAU2 can then be calculated on the basis of the population potentials of grid cells within its boundaries. It is also possible to consider internal variations of population potential within LAU2 boundaries.

⁶ Palmer, Ann (2005) The Effect of Travel Time and Mode of Transport on Health – What have we learnt from the Kent and Medway Health and Lifestyle Survey?, University of Kent centre for health services studies. <http://www.kent.ac.uk/chss/researchcentre/docs/commuter.pdf>

⁷ Polk, Merritt (2004), Law, Robin (1999) Krantz, Lars-Gunnar (1997) Diaz Olvera et al. (2004), Orfeuill, (2006) Krakutovski and Armoogum (2007), Vågane (2000)

⁸ It is not possible to integrate travel times by rail in the model, as this would presuppose detailed information on railway connections. For each of these connections, one would need to consider whether the frequency and cost justify that they should be taken into account. In addition, railway connections are subject to frequent changes.

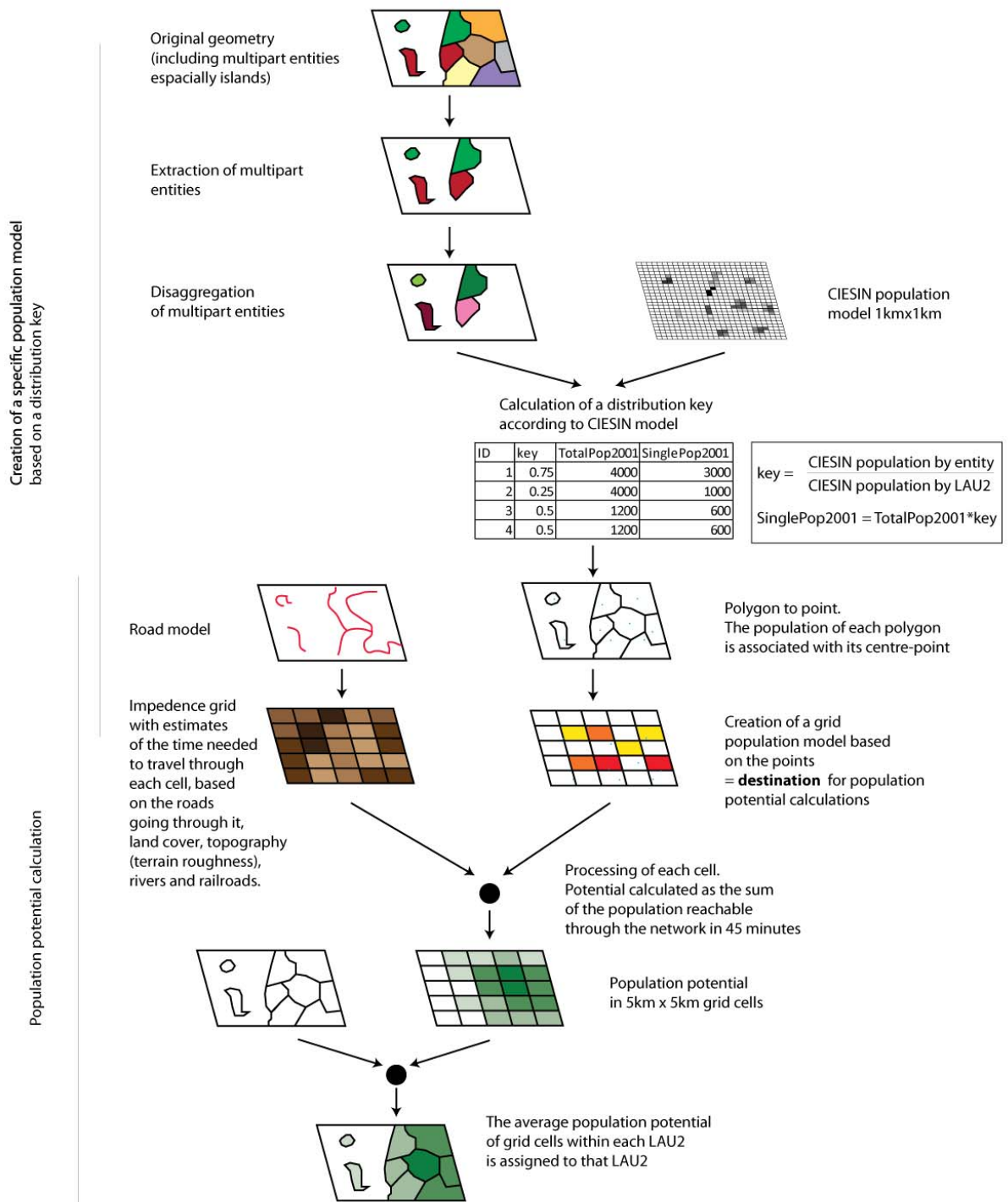


Figure 5 Method for the calculation of potentials

2.3 Delineation of urban areas

As illustrated by Figure 6, urban areas and regional urban endowment can be approached from different perspectives:

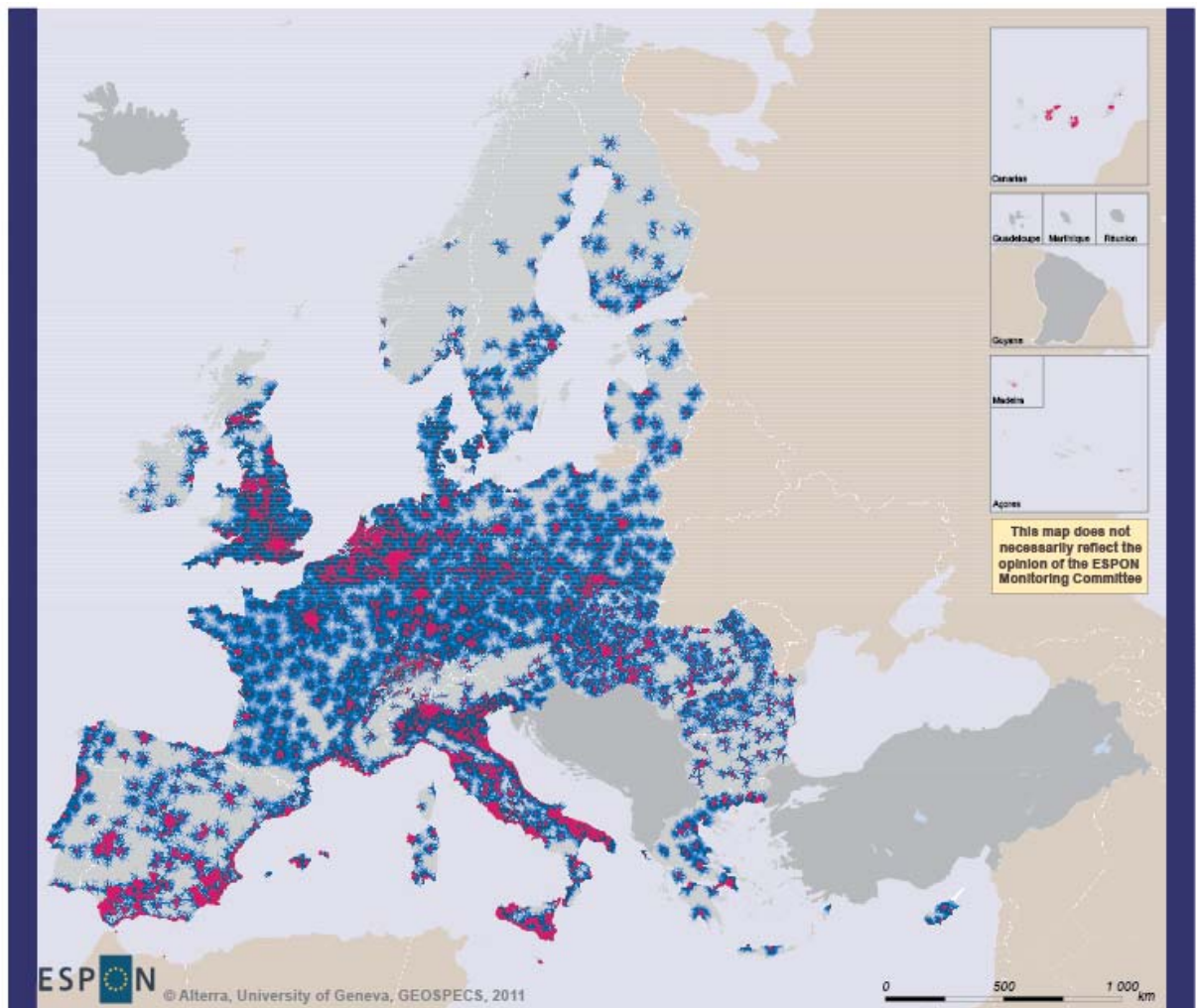
- From a settlement structure point of view, using morphological urban areas;
- From a functional point of view, using functional urban areas delineated on the basis of commuting-patterns;
- From an accessibility, by considering travel times to the nearest urban centre.

GEOSPECS combined these three approaches, considering the limits as morphological urban areas as a proxy for urban centres, whose relative importance was estimated on the basis of the population of the Functional Urban Areas around them, while considering that being within a travel distance to an urban centre was the most importance aspect when analysing development opportunities and challenges.

As specified in section 2.4, data on morphological urban areas (MUAs) and functional urban areas (FUAs) was provided by the ESPON Database project. These MUAs are delineated at the LAU2 level, and are considered as an acceptable proxy of urban centres in most of Europe. However, in northernmost Europe (Norway, Sweden, Finland and Denmark) another, more restrictive proxy for urban centres was used because of the particularly large size of LAU2 units: the largest continuous built-up areas within each MUA were identified on the basis of the EuroRegionalMap V30/31. Similar types of corrections could have been applied to other parts of Europe, e.g. southern Spain. This was not done because of time constrains. Delineations of areas within time-distance of urban centres have previously been carried out as part of the ESPON 1.1.1 project^{9,10}, using a threshold of 45 minute. These areas were designated as Potential Urban Strategic Horizons (PUSH). Contrary to ESPON 1.1.1, GEOSPECS considered distance from the edge of the urban centres (i.e. MUAs or built-up areas in Norway, Sweden, Finland and Denmark). This allowed GEOSPECS to take better account of the spatial extent of the largest urban centres. To reflect these improvements of the PUSH calculations from ESPON 1.1.1, the areas within 45 minutes travel time from urban core areas are designated as PUSH2-areas.

⁹ Nordregio et al. (2005) Final report of the ESPON 1.1.1 project « Potentials for polycentric developments in Europe », ESPON: Luxembourg.

¹⁰ ESPON 2013 Technical report: The functional urban areas database



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Sources: ESPON database (MUA boundaries),
Eurogeographics (built-up areas), GEOSPECS,
2011 (time-distance calculations)
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Travel times to edge of urban core areas

- 0 to 10 minutes
- 10 to 15 minutes
- 15 to 20 minutes
- 20 to 30 minutes
- 30 to 45 minutes

Urban core areas (MUAs, except Norway, Sweden, Finland and Denmark: largest continuous built-up areas within MUAs)

- Lakes
- Cyprus - Acquis suspended
- Non-ESPON space
- No data
- ESPON Space

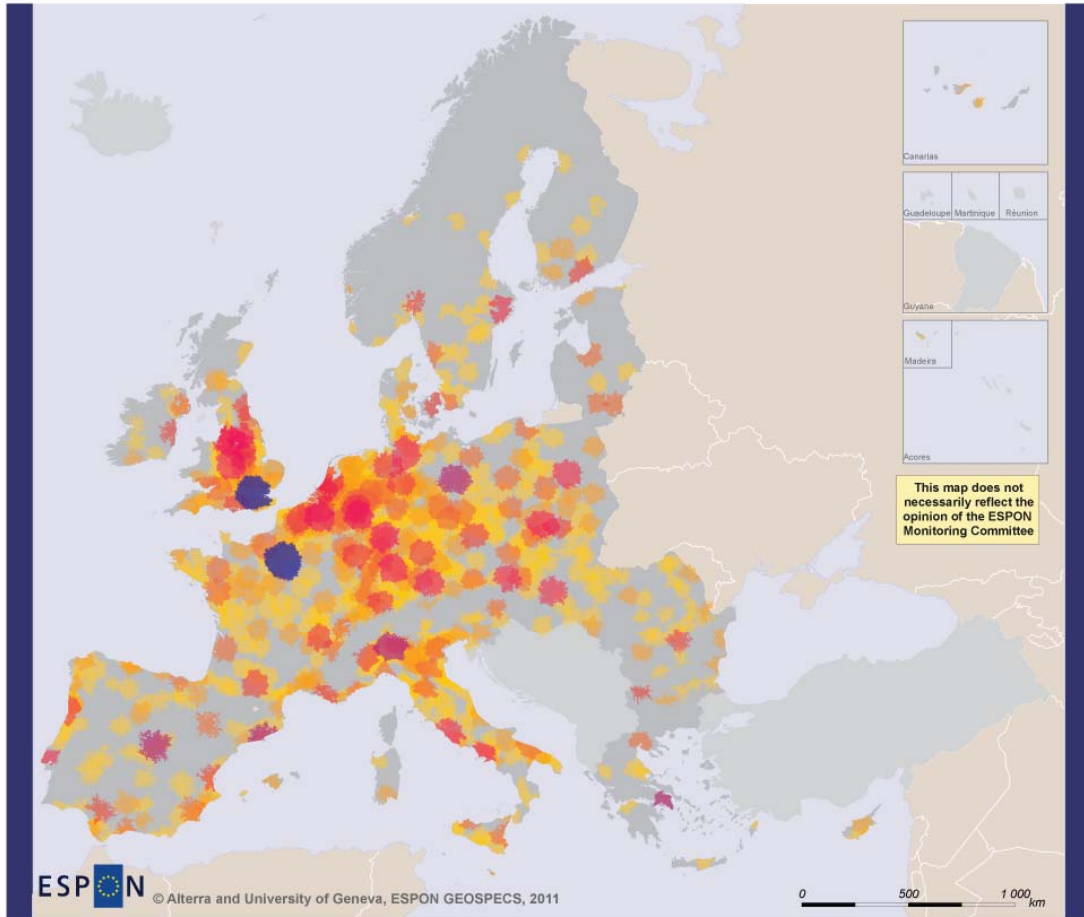
Map 2 Time distances to the nearest urban core area

The time distances to the nearest urban core area, calculated using the same impedance grid as for population potentials (see Figure 5) is represented in Map 1. Time distances were also calculated individually from each urban core area, so as to identify areas with access to urban areas of different sizes (as the travel time to the closest urban area can be a less relevant than that to a more distant and larger city). Additionally, as previously argued by ESPON 1.1.1, simultaneous access to multiple urban centres creates situations of potential polycentric development, from which individual localities can draw additional advantages, e.g. in terms of access to services and diversity of employment opportunities.

The overlay of areas within 45 minutes travel time of urban centres of different importance is presented in Map 3. The relative importance of urban core areas is assessed on the basis of the total population of its Functional Urban Area, calculated by the ESPON Database project.

Comparing the maps of MUAs, FUAs and PUSH2 areas in a specific territory (e.g. Cyprus, Figure 6), one observes the different perspective induced by each type of representation of the urban. The MUAs only cover a small proportion of the national territory. The FUAs are mutually exclusive. The limited extent of the Larnaca FUA is for example due to the fact that most important commuting flows are in direction of Nicosia. By contrast neighbouring PUSH2 areas overlap, reflecting the possibility of commuting to multiple locations.

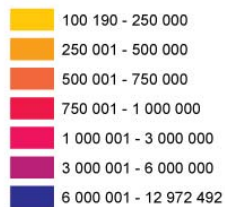
As a last step, for analytical purposes, PUSH2 areas were approximated to LAU2 boundaries. LAU2 units of which more than 30% of the area was covered by a PUSH2 areas were considered to belong to that PUSH2. The groups LAU2 belonging to PUSH2 areas of which the urban core was associated with FUAs of more than 100 000 and 750 000 inhabitants constituted to delineations of "urban areas" that were integrated in the cross-analysis of geographic specificities. These thresholds were chosen because they make it possible to cover to major national and regional capital cities, respectively.



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

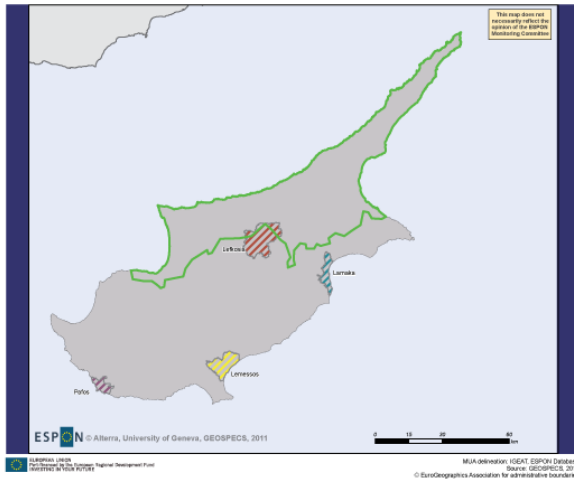
© EuroGeographics Association for administrative boundaries

PUSH2 areas (FUA population > 100 000 inhabitants)
Areas within 45 minutes travel time from each urban core area, classified on the basis of the population of the Functional Urban Area that is associated with it.

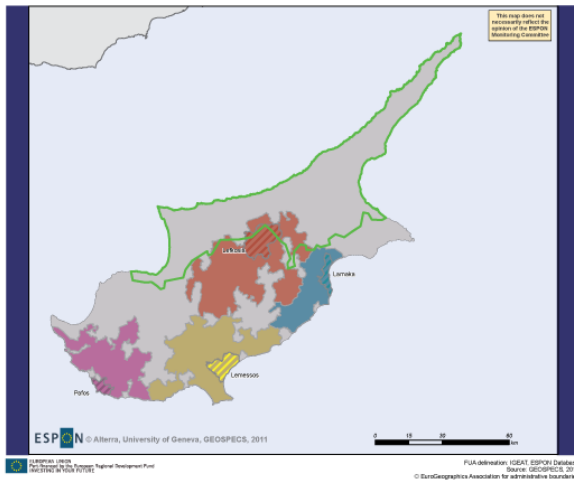


Map 3 PUSH2 areas around urban core areas associated with a FUA of more than 100 000 inhabitants

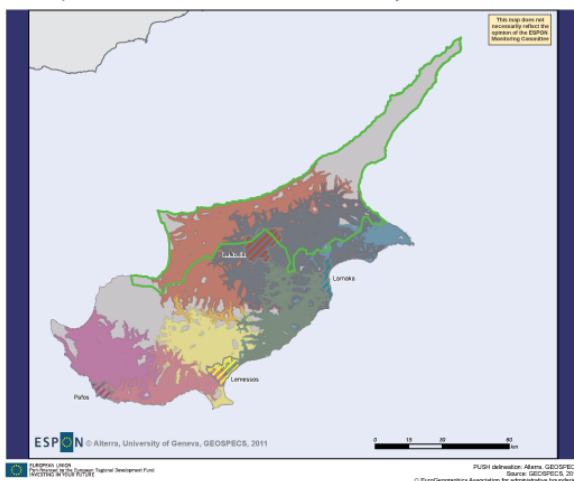
Morphological Urban Areas (MUAs)
Municipalities with continuous built-up areas




Functional Urban Areas (FUAs)
Municipalities with over 10% in-commuting to MUA





Potential Urban Strategic Horizon (PUSH areas)
Municipalities within 45 minutes from MUA by road



 Morphological Urban Areas (MUA)

 Functional Urban Areas (FUA) - mutually exclusive

 Potential Urban Strategic Horizons (PUSH) - overlapping

 Areas that are not under the control of the government - acquis suspended

MUAs in this part of Cyprus not taken into account (missing data)

Figure 6 Different approaches of urban areas and urban endowment: MUA, FUA and PUSH

2.4 Analytical matrix

The GEOSPECS project analyses seven categories of geographic specificity and eight transversal themes (see 1.3). The analytical matrix crosses these two dimensions. It is a product of the conceptualisation of each category of geographic specificity and of reflections on each transversal theme, and functions as a framework for quantitative analyses and case studies (see annex 1).

It also provides an overview of the ways in which each transversal theme are dealt with across the different geographic specificities, in view of producing a stronger narrative on geographical specificities across the whole ESPON space.

The analytical matrix contains both general questions concerning each transversal theme and geographic specificity and more detailed research hypotheses. While these questions and hypotheses have guided the analyses, it has not been possible to address all of them in detail. As such, the analytical matrix is a more general programme for research and investigation on categories of geographic specificity, going beyond the scope of the project.

2.5 Compilation of data

This section presents the datasets gathered as part of the GEOSPECS project, and information on the ways in which these data were processed.

One goal of the project has been to collect local data (at LAU2-level, whenever possible) covering the entire ESPON space¹¹ in order to describe GEOSPECS categories and their subdivisions (e.g. mountain massifs, island, coastal areas) by aggregating local data. Considering the scope of the task (125,049 entities), the TPG focused on a group of basic indicators, so-called "core indicators". These cover all basic territorial dimensions, including demography, economic activities, environment and accessibility. Additional datasets have complemented these core indicators, such as NUTS0 data used to compute discontinuities along national border and data covering themes of particular relevance for Outermost Regions.

¹¹ excluding the western Balkans

Total population 2001 and 2006

Population data for 2001 are drawn from a GISCO dataset combining national census data from 2001 with an adapted boundary map. This dataset covers the 27 EU countries, EFTA and Croatia. The geometry of this map differs from the EuroBoundaryMap 2008, which has been used for all delineations and calculations in GEOSPECS. The transfer of the data from one geometry to the other was based on automated overlay procedures, with manual corrections along the coastline.

Population data for 2006 is primarily based on population data in the attribute table of the Eurogeographics EuroBoundaryMap 2006. This file provides population data for all of the ESPON space except Latvia, Portugal, the United Kingdom, the Western Balkans and Turkey. For these countries, the populations of municipalities have been calculated using the CIESIN¹² 2005 1km² population model and the grid data were then aggregated into EuroBoundaryMap 2008 geometry.

The differences between these two data sets imply that the data should not be used to compare demographic trends in individual LAU2, but that they provide a reasonably accurate basis for analyses at the level of groups of LAU2 (e.g. mountain massifs, islands, coastal areas).

The same consolidated data set for population in 2006 has served as basis for the calculation of population potential in 2006 (see Section 2.2 of the scientific report).

Population by age structure

Data on LAU2 population by age groups are drawn from the database compiled for the study "Analysis of mountain areas in EU Member States, acceding and other European countries"¹³. The reference year is 2001.

However, for some countries, data were missing or considered to be of insufficient quality. In these cases, data was collected from national sources: Switzerland (2000), Germany (2008), Iceland (2001), Italy (2001) and Spain (2008).

¹² <http://sedac.ciesin.columbia.edu/gpw>

¹³ NORDREGIO (2004). Analysis of mountain areas in EU Member States, acceding and other European countries. Report prepared for the European Commission. Stockholm, Nordregio

Employment by sector of activity

Local data on employment by economic sector have been gathered directly from national sources with support from the ESPON contact points (ECPs) in some cases. The datasets that were compiled were rather heterogeneous, as different methods of counting the number of gainfully employed persons are used in ESPON countries. Some countries register employees at their place of work, while others use the place of residence. The years for which data were available varied significantly. Older datasets use the NACE Rev 1.1 classification, while newer ones applied the Rev. 2 version. Some count the total number of work places, while others convert figures into full time equivalents. The challenge was therefore to develop a method to produce a consistent European database based on these different national datasets.

As a first step, datasets using the Rev. 2 classification were converted into the Rev. 1.1 classification. This older classification was used for the European dataset because conversion to the Rev. 2 classification is not possible.

The second step consisted of adjusting data from various years and counting employment in different ways. This was done by calculating a ratio between GEOSPECS scores and Eurostat 2008 NACE data at NUTS0 level. National data on local employment structures were, in other words, used as a key to distribute European national employment figures of 2008 at the LAU2 level.

As a result, comparable data on local employment structures have been produced. However, there are some biases in the data due to the fact that local data correspond to different years.

Land cover

Data on land cover define the areas of, and boundaries between, ecosystems such as artificial surfaces, forests, grasslands and cultivated systems.

Two sets of data on land cover have been combined to produce analyses covering the entire ESPON space, as Greece and the Outermost Regions are not covered by Corine Land Cover 2006¹⁴. For these regions, they were replaced by ESA GlobCover 2009 V2.3¹⁵. As categories differ between the databases, they have been simplified so as to construct aggregate classifications that are comparable.

¹⁴ <http://www.eea.europa.eu/data-and-maps/data/corine-land-cover-2006-raster-1>

¹⁵ <http://ionia1.esrin.esa.int/>

Protected areas

Datasets on protected areas have been constructed by combining two complementary databases:

- The European inventory of nationally designated areas (CDDA¹⁶) provides information on protected sites and the national legislative instruments which directly or indirectly create protected areas.
- Natura 2000¹⁷: an EU-wide network of nature protection areas established under the 1979 Birds Directive and the 1992 [Habitats Directive](#). The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats.

Most correction on original datasets was technical, undertaken to get a consistent dataset (without counting doubles etc.). Regions not included in the public EEA data and French Outermost Regions have been complemented with published CDDA data and/or available national datasets.

Sunshine duration

Data on sunshine duration were compiled from the World Radiation Data Centre¹⁸, European Climate Assessment & Dataset¹⁹ and the Swiss and Norwegian Meteorological Institutes.

The GEOSPECS data on sunshine duration are the results of an interpolation of 600 measurement points gathered from these four data sources, with monthly sunshine durations between 1961 and 2001. Based on inverse distance weighted (IDW) interpolation with a distance coefficient $P=3$, estimates were calculated for all the ESPON space, providing a coherent global European coverage. However, local comparisons should be carried out with caution, taking into account the positions of the measurement points. For a better interoperability with other GEOSPECS data, the interpolation is calculated for 5*5km grid cells.

¹⁶ <http://www.eea.europa.eu/data-and-maps/data/nationally-designated-areas-national-cdda-5>

¹⁷ http://ec.europa.eu/environment/nature/natura2000/db_gis/index_en.htm

¹⁸ <http://wrdc.mgo.rssi.ru/>

¹⁹ <http://eca.knmi.nl/>

Accessibility by road

ESPON GEOSPECS used the EuroRegionalMap V30-31 road model for all countries with the exception of Western Balkans, Bulgaria and Turkey for which they were missing. In these countries, the Eurogeographics road model has been replaced by Open Street Map²⁰. The limited number of secondary roads in Open Street Map, however, creates some bias in the analyses that must be kept in mind when interpreting results.

The processing methods for the calculation of travel times based on these road models are described in Section 2.2 of the scientific report. The general principle is that an impedance is calculated for each grid cell across Europe, based on the roads going through it, its land cover, topography (terrain roughness) and the presence of rivers or railroads.

Accessibility by Air

Air accessibility calculations are based on data extracted from Eurostat databases in cooperation with the ESPON TRACC project. This extraction covers all airports with more than 150,000 passengers per year and air connections with more than 15,000 passengers per year.

To give a measure of "air connectivity" of municipalities, the first step was to delineate areas accessible within 45 minutes around airports, using the same type of method as for urban areas (see Section 2.2 of the scientific report). This has made it possible both to identify municipalities within 45 minutes of airports and to calculate the total population within this travel-time around each airport.

In a second step, air connectivity was calculated by combining the matrix of flight connections and the data on the population within 45 minutes from airports. The total number of persons that can be reached with non-stop flights from airports situated within 45 minutes and travelling a maximum of 45 minutes from the destination airport is used as a proxy for "air connectivity". It should be noted that populations situated within 45 minutes from multiple airports are counted multiple times, i.e., in relation to each airport.

²⁰ <http://www.openstreetmap.org/>

Discontinuities along borders

The World Bank database provides comprehensive and harmonized lists of indicators at NUTS0 level for most of world's countries. Furthermore, it covers a wide range of topics related to development issues and including: Agriculture & Rural Development, Health, Aid Effectiveness, Infrastructure, Climate Change, Labour & Social Protection, Economic Policy & External Debt, Poverty, Education, Private Sector, Energy & Mining, Public Sector, Environment, Science & Technology, Financial Sector, Social Development, Gender and Urban Development.

These data have been used to map border discontinuities, especially between the ESPON space and neighbouring countries, in continental Europe as well as in the Outermost Regions. Data on the efficiency of customs procedures were also used to characterise borders.

Database for Turkey

Digital LAU1 boundaries for Turkey have been compiled from Harita Genel Komutanligi (General command of mapping) and have been adjusted to fit with EuroBoundaryMap limits of coast, borders and lakes.

Socio-economic data at the LAU1 level have been compiled from TurkStat by Oğuz Işık of the Middle East Technical University in Ankara. These datasets include demographic data with 10-year trends, levels of education, population by age group, and employment by branch.

INTERREG

Indicators of age and maturity of decentralised cross border co-operation in Europe are based upon a concept developed (and data gathered) by Thomas Stumm for the Commission's INTERREG III ex-post evaluation (PANTEIA, 2009).²¹

Data on Outermost Regions

Additional data on available income, health and education have been collected from national sources, to cover aspects of particular relevance in the context of Outermost Regions. These data were either at level of LAU2 (France) or of groups of LAU2 (Spain and Portugal).

²¹ PANTEIA (2009)

3. Conceptual understanding and delineation of GEOSPECS categories

3.1 GEOSPECS categories as social, cultural and political constructs

In order to be able to characterize GEOSPECS areas in socio-economic terms, it is necessary to delineate them. The delineation has to be based on the coherent conceptualisation of each GEOSPECS category. Although this may seem straightforward, there are a number of potential pitfalls. Many of the difficulties of elaborating a pan-European, coherent understanding of each category relate to the categories being a *social construct* as much as a physical reality. Even though the concepts "mountain", "island" and "coast" exist in every language, and even though they appear to be "objective" physical categories, the perception of these notions varies – sometimes from country to country, sometimes from region to region, and sometimes with the topic/policy field that is being considered.

The added challenge for GEOSPECS is that the project does not only study categories that are clearly *geographical* (i.e. distinguishable by physical features, namely mountains, islands and coasts), but also one category that is defined purely by *demographic* factors (or settlement patterns), namely sparsely populated areas, and one that is defined purely in relation to a *political* construct, namely border areas. In addition, one category – Outermost Regions – can be called a mixture of geographical factors (remoteness from the European mainland) and political factors (as the status of "OR" as opposed to "OCT" is the result of political decisions). The last category – Inner Peripheries – is arguably not a "geographic specificity" at all, as its main defining characteristics are related to economic and social trends, and thus the line between "definition of geographic specificity" and "impact of geographic specificity" is hard to draw.

Table 6 Defining features by GEOSPECS category

Definition based on...	Category
Geographic factors	Mountains
	Islands
	Coasts
	Outermost Regions
Political factors	Borders
Demographic factors	Sparsely Populated Areas

Regardless of *how* they are defined, the presence of geographic specificities has impacts on the social and economic characteristics of the respective areas. This characterization of GEOSPECS categories is set out in chapter 4 of the present report.

In addition, there is also a “cultural” dimension to them, as many geographic specificities give rise to a strong sense of identity of the local population. Given that many of the GEOSPECS areas are 1) clearly distinguishable from their surroundings and 2) relatively isolated (communities on islands, in mountain valleys, in remote sparsely populated areas, or Outermost Regions), the perception of “us” versus “them” is often particularly strong (and may be associated with the emergence, or preservation, of particular traditions, habits, or dialects). These emotional factors can be built upon when trying to rally actors behind objectives or strategies of local development. At the same time, it means that the definitions are sensitive, and scientific delineations that do not align with local perceptions of geographic specificity may cause irritation.

Since these local (or even national) perceptions differ, a European framework for geographic specificity will have to find a common denominator / apply the most logical criteria from a European perspective.

The least controversial of all categories are islands, generally perceived as lands surrounded by water: the only question being whether an island with a bridge to the mainland can be considered together with “real” islands, as both face different challenges. For mountains, it is the lower boundary that is controversial. For instance, taking into account both cultural perceptions and the possibilities for agriculture, the altitude at which a “mountain” is deemed to start is much higher in Switzerland (an almost entirely mountainous country) than in Ireland (where only very few mountains can be distinguished).

For coasts, perceptions differ not so much according to nations, but according to the use of the coast that is considered. Different coastal delimitations exist for purposes of fisheries, shipping, species conservation, freshwater protection, recreational activities, etc. All definitions aim to establish a strip of a particular width as measured from the coastline, but some definitions apply to the marine area, some to the terrestrial area, and some to both. International Conventions, the EU and States apply their delineations according to purpose. Any particular definition of width (in terms of kilometres) of the terrestrial coastal strip may be applicable in some areas, but illogical in others (where, for instance, the terrain makes it much more time-consuming to travel the same distance). Similarly for border areas, while the border *line* itself is clearly defined, the perception of whether one finds oneself in a border *area* - or where the "border area" ends and the "interior" begins - may vary not only from community to community, but perhaps even from individual to individual.

The issue of sparse population density was introduced to the EU with the accession of Finland and Sweden, and therefore the criteria used for delineation (commonly under 12.5 inhabitants per square kilometre) is one that is tailored to the situation in these countries. GEOSPECS, however, uses a different method to delineate these areas (related to population potential, see below), and therefore also identifies other areas (particularly in Spain) as "sparsely populated". However, in the Spanish context, these areas have never been designated as such, rather being referred to as "depopulating areas" or "less favoured areas". Again, it becomes evident that perception of geographic specificity (in this case sparsity) depends on context.

Recently, categories of geographic specificity have received more and more recognition in EU policy documents (see also a more detailed description in the GEOSPECS Inception report). Of greatest significance, Article 174 of the TFEU mentions regions which "suffer from severe and permanent natural or demographic handicaps such as the northernmost regions with very low population density and island, crossborder and mountain regions". Before that, the Second Cohesion Report (2001) already referred to "regions that face particular challenges", such as border regions, mountainous regions, or islands. The Green Paper on Territorial Cohesion (2008) mentions three types of regions with geographic specificities that face particular development challenges: mountains, islands, and sparsely populated regions (while also mentioning that this list is not exhaustive). The current legislative proposal for future Cohesion Policy (2014-2020), in line with the Commission's proposal for a multi-annual financial framework, explicitly foresees an extra allocation for

Outermost and sparsely populated regions. Furthermore, specific rules already exist for mountain areas (in Agricultural policy), for Outermost Regions (in both Cohesion policy and Agricultural policy), for border regions (under Cohesion policy), for small islands (under competition law), and for SPA (under competition law and Cohesion policy).

While all these measures show that areas with geographic specificities are increasingly *recognized* at European level (and also that they are mainly approached as a subset of disadvantaged and/or “less favoured” regions), the texts are also accompanied by definitions, some of which are more explicit than others.

Outermost Regions are politically constructed by definition, as they are exhaustively listed in Article 349 of the TFEU.

Border regions – apart from referring to a political construct, the border – are, at European level, approached through the funding instruments supporting cross-border cooperation initiatives, particularly INTERREG. “Border regions” are therefore quite often simply those which are eligible for INTERREG funding.

EU practice has been to recognise as an “island region” any territory totally surrounded by water, with no fixed link between it and the mainland and without the capital city of any Member State.

Interestingly, the definition of mountain areas is left to the Member States. This is the case both for the Less Favoured Areas scheme under the Common Agricultural Policy, as also for the current legislative proposal for EU Cohesion Policy after 2013 and discussions regarding a reserved term for mountain foods. This shows that some definitions may be too strongly rooted in national perceptions to be harmonized across Europe.

The legislative proposal for future Cohesion Policy defines both sparsely populated areas (less than 50 inhabitants per square kilometre) and very sparsely populated areas (less than 8 inhabitants per square kilometre). However, in the Green Paper on Territorial Cohesion, sparsely populated areas are defined as NUTS3 regions with a population density of less than 12.5 inhabitants per square kilometre.

As mentioned above, the definition of coasts varies according to policy sector, and no single accepted definition exists.

This brief listing demonstrates that policy also plays a role in defining these areas, i.e., that their definition is at least partly a political construct. The example of border areas, in particular, shows how a definition deriving from policy can take up a “life of its own”. If border regions are defined as “those regions eligible for INTERREG funding”, there is a risk of a circular argument.

Lastly, when speaking of the “political construction” of territories, it is necessary to also point out that administrative boundaries often have a significant impact on delineation. For instance, if “population density” is applied as a criterion, this must by definition be population density *in a particular pre-defined area*, and this area will usually be an administrative unit (as in the case of the Green Paper, which defined SPAs as NUTS3 of < 12.5 inhabitants/km²). Therefore, the administrative boundaries have a strong impact on which region is defined as sparsely populated. The same is true for coastal and border regions: If one takes “NUTS 3 regions adjacent to a coast” / “adjacent to a border”, it is the size of the NUTS3 region that defines the size of the border or coastal area.

GEOSPECS, however, considers that these definitions are not always appropriate for capturing the true situation at the local level, or (in the case of SPA) do not take into account the main problem (the issue of sparsity is not that there are few persons per land unit, the problem is that the small size of individual localities and the wide distances between them effectively limits the population of functional regions). The following sets out the delineations used by GEOSPECS, and their founding in popular perception, history, and policies.

3.2 Conceptual understandings and delineations of the GEOSPECS categories

3.2.1 Mountains

The delineation of mountains used in GEOSPECS is essentially topographic and is consistent with the prevailing perception of mountains in modern Western societies: as a type of spatial entity characterized by its three dimensions in space. To understand the origins and objectives of this delineation, it is useful to proceed in two stages: first, recalling the conditions of emergence and diffusion of a modern concept of mountains in the European culture (see Debarbieux and Rudaz, 2010; Mathieu, 2011); and, second, indicating the procedures used for the statistical and cartographic definition of mountains in public policies.

The mountain as a spatial entity

The modern perception of mountains has emerged since the 18th Century, and contrasts with previous concepts that have existed as popular images. In most languages and European societies before the Enlightenment, a mountain was perceived (and designated as such) if a contrast in

landscape allowed one piece of landscape situated above (e.g., a plateau, called the Mountain of Reims, in France) to be conspicuous from a particular observation location (e.g., the city of Reims). The pre-modern idea of a mountain was thus relative to an observation site, and therefore to observers. The same place could be perceived as a mountain (from Reims) or not (from the plateau itself), depending on the position of the observer. It is by virtue of this pre-modern and popular understanding that a number of places have been named "mountains" (*montagne, berg, montana*, etc.) because they formed a marked contrast with their surroundings. The toponymy in many European regions (Mount St. Genevieve in Paris, the "mountains of Rome", requalified as the "hills of Rome" at the end of the 18th century, Maastrichtberg, etc) and North American regions (the Mountain of Montreal, Little Mountain in Vancouver, etc.) testify to this heritage and its importance in popular language. The same terms could also designate other types of entities: *berg* for mining sites in Germany, *montagne* for high pastures in the Franco-Provencal world, etc.

Despite the survival of many old usages of the word mountain, European societies are now largely familiar with the naturalist and objectivist meaning which asserted itself in the dictionaries of the 18th century. Education and popular science have played a decisive role in the widespread adoption of this modern usage by western societies. This understanding consists of isolating a geographical entity using criteria considered as objective: mainly criteria of altitude and slope. The mountain thus became a kind of natural entity, a view made manifest through measuring and mapping, and thus independent from the location and viewpoint of the observer. One can say that it was made objective, i.e. specified by an exercise of objectification, thanks to instrumentation and the application of naturalist and geographic knowledge.

When moving from the status of a type of landscape contrast to one of a physical entity in itself, the mountain as a category of cognition allowed the specification of a number of subcategories, which played a role in the structuring of perceptions by societies and in the development of public policies.

The mountain as a type of natural entity led to the identification of an ethnotype – the mountain dweller, i.e., one who lives in this kind of environment and is influenced by it – who, in some countries, became an important figure in the imagery of the nation (e.g., in Switzerland, Slovenia, Italy, Romania, or Poland). This designation, adopted initially by scholars, philosophers and tourists, has become a way of reformulating collective identities and inspiring the creation of lobbying organisations,

both national (in Switzerland, France and Italy) and European (e.g., the *Association Européenne des Elus de Montagne*).

The idea of identifying mountains as a type of natural entity, and thus as a type of geographical region, has also led to the specification of activities – mountain agriculture, mountain industry, mountain tourism, etc. – and to the definition and implementation of public policies. Forest policies in the Alpine and Pyrenean countries in the second half of the 19th century thus clearly targeted regions designated as “mountainous” for activities of reforestation and enclosure, to protect the interior valleys and the urban areas around the main massifs from flooding. On these occasions, the “mountain farmer” and more generally the “mountain dweller” was often singled out as responsible for downstream destruction caused by floods. Energy policies in several European countries since the beginning of the 20th century have also targeted mountain regions as potential sites for installations, with the development and adoption of specific technologies (mainly dams). Finally, “mountain tourism” gradually emerged, based not so much on summer visits, but rather thanks to the rapid and spectacular development of winter sports since the inter-war period.

The elaboration of a scholarly, naturalistic and regional conception of the idea of mountains since the 18th Century, and its very wide diffusion in the European societies since the mid-19th Century, thus had numerous and varied effects on the perceptions of national societies, the emergence of new collective identities, and the problematization of issues of economic development and resource management. From the category of scholarly knowledge, ‘mountain’ has turned into both a category of linguistic and spatial practices of all European societies, and a category of action, primarily public action, thanks to (inter alia) the inclination to territorialize the public policies in Europe since the 1960s.

Objectives and terms of a delineation of European mountains

The adoption of a modern, naturalistic, view of mountains made delineation possible. Scientific methods, varied and contentious, are not presented here. Only definitions adopted in public policies and administrations are discussed below.

Generally, topographical criteria of altitude and slope prevail in existing national definitions of mountains, notably in cadastral documents (e.g., in Switzerland and Austria) and agricultural policies. This designation of mountain regions – and the choice of criteria for delimitation – is guided by the idea of *compensation of natural handicaps* in a competitive economy, and, as a backdrop, the support of the rural economy.

The definitions included in the cadastral documents pertain to the level of plots. They are sometimes restrictive, as in the case of Austria, where the official definition of mountains, inherited from the installation of the cadastre during the Empire, for a long time only included high-altitude pastures. National definitions in agricultural policies most often refer to the level of the farm or municipality (Castelein et al., 2006). In these agricultural definitions, the lower altitude limit is most often fixed between 600 and 1000 metres. This limit is – on average – higher in the South (1000m in Spain, 800m in Greece) than in the North (300m in Belgium, 350m in Poland) (Price et al., 2004). The criterion of slope takes into account production techniques, with a view to compensating the difficulty or additional cost for mechanisation. The indicators used are usually the average slope of the farm or municipality, sometimes the difference between the highest and lowest points in the territory, as in Spain. Most countries combine the two criteria, sometimes adding secondary criteria: thus, Switzerland, when elaborating the cadastre of agricultural production between 1944 and 1949, supplemented the criteria of altitude and slope with other criteria based on “most important production factors”: “duration of vegetation period, atmospheric precipitation patterns, sunshine exposure, accessibility, etc” (Ofiamt, 1956).

Since the classification of land or farms “in mountain areas” influences the allocation of subsidies, farmers have a strong interest in these matters, as their incomes are affected. Thus a number of different pressures are exerted, and the allocation criteria are not always taken into account objectively (or ideally) in this process (Broggio, 2002).

The same criteria of slope and altitude and the same idea of compensating for natural handicaps can be found in the mountain definition used in the **Common Agricultural Policy** (CAP) of the EU. Council Directive No 75/268/EEC of 28 April 1975, on mountain and hill farming and farming in certain less-favoured areas, takes into account the geographic differences and production conditions, targeting in particular “agriculture in mountains and certain less-favoured areas” which should benefit from compensation measures. However, instead of letting the Commission determine which regions would benefit, the Directive leaves Member States to define their own zoning of mountain areas. Thus, the Member States took different approaches: countries which had already delineated a mountain area in their own agricultural policies (such as Italy in 1952 or France in 1961) generally proposed to the Commission to use the same boundaries; this definition could be broad and encompass all farms for which characteristics of altitude or slope were considered challenging. Most of the countries which joined the EU in 2004 and 2007 adopted a mountain definition according to this model; thus, it applies both in their national

policies and in Community policy. Other countries did not make use of this possibility, e.g., the UK, even though most British people consider the Scottish Highlands, large parts of Wales and parts of England as clearly mountainous. Under these circumstances, the European definition of mountains appears remarkably heterogeneous, and sometimes far from dominant social perceptions which, for some, are still closely linked to considerations of landscape.

Article 18 of the most recent Community regulation on the topic – Regulation 1257/1999 on support for rural development from the EAGGF – is very explicit: “Mountain areas shall be those characterised by a considerable limitation of the possibilities for using the land and an appreciable increase in the cost of working it due, either, to the existence, because of altitude, of very difficult climatic conditions, the effect of which is substantially to shorten the growing season, or, at a lower altitude, to the presence [...] of slopes too steep for the use of machinery or requiring the use of very expensive special equipment, or to a combination of these two factors, where [...] the combination of the two gives rise to an equivalent handicap.” Europe’s mountains, juxtaposing national mountain areas, thus comprise an area with limits to agricultural production, for which the criteria of definition stem from the concept of the limit itself. Evidence is to be found in the fact that regions without significant variation in elevation have been included in this definition, owing to their short growing season, e.g., areas in Finland and Sweden that, in the CAP, are classified alongside mountain regions: “Areas north of the 62nd Parallel and certain adjacent areas shall be treated in the same way as mountain areas”.

Some countries have adopted delineations of mountains specifically for **tourism policy**. In France, for instance, the “mountain directive” of 1976, on the construction of ski stations and ski lifts, delineated a “high mountain” region (e.g., above 1600m altitude in the Northern Alps), in which enhanced control and specific procedures were put in place.

Countries which adopted a zoning for their **regional policy** often reuse the same criteria of slope and altitude, but apply them at the level of municipalities and extend the boundaries to cover pre-mountain municipalities and those located in the main valleys within the massifs. Examples include the definitions of mountain regions in the Swiss Law on Investment in Mountain Regions (LIM, 1974), mountain massifs in France (law of 1985), mountain regions in Austria (*Berggebiets-Sonderaktion*, 1979) and *communita montane* in Italy.

The EU’s Regional Policy, initiated in 1975, does not refer to any kind of definition of mountains. It adopts a number of measures for different objectives. The main one (Objective 1) organizes financial transfers to

less-developed regions (below 75% of the EU average per capita GDP). This is done at the level of NUTS 3 regions. Many of the beneficiary regions are mountainous and in the periphery of the Community space: Ireland (until the beginning of the Millennium), the Scottish Highlands, Southern Italy, and much of Spain, Portugal and Greece. In the coming decades, this rule will allow financial transfers towards the regions that joined the EU in 2004 and 2007, many of which are mountainous. However, the mountainous character of these regions is not reflected in the allocation of EU funds. The other two objectives of Regional Policy have much more limited financial envelopes: Objective 2 aims to promote competitiveness (in regions that do not come under Objective 1) and Objective 3 encourages cooperation across borders. A number of mountain regions have profited from INTERREG funding to border regions. At the end of the 1990s, about 95% of the then EU's mountain areas were estimated to have profited from European funds under Objectives 1 or 2. However, in all of these cases, the regions were not beneficiaries by virtue of their mountainousness as such, this not being an official criterion for consideration (Broggio, 1992).

European **environmental policy** is based on a division of the territory of the EU into several biogeographic regions (11 in 2005), each with a specific combination of vegetation, climate and geological characteristics (Roekaerts, 2002). One of these regions, called "Alpine", comprises the Alps, the Pyrenees, the central Apennines and the Scandinavian mountains, the Carpathians and some Balkan massifs. The delineation of this biogeographic region is based on natural science, mainly botanical, criteria. Other massifs in Europe are part of more contiguous regions, mainly characterized by climatic criteria: the Scottish Highlands and the Cantabrian chain in Spain are part of the "Atlantic" region; the southern Apennines and the Greek and Iberian mountains (apart from the Pyrenees) are within the "Mediterranean" region; the Vosges, Harz and Giant Mountains are part of the "Continental" region, etc. However, the massifs are not delineated as such.

International treaties exist for the Alps and the Carpathians. For the Alps, the delineation is also based on criteria of slope and altitude, which are applied at the level of municipalities (Price, 1999). For the Carpathians, no precise delineation has been accepted; several national consultations have not led to a consensus. Nevertheless, the preparatory documents suggested a number of delineations (e.g., Ruffini *et al.*, 2006; UNEP, 2007) . Current initiatives for the creation of similar agreements in the Balkans and the Dinaric Arc have not yet decided on the question of delineation.

Delineation of mountains in GEOSPECS

The first global delineation of mountains using consistent criteria was developed by Kapos et al. (2000), using the GTOPO30 global digital elevation model (DEM), which records the altitude of every square kilometre of the Earth's land surface (horizontal grid spacing of 30 arc seconds). Kapos et al. (2000) used this DEM to derive a detailed typology of mountains based on not only altitude, but also slope and terrain roughness (local elevation range, LER), starting from first principles and in consultation with scientists, policy-makers, and mountaineers. First, 2500 m, the threshold above which human physiology is affected by oxygen depletion, was defined as a limit above which all environments would be considered 'mountain'. Second, they considered that at middle elevations, some slope was necessary for terrain to be defined as 'mountain', and that slopes should be steeper at lower elevations. Finally, to include low-elevation mountains, the LER was evaluated for a 7 km radius around each target cell: if the LER was at least 300 m, the cell was defined as 'mountain'. This delineation has been widely used at the global level.

In 2004, a study prepared for DG Regio (European Commission, 2004) took a similar approach. However, as mountains extend down to sea level in several parts of Europe, a European delineation required a revision of the criteria. The final selection was made, after testing 16 different combinations, on the basis of feedback from national experts, who were asked to assess the degree to which each delineation fitted prevailing national understandings of mountain areas.

Thus, mountainous grid cells were identified according to the following criteria:

- between 0 m and 300 m, the objective is only to include areas with a particularly rough landscape in the mountain delineation. For this purpose, the standard deviation of elevations between each point of the DEM and the eight cardinal points surrounding it is calculated. If this is greater than 50 m, the landscape is sufficiently rough to be considered as 'mountain' despite the low altitude.
- between 300 m and 1,000 m, areas which either meet the previously mentioned criterion or where altitudes encountered within a radius of 7 km vary by 300 meters or more are considered mountainous.
- between 1,000 m and 1,500 m, all areas which meet any of the previously mentioned criteria are considered mountainous. In addition, areas with a maximum slope of 5 ° or more between each point (to which value is assigned) and the 8 cardinal points surrounding it are also considered mountainous.

- between 1,500 m and 2,500 m, in addition to all previous criteria, areas with a maximum slope of 2 ° or more between each point (to which value is assigned) and the 8 cardinal points surrounding are also considered mountainous.
- above 2,500 m, all areas are considered mountain.

The Fifth Cohesion Report (CEC, 2010) defined mountain regions as NUTS 3 regions where at least 50% of the population lives in a mountainous area or at least 50% of the land area is mountainous, in both cases using the same topographic criteria as in the report for the European Commission (2004). The share of population in mountain areas was estimated by overlaying the grid cells identified as mountainous in European Commission (2004) and population estimates at the same scale. However, when the grid cells are used for an approximation at the level of NUTS 3 regions, this perspective is lost, as the resulting maps generally bear little resemblance to commonly accepted mountain areas. On a more fundamental level, individual grid cells with a rough topography (i.e. satisfying the above-mentioned criteria) should not *a priori* be identified as mountain areas; it is the local concentration of such cells that constitutes a mountain. Finally, and perhaps most importantly, the approximation of mountain areas at the NUTS 3 level generally makes it impossible to analyse mountain-piedmont relationships, as these two types of areas are usually included in the same regions. Major components of specific social and economic processes that are specific to mountain areas would therefore be ignored if the TPG were to apply a NUTS 3-based delineation of mountain areas.

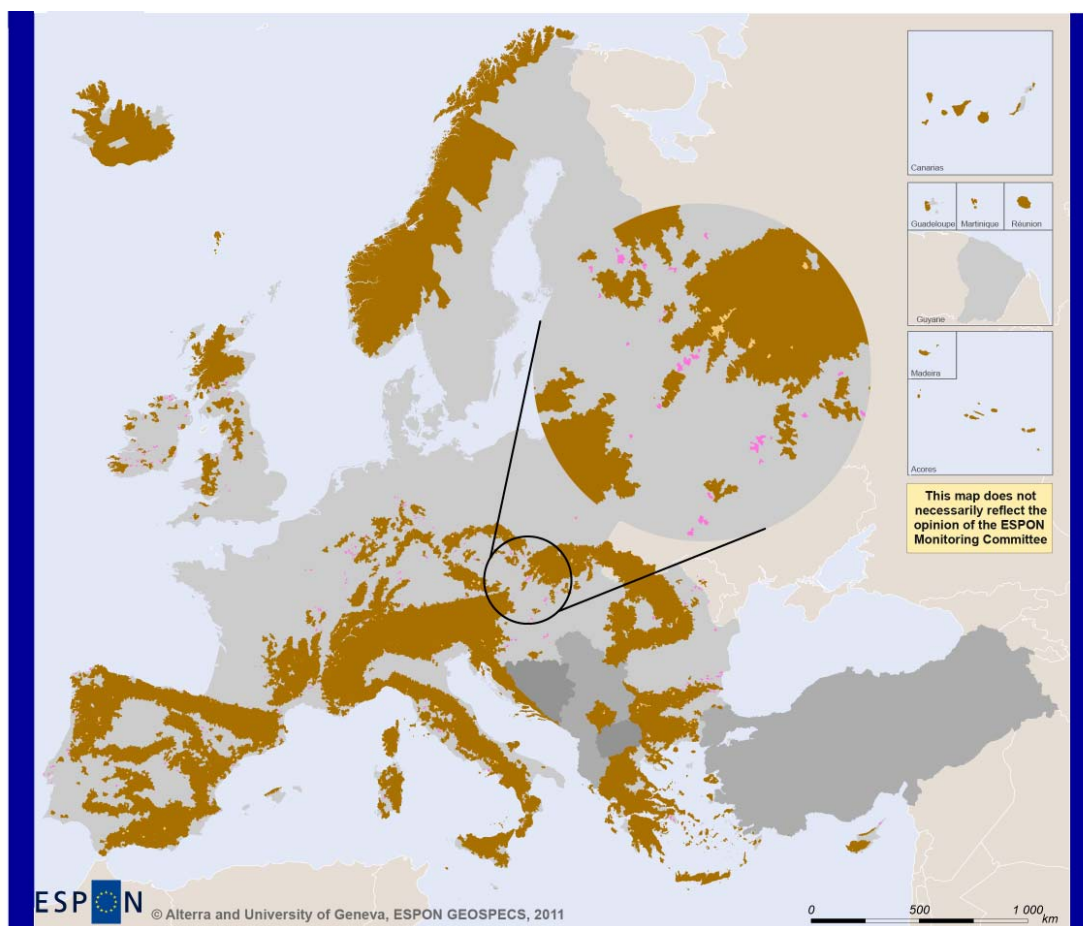
Consequently, the TPG has used the delineation from the European Environmental Agency (2010), which applied the same criteria as in European Commission (2004) over a wider space including the entire ESPON study area. Furthermore, isolated mountainous areas of less than 10 km² were not considered, and non-mountainous areas of less than 10 km² within mountain massifs were included.

This set of grid cells with mountainous topography was approximated to municipal boundaries by considering that LAU2 units with more than 50% mountainous terrain should be considered to be mountainous. Continuous mountain areas of less than 100 km² were then identified, and designated as exclaves which were excluded from the mountain delineation except on islands of less than 1000 km². In this latter case, small mountain areas were deemed to constitute a greater potential constraint for social and economic activities, insofar as the total available land is limited. Similarly, non-mountainous groups of LAU2 units of less than 200 km² surrounded by mountain areas were identified as enclaves and included in the mountain delineation (see Map 4).

Mountain areas have been grouped into 15 massifs, defined on the basis of the delineations of the EEA (2010), with some modifications:

- Mediterranean island mountains include Sicily;
- A Central European Middle Mountain category – including the Middle Mountains of Central Europe, Germany, France and Switzerland – has been created;
- The Massif Central (including Morvan) has been defined as a separate category.

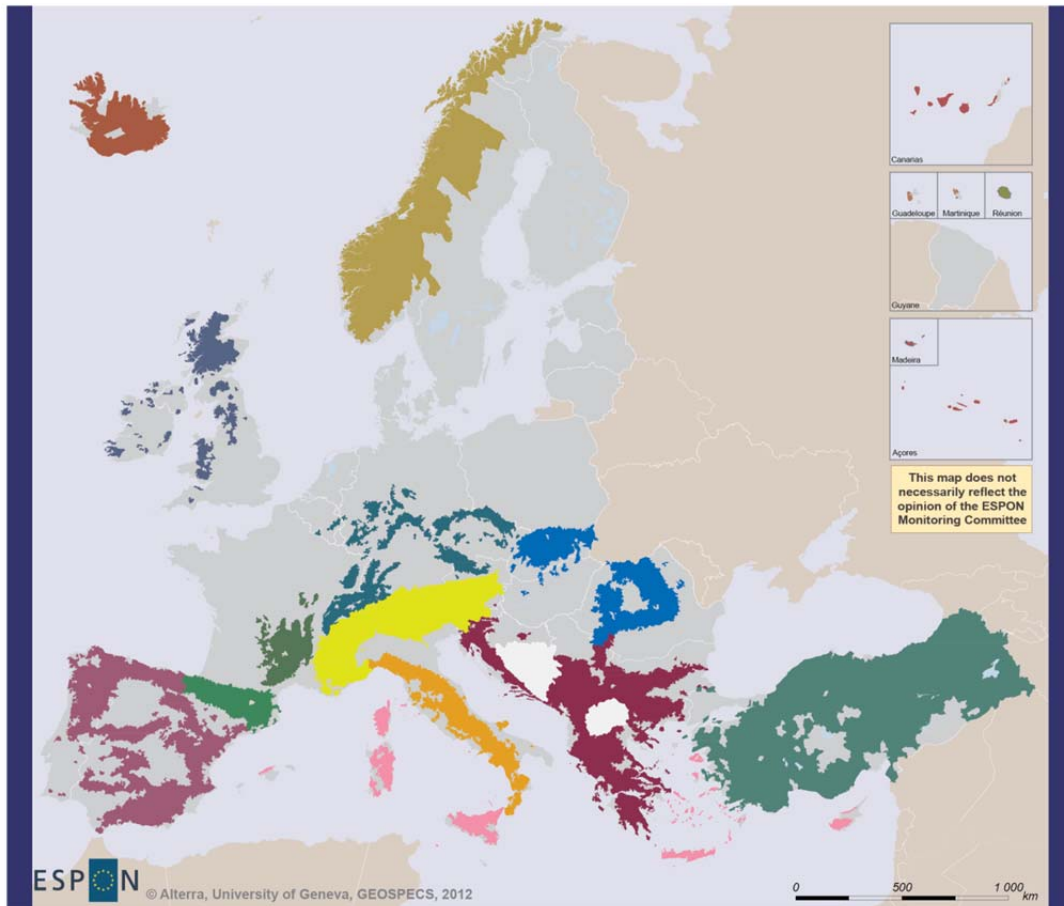
This delineation principle leads to the exclusion of Kiruna municipality in Sweden, in spite of the fact that this municipality includes significant mountain areas and Sweden highest peak (Kebnekaise). However, the vast majority of the population of the municipality lives in Kiruna, which is not situated in the mountainous area (see Annex 57).



Mountain areas in Europe - enclaves and exclaves



Map 4 Mountainous LAU2 units in Europe, enclaves and exclaves



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Massif names

- | | | |
|------------------------------------|--------------------------------|-----------------|
| Alps | Icelandic mountains | ESPON Space |
| Apennines | Indian Ocean Island mountains | No data |
| Atlantic Islands mountains | Massif central | Non-ESPON space |
| Balkans/Southeast Europe mountains | Mediterranean island mountains | Lakes |
| Caribbean Island mountains | Mountains of the British Isles | |
| Carpathians | Pyrenees | |
| Central European Middle mountains | Scandinavian mountains | |
| Iberian mountains | Turkish mountains | |

Map 5 Massif areas in the ESPON space

Table 7 Overview of mountainous areas in Europe

Country	Number of massifs	Number of mountain municipalities	Area of mountain areas (km ²)	Number of enclave municipalities	Area of enclaves (km ²)	Number of enclave municipalities
Albania	1	DP	DP	DP	DP	DP
Austria	3	1435	61,760.7	6	121.5	5
Belgium	1	14	1,297.5	0	-	0
Bosnia Herz.	1	DP				
Bulgaria	1	2330	53,195.8	88	1050.7	40
Switzerland	2	2380	37,472.3	36	215.7	7
Cyprus	1	316	4,264.3	6	21.7	1
Czech Republic	2	1536	25,071.1	34	526.4	42
Germany	2	2127	54,102.3	22	512.5	98
Denmark	0	0	-	0	-	0
Estonia	0	0	-	0	-	0
Spain	4	4198	272,954.9	45	1237.8	26
Finland	0	0	-	0	-	0
France	5	7352	137,252.4	71	933.3	117
FYROM	1	MD	MD	MD	MD	MD
Greece	2	710	102,675.9	3	306.6	12
Croatia	2	153	21,702.5	0	-	6
Hungary	3	143	3,524.2	0	-	25
Ireland	1	236	8,515.1	0	-	53
Iceland	1	52	86,810.7	0	-	0
Italy	4	4512	182,768.0	20	693.2	25
Kosovo	1	29	10,804.2	1	104.9	0
Liechtenstein	1	11	160.0	0	-	0
Lithuania	0	0	-	0	-	0
Luxembourg	0	0	-	0	-	5
Latvia	0	0	-	0	-	0
Montenegro	1	DP	DP	DP	DP	DP
Malta	1	2	10.6	0	-	0
Netherlands		0	-	0	-	0
Norway	1	297	267,466.5	0	-	0
Poland	2	169	16,508.0	2	82.4	1
Portugal	2	2018	31,607.9	56	551.3	32
Romania	2	951	90,749.7	9	337.6	11
Serbia		DP	DP	DP	DP	DP
Sweden	1	10	87,826.5	0	-	0
Slovenia	2	135	15,933.4	7	321.1	0
Slovakia	1	1575	29,609.2	51	605.2	17
Turkey		DP	DP	DP	DP	DP
UK	1	488	61,736.9	29	180.6	81
Sum		33179	1,665,780.6	486	7,802.5	604

MD: Missing data – DP: Data processing on-going

3.2.2 Islands

Islandness defines the situation of a place surrounded by the sea. This geographical specificity of islands arises from a discontinuity between land and sea, which in turn affects human development. These effects, however, are not absolute but can be described as occurring in relative terms. They may be attenuated by the presence of fixed links between an island and a mainland, which in itself may be regarded as reducing, though not completely eliminating, islandness itself. Transport facilities would likewise reduce the effects of islandness. The latter may, however, be exacerbated in cases where the main geographical reference point of an island is itself another island.

There are other dimensions which affect the relationship between islandness and human development. These arise out of the islandness characteristic itself, but are also a result of human activity. They include peripherality in relation to the main centres of economic and social activity, as well as dependence upon decisions taken outside the island territory itself. Islandness, peripherality and dependence are considered to constitute the elements of the concept of insularity, which relates to the wider spectrum of specific conditions impinging upon human development in island territories.

The geographical particularities of islands constitute a generally acknowledged reality. However, the substantial diversity of islands at global, national and regional levels makes the use of the concept of insularity even more relevant as it provides a common framework which within itself caters to this great diversity. Insularity is presented as a spectrum, with a number of natural or man-made characteristics resulting in islands displaying different degrees of insularity. The main characteristics of insularity are: small size of population and limited access as well as limited resources; remoteness from the European or national centre; isolation and low accessibility; unique cultural heritage; and rich but fragile natural environment. The more of these characteristics that an island exhibits, the higher the level of insularity. In addition, islands that form part of an archipelago and therefore exhibit double insularity, places them at the more acute end of the spectrum of insularity, as does having more than one geographic specificity, such as the case of mountainous islands. The critical point remains isolation, in physical but also psychological terms. The inhabitants of islands depend on air or sea transport for exports, passenger travel, and the provision of goods. In addition, the concept of 'island mentality' has a strong bearing on a

number of factors that influence development, such as entrepreneurship and governance.

Insularity is a factor that distinguishes islands from other European regions. Islands are vulnerable economically and ecologically; they are also places where the interactions between economic, political, social and environmental factors tend to be particularly rapid and severe – and especially sensitive in view of the challenges of climate change.

Using the concept of insularity has the advantage of being able to use quantitative data to make it possible to classify islands according to various criteria. This allows for the development of the concept that some islands exhibit stronger effects of insularity. Authors such as Doumenge (1983)²² worked on such classifications which were, in their own words, “difficult to measure”²³.

Royle (2001)²⁴ argues that that every island is affected in some way by a range of constraints, including small scale, size, isolation, and resource availability. In his view, peripherality is a permanent, concrete condition, not just a state of mind, and hence unalterable. An additional characteristic of most European islands is that, as well as being islands, they are also peripheral regions situated on the EU’s external borders.

The present study thus takes the concept of insularity to be determined by three main elements:

Surrounded by Sea: This refers to the geographical characteristic of islands that they are separated from the mainland by the sea. The effect of this separation is constant, notwithstanding the fact that mainland could take on different meanings in the case of island states, island regions, island municipalities, and island components of municipalities. This characteristic is also present when man-made constructions, such as bridges and tunnels, attempt to remove this separation from mainland. The idea that insularity is not only physical but also has a strong psychological element implies that, while bridges and tunnels manage to remove the physical separation of an island from the mainland, the psychological effects of separation often still remain, and the impact of these effects on development can still be felt following such infrastructural investment. In some instances, these effects can be even more

²² Viability of Small Island States; Francois Doumenge 1983 United Nations Conference on Trade & Development.

²³ Worlds Apart; Francois Doumenge. UNESCO Courier Oct 1986

²⁴ *A Geography of Islands: Small Island Insularity*. Stephen A. Royle. London and New York: Routledge, 2001.

pronounced if physical links lead to the establishment of different sub-cultures within an island.

Peripheral: Islands are peripheral to the main centres of economic, social and political activity. Islands are often an afterthought in national or European economic development plans, they are not well represented in political bodies, and are usually labelled with social stereotypes that foster an “us and them” mentality.

Dependent: Islands are dependent on the main centres of economic, social and political activity for their development. They are not able to act of their own will, but tend to find themselves in a constant reactionary role to what is happening on the mainland. This breeds a feeling of helplessness and dependence on islands which often manifests itself as requests for financial assistance, and insufficient ability to control events which may have an impact on their socio-economic development; these factors may form a vicious circle.

It is apparent that the specificities of islands can be seen in different spheres, for example: the political implications of being removed from the centres of decision making; the social implications of reduced access to better education facilities; and the cultural implications of being seen as a separate entity from the rest of the country or region. These facets of insularity add to the definition of what it is to be an island. Some elaboration on these issues follows.

Political

From a global perspective, most islands were conquered by one or another of the rival American, European, and Japanese empires during the era of colonialism and subjected not only to foreign military domination and political rule but also integration into the economic systems of their overlords. Their agricultural plantation and resource-extraction economies were developed to complement and enrich those of the colonial power and, even after independence, many remained closely integrated into these larger economies. Overly dependent on a single export, their prosperity was subject to the whims of shifting market demand in the empire. Resource depletion was also consequently a threat (Royle, 2001).²⁵

²⁵ *A Geography of Islands: Small Island Insularity*. Stephen A. Royle. London and New York: Routledge, 2001.

While many islands in recent times have achieved some form of self-administration, whether at municipal, regional or national level, they often suffer from policies promulgated at higher levels at which they have little influence. The situation of powerlessness that islands often experience in their self-governance has perhaps contributed to the sometimes unorthodox development of island politics and to particularities in governance structures.

Social

Their frequently relatively small population base, coupled with large-scale emigration, has left many islands with a paucity of seasoned public servants and forced them to depend on external intellectual resources. The lack of anonymity on small islands can furthermore foster nepotism, cronyism, patronage, and political clientism (Royle, 2001).²⁶ On the other hand, small islands exhibit homogeneity, social cohesion and a strong sense of community, as well as shared interests, closeness and intimacy. The social display of insularity is often manifested in an inward-looking society that feels detached from the rest of the country or region. This can often cause a sense of claustrophobia in inhabitants of islands, especially the younger generations, who experience a strong need to leave the island at regular intervals.

Small island societies are particularly vulnerable to outside interference, which may reach dimensions that could effectively threaten a culture or society. In terms of population, islands amplify effects which quickly die out on continents. Island populations are vulnerable because of their isolation, and may be decimated by contagious diseases introduced by immigrants or visitors. In the nineteenth and the early twentieth centuries, this happened on a number of Pacific islands ravaged by epidemics of influenza, measles, smallpox or cholera, which took a heavy death-toll (Doumenge, 1986).²⁷ Even today, many islands, especially in the Mediterranean, are feeling the burden of North African migration in a disproportionate way to European mainland.

²⁶ *A Geography of Islands: Small Island Insularity*. Stephen A. Royle. London and New York: Routledge, 2001.

²⁷ *Worlds Apart*; Francois Doumenge. UNESCO Courier Oct 1986

Cultural

The importance of islands, historically, in the artistic imagination is clear to many policy-makers, yet the "real world" of islands is often at some remove from the "island of dreams" concept (Royle, 2001).²⁸ Islands are nowadays the object of what may be considered to be a centuries-long collective perception whereby they are presented as locales of desire, as platforms of paradise, or as habitual sites of fascination, emotional offloading or religious pilgrimage.²⁹

Over time, many island territories have realized that they can 'sell' their sea, sun and sand to visitors by appealing to their modern need for travel, and thus carve out for themselves an easy route to development. This has resulted in a high dependence on a highly seasonal tourism industry which is sensitive to external economic shocks and changing trends and fashion.

Environmental

Many islands, due to their geological formation and geographical situation, are subject to earthquakes and volcanic eruptions. Islands are more susceptible to natural disasters such as droughts, typhoons, and floods. Islands suffer also from biological constraints of endemism. These are particularly onerous since fewer plant and animal species are found on islands, because of their physical isolation, than on continents. These natural populations are fragile, since their regenerative capacity and resilience are low when faced with overexploitation or strong competition from outside species introduced accidentally or for economic reasons. The proliferation of such species and their retinue of parasites and pathogenic organisms may cause ecological catastrophes. On the other hand, by virtue of their isolation, islands may constitute veritable biological sanctuaries for the preservation, and even evolution, of species which might have been eliminated in evolutionary competition among continental communities (Doumenge, 1986).³⁰

²⁸ *A Geography of Islands: Small Island Insularity*. Stephen A. Royle. London and New York: Routledge, 2001.

²⁹ Euroislands.. Annex IV

³⁰ Worlds Apart; Francois Doumenge. UNESCO Courier Oct 1986

Small island states

Insularity is generally constructed in relation to a mainland within the national context. In the case of “insular countries”, the situation is obviously different; key issues are whether being an island is a constitutive feature of national identity, and the degree to which insularity influences economic and social processes negatively or positively.

The category of Small Island Developing States (SIDS) is defined by the United Nations’ Department of Economic and Social Affairs (UN DESA) as “*small island and low-lying coastal countries that share similar sustainable development challenges, including small population, lack of resources, remoteness, susceptibility to natural disasters, excessive dependence on international trade and vulnerability to global developments. In addition, they suffer from lack of economies of scale, high transportation and communication costs, and costly public administration and infrastructure.*”³¹

Malta and Cyprus were included in the UN DESA’s *World Statistics Pocketbook on Small Island Developing States*³² until 2003. However, since their accession to the European Union, these countries are no longer included in the list of SIDS³³. Thus, as EU members, the UN DESA no longer considers Malta and Cyprus to have social and economic constraints due to limited size and insularity. In the Structural Funds regulations for the period 2007-2013, inclusion under the Regional competitiveness and employment objective is made conditional upon eligibility to the Cohesion Fund³⁴ (i.e. have a Gross National Income per capita below 90% of the EU average). Nevertheless, if either of these states were to exceed the threshold of eligibility to the Convergence objective, they may continue to receive particular attention according to declaration 33 of the Intergovernmental Conference, annexed to the Lisbon Treaty, which specifies that “*the Conference considers that the reference in Article 158 to island regions can include island States in their entirety, subject to the necessary criteria being met*”.

In order to contribute to discussion on the possible policy implications of this declaration, the Geospecs TPG has chosen to consider NUTS 0 territories with population size and relative isolation levels that would be

³¹ http://unfccc.int/files/documentation/text/html/list_search.php?what=keywords&val=&valan=s&anf=0&id=5671

³² http://www.sidsnet.org/docshare/other/20040219161354_sids_statistics.pdf

³³ http://www.un.org/esa/dsd/dsd_aofw_sids/sids_members.shtml

³⁴ Council of the European Union (2006) *Council Regulation (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999*, Official Journal of the European Union, L 210/25. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:210:0025:0078:EN:PDF>

equivalent to, or more constraining than, those of Malta and Cyprus, as Small Island States. Despite its large territory (100,250 km²), Iceland meets these criteria. Iceland's population of only 319,062 inhabitants, is less than that of either Cyprus (871,000) and Malta (414,971). However, being a Small Island State with a large, mostly sparsely populated territory creates a series of specific development challenges (Figure 7).

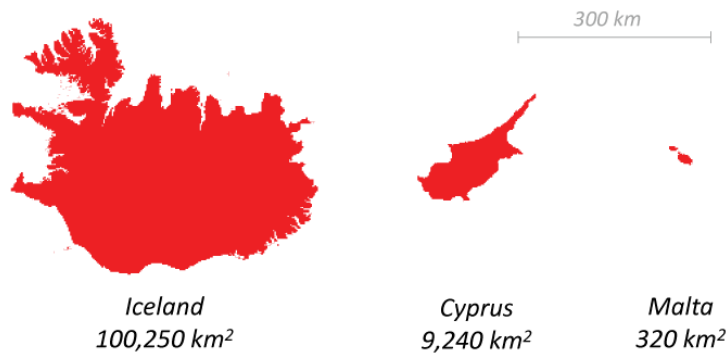


Figure 7 Comparison of geographic extent of the three Small Island States of the ESPON area

By comparison, the two other countries that could be characterised as island, Ireland and Great Britain, are considerably larger (see Figure 7). Great Britain cannot be characterised as insular, given its population of over 60 million, and the fact that it is hardly peripheral to main centres of economic and social activity. The Republic of Ireland, which has a population of 4,450,000, is not insular because it is not dependent upon external decision-making processes, as are, for example, Sicily and Sardinia. Together with Northern Ireland, the total population of island of Ireland is 6.1 million inhabitants, i.e. more than 7 times that of Cyprus. Most importantly, neither the United Kingdom nor the Republic Ireland has requested any specific treatment linked to insularity in the European context.

Fixed Links

Many islands in the ESPON area have been connected to the mainland through the construction of a fixed link. This type of connection is popular in the Nordic countries, with Norway, Finland and Sweden being the three countries with the most fixed links in Europe. Fixed links are less popular in the South, with only a few islands in the Mediterranean having such a connection.

While a fixed link makes it possible to interact with the other localities and regions without being dependent on sea or air connections, it does not necessarily remove all local social and economic constraints due to insularity. The financing of some bridges and tunnels is based on tolls, which may constitute a significant barrier to interaction between islands and the mainland. Some countries have created systems of frequently operated, toll-free ferries that may be regarded as equivalent to bridges; some are operated by cable ferries.

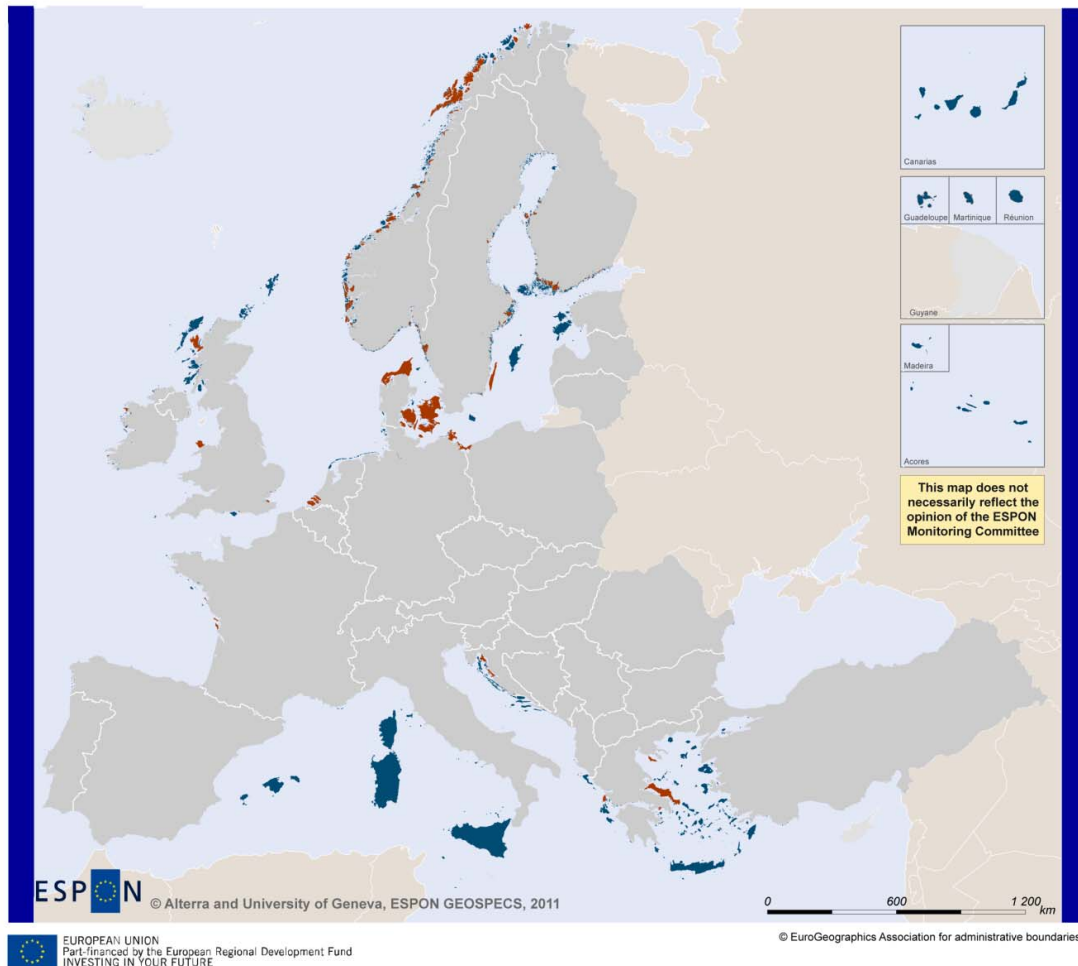
Overview of Delineation

The delineation of the insular geographic specificity thus goes beyond the mere fact that a territory is surrounded by the sea, as this may not necessarily imply the existence of the peripherality and dependence characteristics of islands. Likewise, the existence of a fixed link to a mainland may not be sufficient to overcome the peripherality and detachment characteristics associated with insularity. Furthermore, being a state makes an island less dependent upon external decision, and hence less insular. However, Small Island States would still be considered as insular, because their smallness, and consequent peripherality are not considered to outweigh the dependence factor. For the purposes of this study, the island delineation has been developed so as to best take into account these considerations (see Map 7).

The island delineation has been constructed using the highest resolution map of European municipalities available from Eurogeographics. As a starting point, all territories that are physically disjoint from the European mainland have been considered as insular, including parts of municipalities (excluding inland islands). Given that fixed links are considered to merely alter the intensity of insularity, islands connected to the mainland by a fixed road link have been included in our analysis in order to explore the social and economic relevance of insularity. Given the different challenges these islands face, they have been included as a distinct category of islands, as can be seen from Map 6.

An extensive data collection exercise was carried out and municipal level data was collected for most of the ESPON area. Data on 319 islands and island municipalities in Europe have been compiled. Multiple islands belonging to one municipality have been considered as one unit, this has substantially decreased the number of island units identified in the data set. This rationalisation would apply to a number of Greek islands which form part of the same municipality, as well as to a number of islands in Norway, Finland and Sweden. Multiple municipalities which form part of

one island have been grouped together. In the case where part of an island is covered by one or more insular municipalities, while another part is covered by a municipality which is partly on the mainland, the municipalities that are entirely insular are the only ones considered.

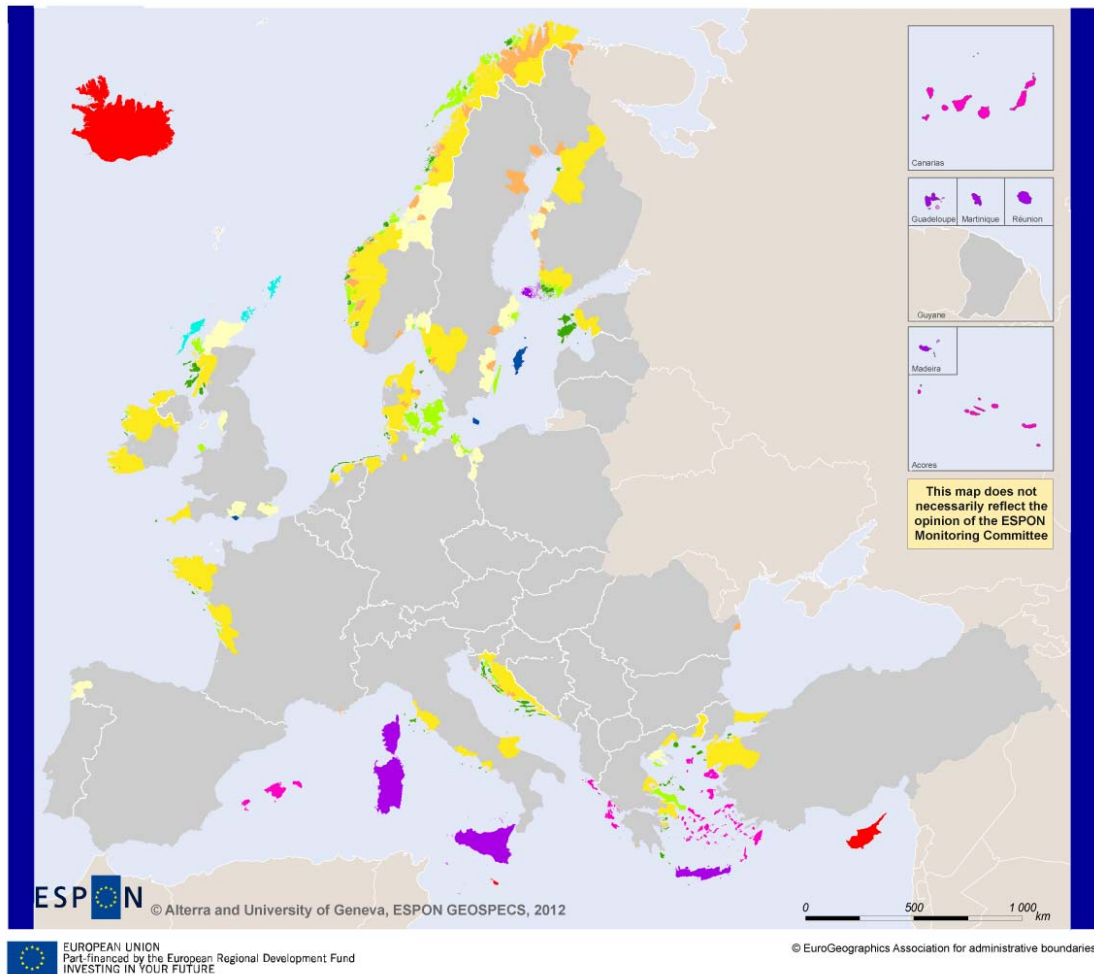


Preliminary identification of insular areas - excluding island states



Map 6 Preliminary identification of insular areas – excluding Island States

This map includes all territories that are disjoint from the national mainland, irrespective of their administrative status. 14,251 islands may be identified, with a total area of 136,077 km². Among these, 421 islands have an area of more than 10 km². The remaining 13,830 islands have a total area of 7,029 km² only.



Island delineation

NUTS 0 level: Small island states

- Main island
- Secondary island municipalities: situations of double insularity

NUTS 1/2 level island regions

- Main island
- Secondary islands municipalities: situations of double insularity
- Archipelagos

- ESPON space
- Other countries

NUTS 3 level island regions

- One main island
- Archipelagos

LAU 2 level: Island municipalities

- Entirely insular municipalities with a fixed link to the mainland (from one or more islands)
- Other entirely insular municipalities

Regions and municipalities with significant insular component

- NUTS 3 regions including island municipalities with a fixed link to the mainland
- NUTS 3 regions including other island municipalities
- Municipalities within significant insular component: > 8% of the municipal territory or total island area > 10km²

Map 7 Delineation of islands and of regions and municipalities with a significant insular component

The islands identified include 105 islands that form part of an archipelago, 75 islands that have a fixed link to the mainland, and 128 islands with a mountainous component. 124 of the islands are found in the Mediterranean Sea, 44 in the Baltic Sea, 48 in the North sea, 63 in the Atlantic Sea, and 32 are located in the Norwegian and Barents Seas while the remaining 8 are Outermost islands spread over other seas.

3.2.3 Sparsely Populated Areas

The basic features of sparsity, i.e. a patchwork of geographically distant, scattered, small settlements, remind us that territories are rarely as continuous as one might think when looking at classical maps. Hence, delineating territories with sparse demographic settings thus requires taking new approaches with regard to cartography³⁵. In the GEOSPECS project, we propose to delineate 'sparsity' on several geographical levels to (1) enable us to understand the territorial extent of the 'sparsity' phenomenon across Europe and (2) provide a sound scientific base for deriving territorial policies and initiatives able to 'fit' to the needs of multiple territorial levels. Our underlying argument for understanding territorial sparsity and intending to delineate it is that it ought to be, first and foremost, understood as a specific living environment shaped and imagined through the tight relationships between 'islands' of European population and their respective territory.

As a first step, this section presents the main elements of sparsity as a political, socio-economic and cultural construct. Then, the section continues by connecting these features with the main elements of the delineation of Sparsely Populated Areas (SPA) undertaken in the GEOSPECS project.

A political construct

With regard to policy, the issue of sparsely populated areas has its origins in the Nordic countries, and was introduced in the European regional policy debate much later. Indeed, its emergence in the debate of European regional policy also has Nordic origins, as it stems from the Treaty of Accession to the EU negotiated by Finland, Norway and Sweden in the mid-1990s. During the negotiations, these countries argued in favour of a new strand of the Structural Funds specifically dedicated to their most sparsely populated regions (Gloersen, 2009). In the end, only Finland and Sweden joined the EU (in 1995), and this demand was then implemented through protocol 6 of their Treaty of Accession to the EU (Gloersen, 2009). Thus, the idea that 'sparsely populated areas' represent a specific type of territorial context for regional development policies was coined. Yet, the accession to the EU has enabled new actors to emerge in the SPA debate: regions. Through the instruments of EU Regional Policy, regions have taken a leading role in steering the debate on the challenges

³⁵ Gloersen, E. (2012) *La Finlande, la Norvège, la Suède face au projet d'une Europe polycentrique - La centralité à la marge de l'Europe*, Presses Universitaires de Rennes

and opportunities of SPA, e.g. through the transnational Nordic network of regional authorities *NSPA* (Northern Sparsely Populated Areas).

In the early 21st century, the geographical focus of territorial cohesion has shifted towards the (greater) challenge of reducing the development gap between the EU15 and the NMS12, particularly the most rural and remote parts of the latter. Hence, the debate for continued support to SPA entered a new phase around 2005 with the negotiations of the 2007-13 Structural Funds Programming Period. First, there has been a shift from an essentially Nordic focus to a wider pan-European one. In the Green paper on Territorial Cohesion³⁶ (European Commission, 2008), sparsely populated areas were identified in other parts of Europe, such as Northern Scotland, Central Spain and Southern Greece. In spite of this, some official EU documents, such as the Treaty of Lisbon³⁷, still refer to 'northern' sparsely populated areas. Nevertheless, this 'mainstreaming' of the issue turned the focus from 'uniqueness' to 'specificity'. Second, the need for continued financial support was targeted to 'enabling' growth and development rather than 'fixing' development issues.

Thus the issue of sparsity, and more specifically the challenges and opportunities it entails, has become a defining component of the policy agenda at different levels of territorial governance: for the region(s), it is a matter of economic attractiveness and the continued existence of its social model; for the State(s), it is a matter of ensuring the competitiveness of territories through labour-market integration (regional enlargement through the lens of economic development; and for the EU, it is a matter of territorial cohesion, i.e. seeking well-functioning regional economies contributing to the overarching European welfare

A multi-layered socio-economic construct

It appears difficult to distinguish the social and economic dimensions of sparsity. In the Nordic countries, the emergence of SPA as industrial territories has strongly influenced the construction of the modern states and their values. Moreover, the understanding of SPA as a socio-economic construct is also perceived through its history of settlement, migration and urbanization.

³⁶ European Commission (2008) Green Paper on Territorial Cohesion - Turning territorial diversity into strength <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0616:FIN:EN:PDF>

³⁷ Official Journal of the European Union C 306, 17.12.2007 http://europa.eu/lisbon_treaty/full_text/index_en.htm

One characteristic that seems to be shared by all European SPAs is that the land is usually not suited for large-scale agricultural activities, due to the harsh climate (either cold or hot) and difficult topography (many SPAs are also mountainous areas: see section 3.3). One could thus see sparsity as a historical legacy from non-agricultural rural places. In the pre-Industrial period, when communities had to be self-sufficient in terms of food, this meant that these territories were less attractive for settlers to develop economic activities). The only economic 'hotspots' in these regions were on the coasts (especially in Scotland, NSPA and Iceland) where the climate is milder and local production is based on fisheries or to trade and transport of other regional products like timber and minerals. These economic features shaped the SPA territories in the pre-Industrial era: access to natural resources, mostly non-usable hinterland, and communities concentrated on the coast³⁸.

The Industrial Revolution triggered a new development path for SPAs. Industrialisation throughout Europe was strongly dependent on the large-scale exploitation and consumption of material used in manufacturing processes: wood (timber, tar), coal, or ores (especially iron ore). Most of the SPAs had significant quantities of these resources (especially in the NSPA and Central Spain), giving a new impetus for the settlement of these territories: new towns developed around mines or paper-mills in the interior. Possibilities for developing water energy possibilities to meet the electricity needs of the expanding industrial activities were also of importance. However, the consequences of this socio-economic development were not merely regional. In the Nordic countries, the exploitation of natural resources played an immense role in the creation of the generous modern Nordic Welfare State, having social repercussions across entire national territories.

Another aspect is related to history of settlement and urbanization in these areas. In the Nordic countries, their main period of development coincided with industrial development and the years after the Second World War, with a rather broad array of cohorts arriving. In the Spanish context, the situation is rather different. Although the SPAs of Central Spain do not have particularly good agricultural land compared to other Spanish regions, they included numerous small villages and rural settlements. After General Franco's *Plan de Estabilización* in 1959, there was a rural exodus, especially during the 1960s and 1970s. The population declined steeply as people emigrated towards the industrial

³⁸ For more information on this subject, the reader may refer to the works of Einar Niemi (*Trekk fra Nord-Norges historie*) and Ottar Brox (*Hva skjer i Nord-Norge?*).

areas of the large cities and the coastal towns, where tourism grew exponentially. During the second half of the 20th century, the provinces of Cuenca, Soria and Teruel lost almost 40% of their total population.

Cultural anchorage: between image and identity

An important part of the long-standing cultural anchorage of SPAs in Nordic consciousness is related to pioneer settlers and the presence of the Sámi people, the last indigenous people of Europe. The cultural importance of the Sámi is much more than a mere ethnic one: they have their own language, traditions and, not least, resource-based livelihoods such as reindeer herding, fishing and hunting. The preservation of this ancient right has been translated in territorial terms by the delineation of *siidas*, i.e., a local Sámi community, or a "reindeer herding district," a member- and area-based economic unit. The ancient reindeer herding *siidas* have been the basis for the geographically-delineated economic entities of today. In the national laws, these herding units are termed as *paliskunta* ("reindeer herding cooperative") in Finland, *reinbeitedistrikt* ("reindeer pasture district") in Norway, and *sameby* ("Sámi village") in Sweden. In this sense, there is a close connection between the 'cultural' and the 'territorial' regarding the perpetuation of 'tradition' and 'identity' in the NSPA.

The cultural anchorage in the broader national consciousness in the Nordic countries has its roots in history, which means that it is also embedded in the languages. In all Nordic countries, specific expressions qualify the SPA territories, not only by labelling them but by also describing their main feature: the terms used for SPA are, in Scandinavian languages, *glesbygden*, and, in Finnish, *harvaan asutut alueet*: both refer to an internal sparse settlement structure. In Scotland or Spain, the terms given to SPA refer more to their peripheral location (*remote*), their socio-economic structure (*rural*) or their overall development challenges (*fragile, less-favoured*).

Four territorial levels of sparsity

Sparsity is evidently a complex notion in human geography. In this respect, it is unlikely that a single method for delineating these territories could provide the necessary base for a good understanding of the specific development opportunities and challenges they face. In order to retain this complexity as much as possible, while providing a clear basis for an analysis of SPAs, the delineation methodology developed in GEOSPECS

takes a three-level approach to the notion, each level producing a specific understanding of sparsity related to one of the three main 'constructs' cited above.

Sparsely Populated **AREAS**: portrays sparsity as a contiguous territorial phenomenon not bounded to administrative boundaries, mainly revealing two types of structure of such territories made of either several large 'massifs' (NSPA, Central Spain, Northern Scotland, Turkey, Iceland) or small 'islands' (in the Alps, for instance). The resulting cultural perception of sparsity and anchorage in the identity of the communities is likely to be different between the large-scale phenomenon (in the case of 'massifs') and the scattered, fragmented one (in the case of 'archipelagos').

Sparsely Populated **LOCALITIES**: essentially raises the issue of sparsity in the light of difficulties in matching the labour market supply and demand in small economies, i.e., the small size of the local economy, combined with its relative isolation from other surrounding local markets, leads to a lack of diversity in the labour market, making it more complicated for the labour market to reach an equilibrium point between the supply side (labour force) and the demand side (firms and public authorities).

REGIONS faced with demographic sparsity: essentially acknowledges that the regional level is a much appropriate level for making the synthesis between the territorial challenges and opportunities linked to sparsity and the policy apparatus.

SPARSE **TERRITORIES**: designates territorial entities of SPA based on a clustering of sparsely populated localities into coherent territorial ensembles, both geographically and socio-economically, in the spirit of Lévy's (2011) definition of territories as "belonging to a field of spaces relating to the social world"³⁹. This level of analysis brings together the notion of 'sparsity' as a measurable topographic feature and a specific territorial context for developing socio-economic activities.

Methodology

In our methodology, sparsity relates to a low level of population potential. The population potential represents a measurement of the number of persons that are within a reasonable commuting distance of each "point" in Europe. The commuting space for each point can be conceptualized either as "isotropic" i.e. one can commute in all directions equally, or as "directed", i.e. commuting can only occur along certain directions,

³⁹ Lévy, J. (2011) *Territory*, in Agnew J. and Duncan J.S (2011) *The Wiley-Blackwell companion to Human Geography*. Blackwell Publishing.

typically along existing transport corridors. The distance used for the isotropic population potential is calculated by using an as-the-crow-flies measurement within a radius of 50km. The directed population potential is calculated by using 45 minutes isochrones, using detailed road network modeling. Both calculations are made using grid cell data that are later aggregated to different administrative levels depending on the scale of the analysis. Equivalent criteria are also used within GEOSPECS to delineate other specificities.

The isotropic and directed models of population potential provide complementary understandings of the structure of the European territory: the former is purely based on the settlement structure, and the latter based on the structuring of the territory through the (mis)match between the settlement structure and the transport network. However, having low potential according to either of those models may have different implications with regard to policy action and relevance. Consequently, we have identified two parallel tracks for delineating low potential areas.

Sparsely Populated Areas

SPAs are delineated as the places (i.e. grid cells) in Europe with a population potential below the threshold of 100,000 persons. In the isotropic model of population potential, based on Euclidian distance of 50 km (i.e. as the crow flies), this threshold corresponds to a population density of 12.7 persons/ km². In the European policy-making spheres, the threshold of 12.5 persons/km² is generally used to identify regions (at NUTS 3 level) that fall into the 'sparsely populated' category.

According to the isotropic model, 17.2% of the ESPON space is sparse in terms of population potential. These *Sparsely Populated Areas* are mostly in Northern Europe and Mid-Spain. A few smaller areas with low population potential were also identified in the Baltic States, Corsica and some Greek islands (see blue areas in map 1).

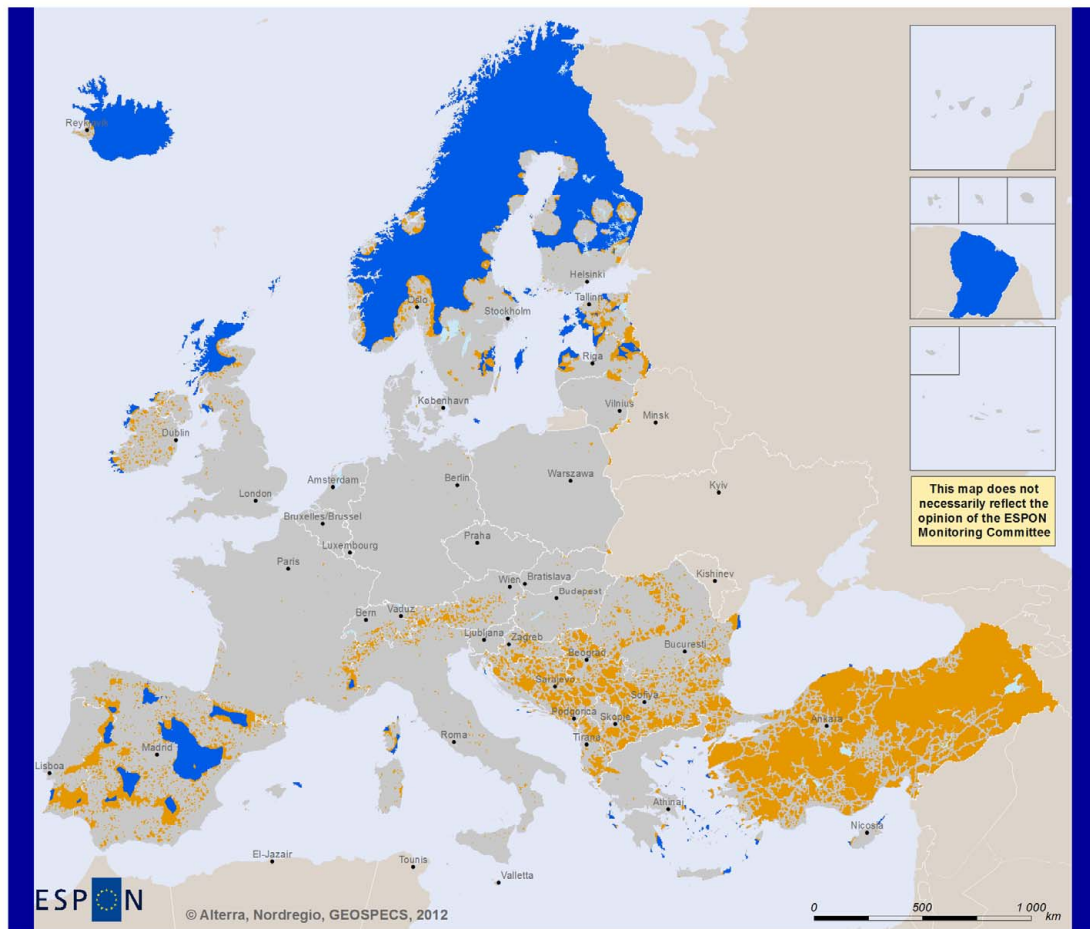
According to the directed model, based on time distances of 45 minutes on the road network, the area with low population potential covers 34.6% of the ESPON space. This figure correlates very well with the Euclidean distance of up to 50 km delineations. In addition, these *Poorly Connected Areas* can be found in vast areas in the Balkans, Turkey and in many mountain areas (see orange areas in Map 8).

Sparsely populated localities

The second level corresponds to the first aggregation of the population potential data at an administrative level. For this aggregation, the level used is the lowest level available on a pan-European basis: the LAU2 (formerly NUTS5) level. In this configuration, sparsity is understood as a local phenomenon, because it relates to how a community perceives its socio-economic integration with its surroundings. In concrete terms, sparsity 'in real life' corresponds to a relative perceived isolation of local communities from other places surrounding them. Consequently, the TPG proposes that aggregating the population potential grid cell data at the local level provides an insight to the localities that may run the risk of being isolated. For such communities, sparsity is a major challenge for their capacity for future sustainable development.

For each European locality (LAU2; LAU1 for Turkey), the proportion of the total municipal area covered by low potential areas (as defined above) was calculated. In total, 13,868 LAU2 units can be considered as 'partly sparse' or "totally sparse" as they contain at least one area with population potential below 100,000 inhabitants. There are, however, significant differences in the numbers of distance- and time-based sparse localities. While there are 2440 LAU2 units with low potential areas according to the isotropic model, there are 13,834 LAU2 units with low potential according to the directed model. 2375 LAU2 units have areas that can be classified as low potential according to both models. In addition, there are 71 localities, mostly in Spain, that could be classified as sparse according to the isotropic model, but not the directed model. All of these localities are located in the commuter catchment areas of the major cities, along major transport corridors, and are therefore excluded from the analysis.

In order to focus on the LAU2 localities (LAU1 in Turkey) where sparsity can be seen as a major challenge for regional development, only the low potential localities with at least 90% of their area covered by either isotropic or directed sparsity, are labelled as Sparsely Populated Localities or Poorly Connected Localities and thus included in the GEOSPECS delineation. According to this delineation, there are 1488 *Sparsely Populated Localities* and 2244 *Poorly Connected Localities* (Map 9).



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Areas with Low Population Potential

Population Potential in Persons in Areas below 100 000 Inhabitants Potential according to 50 km and 45 Minutes Delineations

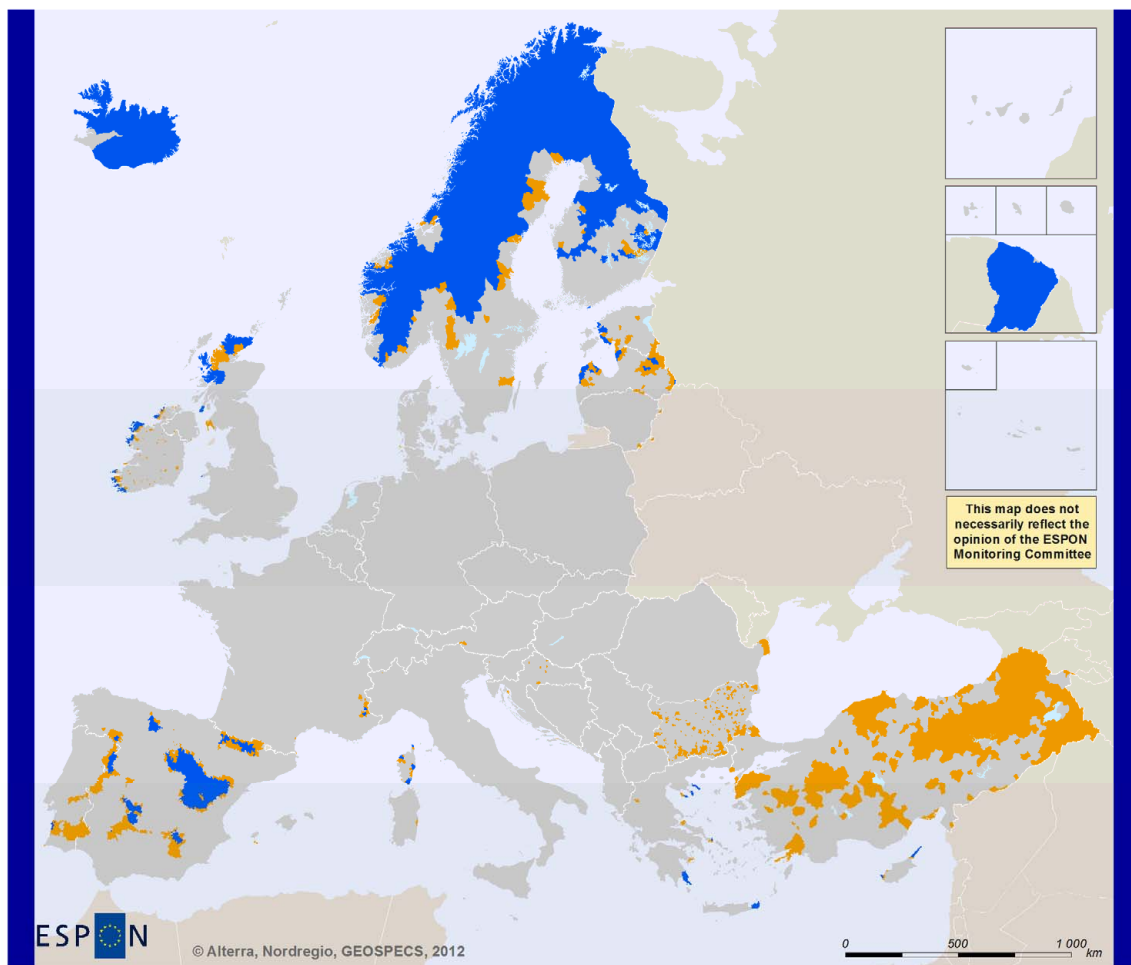
- Poorly Connected (according to the 45 min delineation only)
- Sparsely Populated (according to the 50km and 45 min delineations)

- Lakes
- ESPON Space
- Non-ESPON space

Map 8 Sparsely populated and poorly connected areas.

This map identifies 1x1 km grid cells with a population potential of less than 100,000 inhabitants according to the isotropic and directed models.

Two parallel delineations of low population areas have been developed in GEOSPECS: Sparsely Populated Areas, where transport infrastructure does not allow compensation for the low level of human resources available in the adjacent area; and Poorly Connected Areas, where the absence or inadequacy of the transport network means that they are not able to achieve the critical mass that is ideally available to them. In addition, there are some small areas located within the 45 minutes distance but beyond the 50 km radius, located in a scattered pattern along the main transport corridors.



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Sparsely Populated and Poorly Connected LAU2s

- Sparsely Populated (according to the 50km and 45 min delineations)
- Poorly Connected (according to the 45 min delineation only)

- Lakes
- ESPON Space
- Non-ESPON space

Map 9 LAU2s with more than 90% of the total area covered by SP Areas.

Many localities in Europe contain at least some areas with a low potential population potential. However, in GEOSPECS, the focus has been on LAU2 units where this is a predominant a feature. Only localities with over 90% sparsely populated areas have therefore been selected.

Population densities have not been used because they fail to take into account the geographic context of each LAU2 unit. Furthermore, they are largely determined by the way in which administrative boundaries are drawn.

Regions faced with demographic sparsity

The regional level is the level at which European Regional Policy is designed, implemented and monitored. In many instances, the regional level is considered the appropriate level to bring together the leverages available through European territorial policies and instruments (e.g. Structural Funds) and the development initiatives taken at local and national levels.

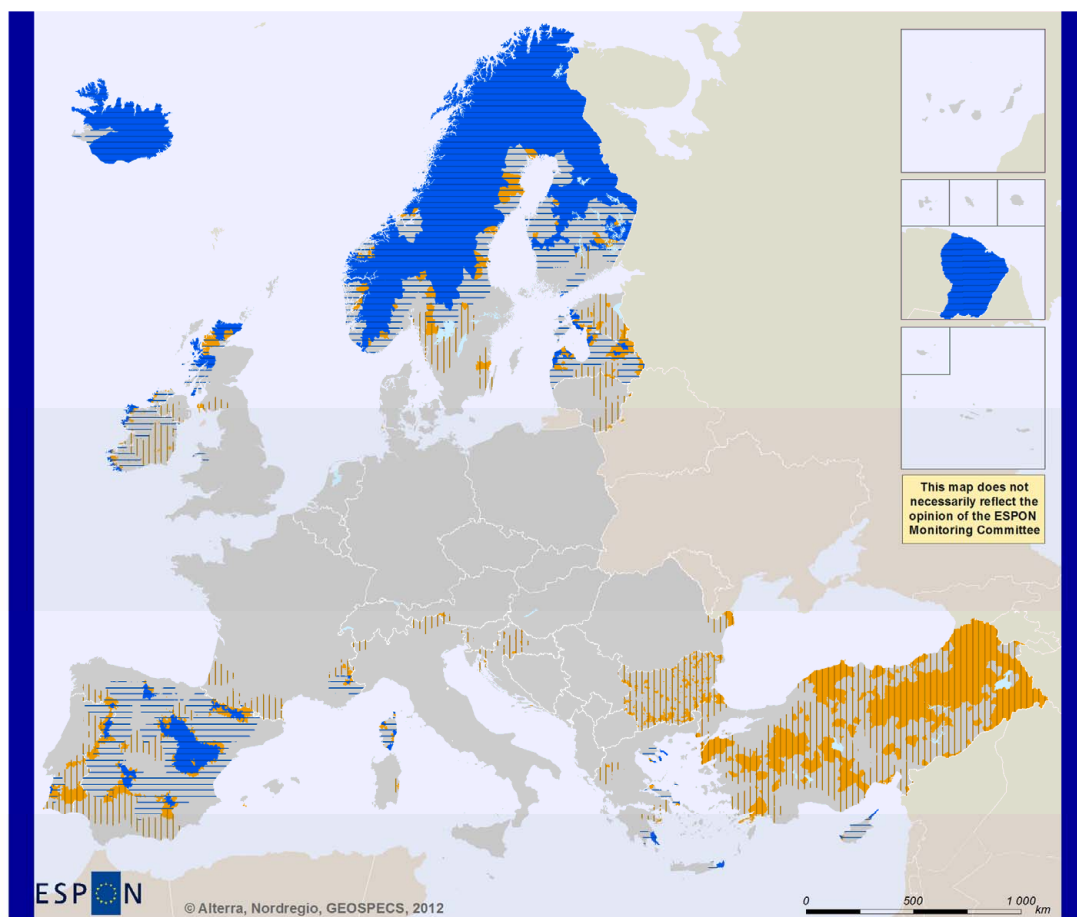
According to such criteria, sparsity becomes a 'regional' issue when a region includes at least one Sparsely Populated or Poorly Connected locality, i.e., there is at least one local community that is relatively isolated from the rest of the regional economy and labour market. In this regard, developing appropriate policy responses to mitigate the risk of 'territorial exclusion' of such communities should be on the regional agenda. At the NUTS3 level, there are 228 such regions.

In order to make it easy to compare the sparse LAU2 and NUTS3 regions, a map combining these two levels is included (Map 10).

Sparse Territories

Sparse Territories (ST) are territorial 'clusters' of SPAs that form, to our understanding, relevant geographical units for developing a spatial analysis of SPA, to promote a sharper understanding of the interplay between sparsity as a territorial notion and territorial development potentials. In that respect, ST may be seen as pertinent territorial entities for framing initiatives leading to increased interactions and exchanges in the SPA, especially with regard to economic cooperation and provision of services. Moreover, the ST can be seen as coherent territories for developing integrated 'regional' economic spaces, enabling the design of development strategies based on the compatibility of local specialisations, leading to regional economic diversity and enhanced competitive advantage.

A total of 39 Sparse Territories have been identified, based on geographic contiguity and proximity and close socio-cultural proximity of sparse LAU2 units (0). For most countries, the ST are based on the aggregation of the sparse units that are either 1) geographically contiguous (as in Spain) or 2) scattered within a country (as in Bulgaria). In the Nordic Countries, as the area of the ST would have been too large, the sparse areas in Finland, Norway and Sweden have been divided into larger units based on their geographic context and potential accessibility to MUAs of LAU2 units.



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Sparsely Populated and Poorly Connected LAU2s

■ Sparsely Populated (according to the 50km and 45 min delineations)

■ Poorly Connected (according to the 45 min delineation only)

NUTS3 regions that intersect with at least one sparse LAU2

NUTS3 regions with at least one Sparsely Populated LAU2

NUTS3 regions with at least one Poorly Connected LAU2

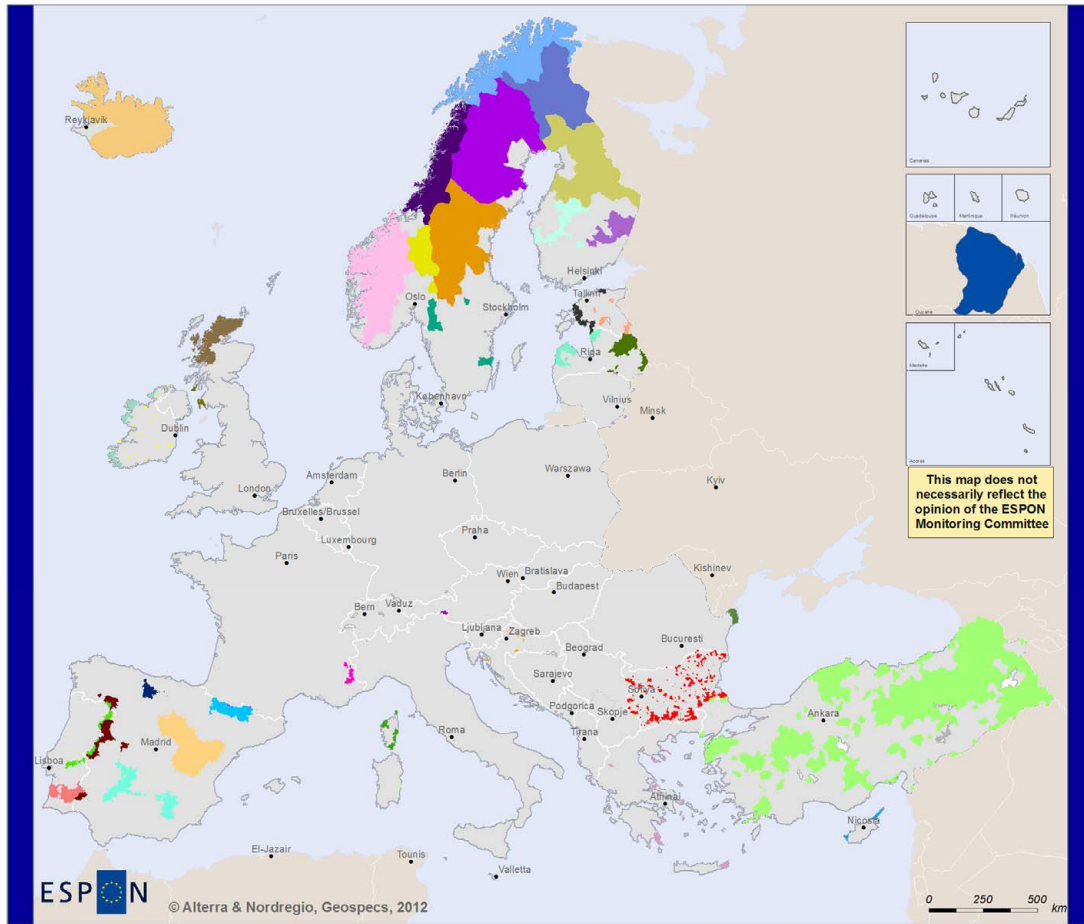
Lakes

ESPON Space

Non-ESPON space

Map 10 LAU2 and NUTS3 regions with low population potential.

When comparing the sparse regions at the LAU2 and NUTS3 levels, the challenge of the administrative structure is visible. Many of the sparse LAU2 concentrations are located around the borders of NUTS3 regions, so that the coverage on NUTS3 level is much larger. This is particularly visible in Ireland, Scotland (UK) and Spain where a relatively large share of the country is classified as sparse at the NUTS3 level. Notably, some capital and major city regions can be classified as 'sparse' if the delineation of 'at least one LAU2 unit' is used: e.g., the regions of Ankara, Helsinki, and Madrid.



Regional level: GRID
 Source: ESPON Database 2013
 Origin of data: ALTERRA 2011
 © EuroGeographics Association for administrative boundaries

Sparse Territories - Subdivision of Sparsely Populated and Poorly Connected LAU2 units

Sparse Nordic Territories

- Iceland
- Northernmost Finland
- Northern & Eastern Fin.
- Ostrobothnia & Mid-Fin.
- Savo and Karelia
- Troms and Finnmark
- Nordland
- Hedmark
- Southern Norway
- Northern Sweden
- Southern Norrland
- Southern Sweden

Sparse/Poorly Connected Western Europé

- French Guyane
- French Alps
- Corsican coast
- Sardinian coast
- Alpine municipalities
- Southern inland in Spain
- Western boundary in Spain
- Northern Spain
- Spanish Pyrenees
- Iberian mountain fringe
- Portugese border area
- Southern Alentino

British Isles

- Irish west coast
- Irish countryside
- Scattered areas in UK
- Scottish Highlands

Balticum

- Estonian coast
- Scattered municipalities in Estonia
- Scattered municipalities in Latvia
- Latvia coast
- Scattered municipalities in Lithuania

Eastern Europe

- Scattered municipalities in Bulgaria
- Cyprian outskirts
- Scattered municipalities in Greece
- Scattered municipalities in Croatia
- Romanian Danube delta
- Poorly connected areas in Turkey

Map 11 Sparse Territories: clusters of Sparsely Populated and Poorly Connected LAU2s

When comparing sparse territories at the European level, the use of clustered sparse areas can help us to understand the characteristics of those areas. These clustering can take two main forms, either as contiguous 'massifs', as in the Nordic countries, Scotland or Central Spain, or scattered 'archipelagos', as in Ireland, Bulgaria or Turkey.

The policy relevance of the sparsity debate needs to start with an adequate delimitation

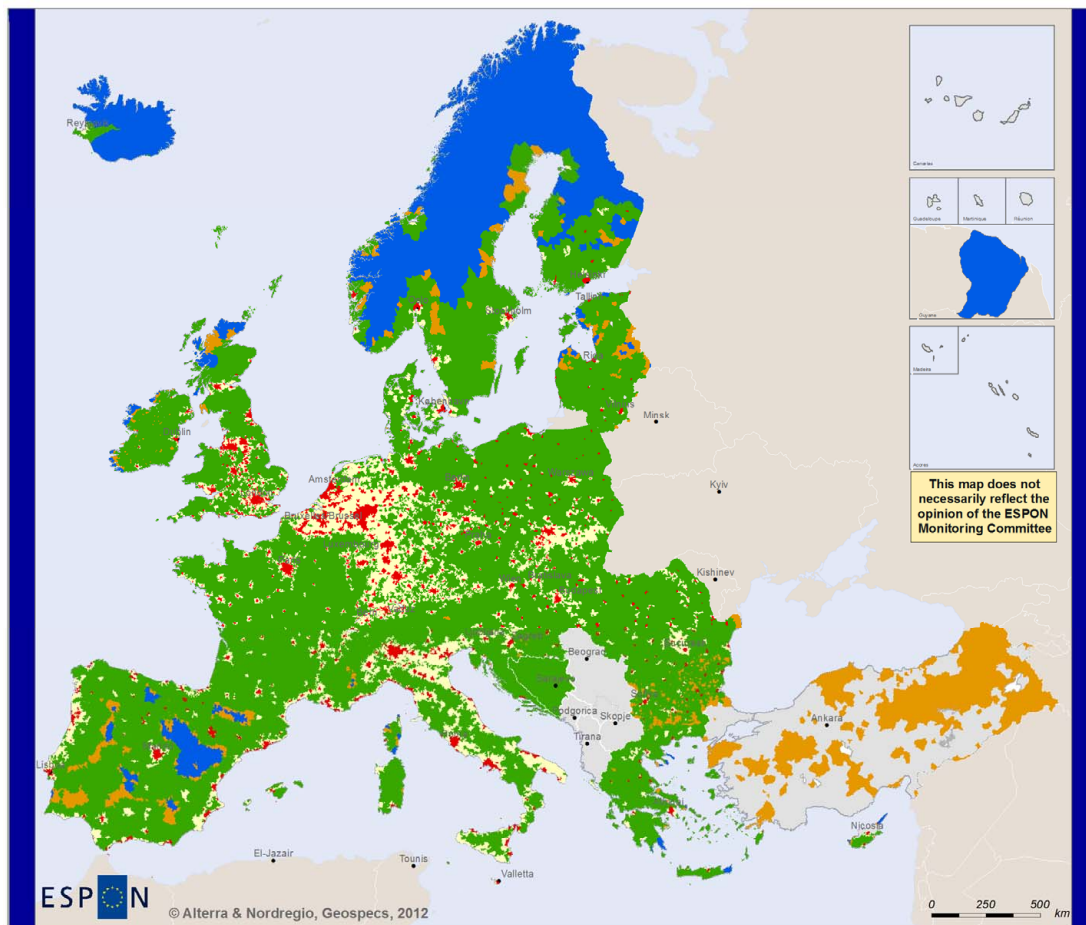
Sparsely Populated Areas (SPAs) entered the vocabulary of European regional policy-making with the Treaty of Accession of Finland and Sweden. Since then, the territories of Northern Sweden and Northern and Eastern Finland have been referred to as *Northern Sparsely Populated Areas*. The Green Paper on Territorial Cohesion proved to be a turnaround in the sparsity policy debate as it suggested that SPAs can be found in other parts of Europe as well.

In spite of this attention to SPAs, no European institution has yet produced a pertinent definition and delimitation of such territories. The first delimitation was provided by the European Commission in the framework of the Green Paper, based on a certain threshold (12.5 persons/km²) of population density at the NUTS 3 level. The main objective was to provide policymakers with a delimitation of immediate use for allocating support funds, rather than to rigorously identify the territories that are characterised by a sparsely populated environment. From the viewpoint of the TPG, the Green Paper definition misses the fundamental understanding of sparsity as about the perception of the living conditions for communities, i.e. both people and businesses, that are isolated due to their remoteness from main agglomerations and other neighbouring small communities.

More recently, Eurostat has developed a category of territories labelled as 'thinly populated areas' (note that this avoids the term 'sparsely' in order to distinguish itself from the Commission's definition). This delimitation is also fundamentally biased, as it identifies 'thinly populated areas' as the non-urban areas of Europe, thus contrasting this territorial category with 'densely populated areas'. Thus, Eurostat does not delimitate sparsity *per se*, but rather identifies various degrees of urbanness: 'Thinly Populated Areas' are thus considered as the areas of Europe with the least urban quality – they are defined *by default*. In effect, 'Thinly Populated Areas' consist of all non-urban areas in Europe. Moreover, the definition of urban areas by Eurostat misses a fundamental features of SPAs: the presence of dynamic local/regional urban centres at the fringe or within them. For instance, the important regional centres in the Northern part of the Nordic countries (Umeå in Sweden, Oulu in Finland or Tromsø in Norway) become 'invisible' in their typology. This is due to the methodology chosen by Eurostat that uses measures of population size and density at municipal level (and Nordic municipalities are large), thus creating this over-simplification of both urban and non-urban territories.

In this respect, GEOSPECS proposes a methodology that, if not perfect, intends to delimitate SPAs by focusing on what are understood as the key features of sparsity, i.e. the relative isolation of communities from other regional communities due to a loose settlement structure. As a result, the delimitation ends up with a more restricted territorial extent of SPAs than according to the Eurostat definition, but it is

more appropriate for use as an input in debates on regional policy as it provides a sound, understandable basis for developing adapted local and regional strategies for these territories.



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: GRID
Source: ESPON Database 2013
Origin of data: ALTERRA 2011; Eurostat 2011
© EuroGeographics Association for administrative boundaries

Degree of Urbanisation in Connection to Sparsely Populated LAU2 regions

- Sparsely Populated (according to the 50km and 45 min delineations)
- Poorly Connected (according to the 45 min delineation only)

- Degree of Urbanisation*
- Densely populated area
 - Intermediate area
 - Thinly populated area
 - No data/not included

*Degree of urbanisation based on Eurostat definition, where:

- Densely populated area: LAU2s which has a density of more than 500 inhabitants per km², AND where the total population is at least 50 000 inhabitants.
- Intermediate area: LAU2s which has a density superior to 100 inhabitants per km², and either with a total population for the set of at least 50 000 inhabitants or adjacent
- Thinly populated area: rest

Map 12 Degree of urbanisation and sparsely populated and poorly connected LAU2

Existing delineations of Sparsely Populated Areas, such as Eurostat's, are too broad and cover most of the non-urban territories in Europe. Our typology of sparse localities, which ends up being entirely included in Eurostat's Thinly Populated Areas category, is developed for identifying the areas of Europe for which sparsity is a major territorial issue.

3.2.4 Coastal areas

22 of the 27 EU Member States have coastlines (Eurostat, 2010; Weinstein *et al.*, 2007; Creel, 2003). The length of the EU coastline is estimated to be slightly over 200,000 km for the ESPON space as a whole, including Turkey (source: GEOSPECS calculations). In 2006, 177 million people (34,1%) lived within commuting distance of the coast (45 minutes) of the coast in the European Union, and a 182 million (35,1%) in ESPON space (excluding Montenegro). The corresponding figures within a wider distance of 90 minutes are 236 million (45,5%) for the EU27 and 242 million (46,8%) for ESPON space (excluding Montenegro) (source: GEOSPECS calculations).

Coastal areas function as interfaces between terrestrial and marine systems. Two notions need to be distinguished:

- The *coastline* is the physical environment where marine and terrestrial systems meet, geomorphologically varying from heavy indentations to long stretches of sandy beach.
- From a functional socio-economic perspective, the *coastal zone* is an area where the proximity to the coastline has a direct effect on socio-economic structures, trends and development perspectives, e.g. in terms of employment opportunities and residential attractiveness.

A multitude of varied and sometimes contrasting efforts have been undertaken to describe and define the coastal zone. They range from looking from a policy perspective and examining its physical attributes (Crossland *et al.*, 2005; O'Hagan and Cooper, 2001; Aurrocoechea and Pethick, 1986) or investigating the socio-economic and philosophical make-up of the coast (Thackray, 2005). A vast array of actors has interest in the coastal zone. Coastal zones serve as fishing grounds (i.e. sources of food), focal points for trade and transport, as recreational spaces, but they are also the habitats of a number of species. Ports in their function as gateways have historically attracted industry and population, a reason why coasts can be densely populated. The conflicts of interest that result from the high number of activities in coastal zones is reflected in policy documents: In general coastal and marine policy in Europe is driven by the negative impacts from human activities on natural coastal and marine resources, resulting in a host of policies that concern for example water management, pollution, bathing water, nitrates, shellfish, conservation, renewable energy, climate adaptation, floods and erosion.

This section explores the concept of the European coast. The objective is to identify in what respects it may be relevant to consider “coastal areas” as a category of territories for which dedicated policy measures or specific adaptations of regulation and policies would be needed.

The focus is on specific preconditions for social and economic development. However, a holistic approach to this issue implies that one needs to take into account aspects, as well as trying to better understand the physical environment that shapes the coast.

Historical and cultural concept of the coast

Almost every length of coastline bears a historic meaning and value (Thackray, 2005). When people first settled on the coast, the sea was viewed as an obstacle and a dangerous place (Amos and Manica, 2006; Thackray, 2005). Such views were expressed in numerous maritime legends, for example in the Danish King Canute’s eternal battle with the sea, demonstrating the limit of man’s power over the tides (Forte *et al.*, 2005). On the other hand, the sea has consistently attracted people to its shores (Martínez *et al.*, 2006). Archaeological evidence has shown that much of the diet of early humans consisted of intertidal shellfish (Marean *et al.*, 2007). European coasts have been settled on, fished off as well as ploughed, grazed, quarried, mined, visited and fought for (Thackray, 2005), and became focal points for trade (Mee, 2010; Weinstein, 2009). Forte *et al.* (2005) argue that the success of the Viking colonial episodes of the 8th and 9th centuries may not have occurred without them being a seafaring people intrinsically linked to the coast. The Viking expansion was also responsible for laying the foundations for urban settlements and trading economies of much of coastal UK, Ireland and northern France.

Famine, war and colonisation have also contributed to historical migration towards the coast: e.g., between the 15th and 19th centuries, population movement towards the European coasts was caused by inter-regional wars and colonialism (Mee, 2010). Successive waves of human migration to the coast have continued right up to the present day, and have now reached their most intense level (Curran and Agardy, 2004). More recently, economic necessity has provided the impetus for the enormous shift of the world’s population to the coast (Weinstein, 2009; Creel, 2003), resulting in large coastal conurbations or “mega-cities” drawing even more people seeking employment. In Europe, coastal regions are home to 196 million inhabitants, most of who live in cities (Eurostat, 2010). By extension, this phenomenon, plus seasonal visitors, can have a negative

impact not only on the ecology of the coasts but replacing a traditional way of life, often accompanied by loss of associated cultural assets. According to UNESCO (2011), many of Europe's threatened languages are found in coastal regions, e.g., Asturian, Basque, Breton, Irish, many of the Sami languages and Welsh; some are already extinct, such as Cornish, Manx Gaelic and Dalmatian.

In a cultural sense, the coast has inspired and sustained artists, musicians and writers throughout the centuries. Art, in the form of literature, paintings and music, documents people's history with and perception of the coast (Thackray, 2005). Music is a very powerful element of coastal and marine culture, where sea songs or "shanties" were sung to keep the rhythm of work onboard ships. These folk songs have survived as an important part of Europe's cultural heritage, describing the land and seascape, the people and a way of life shaped by the sea. The coast and the sea, perhaps, conjure up no stronger image than of those who work there, in particular, the fishermen. Much of the music and poetry of the sea derives from the intimate connection that fishermen have with it, a connection that typically permeates through several generations: fishing is also important for communities not just as a means of earning a living, but as a way of life with more deeply embedded cultural relationships (Urquhart and Acott, 2011). The rich cultural heritage linked to fishing in Europe also contributes to attracting visitors to the coasts, thus laying a foundation for the economic success of coastal tourism. For these visitors, the coastline is associated with recreation and relaxation. It is seen as a place of holiday where scenic land and seascapes, as well as particular cultures and histories associated with the coast and the sea, are the main attractions (Rodriguez, 2001).

The coast from the social and economic point of view

Economy

The economic value of the coast can be assessed in a number of different ways (Barbier *et al.*, 2011; Cooper, 2009; Martínez *et al.*, 2006). Cooper (2009), for example, suggests three approaches: the economic value of sectors of human activity; ecosystem services; and the market value of property and land in the coastal zone. The largest influence on coastal economies is the first approach, the sectors of human activity. Evidence suggests that international trade increases significantly in coastal economies (Behrens *et al.*, 2006) compared to their landlocked counterparts: e.g., on average, trade volume for landlocked countries is less than 40% compared to countries with a sea border (Limao and

Venables, 2001). The second of Cooper's approaches, ecosystem services, is defined as value derived from the physical environment for the benefit of people, such as seafood, drinking water, energy, minerals, and regulating services such as carbon sequestration, water purification and nutrient dispersal. Such services are intrinsically linked to coastal ecosystems discussed further in section 4. The world's estuarine and coastal ecosystems are experiencing a significant loss of species diversity due to human activity (Barbier *et al.*, 2011; Martínez *et al.*, 2006) reducing their ability to provide ecosystem services, which will be further accelerated through the impacts of climate change (Kopke and O'Mahony, 2011; Cooper, 2009; Costa *et al.*, 2009). Climate change can potentially alter the economic profile of a coastal region, as local businesses from various sectors (e.g. coastal and marine tourism, fisheries, and residential housing) will have to face a number of challenges, in particular sea level rise, recurrent and more dramatic storms, and flooding events. These have the potential to disrupt day to day business and living conditions in affected areas, and at significant financial cost (Kopke and O'Mahony, 2011; Cooper, 2009, Costa *et al.*, 2009). Cooper's third approach, land and property value is discussed below in sub-section 3.3.

Social

Some of the world's largest metropolitan areas are situated on coasts, and recent migration towards the coast has been remarkable (Martínez *et al.*, 2006; Curran and Agardy, 2004; Creel, 2003).

In the ESPON space⁴⁰, LAU2 units within commuting distance of the coast and contiguous to the coast have an average population density of 149 inhabitants per km², which is 44% higher than the average (103 inh./km²). The corresponding figure for EU27 is 186, which is 66% higher than the average (111 inh./km²). It is however notable that the area situated at more than 45 minutes and less than 90 minutes from the coast has a population density that is significantly lower than the average (80 inh./km² in ESPON Space and 91 inh./km² in the European Union. The coast is therefore an area with a contrasted settlement pattern where population generally concentrate close to the coastline (0 and Table 9).

⁴⁰ excluding Croatia, Turkey and Macedonia

Table 8 Population densities in coastal areas and the inland in ESPON space¹

	ESPON space*				
	Area	Population 2001	Population 2006	Pop. Density 2001	Pop. Density 2006
45 minutes + contiguous	1 337 520	177 439 244	182 231 092	145	149
Between 45 and 90 minutes	757 832	56 324 614	60 564 608	74	80
90 minutes + contiguous	1 979 734	233 763 858	242 795 700	118	123
Other areas	3 059 739	260 589 873	276 213 956	85	90

Table 9 Population densities in coastal areas and the inland in the European Union

	EU27				
	Area	Population 2001	Population 2006	Pop. Density 2001	Pop. Density 2006
45 minutes + contiguous	954 840	173 387 976	177 289 920	182	186
Between 45 and 90 minutes	690 201	55 979 146	58 953 801	81	85
90 minutes + contiguous	1 645 042	229 367 122	236 243 721	139	144
Other areas	2 766 161	252 832 917	256 353 060	91	93

However, coastal population densities are unevenly spread: sparsely inhabited rural coastlines contrast with extremely high-density urban areas. A very high population density of over 200 km² is registered in the coastal zones of Malta, Belgium, Netherlands, United Kingdom, Portugal and Italy, while Northern Scandinavia and the Baltic have Europe's lowest coastal population densities (0).

Table 10 Population densities in coastal areas (LAU2 at less than 45 minutes from the coast or contiguous to the coast)

Code	Country	2001	2006
AL	Albania	-	211.4
BE	Belgium	487.6	496.4
BG	Bulgaria	154.6	154.7
CY	Cyprus	78.5	89.4
DE	Germany	204.1	206.0
DK	Denmark	124.7	143.4
EE	Estonia	57.1	55.8
ES	Spain	298.3	333.8
FI	Finland	53.8	55.2
FR	France	120.2	127.3
GR	Greece	115.8	119.3
HR	Croatia	84.4	-
IE	Ireland	86.1	94.3
IS	Iceland	3.4	3.6
IT	Italy	263.4	269.5
LT	Lithuania	98.8	91.4
LV	Latvia	84.9	82.6
ME	Montenegro	-	49.5
MT	Malta	1251.1	1283.8
NL	Netherlands	537.9	549.2
NO	Norway	21.0	21.6
PL	Poland	178.1	178.9
PT	Portugal	323.7	319.7
RO	Romania	112.1	117.1
SE	Sweden	55.3	56.9
SI	Slovenia	86.6	88.7
TR	Turkey	247.6	-
UK	United	263.4	251.6

- : No data

Coasts are generally considered to be desirable places to live because of the scenic landscape and/or lifestyle (Fontaine and Rounsevell, 2009; Datzira-Masip and Julia-Eggert, 2008; Rodriguez, 2001). As property and land values in many coastal areas are inflated due to high population densities, a large proportion of the population, often less affluent younger generations, is excluded from living near the coast, often where they grew up (Gervais-Aguer, 2006; Bryden, 2000). This phenomenon is coupled with, and in some cases caused by, an influx of a generally older population “equipped with a decent purchasing power”, are willing and able to pay the increased prices (Gervais-Aguer, 2006). Ostend, Belgium, is an example of an area that has experienced an influx of older more affluent retirees (Delaney *et al.*, 2010). Retirees tend to move down the metropolitan hierarchy when migrating, i.e. from cities to smaller towns and villages (Longino and Bradley, 2003; Bryden, 2000). In 2007, 41% of people aged 65 and over resided in EU coastal regions. In almost 60% of EU coastal regions, the share of seniors is higher than the national average (Eurostat, 2010). Physical amenities, pleasant climate, scenic value and proximity to the sea are the most common determinants of such migration (Fontaine and Rounsevell, 2009; Rodriguez, 2001).

Rodriguez (2001) suggests that elderly people who reside for relatively long periods and repeatedly in the same holiday destinations are often looking for a more permanent residence. Datzira-Masip and Julia-Eggert (2008) find that, in Spain's Costa del Sol, the preference for retirement locations was based on comfort and previous experience.

Fuelled by increased wealth, an ageing society, better infrastructure and tax incentives, second home ownership in the coastal zone has substantially increased in recent years (Quinn, 2004). The consequences of such developments do not only shape the socio-economic fabric of a coastal region: so-called "ghost" estates both impact negatively on the lifestyle of the host communities and drastically alter the physical nature of the area. Many coastal regions in Europe have experienced a surge of housing construction in the last decade, but the problem is particularly acute on the coasts of Ireland, the Spanish Mediterranean and the French Atlantic (Datzira-Masip and Julia-Eggert, 2008; Gervais-Aguer, 2006; Quinn, 2004). In 2006, 28% of the total demand for residences in Spain was from holiday-makers, which was predicted to rise to over 50% by 2011. Datzira-Masip and Julia-Eggert (2008) suggest that this phenomenon is caused by a combination of relaxed planning laws, affordable accommodation and tax incentives. In Ireland, the construction boom of the now defunct 'Celtic Tiger' economy was unprecedented in the country's history, leading to a flood of holiday homes in large tracts of the coastal zone (Quinn, 2004).

Landing Points

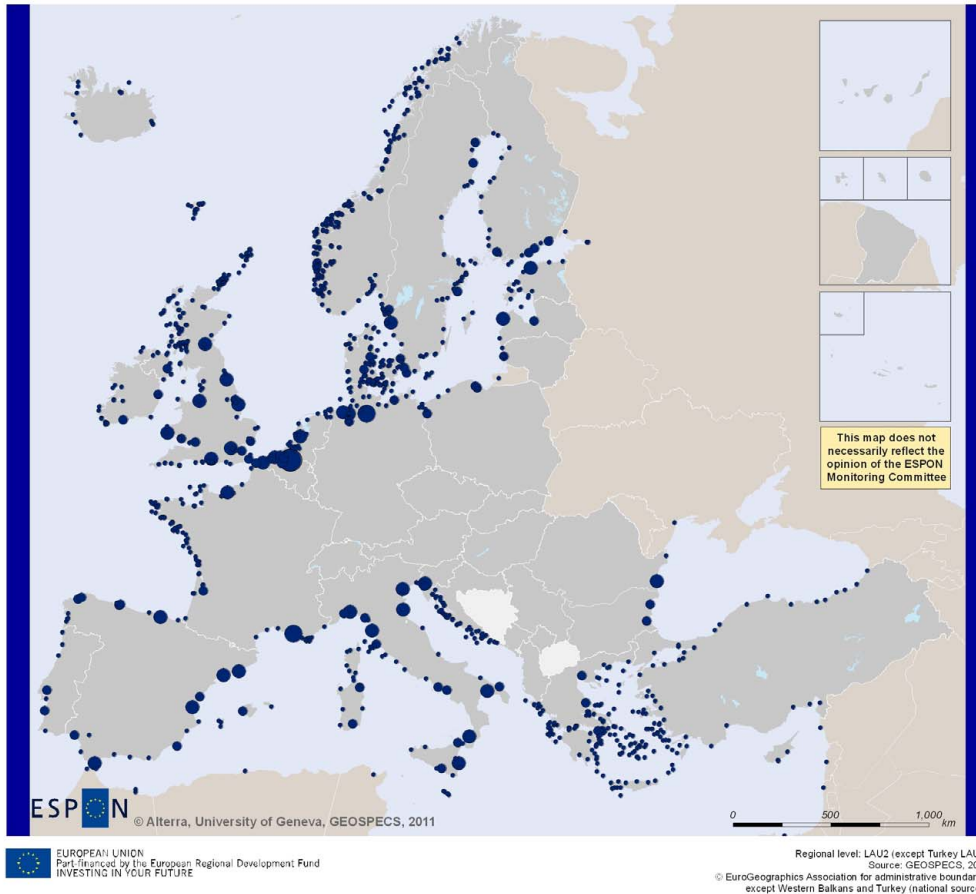
The notion of 'landing points' may be a useful geographic, social and economic descriptor in order to explore coastal specificities. Landing points, principally in the form of ports, are unique to coastal zones. Landing points or ports act as a 'hinge' for the interplay of social-economic indicators. In one sense, it can be argued that the basis of socio-economic activity in many coastal areas has been the development of ports. Evidence shows that access to the coast and open trade policies increase the per capita income in a country by more than 20% (Redding and Venables, 2004). In the UK, for example, the orientation of ports has a vital role for market access in determining the geography of trade (Behrens *et al.*, 2006). UK ports nearer continental Europe (e.g. Dover, Southampton, and Felixstowe) have a significantly greater level of trade activity than most other ports in the country. According to British Ports Industry⁴¹, 95% of Britain's trade is conducted through its ports and the

⁴¹ Source: <http://www.britishports.org.uk/uk-ports-industry/market-overview>.

value of goods passing through ports in 2006 was £340 billion. On a European level, trade through EU ports was valued at over €700 million in 2007 (Eurostat, 2009) (see Map 13).

Ports are the primary gateways for operations such as ferries, containers, oil, leisure, fishing, bulk goods and general cargo. The location of many petro-chemical and pharmaceutical industries coincides with sufficiently large and deep ports. Ports are central, not only to trade, but also to a range of other social and economic activities that have a marked influence on the structure of local employment, demography and social profile. For example, Eurostat (2010) finds that employment in the coastal zone is greatest where there are large urban centres, tourist hotspots or large harbour or port infrastructure. In 2007, 410 million people embarked or disembarked in EU coastal regions (Eurostat, 2010). However, as illustrated in Map 14, these flows of people are concentrated in a small number of regions, again reflecting the highly disparate socio-economic and physical nature of the coastal zone. 77% of marine passengers depart or arrive in only 9% of coastal regions. The coastal region of Attiki in Greece, for example, has the highest frequency of passengers in Europe, with 48 million people annually passing through its ports. The reasons for this are two-fold: first, Greece consists of numerous well-scattered islands and travel by sea is the most convenient means of transport; second, tourism is by far the largest industry in Greece, and 'island-hopping' is a very popular way for holiday-makers to see the country. In areas of short sea crossings, for example between Denmark and Sweden, and France and England, there are also significantly high numbers of people passing through its ports.

Ports have a powerful influence on the sociological structure of settlements because host a multitude of cultures and languages and, as such, influence the composition, outlook and philosophies of the settlements. Industry and populations have historically developed around ports, which also act as gateways to other, perhaps more exotic places, exposing a place to foreign influences, either through the transience of ship workers and transport hauliers, but also via economic migration – both inwards and outwards. Migration is much more prominent in the enlarged European Union, especially since the inclusion of many Eastern European states, which resulted in a large-scale east-west flow of workers (Kraus and Schwager, 2003).



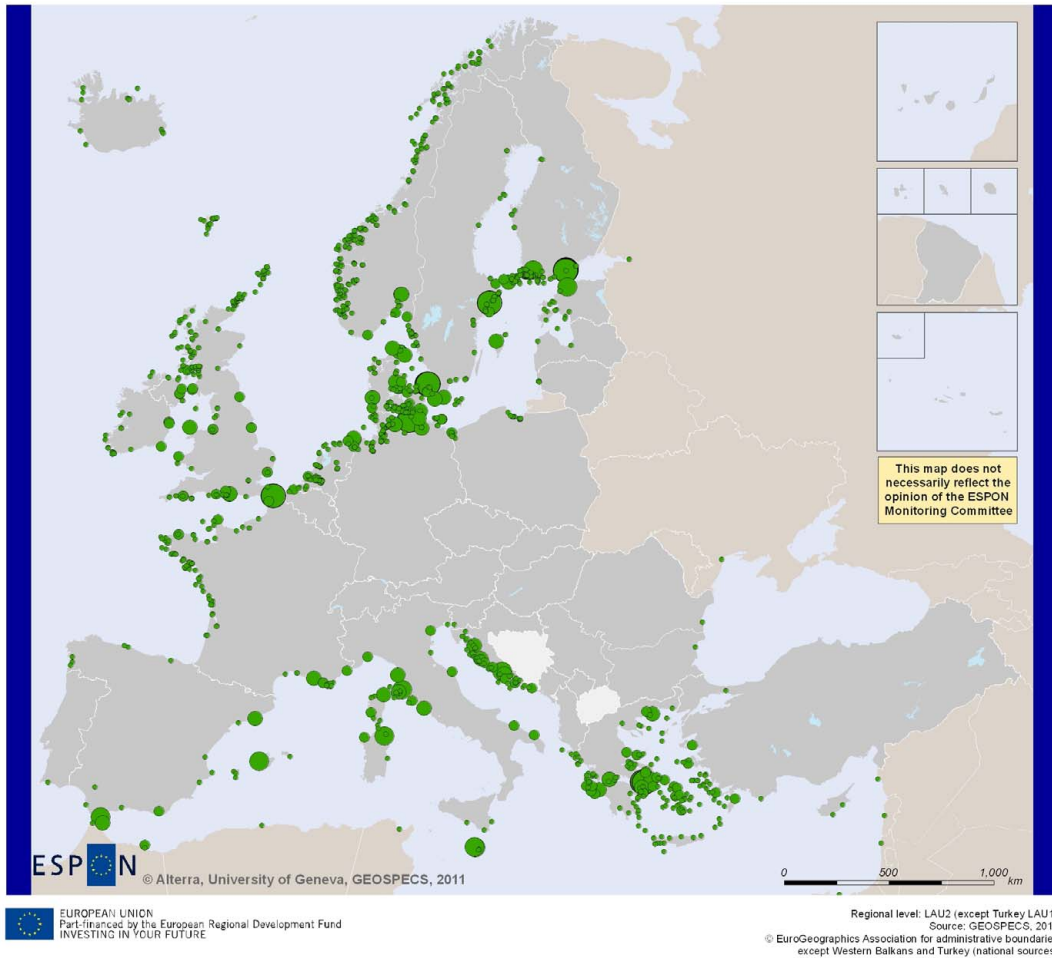
Goods transported/ thousand tonnes

2007

- < 7500
- 7501 - 27000
- 27001 - 74000
- 74001 - 165500
- 165501 - 374100

source: Eurostat

Map 13 Goods transported (inwards and outwards) in the EU coastal zone in 2007 (source: Eurostat)



Port Passengers/thousands

2007

- < 450
- 450 - 1500
- 1500 - 3200
- 3200 - 7000
- 7000 - 14400

source: Eurostat

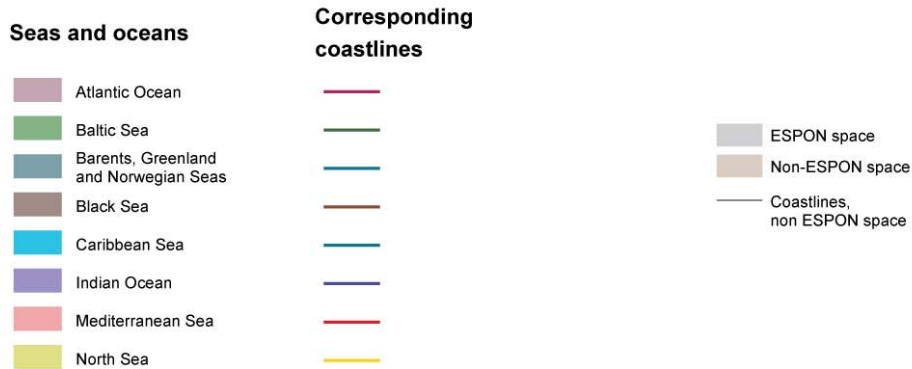
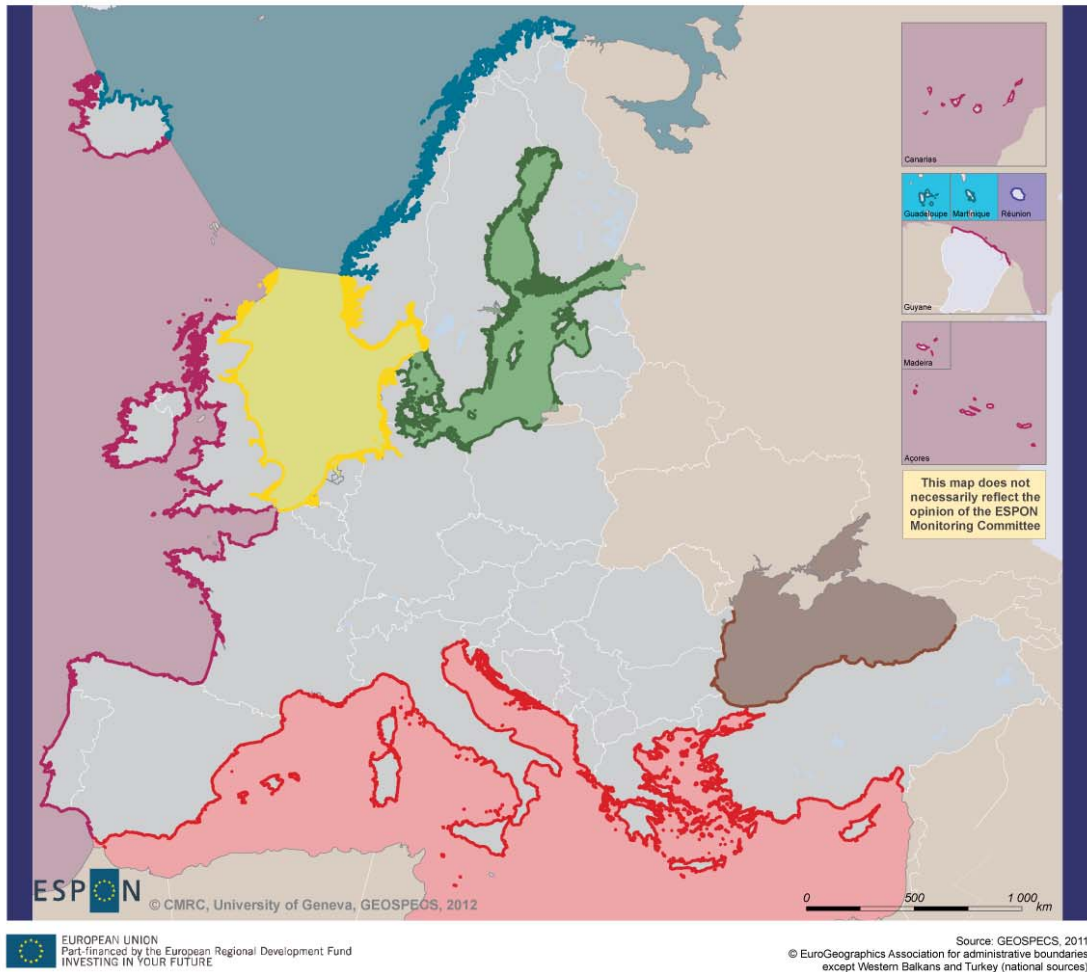
Map 14 Port passengers for the EU coastal zone in 2007

The physical/geographical concept of the coast

Europe's regional seas (e.g. the Mediterranean Sea, Baltic Sea, North Sea, Norwegian Sea, Greenland Sea and Black Sea) and its two oceans (Atlantic and Arctic) have diverse coasts in terms of their morphology, environments and ecology. They vary in climate and tidal regimes as well as being influenced by a diversity of socio-economic pressures. As part of the ESPON ESaTDOR project, Kidd *et al.* (2011) have outlined the general characteristics of these European seas in terms of their physical environments:

- The European Atlantic coasts range across a large geographical area, from Iceland to the southern tip of Spain, geomorphologically varying from heavy indentations to long stretches of sandy beach. Renewable energy (wave and wind) is being developed due to the availability of consistently westerly winds and substantial Atlantic swell.
- The Mediterranean coasts are dominated by micro-tidal regimes⁴² and long sandy beaches. Their high tourism concentrations and large-scale urbanisation result in environmental pressures: water shortages, inshore pollution and land degradation.
- The North Sea coasts have perhaps the largest variation in terms of physical environment. Areas devoid of human habitation, such as the north of Scotland and much of southwest Norway, stand in marked contrast to the large port regions of southeast England and the Dutch and Belgian coasts. Much of the North Sea coast is dominated by energy and transport infrastructure, with some of the largest wind farms and busiest shipping lanes in the world.
- In contrast, the northern coasts of the Arctic Ocean and Norwegian and Greenland Seas are extremely sparsely populated with low levels of urbanisation, while hosting some of the world's most fragile ecosystems. Climate change, which is more acute in the extreme latitudes, has the potential to drastically alter the region's ecology and morphology. The coasts of the Baltic and Black Seas suffer considerably from pollution in the form of eutrophication. Algal blooms are frequent, with major impacts on biodiversity. Both coasts are dominated by industry: in the Black Sea, by oil and gas transportation; in the Baltic Sea, by cargo traffic human activities that impact negatively on the abundance of marine species.

⁴² Source: www.eurosion.org/database/tidalregime



Map 15 Main seas border ESPON space and corresponding coastlines

The socio-economic development opportunities of coastal areas are partly determined by the sea they are bordering. For some areas, such as around the straits of Kattegat, Gibraltar and the Bosphorus, the fact of bordering multiple seas creates specific preconditions.

Natural coastal features and habitats

The factors that influence the formation and maintenance of the natural physical coast and its habitats are primarily natural processes such as waves, storms, tides, river sedimentation, uplift and subsidence, offshore currents, ice, wind and sea level change. The development of physical coastal landforms and features represents equilibrium between wave energy and sediment supply, adjusting under the constant influence of erosion and sedimentation (Swift *et al.*, 2004). These cycles of multi-temporal re-shaping dominate almost every stretch of European coastline. However the rate of change is more conspicuous in softer, sediment-based coasts than hard, rocky shores and cliffs (Devoy 2008; French, 1997).

Globally, coastal habitats and ecosystems are shaped in one of the most dynamic environments, and among the richest and most productive ecosystems. They are, however, highly susceptible to physical impact caused by natural and human factors (Airoldi and Beck, 2007; French 1997; Williams, 1990). European coastal areas harbour many important habitats and species that are geographically specific to the coast e.g. habitats in the intertidal zone. This zone alone hosts as many as ten phyla⁴³ of the animal kingdom, representing over a quarter of all animal species (Mander *et al.*, 2007). Wetlands, also highly productive ecological areas specific to the coast, provide important wintering sites for waders and wildfowl, roosting and feeding grounds, moulting sites and migration staging areas (Mander *et al.*, 2007).

Coastal ecosystems and habitats provide important ecosystem services e.g. flood absorption, filtration and groundwater recharge. For example, wetlands and beaches can act as effective buffer zones against tidal inundation (Gault and McSweeney, 2006; French, 1997). Considering the potential future impacts of climate change on the coast (e.g. rising sea levels, increasing frequency of extreme weather events), these landforms provide extremely important services to people living and operating on the coast (Kopke and O'Mahony, 2011). Wave activity can be absorbed by halophytic vegetation and sediment; more than 50% of wave energy is dissipated within the first 2.5 metres of a salt marsh, and it is virtually eliminated at 30 metres (Williams, 1990). However, human activities such as land reclamation, coastal development, overfishing and pollution threaten Europe's coastal habitats by causing the loss of physical available area and species and habitat diversity. Such impacts are particularly evident and acute in areas that have been historically centres of human

⁴³ Phyla (singular *phylum*) are taxonomic subdivisions of kingdoms, which group related species together according to body plan and internal organisation. There are 36 phyla of the kingdom *Animalia*

activities (Airoldi and Beck, 2007). Furthermore, habitat and species loss will potentially be accelerated by the impacts of climate change, altering the natural European coastal land and seascape, which could negatively impact on coastal tourism (Kopke and O'Mahony, 2011; Cooper, 2009).

The European coast as a policy object

Coastal areas represent the sea/land interface, where many use interests overlap, creating environmental pressures (Cooper, 2009; Weinstein *et al.*, 2007; Cummins *et al.*, 2004). The ambiguous extent of its boundaries is specific to the coast, rendering any political and legislative analysis quite complex (O'Hagan *et al.*, 2005). The expression the 'environment knows no borders' immediately loses meaning because the concept of administrative areas and borders is central to policy and legislation. There are seven maritime areas in which coastal states can exercise jurisdiction: internal waters, archipelagic waters, territorial seas (TSs), contiguous zones, continental shelves (CSs), exclusive economic zones (EEZs) and fishery zones (Maes, 2008). The Regional Sea Conventions can have the EU Member States and non-Member States as signatories: Oslo-Paris (OSPAR) Convention for the North East Atlantic; Barcelona Convention for the Mediterranean (including a specific ICZM protocol); Helsinki Convention (HELCOM) for the Baltic Sea; and the Black Sea Convention. These regional programmes facilitate activities focused on thematic, often common, issues, e.g. environmental quality, but they can also contribute to efforts to enhance Cohesion Policy.

Policies affecting the coast are numerous and vary according to their purpose, with a large range of issues associated with the marine and coastal systems in Europe (Meiner, 2010). In many instances, EU law is supreme over the law of individual Member States (O'Hagan *et al.*, 2005; Skjærseth and Wettestad, 2002). In terms of legislation concerning the coast, this is advantageous as most Member States have no specific coastal legislation (O'Hagan *et al.*, 2005). For example, coastal planning law for the most part involves only the terrestrial aspect of the coastal zone. The following sections give an overview of policy instruments and legislation that are specifically relevant to the European coast.

Integrated Coastal Zone Management (ICZM)

The problems associated with constructing concepts of the coast are well illustrated with the EU Demonstration Programme on ICZM. Launched in 1996, it was the first serious investigation into coastal management on a pan-European basis. Its central aim was to promote a holistic and

cohesive approach to coastal zone management involving all stakeholders and administrators (Cummins *et al.*, 2004). Underpinning the Demonstration Programme's 35 projects were (i) knowledge and experience exchange, (ii) fostering dialogue between the European institutions and stakeholders of the coastal zone and (iii) leading to a consensus regarding the measures necessary in order to stimulate ICZM in Europe (EC, 1999).

In 2002, the European Commission adopted a Recommendation based on the experiences and outputs of the Demonstration Programme. While Member States did not fully implement ICZM into their national law based on those recommendations, for the success of ICZM in Europe requires more political support at EU and national levels (Gibson, 2003). O'Hagan *et al.* (2005) suggest that the sectoral nature of coastal activities coupled with the loose definition of the coast (which disregards administrative boundaries) both impede the management process. Nevertheless, the Recommendation is now perceived as an important instrument in delivering the EU's Integrated Maritime Policy (IMP) (Long, 2011). A constituent of IMP, Maritime Spatial Planning (MSP) is seen as a key instrument in achieving integrated coastal management (Douvere *et al.*, 2006; O'Hagan *et al.*, 2005).

The Water Framework (WFD) and Ecosystem-based management (EBM)

The Water Framework Directive (WFD) in 2000, while not exclusively focussing on marine or coastal waters, constituted a new view of water resources management in Europe (Borja, 2005). The WFD divides the European seas into six different eco-regions: Atlantic Ocean, Norwegian Sea, Barents Sea, North Sea, Baltic Sea, and Mediterranean Sea (including the Black Sea) (Commission of European Communities 2000). The Directive's purpose is to protect groundwater, inland surface waters, estuarine waters, and coastal waters, with ecosystems being at the centre of the management decisions. Borja (2005) argues that the WFD is likely to influence management of all marine ecosystems because pollutants that originate in inland water basins inevitably pass through the coastal zone to open waters. Furthermore, the WFD was one of the first attempts to view the coastal zone in the context of a wider ecosystem, i.e. water basins. This has a profound implication for the political and legislative concept of the coast.

The ecosystems approach has increasingly become important for addressing the management of human activities in the marine environment (Long, 2011). The key principle is to manage human

activities in a way that preserves the entire structure and function of an ecosystem to maintain its capacity to provide products and services (Long, 2011; Ehler and Douvère, 2009). The reformed Common Fisheries Policy, anticipated in 2013, aims to implement the EBM (Maes, 2008). EBM is directly related to the requirements of other legal-binding directives such as the WFD and the Marine Strategy Framework Directive.

The Integrated Maritime Policy (IMP) and the Marine Strategy Framework Directives (MSFD)

The publication of the Integrated Maritime Policy (IMP) in 2007 was a major milestone in EU policy; its main objective is to maximise sustainable use of the oceans and seas while enabling growth of the maritime economy and coastal regions (Long, 2011; Meiner, 2010). This requires cross border and cross-sectoral work, promoting the integration of governance structures in the Member States and building scientific knowledge on the status of the marine environment (Commission of European Communities, 2007). The environmental pillar of the IMP is the Marine Strategy Framework Directive (MSFD), adopted in June 2008. The ecosystem-based approach is a core feature of the MSFD, which requires EU Member States to achieve “Good Environmental Status (GES)” of marine waters by 2020, to protect the economic and social resource that is the marine environment (European Commission, 2008b).

Maritime Spatial Planning (MSP)

MSP, also mentioned in the IMP, is a means to implement a more collaborative and integrated decision-making process in order to secure the sustainable development of marine areas (Meiner, 2010). The main drivers for MSP in recent years have been the increased activity on Europe’s seas and competition between sectoral interests, such as shipping and maritime transport, offshore energy, ports development, fisheries and aquaculture and environmental concerns. Among the key objectives of MSP are stakeholder participation, legal effect at the national level, cross-border cooperation and, perhaps most importantly, coherence between terrestrial and marine spatial planning (Ehler and Douvère, 2009; Maes, 2008). This last issue has the most bearing on the coastal zone. It represents a significant step forward in legislating for the coast’s multi-sectoral, cross-geographical nature, and constitutes a large shift in the traditional concept of managing the coast (O’Hagan *et al.*, 2005). Coasts will benefit the most from MSP because they have most to lose in the absence of coherent policy (Meiner, 2010).

Climate change and conservation

A range of policy instruments, agreements and legislation reiterate the wide range of issues that need to be addressed in the European coastal zone. The White Paper on adapting to climate change recognises the need to address potential impacts of climate change for Europe (Commission of European Communities, 2009a). The accompanying working document 'Climate Change and Water, Coasts and Marine Issues: an integrated approach' is specifically important for coasts as it addresses the requirements for increased resilience towards the potential impact of climate change within the coastal and marine environment, in relation to the human activities that taking place and depend on these environments (Commission of European Communities, 2009b).

At the EU level, the conservation of coastal and marine habitats is included within the Directives that also apply to terrestrial habitat and species protection (Directive 79/409/EEC and Directive 92/43/EEC). Both form the Natura 2000 network, which builds the foundation for Europe's nature conservation policy (Douvere, and Ehler, 2008). However, on an international level, the Ramsar Convention for wetlands of international importance and OSPAR Marine Protected Areas (MPAs) are specifically geared towards the protection of these coastal and marine areas.

Delineating coastal zones in Europe

For statistical analysis and measurement, Eurostat uses the NUTS 3 level to define the coastal zone by (Eurostat, 2010). Eurostat (2010) defines EU coastal regions as "regions with a sea border, regions with more than half of its population within 50 km of the sea and Hamburg". Such an approach may be relevant from a governance perspective, as proximity and contiguity makes the coastal dimension relevant issue for territorial policy making. However, it creates problems as areas with a small population density where coastal regions that include large inland areas e.g., northern parts of Scandinavia. Other methods of delineating the coast are often employed for a specific purpose and are therefore varied: e.g., immediate land/sea boundary extending in metres in both directions (land/sea), or visual distance from the sea (Hynes and Farrelly, 2011).

When seeking to understand how proximity to the coast influences socio-economic structures, trends and development perspectives, it seems more relevant to consider the distance of individual communities (i.e. LAU2 units) to the coast. One can also consider the specific effects of contiguity

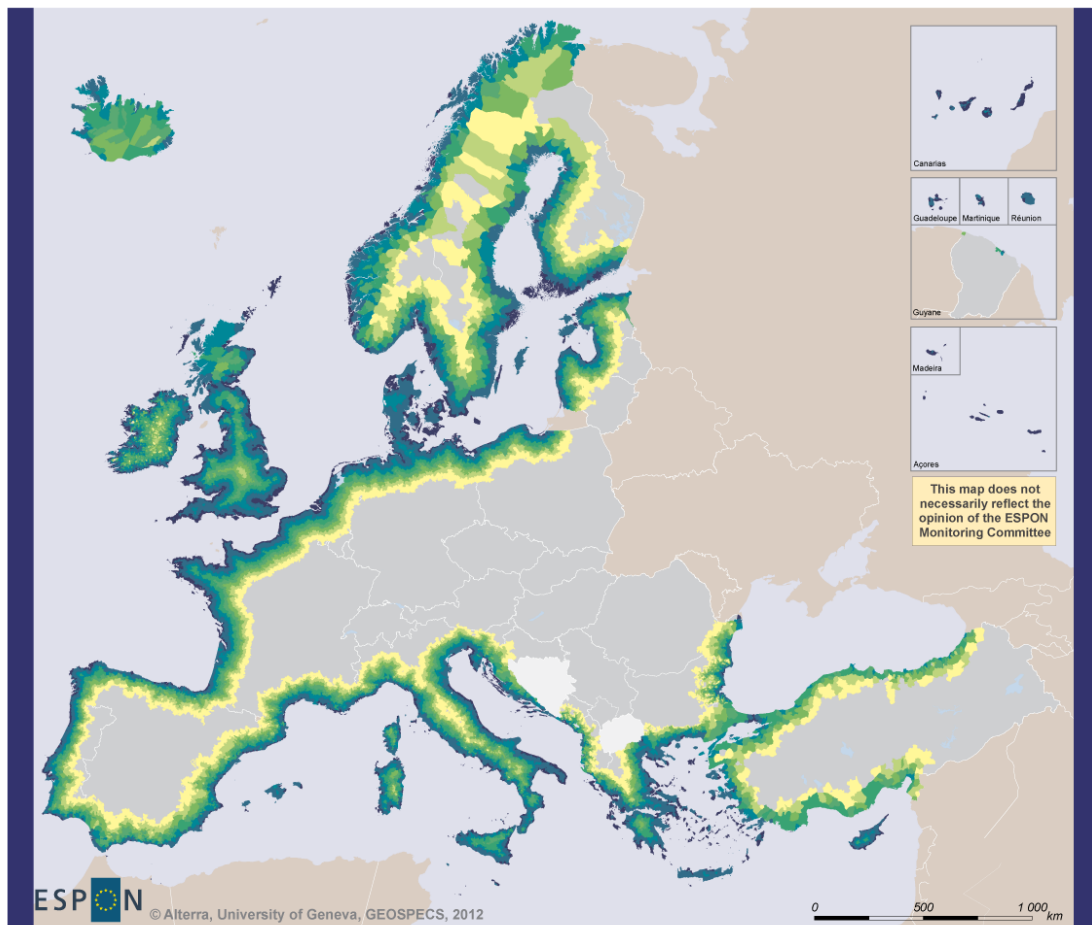
and of proximity to so-called “landing points” where resources from the sea or transiting through the sea arrive.

Therefore, GEOSPECS does not consider it meaningful to produce a fixed delineation of coastal zones. The objective is on the contrary to identify the various the ranges of mobility and interaction associated with the different types of coastal effects. Two of the hypotheses to be tested are whether areas within commuting distance to the sea (45 minutes by the road) and contiguous to the sea exhibit specific socio-economic patterns.

Time-distances to the coast are calculated in each LAU2 unit are based on the average of time-distance of 1x1 km grid cells within its boundaries. Some LAU2 that are particularly large or with a limited road network fall below time thresholds such as 45 minute in spite of being contiguous to the coast. When considering a coastal zone based on time distance, it appears purposeful to add these contiguous LAU2 units, as they have most of their settlements along the coast (see Map 15).

Time distances have also been calculated from each sea or ocean, so as to distinguish between coastal zones exposed to different types of marine influences and interactions with marine systems. For this purpose, the coastlines of the eight main Seas and Oceans of the ESPON space, including the outermost regions of the European Union, have been identified. Iceland, Norway, Sweden, the United Kingdom, France, Spain and Turkey have coastlines to multiple seas. The coastlines of the Shetlands and Orkneys have been assigned considered to be bordering the North Sea (see Map 16).

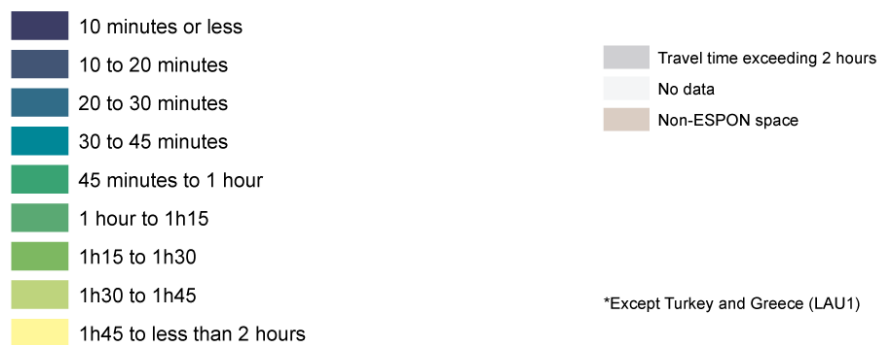
Travel time to the coast



ESPON
 © Alterra, University of Geneva, GEOSPECS, 2012

Regional level: LAU2 (except Turkey and Greece: LAU1)
 Source: GEOSPECS, 2012
 © EuroGeographics Association for administrative boundaries
 except Western Balkans and Turkey (national sources)

Average travel time to the coast from LAU2 units*



Map 16 Average travel times to the coast from LAU2 units

GEOSPECS does not consider it meaningful to produce a fixed delineation of coastal zones. The objective is on the contrary to identify the various the ranges of mobility and interaction associated with the different types of coastal effects.

3.2.5 Border areas

Borders in Europe are the result of a long evolutionary process which is closely connected to modernist nation building, but the very nature of state borders is nowadays increasingly changing due to the parallel influence of the European integration process and of the on-going globalisation process.

The modernist nation-building process started throughout Europe with the Peace of Westphalia in 1648, which initiated a new political order in central Europe based upon the concept of sovereign states, and the subsequent establishment of the first absolutist monarchies during the 17th century. This process continued over the next three centuries. It created a new reality at the "edges" of these sovereign nation states (i.e. along their borders) which was completely different from the situation during the Middle Ages, where a more dynamic interpretation of territorial boundaries and the existence of neutral and also more permeable areas called "frontier zones" or "marchlands" generally prevailed.⁴⁴

The emerging and further evolving nation-states now defined their borders more statically (i.e. as a clearly defined & demarcated border line, often following physical obstacles such as mountain chains, rivers, larger lakes, maritime separations) and also attributed to them a major new political and economic function which made them less permeable for all sorts of exchange relations. The main elements of this new function were the establishment of national codes of law; the streamlining and centralisation of the state's administrative apparatus; the establishment of a national economic policy, a national fiscal and monetary system (i.e. taxation & single currency), and a protectionist trade policy (through the introduction of trade barriers); and the creation of a unified national transport and communication system. These developments generated a considerable number of new border effects throughout Europe, often reinforcing the barrier effects caused by physical obstacles, which also penalised the areas situated along those national borders in a number of ways (see: Annex 3).

This European nation-building process and the re-shaping of state borders continued until very recently, as a result both of peaceful secessions or reunifications⁴⁵ and of violent secessions involving military clashes among

⁴⁴ **Bottin, M. (1996):** *La frontière de l'Etat. Approche historique et juridique.* In: Sciences de la Société, no. 37 / février 1996. **Mancebo, F. (2001):** *Discontinuités, lisières et territoires. Tentative de généralisation de la notion de frontière et de compréhension des dynamiques frontalières.* Manuscrit auteur, publié dans « Sud-Ouest Européen », 10 (2001) p. 77-87".

⁴⁵ e.g. in 1990 the former German Democratic Republic (GDR) joined the Federal Republic of Germany; in 1991 the former Union of Soviet Socialist Republics (USSR) was formally

different ethnic and religious groups (i.e. the dissolution of former Yugoslavia during the 1990s and the emergence of several new nation-states).

Since the Second World War, the previously static and rigid functions of the classical nation-state borders and many of the associated obstacles have started to change over ever larger parts of the continent due to **the influence of the European integration process**. This first began in Western Europe with the creation of the Council of Europe (in 1949) and the European Communities (in 1951 & 1958). The latter, in particular, then slowly expanded over the following decades (1960s & 1970s) and was significantly widened and deepened from the mid-1980s. Several closely interconnected developments have changed and continue to substantially change the nature of borders in Europe.

Since the late 1980s and during the 1990s, the further deepening of the EU integration process⁴⁶ dismantled many economic, social, political-regulatory and also monetary border obstacles along the old internal borders of the EU12 and, after the enlargement in 1996, also along the internal EU15 borders. This has led to the "re-introduction" of prevalently dynamic and open borders, which generated new economic development dynamics perspectives within the EU15 and also stimulated the emergence of a new territorial dynamism and alternative patterns of spatial integration.⁴⁷ Moreover, continuing obstacles and barriers along the internal and external EU borders were more proactively tackled by newly introduced EU-level policy initiatives (especially since the launch of the INTERREG Community Initiative in 1990).

With the successive Eastern enlargement of the EU (in 2004 & 2007), which became possible after the fall of the "Iron Curtain" (beginning of the 1990s) and the subsequent economic transition and democratic development in Central and Eastern European Countries, the new Member States were "melted" into the Single European Market Economy and the wider EU integration process. This further increased the Union's cultural diversity and internal socio-economic disparities, but also created new opportunities for exchanges, investments and co-operation. This changed

dissolved, leaving all fifteen republics of the Soviet Union as independent sovereign states; in 1993 the former Czechoslovakia was peacefully dissolved and formally separated into two completely independent countries: the Czech Republic and the Slovak Republic.

⁴⁶ i.e. through the successive implementation of the Schengen Agreement (since 1985) and of the Single European Market legislation (since 1987), the establishment of the European Union (in 1993) and the creation of the Euro-Zone (in 1999).

⁴⁷ Traditionally, the most common patterns of spatial integration are local, regional and national. More recently, alternative options in terms of cross-border, transnational and inter-regional co-operation are intensively pursued as a response which is well-adapted to the dynamic change of the nature of borders in Europe.

the situation along the new internal EU borders, which *became more porous, permitting and encouraging more investment capital, consumer goods, services of all kinds, and, most dramatically, newly-minted EU citizens to pass relatively unimpeded from one country to another.*⁴⁸ Much of the Western European capital rushing into Central Europe focused on the western border areas of Poland, Slovakia and the Czech Republic, where more amenable tax regimes and lower wages/labour cost invited investment by outsourcing industries, ranging from major companies to small businesses.⁴⁹ Although seasonal and temporary labour could also move more freely from East to West, the degree of real border openness remained, and still remains, limited for permanent labour migration or cross-border commuting.

In a Pan-European perspective, the EU enlargements and the further evolution of the integration process considerably redefined the geopolitical landscape and the nature of many external EU borders (i.e. substantially increased overall length⁵⁰ & new positioning of the eastern external EU borders). This also brought to the surface a new "mentality map" redefining the notion of vicinity and neighbourhood which also (...) *is associated with new contradictions and divisions that create or redefine the perceptions and images of "us" and "others".*⁵¹ One specific new division which becomes visible especially in the East of the EU is that many state borders now functioning as new external EU borders became less permeable than in the pre-integration period. A first, more general, aspect explaining this development is that the Single Market freedoms and other advantages granted by the EU or the Schengen regime end at most of the external EU borders, with many implications for the economic and social exchange relations across these borders. The second aspect is the fact that most of the external EU borders now take over for the whole of the Union the "old" function of a rigid demarcation line which previously existed between the individual states.

These new border dynamics created by the European integration process are superposed by **the ongoing process of globalisation**, which characterises our post-modern era and increasingly integrates national/regional economies, societies and cultures in a world-wide

⁴⁸ **Williams, E. / van der Velde, M. (2005):** *Borders for a New Europe: Between History and New Challenges.* In: Journal of Borderlands Studies, Volume 20, No. 2, Fall 2005.

⁴⁹ **ibid.**

⁵⁰ Since the last enlargement in 2007, the European Union has slightly more than 13,000 km of external land borders with 19 different neighbouring non-EU countries. The shortest external EU-land borders are those with Gibraltar (1.2 km) and with the Vatican City (3.2 km), while the longest are those with Norway (2,348 km) and Russia (2,257 km).

⁵¹ **Topaloglou, L./Kallioras, D./Manetos, P. /George Petrakos, G. (2005):** *A Border Regions Typology in the Enlarged European Union.* In: Journal of Borderlands Studies, Volume 20, No. 2, Fall 2005.

network of political ideas, communication, transportation and trade. Although it is often argued that globalisation would generally lead to a less static nature or even a slow disappearance of existing borders, this assumption needs to be carefully re-examined for both the economic and the socio-cultural dimension of globalisation (see: Annex 4).

The above-mentioned political and societal macro-processes help indeed to better understand the historical roots and also the changing nature of European borders, but they cannot explain how and to what extent a border tends to affect the socio-economic development dynamics of areas which are located in the immediate proximity. Due to this, we now develop an analytical concept which will allow us to adequately appraise "borders" and the associated "border effects".

The multidimensional reality of "borders"

GEOSPECS considers that borders are in fact a multidimensional reality. This reality comprises simultaneously features which are directly associated with the polity- and policy-dimension of a border, but also a number of other features which are related to the particular physical/geographical, economic and socio-cultural circumstances prevailing along a given border. In order to analyse this multidimensionality within GEOSPECS, five different concepts are used which address each a particular feature of this reality (see: Annex 5).

The polity- and policy-dimension of a border is addressed by two concepts which are both line-focussed and also closely inter-connected. The most established and long-standing is the concept of **political land borders**, which needs, for a maritime nation, to be supplemented by the concept of **maritime boundaries**. The latter show similarities to the political land borders, but the concept is relatively new because it was put into practice only in the 20th century through multilateral international conventions and treaties.⁵²

The overall physical/geographical, economic and socio-cultural context settings prevailing along a given border are indeed strongly conditioned through domestic policy action on either side, but the overall results of this action also generate cross-border implications which can affect the socio-economic dynamics of areas being more or less distant from the political border line. Due to this, three additional concepts are used by GEOSPECS which consider such cross-border implications: the first relates

⁵² See for example: **Charney, J. I./Alexander, L.M. (eds.) (1996):** *International Maritime Boundaries*. Dordrecht, the Netherlands, 1993 and 1996.

to **natural obstacles**, the second to **economic discontinuities** and the third to **socio-cultural lines of division**.

In the following, these five concepts are now applied for briefly highlighting the main features which currently characterise the internal and external EU-borders.

Political land borders in the EU

Since World War II, the nature of many traditional political land borders in Europe has become more differentiated and more complex, due to the various European processes of intergovernmental co-operation and supranational integration (e.g. Council of Europe, European Union, Schengen Agreement, European Free Trade Association, European Economic Area, EU Customs Union, Euro-zone, agreements with the EU to mint Euros).

These integration processes eliminated neither the involved nation states, as such, nor their politically defined border lines. Instead, these processes established new "international political borders" which follow the existing national borders and create multiple overlaps of different border-statuses that affect both the internal and external EU borders (see: Annex 6 and Map 17). Those variable statuses also have concrete legal implications, because these new international political borders delineate - similarly to the traditional national political borders - the sphere of application of more general political principles⁵³ and established supranational legislation or rules⁵⁴, as well as of the use of new symbols representing an emerging supranational sovereignty⁵⁵.

Under this influence, the internal EU borders have indeed become more open for economic and interpersonal exchange relations and are now only partially, or often even completely, unguarded (especially borders within the Schengen Area⁵⁶). At the external EU borders, however, intergovernmental co-operation and the supranational regulations of the EU established a new political dividing line in recent decades. This also creates a stronger division between the notion of "us" and "them" which often ignores individual, social, historical, political or economic

⁵³ e.g. legal standards for democratic development & human rights enforced by Council of Europe; European Union citizenship etc.

⁵⁴ e.g. EU-legislation, Schengen-rules, EFTA-rules, EEA-legislation & rules.

⁵⁵ e.g. since 1985/86 use of the EU flag as the official symbol; since 2002 de-jure use of the Euro as the official currency of the Euro-Zone & de-facto use of the Euro by other countries.

⁵⁶ Today, the Schengen area extends along nearly 8,000 km of external land borders and nearly 43,000 km of external sea borders as well as hundreds of border crossing points.

circumstances⁵⁷ and has led in some cases to a further decrease in border permeability if compared to the pre-integration period (especially the eastern external EU borders). The most important drivers behind this process are mainly the increased "securitisation" of external EU borders and border crossing points, as well as the establishment of an externalised and internationalised regime of "shadow borders" which created new functional barriers affecting the free movement of people between Schengen and non-Schengen countries and, in particular, refugees and asylum seekers (see: Annex 7).⁵⁸

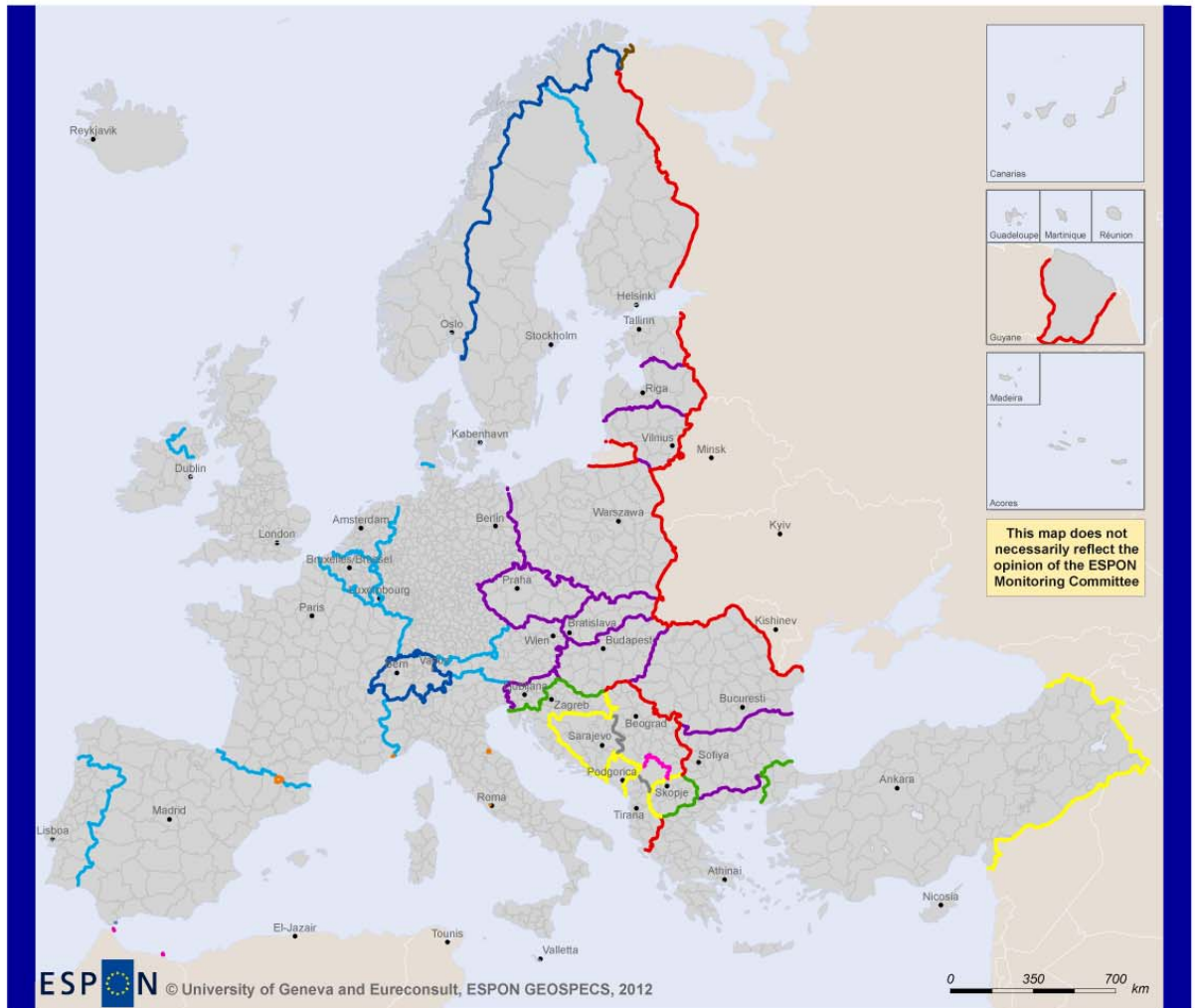
Disputes about the location of a political border continue to exist in some parts of the EU, despite its success in forming a bloc of peaceful and co-operating nations.⁵⁹ A few disputes can be found in the Baltic Sea area (e.g. diverging views on land border changes between Estonia / Russia and the role of the Tartu Peace Treaty of 1920), but most are in the southern part of the EU and involve either only EU Member States or EU Member States and non-EU countries.⁶⁰

⁵⁷ **Topaloglou, L./Kallioras, D. /Venieris, S. (2009):** [*Tracing the Determinants of Economic Cross-Border Interaction in the European Union*](#), *Spatium*, 21 (1), p. 4.

⁵⁸ See also the "internal working paper" elaborated for the GEOSPECS border group: **Roters, J. (2011):** *The EU external border regime*. Dresden (Leibniz-Institut für ökologische Raumentwicklung), October 2011.

⁵⁹ **Stetter, S. (2006):** Border Conflicts in Europe. Available at: www.uni-bielefeld.de/Universitaet/Einrichtungen/Pressestelle/dokumente/BI_research/29_2006/Forschungsmagazin_1_06_Grenzkonflikte_76_80.pdf

⁶⁰ e.g. Spain-Portugal on Olivenza including the municipality of Táliga; Spain-UK on Gibraltar and the Isthmus between Gibraltar and Spain; Spain-Andorra on an area near Montalmus peak; Italy-France on the border at the Mont Blanc, UK-Cyprus on a part of Dhekelia Sovereign Base Area.



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

© EuroGeographics Association for administrative boundaries

Classification of national land borders

Internal EU borders

From before the enlargements of 2004 and 2007

Since the enlargements of 2004 and 2007.

ESPON area

Other countries

External EU borders

External EU borders to candidate country

Disputed external EU borders (Ceuta and Melilla)

External EU borders to EFTA countries

External EU borders to microstates

Other external EU borders

Other borders in ESPON space

Border of candidate country to non-EU countries

Border of an EFTA country to non-EU countries (Norway-Russia)

Other disputed border in ESPON space

Other borders in ESPON space

Disputed border of a European territory with special status (Gibraltar)

Map 17 Classification of national land borders in the ESPON space

Maritime boundaries of the EU

The EU is surrounded by four seas (i.e. the Mediterranean, the Baltic, the North and the Black Sea) and one Ocean (i.e. the Atlantic) and the length of its coastline is estimated to be 136,106 km. Among the 22 Member States with a sea border, the EU countries having by far the longest coastlines are Sweden, the UK, Finland and Greece.⁶¹

The maritime boundaries of the EU are established through international conventions listing the coordinates of points being the vertices of segments which, in turn, define bi- or multi-lateral maritime boundaries (e.g. in the North Sea). These limits of maritime boundaries create concentric areas and zones surrounding coastal and feature baselines on which a nation claims sovereignty and exclusive rights or control over the mineral and biological resources. In the case of the EU, these areas and zones are usually the "coastal waters", the "territorial sea", the "contiguous zone", the "Exclusive Economic Zone" and also some fishing areas.⁶²

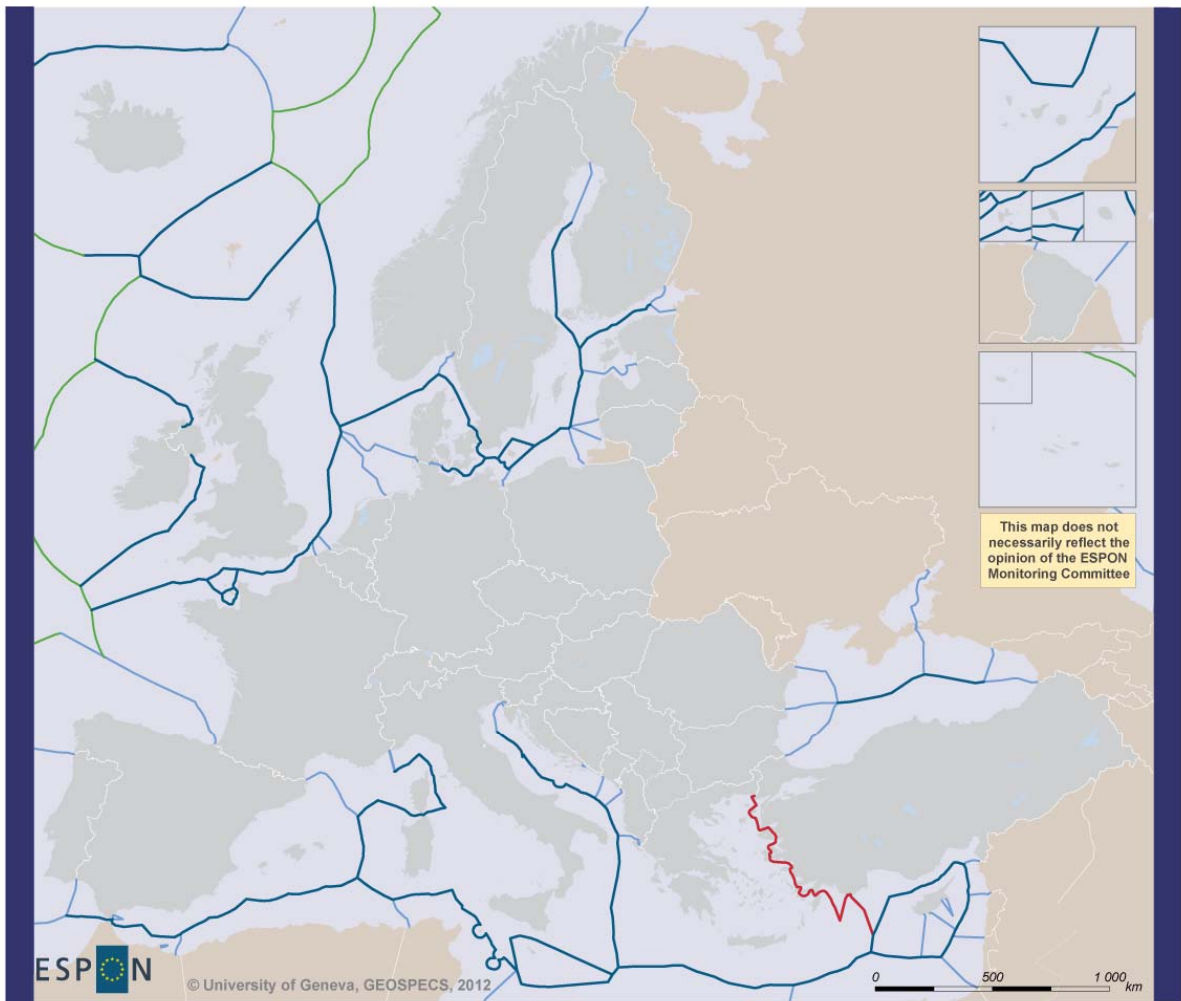
Disputes over the location of maritime boundaries continue to exist in Europe, as some have remained indeterminate despite efforts to clarify them. This can be explained by an array of factors, some of which also illustrate persisting regional problems. Such disputes generally involve states which formally recognise each other and exist either between EU Member States or between EU Member states and non-EU countries.⁶³

Map 18 shows different types of maritime boundaries in the surrounding seas of the EU as well as the sea around Iceland (i.e. restrictions exist for those cases where no regulatory text exists within the UNCLOS until now).

⁶¹ Eurostat (2009): Agriculture and fisheries. Statistics in focus 47/2009.

⁶² <http://www.eea.europa.eu/data-and-maps/data/maritime-boundaries>



⁶³ e.g. Greece-Turkey delimitation disputes in the Aegean Sea about territorial waters and exclusive economic zones including the Imia/Kardak dispute; UK-Spain dispute over British claimed territorial waters at Gibraltar; UK-Ireland-Denmark-Iceland dispute on Rockall; Denmark-Poland dispute on the [Baltic Sea](#) boundary near [Bornholm](#); Slovenia-Croatia dispute on the Bay of Piran,




 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

Regional level: NUTS 0
 Maritime boundaries: VLIZ (2011), Maritime Boundaries Geodatabase, version 6,
 available online at <http://www.vliz.be/vmcddata/marbound>
 © EuroGeographics Association for terrestrial administrative boundaries

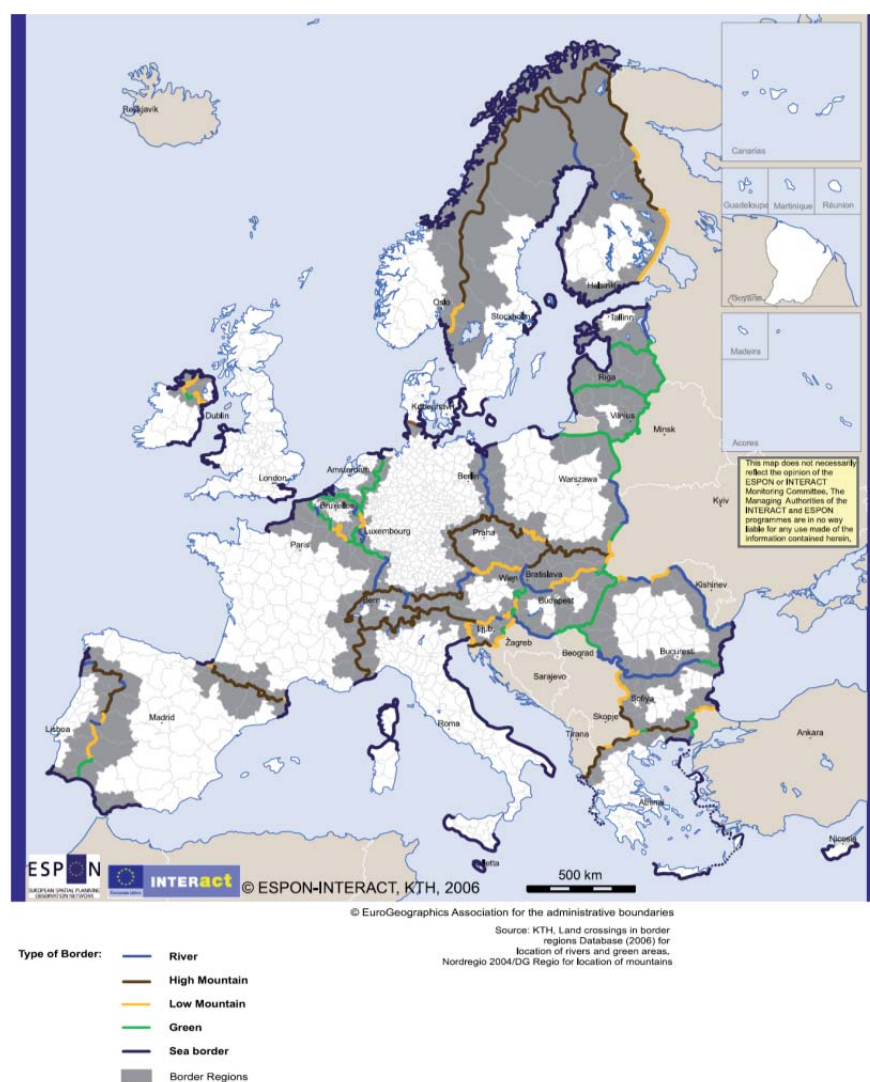
Types of maritime boundaries

- National maritime boundary between territories without a significant land connection
 - Major disputed maritime boundary
 - Maritime boundary between territories with a land connection
 - 200 nautical mile limit
-  ESPON Space
 -  Non-ESPON space

Map 18 Maritime boundaries of the EU

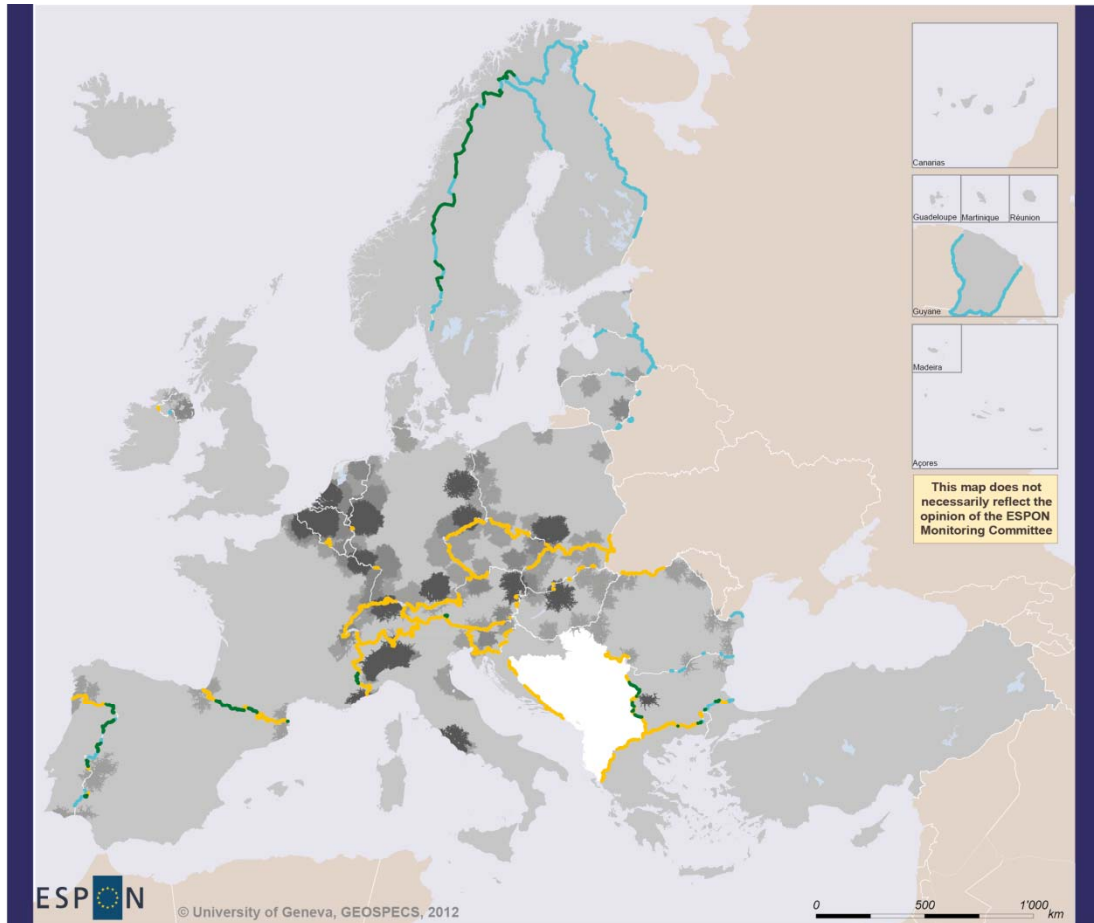
Natural obstacles along the borders of the EU

Natural obstacles exist along most of the political borders in the EU (see Map 19). They are constituted by oceans and seas, high or low mountain ranges, larger rivers and lakes or even denser forests and jungles (e.g. French Guyana). The share of EU borders along which these physical obstacles do not exist (i.e. the “green borders”) is relatively low.



Map 19 Types of natural obstacles existing along EU-borders⁶⁴

⁶⁴ **ESPON-INTERACT (2007):** *Cross-border co-operation – Cross-Thematic Study of INTERREG and ESPON activities.* KTH - Royal Institute of Technology, Stockholm. Esch-sur-Alzette and Viborg: ESPON Coordination Unit and INTERACT Point Qualification & Transfer. The study examined the main geographic features between NUTS3 land regions as well as the sea borders of cross-border regions based on INTERREG IIIA programmes and established different types of natural borders. River borders were constructed if a border of a NUTS3 region consists primarily of a river or lake. Mountain border regions are those NUTS3 regions with a border composed of high mountains (more than 45%) or of low mountains (less than 45%), whereas “green borders” are those where there are neither water bodies nor mountains composing the border (plain region).



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU 2
Source: GEOSPECS 2012
Boundaries: © EuroBoundaryMap v4 2008; except Western Balkans and Turkey (GEOSPECS)

Land borders in perspective of demographic sparsity and mountainousness

- Demographic sparsity (SPA)
- Mountainousness (MTN)
- SPA & MTN

Cross-border Urban areas

PUSH of which the Functional Urban Area 2006 population is:

- between 100'000 and 499'999 inhabitants
- between 500'000 and 999'999 inhabitants
- more than 1'000'000 inhabitants

Background elements

- Lakes
- No data
- Non-ESPON space

Map 20 Types of natural obstacles existing along EU-borders

Over the decades, however, the significance of the “barrier effect” represented by such natural obstacles for transport and communication was considerably reduced through major infrastructure works, the establishment of new transport services, or technological advances.⁶⁵ Yet, quite considerable variations in the availability and density of border-river crossings and rail / road border crossing possibilities remain within the EU. This also continues to generate different burdens for individuals and commercial actors to reach the other side of a given obstacle (i.e. variable travel time & cost needed to overcome similar distances).

Interesting centre-periphery patterns can be observed if one overlays EU land borders, mountainous, sparsely populated and cross-border urban areas (see Map 20):

- Mountainous borders which affect (or “cut through”) cross-border urban areas can mostly be found in the Alpine Space and in the Central-Eastern part of the European Union. They affect less the cross-border urban areas with more than one million inhabitants, but they do so more often in the case of PUSHs where the population of the respective functional urban area is ranging between 100,000 to one million (i.e. Alps, Central European Middle Mountains, partly Carpathians). Larger land border segments which are sparsely populated or at the same time mountainous and sparsely populated do in general not exist here, although a few and very localised border segments of these types can be found at some places (e.g. France/Italy & Austria/Italy).
- On the Western, Northern and Eastern peripheries of the European Union, we can mostly find land borders which are mountainous or sparsely populated or both at the same time. This is primarily the case for the Iberian Peninsula, for Scandinavia and partly also for the in Baltic Countries (esp. the borders of Latvia with its neighbours) and the South-East of the EU (Bulgaria, Romania, Greece). Mountainous borders only affect in a very few cases also cross-border urban areas where population a functional urban area is ranging between 100,000 to half a million (e.g. Spain/Portugal, France/Spain, Bulgaria/Serbia).

⁶⁵ e.g. the building of tunnels under mountain ranges or maritime separations; the building of bridges or major fixed links across larger rivers and maritime separations, the establishment of more ferry services, high-speed train connections or short and long-distance flight connections, through modern communication techniques and esp. the internet etc.

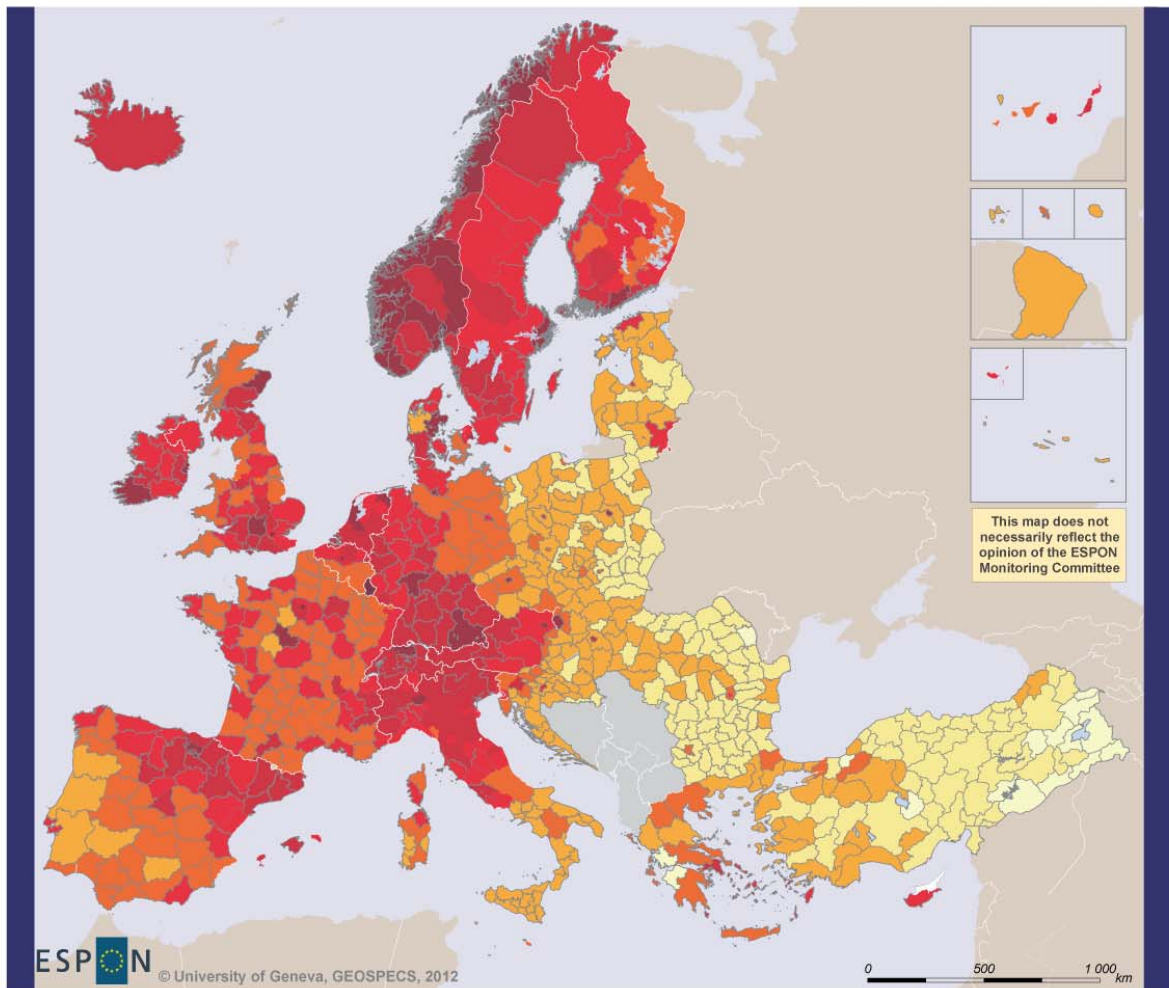
Economic discontinuities along EU borders

Economic discontinuities along EU borders are constituted by significant differences which exist between neighbouring border areas with respect to their respective overall economic performance (e.g. GDP/per capita, employment or unemployment etc) or in relation to more specific aspects which are of particular economic relevance (e.g. levels of taxation and wages, level of labour productivity or of regional R&D/innovation capacity). Significant differences normally act at the same time as “push factors” and “pull factors”, which then generate a wide range of both desirable and undesirable developments in border-regional and cross-border contexts.

The indicator “GDP (PPP) per capita” is an example which illustrates such differences along EU-borders. A mapping of the 2007 levels (see Map 21) shows that significant differences within the EU exist most often in a domestic context, but there are also considerable variations along several internal and external EU borders. The latter holds true for considerable parts of the land borders of France (Spain, Switzerland, Germany, Luxembourg, Belgium) and Belgium (with Luxembourg and France); for some eastern borders of Germany (especially with the Czech Republic, but also with Poland); for parts of the eastern borders of Austria (especially with the Czech Republic, Hungary and Slovenia) and of Italy (with Slovenia); for parts of the Greek border with Bulgaria; for parts of the Lithuanian border with Belarus; and especially for the borders of Finland with Russia.

Additional maps produced by GEOSPECS (see: Annex 8) show very clearly that significant differences between neighbouring border areas also exist

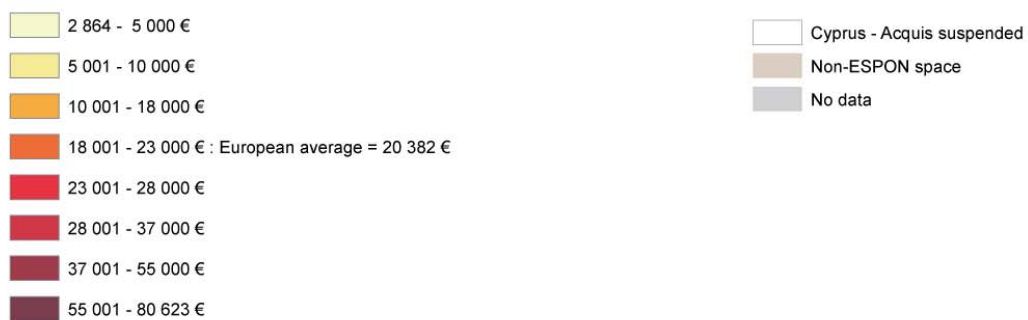
Gross regional product per capita in PPP



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS 2/3
Source: Aire, UMS RIATE
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Gross regional product in purchasing power parity at the NUTS2/3-level (2007)



Map 21 Gross domestic product (purchasing power parity) per capita, 2007

with respect to many other general or specific economic features.⁶⁶ These maps reveal that high “economic discontinuities” can be found along both the internal and external EU borders, which also supports the conclusion that no clear-cut overall geographical pattern prevails in this respect (i.e. polarisation between East-West and North-South of the EU or between “old” and “new” Member States).

Socio-cultural dividing lines along EU borders⁶⁷

Before reflecting about the existence of socio-cultural dividing lines along EU borders, we need to clarify our own position with respect to the notion of European culture. Some views claim that European culture is represented by its diversity which - as a positive asset - forms part of a “common cultural heritage” and can even be the cornerstone for establishing a “European identity” based upon a common history of the European states and the continent as well as values common to Europeans which have arisen out of pan-European civilisations and belief-systems (i.e. Christianity, the Greco-Latin political system, the Renaissance etc.). Other views consider European culture as a series of overlapping cultures which created and still creates a great variety of dividing lines across the continent that become most visible at the boundaries of culturally diverging macro-zones⁶⁸, at the borders of countries, or even at borders between individual regions. In our further analysis we consider both of these views relevant, for the following reasons.

Over the past decades, **many aspects of European culture have increasingly lost much of their demarcation effect.** This mainly results from the long-lasting process of secularisation (e.g. for religion⁶⁹) and more recent globalisation (e.g. for arts, science, philosophy, cuisines, clothing, sports). However, it also derives from a variety of structured societal processes which promote reconciliation (especially regarding

⁶⁶ e.g. proportion of employed population; female & male vulnerable employment; household final consumption expenditure per capita; low income situation; pump prices for petrol

⁶⁷ See also the “internal working paper” elaborated for the GEOSPECS border group: **Roters, J. (2011): *Multilingual borderlands in Europe*.** Dresden (Leibniz-Institut für ökologische Raumentwicklung), September 2011.

⁶⁸ e.g. northern cultures as opposed to southern cultures; western cultures as opposed to eastern cultures; Christianity as opposed to [Islam](#); [Protestant](#) Christianity as opposed to [Catholic](#) or Orthodox Christianity etc

⁶⁹ This mostly applies to Protestant and Catholic Christianity, but less to Orthodox Christianity (raise in importance in many countries belonging to the Eastern Block) and even lesser to Islamic beliefs (i.e. the upcoming of radical tendencies in Sunna & Shia Islam).

negative memories relating to past military conflicts), peaceful understanding among different nations or inter-cultural dialogues, and direct exchanges among people. As a consequence, one can realistically assume for these aspects that a level of common understanding (or "commonality") is now sufficiently well-developed, especially among the post-war generations, which helps to overcome previously existing dividing lines.

Such a loss of influence is, however, much less evident in the cases of belonging to a specific ethnic group or community (see: Annex 9) and also of belonging to a particular linguistic group. In the past and also in the present, one can observe that both aspects are frequently "instrumentalised" for the wider purpose of nation-building (e.g. affiliation of state-external population groups to the own population for politically supporting territorial claims vis-à-vis a neighbouring state; denial of regional differences and/or of ethnic minorities within a country as well as a state-propagated use of only one official language for establishing a national identity etc)⁷⁰ and that they also create still strong lines of socio-cultural division at the limits of many European states. These lines of division can generate many practical or "mental" obstacles which hamper - directly or indirectly - all sorts of individual and collective exchanges between neighbouring border areas.

Potentially existing socio-cultural dividing lines could, for example, be identified through **a mapping of the languages spoken in Europe**. Several tentative mapping approaches (see: 108) show at least that the linguistic situation in Europe is in territorial terms by far more complex than would suggest a simple mapping of only the official majority languages spoken in the different countries. This territorial complexity is also present along the various EU-borders, where the overall situation can be characterised by the following three main features.

First, "linguistic overlapping" exists along many internal and external EU borders. This is the case for:

- the borders of the Iberian Peninsula (Spain-Portugal; Spain-France)
- the south- and north-eastern borders of France (with Belgium, Germany, Switzerland, Italy)
- the border between the United Kingdom and Ireland
- the borders of the Benelux countries (Belgium-Netherlands, Belgium-Germany, Luxembourg-Germany)

⁷⁰ See for example: **Tägil, S. (ed.) (1999):** *Regions in Central Europe. The Legacy of History*. London, 1999. **Smith, A. D. (1995):** *Nations and Nationalism in a Global Era*. Cambridge, 1995.

- the border of Germany with Denmark⁷¹
- some borders of northern Italy (especially with Switzerland and Austria, partly also with Slovenia)
- the borders of Hungary (especially with Slovakia, Serbia, Romania, Ukraine, partly also with Slovenia)
- some northern Greek borders (especially with Macedonia and Bulgaria), the borders of Romania (with Moldova and Ukraine)
- the borders in the south east of Poland
- the borders of Latvia and Estonia (along their external EU-borders and to some extent along their internal EU-borders)
- and the borders of several Scandinavian countries (especially Finland, but also Sweden and Norway).

This overlapping constitutes primarily a "cross-border linguistic zone" and often also a wider "cultural transition zone"⁷² which is inhabited by two or more linguistic (and ethnic) groups which are typically separated from each other by a politically defined border.

Second, a number of "**hard linguistic demarcations**" closely follow the existing political borders in the EU. This is mainly the case for many internal EU borders of Germany (with the Netherlands, Poland, the Czech Republic), large segments of the Austrian borders (especially with the Czech Republic, partly also with Slovakia, Hungary and Slovenia), and Polish borders (with Russia, Lithuania, Belarus, Ukraine, Slovakia, the Czech Republic). Such a clear demarcation can also be found along some borders of Slovenia (especially with Croatia), Romania (especially with Bulgaria and Ukraine), Greece (Turkey) and Lithuania (especially with Russia, but to some extent also with Belarus and Latvia).

Third, a large number of "linguistic islands" are located across Europe, some close to a maritime or a political land border. They are less frequent in Western Europe and Scandinavia⁷³, but more common in South East Europe (i.e. the Balkans, Bulgaria, Romania and also Greece) and in other Third Countries immediately neighbouring the EU (especially Ukraine and Russia, but also Belarus).

⁷¹ There is an officially recognised Danish-speaking minority in Schleswig-Holstein (Germany) and also a widespread bilingualism of Danish municipalities close to the border.

⁷² **Williams, C.H. (2004):** *The geography of language*. In: Sociolinguistics – An international handbook of the science of language and society. Volume 1, pp.130-145. Berlin 2004.

⁷³ Except the Celtic-spoken languages in France, the United Kingdom and Ireland; the Danish-speaking and Sorbian-speaking minorities in Germany; the Swedish-speaking population in Finland.

However, experience from the day-to-day border practice in the EU suggests that **it is difficult to derive from this basic constellation a generally valid overall conclusion.** Neither can it be concluded that all “hard linguistic demarcations”⁷⁴ naturally constitute also strong socio-cultural lines of division which considerably hamper the development of border areas and their mutual exchange relations. Nor can it be stated that the important asset of a “linguistic overlapping” acts as a catalyst which automatically stimulates the development of, and the mutual exchange relations among, neighbouring border areas.

The main basis for this qualified overall judgement is that the de facto development of a socio-cultural dividing line also greatly depends on how the concerned states (and regions) generally deal with aspects related to ethnicity or language in the context of their own domestic policies. This concerns not only issues such as a formal recognition of ethnic or linguistic minorities and the protection or official furthering of their specific cultural heritage (e.g. history, traditions, languages) within a country, but also the promotion of better understanding of neighbouring countries and cultures in the framework of domestic educational policies. Especially within a linguistically much more complex EU, which also aims to preserve this diversity as a fundamental democratic and cultural cornerstone of its own integration process,⁷⁵ the general promotion of language proficiency and the provision of targeted initiatives helping more people who live close to “hard linguistic demarcations” to become bi- or multi-lingual can play key roles for overcoming, in the medium and long term, continuing communicative and mental barriers or specific day-to-day problems.

“Border effects” and their complex implications

Border effects are usually analysed by macroeconomics in the context of trade theory (i.e. trade barriers and related border effects, with the latter being a measurement for the level of trade integration), the traditional location theory (i.e. borders representing a distortion in a market area, also leading to disadvantages for border regions), or new economic geography (i.e. focus on the distribution of economic activities across

⁷⁴ i.e. those clearly following state borders and separating different people and language-use.

⁷⁵ The number of official languages increased with the joining of the new Member States from 11 to 23. The EU requires its legislation to be available in all these languages, thus making it accessible to all citizens. It also guarantees that any EU citizens can write to an EU institution or body and receive a reply in their own language. In the same way, a member of the European Parliament has the right to represent his or her voters in their own language when he or she rises to speak. The EU also helps to make this linguistic diversity accessible to others, e.g. by encouraging people in Europe to learn two languages in addition to their mother tongue.

space & explanation of regional disparities by entirely endogenous location decisions). However, we consider the purely economic perception of such effects as being too narrow. Therefore, and to achieve a more differentiated perception of border effects, we have also taken into account other social science approaches which have analysed the general development of border and cross-border areas by taking into account a wider range of socio-economic aspects and socio-cultural and behavioural influences.⁷⁶

Our **general typology of border effects** (see: Table 1) is based on this more differentiated perception and uses the notion "border effect" as an overall term which encompasses all sorts of consequences that can result from the multidimensional reality of European borders (i.e. political borders as well as their natural, economic and socio-cultural characteristics). For each of the main features of this multidimensional border reality, the typology indicates the main reasons which explain the associated and potentially existing border effects.

This taxonomy mainly has a conceptual and explanatory value, because complex cross-relationships and cross-impacts exist in practice among the various types of border effects (i.e. some effects associated with one dimension might be alleviated or even further reinforced by effects associated with another dimension), particularly because all or most of the multidimensional features simultaneously characterise a given border.

This multitude of political-administrative, natural, economic and socio-cultural border effects can have variable implications for the domestic and border-crossing exchange relationships of a border which are rarely found in areas not located at a border. According to the nature of an effect, the following two basic constellations can be distinguished:

- **"Closure effects"** exist if the political border (and maritime boundary) or other main features of the multidimensional reality function at the same time as a "discriminatory filter" and as a "barrier" between adjacent areas. Closure effects can originate from the presence of a major natural obstacle (e.g. territorial break or discontinuity) or different political and regulatory systems (e.g. contradictory policies, administrative obstacles, various legal

⁷⁶ See for example: **Reichman, S./Ratti, R. (1993):** *Theory and practice of transborder cooperation*. Basel/Frankfurt am Main, 1993. **Bramanti, A./Ratti, R. (1993):** *Verso un'Europa delle Regioni*. Milano, 1993. **Newrly, P. (2002):** *Transnationaler Regionalismus: Die grenzüberschreitende Zusammenarbeit am Oberrhein – ein Beispiel für die Fortentwicklung der europäischen Integration?* Münster-Hamburg-London, 2002. **van Houtum, H./Scott, J. (2005):** *Policy Considerations of Project Results: "Good Practices" and Situational Ethics of Cross-Border Cooperation*. EXLINEA Policy Paper. Berlin and Nijmegen, December 2005. Hufeld, U./Müller-Graff, P-Ch./Okruh, S. (2007): *Nachbarschaften innerhalb der Europäischen Union*. Baden-Baden, 2007.

restrictions), but also from considerably different economic conditions (e.g. import/export restrictions & other trade barriers) and socio-cultural settings (e.g. language barriers and/or mental barriers) on either side of a border. Common to all these influential factors is that they deliberately prohibit or tend to make impossible, or at least involuntarily hamper, flows and exchange relations between border areas, or generate other unwanted side-effects⁷⁷ on one or both sides of the border.

- **“Opening effects”** exist if the political border (and maritime boundary) or other main features of the multidimensional reality function at the same time as a “discriminatory filter” and as an “interface” between adjacent areas. Positive effects can emerge due to the absence of a major natural obstacle (e.g. a highly permeable green border); different governance systems and economic settings which generate specific development opportunities or induce cross-border exchange relations⁷⁸; or similar socio-cultural settings which tend to favour the emergence of common mental or behavioural patterns (i.e. a feeling of belonging together due to a shared historical roots/cultural traditions or because the same language is spoken). Common to all these different influential factors is that they induce border-crossing inter-action and exchange relationships and thus establish a contact zone between the political, economic or socio-cultural sub-systems existing on either side of the border.

A more extensive version of this general typology (see: Annex 11) also contains, for each type-segment, a non-exhaustive list with concrete examples for such opening and closure effects, drawn from practices observable along various EU borders. A look at these examples reveals two important aspects which are worth briefly highlighting.

⁷⁷ Borders may enhance a clearly illegal behaviour such as smuggling or illegal immigration. Also the provision of pornography, of prostitution, of alcohol and/or of narcotics may cluster around borders, ports and airports.

⁷⁸ A border area may flourish on the provision of excise or of import–export services. Different regulations on either side of a border may encourage services to position themselves at or near a border. Special Economic Zones (SEZs) often tend to cluster near borders or maritime entry points (i.e. ports).

Table 11 General typology of border effects

Type of border effect	Main reasons explaining the associated border effects
Effects associated with political borders	Different status of the political border & different degrees of "openness" for economic exchanges & inter-personal relationships, different legal systems and different governance structures (administrative units & powers), different policies meeting at a political border.
Effects associated with maritime boundaries	Different levels of certainty / clarity about the maritime boundaries existing between states, also affecting economic and policy-relevant activities off-shore and on shore.
Effects associated with natural obstacles	Existence or non-existence of a natural obstacle (e.g. high mountain, large river & lake, sea or large maritime separation) & varying significance of the "barrier effect" represented by an obstacle.
Effects associated with economic discontinuities	Significantly different levels of economic performance (i.e. observed with respect to the overall situation or a specific issue) between areas located along a common border, acting at the same time as potential "push factors" and "pull factors".
Effects associated with socio-cultural dividing lines	Variations with respect to the general ethno-cultural & linguistic settings on either side of a border, different interpretation of the common historical legacy, different levels of inter-personal relationships existing between both sides of a border

First, a large number of closure effects continue to exist along the different EU borders.⁷⁹ Despite the existence of a homogenous Community-level legislation on the Internal Market, the different domestic legislative provisions which exist on either side of **internal EU borders** notably continue to hinder the day-to-day socio-economic and inter-personal relations across borders. Fields where this is particularly evident are taxation, social security systems, health care, public services, public procurement procedures, and educational and professional training systems (e.g. recognition of diploma, admission requirements for training courses). These differences still hamper the free movement of people, goods and services within the EU because they considerably reduce the overall transparency of a cross-border market and represent obstacles for

⁷⁹ See in particular the various articles on day-to-day border problems in: **AEBR (2000): LACE-magazine**: (Issue no.5 / winter 2000, Gronau). See also: **PANTEIA (2010): Ex-Post Evaluation of the INTERREG 2000-2006 Community Initiative funded by the Regional Development Fund. Final Report to the European Commission DG Regio**. Zoetermeer, 2010.

border-crossing business activities, especially for SMEs.⁸⁰ If, in parallel to such regulatory differences, marked cultural and linguistic differences also exist along a border, the scope of obstacles tends to further increase (e.g. existence of communicative & mental barriers or specific behavioural patterns). The closure effects and the day-to-day problems are even more accentuated in areas located along the **external EU borders**, because the free movement of people is considerably restricted due to the rules of the Schengen regime and an increased “securitisation” of those EU borders. But also the scope and efficiency of mutual economic interaction across borders is hampered, as many Internal Market provisions on the free movement of goods and services do not apply on the non-EU side of the border (except where countries have concluded specific agreements with the EU) and because of the frequently observable cumbersomeness of customs clearing processes (**see map in Annex 12**).

Second, it also becomes evident that only part of these border effects can be adequately appraised through purely quantitative approaches. A comprehensive assessment of the actual scope and significance of border effects, as well as of their concrete border-regional and cross-border implications, always requires the combination of sound quantitative and qualitative analysis. The latter, in particular, should not only explore the specific multidimensional reality of each border (e.g. physical, political, economic and socio-cultural features), but also shed further light on the primary “cause-and-effect relationships” and the complex interplay or cross-influence between the various primary border effects (i.e. secondary effects).

Border effects in practice: the case of cross-border commuting⁸¹

Cross-border labour market commuting along the internal and external borders of the EU27 is a good example which helps to better understand this complex interplay between different border effects. Although data-gathering on cross-border workers still appears to be difficult (see: Annex 13), a brief comparison of the aggregated figures presented in past and present studies⁸² shows that the overall volume of cross-border workers in

⁸⁰ e.g. knowledge-gaps about economic processes and sales opportunities on the other side of a border; different rules, structures and proceedings hampering access to new markets.

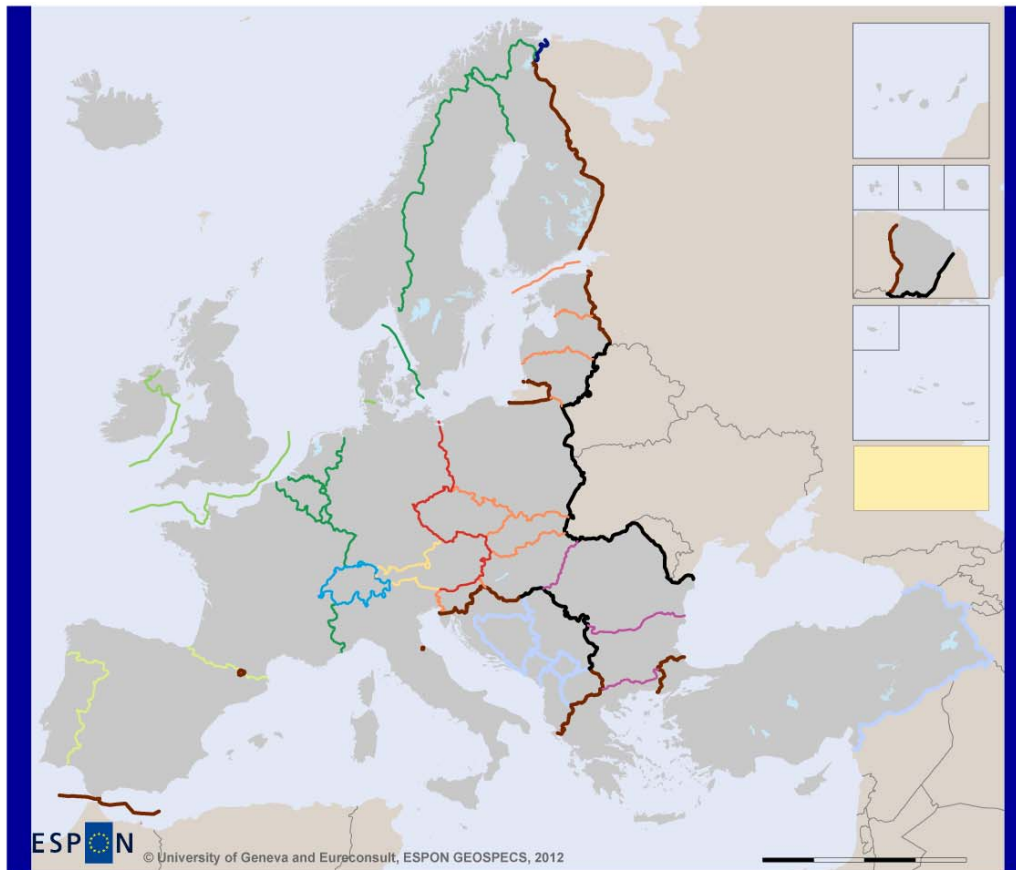
⁸¹ Overall findings drawn from an “internal working paper” elaborated for the GEOSPECS border group: **Stumm, Th. (2011): Mapping labour market integration within the EU27 and with neighbouring Third Countries and cross-border labour market mobility across EU27 borders.** Echternach/G.D. of Luxembourg, August 2011.

⁸² **European Parliament (1997): Les travailleurs frontaliers dans l'Union Européenne.** Série Affaires Sociales W 16 - 5/1997. Luxembourg, 1997 (PE 166.662). **European Commission, DG Employment and Social Affairs (2009g): Scientific Report on the**

the EU has more than doubled within one decade. from approximately 380,000 on average in 1990-1995 (EU15 & NOR, CH, LI) to 780,000 in 2006/2007 for the EU-27/EEA/EFTA countries. These cross-border commuter flows, today as in the past, concentrate mostly on the Central-Western part of the EU27 and also on a few countries and cross-border areas located along specific "old" internal EU-borders and the external EU borders with Switzerland (see: Annex 14). This dynamic but also geographically focussed development of cross-border commuting is the result of a complex interplay between various aspects.

A first factor is the **existence of general restrictions to labour market access**, which also lead to **variations in the openness of the different EU borders for commuting** (see Map 22). Within the EU27 and in some neighbouring Third Countries (i.e. Norway, Iceland, Liechtenstein, Switzerland), such restrictions were successively eliminated through the implementation of the EU Treaty provisions on the free movement of workers. While, until 2002, this process was always characterised by an immediate and also general application of the principle in the concerned EU15 Member States (i.e. after 1958 & the successive enlargements in 1973, 1981, 1986, 1994) as well as in the EEA-countries (since 1994) and Switzerland (since 2002), the realisation of this Community principle was less uniform after the 2004 and 2007 enlargements (see: Annexes 15 & 16). The main reason was that several EU15 Member States, as well as the EEA countries and Switzerland, were allowed to apply temporary restrictions for the labour market access of workers from the 12 new EU Member States.

From 2004, these restrictions also quite significantly limited the cross-border mobility of workers from the new Member States towards some of the old Member States (especially Germany and Austria, but also Italy) but, in 2011, they were fully lifted for the 10 new EU Member States of the 2004 enlargement. For workers from Bulgaria and Romania, however, such restrictions still continue to exist in some EU and EEA countries (until 2014) and in Switzerland (until 2016). **As regards the other Third Countries neighbouring the EU27**, the existence of general restrictions for the access of workers to the EU labour market is much more variable, depending on whether these countries have concluded specific agreements with the Union (see: Annex 17). However, the actual influence on cross-border commuting of those agreements or of existing restrictions is difficult to appraise along those external EU borders.



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Date of total border opening for workers or current status

**Internal EU-borders
& external EU-borders
with EEA/CH**
*(realisation of the EU-principle
on a free movement of workers)*

- 1954* - 1958
- 1973
- 1986
- 1994
- 2002
- 2004
except SI-IT
and FI-EE: 2006
- 2009
except RO-BG: 2007
- 2011

**Other external EU-borders
and external EEA-borders**

- Countries having concluded agreements with the EU
- Countries with no specific agreement with the EU
- Norway-Russia: specific regulatory provisions for Russians seeking employment in North Norway.

Other borders in the ESPON space

- Intra-Balkan borders and Eastern land border of Turkey: general situation unknown
- Non EspoN space border
- ESPON space
- Non-ESPON space

* Agreement on a common Nordic labour market of 1954, creating similar rights.

Map 22 Current situation of labour market integration along different borders of the ESPON space

Further to this more general aspect, the recent DG EMPL study⁸³ also examined the influence of other “push & pull factors” and specific border obstacles on the cross-border mobility of workers in the EU27/EEA area (including CH). For significant economic differences existing between areas on both sides of a border (e.g. income levels, overall employment / unemployment situation; specific types & quality of jobs available), the study generally concludes that these “push & pull factors” are often a necessary condition for stimulating cross-border commuting but also that they cannot sufficiently explain all mobility patterns and trends.⁸⁴ Equally important are other obstacles which commuters face on a daily basis along the internal and external EU borders examined, due to their specific status as cross-border workers (see: Annex 18). National legal provisions (e.g. fiscal, social) and specific administrative practices or geographical and social barriers, as well as an individual opportunity/risk assessment, can all hinder job-seekers from leaving their home region to look for work across the border. From a ranking of such obstacles according to their relevance for mobility, the following appears (see: Annex 19). For all cross-border areas examined, the most important obstacles to mobility result from different language settings and a lack of information (major obstacles), followed by those associated with different regulations, tax and social systems or the non-existence of adequate transport infrastructure to overcome geographical barriers (medium obstacles) and by those relating to different mentalities (minor obstacles). However, the results also point to remarkable geographic differences among the cross-border areas with respect to the significance of those obstacles. The significance is lowest in cross-border regions covering the internal borders between the 12 new EU Member States, higher in cross-border regions covering the internal borders between the 15 old EU Member States, and highest in cross-border regions covering borders between old and new Member States.

In addition, in the context of the **macro-regional labour market integration between the five Nordic countries** (Denmark, Sweden, Norway, Iceland, Finland), many border obstacles hinder cross-border mobility of workers in practice and still make it difficult for Nordic citizens to work in a different Nordic country from their own (see: Annex 20).

⁸³ **ibid. European Commission (2009).**

⁸⁴ **ibid. European Commission (2009), p.18, 19, 22:** In the case of out-commuting, the influences of (...) push factors are rather weak. *Even a bad economic situation of a country is not a sufficient incentive for out-commuting.* In the case of in-commuting, evidence confirms the push-and-pull theory: *Countries with high income and low unemployment attract the highest numbers of cross-border commuters. It must be emphasized that these are just general conclusions. The situation can be very different in certain cross-border regions.*

The basic pattern of socio-economic relations in border areas

If one reflects in a more general way on the multidimensional reality of borders and the complex interplay between the variety of potentially existing border effects, **one can identify two clearly different patterns of socio-economic relations from a territorial perspective** (see: Figure 8 below).

The first pattern of **“half-circle social and economic relations”** generally prevails in border areas, where the exchange relationships with the domestic hinterland are comparatively stronger (more intense) than the relations across the border. The second pattern of **“full-circle social and economic relations”** usually prevails in regions more centrally located within the domestic context, where strong exchange relations generally tend to exist with all of the immediately surrounding domestic areas.

The **general conclusion** to be drawn from these two constellations is **that a degree of “territorial non-integration” exists between immediately adjacent border areas**, resulting from the fact that all kinds of socio-economic interactions and exchange relationships are here still not yet functioning in a way that comes close to what is normally experienced in the domestic context.

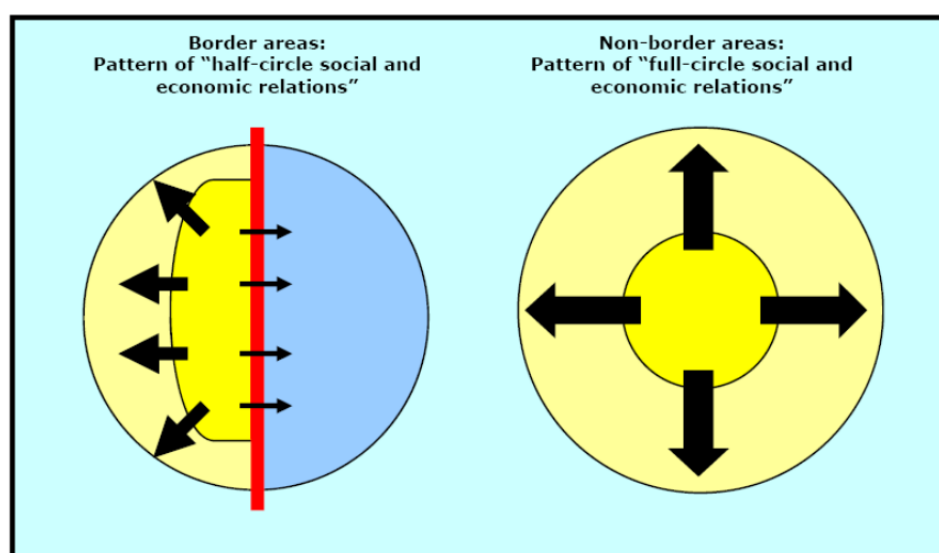


Figure 8 Basic patterns of socio-economic relations existing in border areas & non-border areas

The approach adopted for delineating border areas

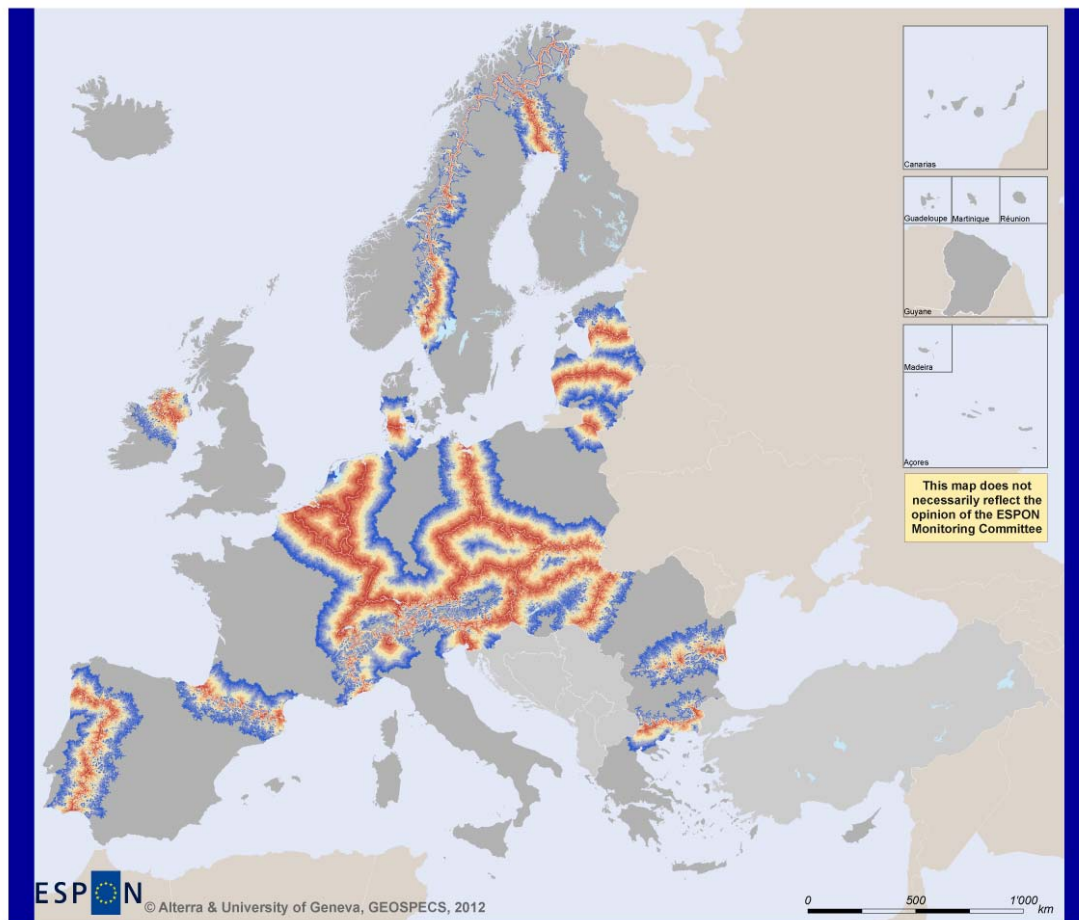
From the discussion above, it is clear that **the specificity of border areas** is mainly constituted by (1) the multidimensional nature of European borders, (2) the existence of a variety of associated border effects which are interrelated in a complex way and create different ranges of mobility and interaction between neighbouring border areas and (3) a degree of territorial non-integration which exists between areas located along a common border with respect to the overall socio-economic and socio-cultural conditions.

Therefore, GEOSPECS understands border areas as **a geographic category with variable geometry for which the notions of "interface" and "buffer zones" are considered to be the most appropriate general characterisation.**

As a consequence, **GEOSPECS did not consider it meaningful to produce a general delineation of border areas which follows the static administrative definition** used in generally comparable ways by the current Structural Funds regulations, the "Fifth Cohesion Report" or the previously published "Green Paper on Territorial Cohesion" (i.e. *border regions are NUTS 3 regions which are eligible for cross-border co-operation programmes under the European Regional Development Fund regulation*).⁸⁵

Instead, GEOSPECS delineated border areas on the basis of a 45-minute travel distance to a politically defined borderline, which corresponds to a reasonable proxy for a generally acceptable maximum commuting and daily mobility distance. The zone delimited by this reference value is used to analyse and better understand the large range of factors influencing the socio-economic development processes of border areas, as well as the types of interaction generating specific local / regional and cross-border identities which are an important factor of development for this geographic specificity. However, by changing this time-distance parameter (< 45 min. or > 45 min.) and by mapping the results (see 0 and 0), one can easily see that the extent of border areas varies considerably across Europe.

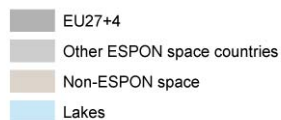
⁸⁵ This is mainly due to the fact that the territorial coverage of those NUTS 3 border areas is extremely variable across the EU and that especially the larger NUTS 3 units do often not fully reflect the outreach of functional exchange relations existing along and across borders.



Travel time by road to the internal borders of the EU and the EFTA countries (EU27+4)

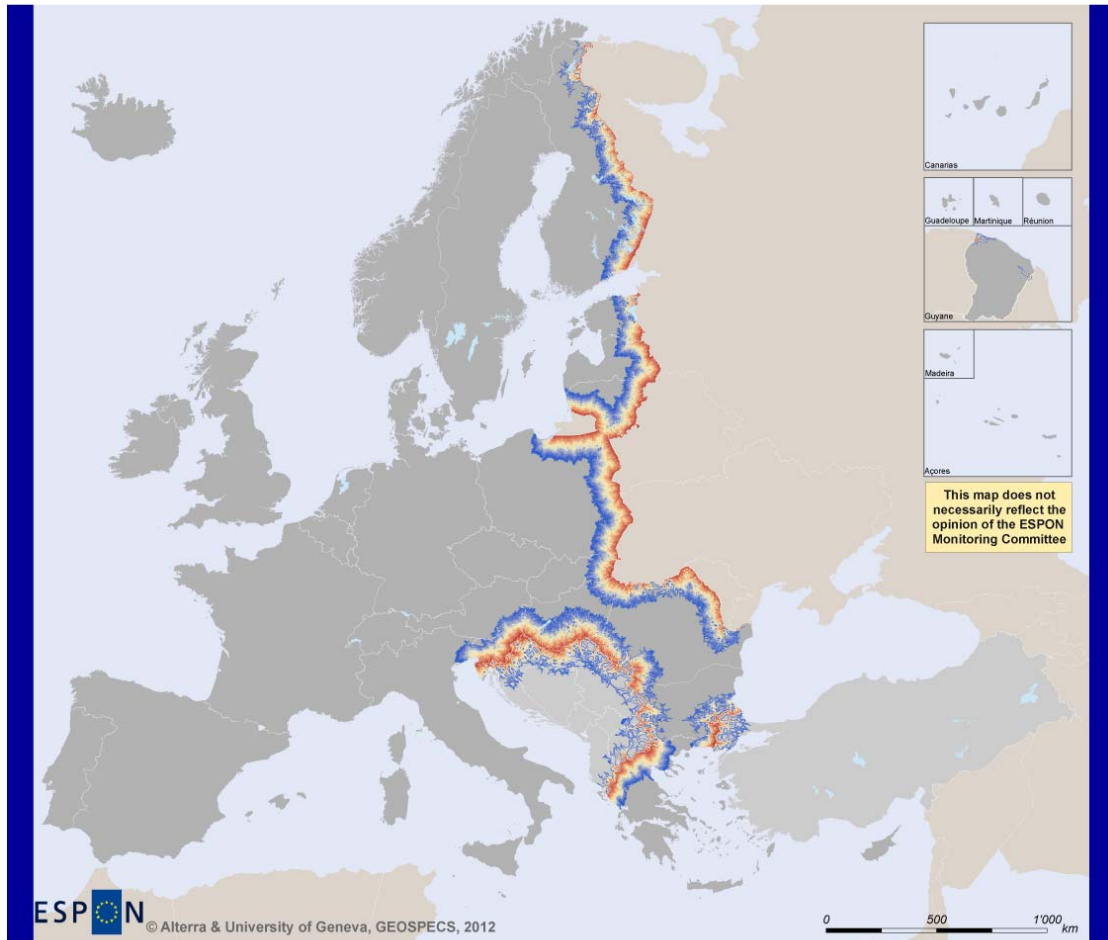


Background elements



EU27 + 4: The 27 European Union member states and the 4 European Free Trade Association (EFTA) countries Iceland, Liechtenstein, Norway and Switzerland

Map 23 Travel time distances to internal EU and EFTA borders



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTSO
Source: GEOSPECS 2011
Boundaries: © EuroBoundaryMap v4 2008, except Western Balkans (GEOSPECS)
Road models: © EuroRegionalMap v31 20090116_TRAN_ROAD.gdb,
except Bulgaria, Outermost regions, Western Balkans and Turkey (Open Street Map)

Travel time by road to the external borders of the EU and the EFTA countries (EU27+4)

- 0 - 15 mins
- 15 - 30 mins
- 30 - 45 mins
- 45 mins - 1 hour
- 1 hour - 1 h 15 mins
- 1 h 15 mins - 1 h 30 mins
- 1 h 30 mins - 1 h 45 mins
- 1 h 45 mins - 2 hours

Background elements

- EU27+4
- Other ESPON space countries
- Non-ESPON space
- Lakes

EU27 + 4: The 27 European Union member states and the 4 European Free Trade Association (EFTA) countries Iceland, Liechtenstein, Norway and Switzerland

Map 24 Travel time distances to external EU borders

3.2.6 Outermost Regions: Conceptualisation and delineation

Article 349 of the Treaty of Lisbon lists nine Outermost Regions (OR) and presents the main determinants of this specific EU status. Following recent decisions, there are now only eight OR:

- 4 French Départements – Martinique, Guadeloupe, French Guiana (Guyane) and La Réunion
- 1 French “Collectivité” – Saint Martin
- 2 Portuguese Autonomous Regions – Madeira and the Azores (Açores)
- 1 Spanish Autonomous Community – the Canary Islands (Islas Canarias)

The territories of Saint Martin and Saint Barthélemy, once attached to Guadeloupe, are now separate entities. Saint Barthélemy recently changed its status and became part of the Overseas Countries and Territories (OCTs) following a decision of the European Council on 1st January 2012.

These territories are parts of the European Union, although situated in the Atlantic Ocean, the Caribbean Sea and the Indian Ocean as well as on the South American continent. Given their situations, the European Treaty officially acknowledges that these regions have to cope with specific constraints –remoteness, insularity, small (usable) area, difficult topography and climate, economic dependence on a few products – the permanence and combination of which severely restrain development capacities.

History and conceptualisation of Outermost Regions

a) Roots in national histories

All OR were discovered in the 15th century by European navigators. In the case of the Canary Islands, the Azores, Madeira, and La Réunion in the Indian Ocean, these discoveries were actually re-discoveries, since early Arabic, Nordic or Mediterranean explorers had visited these islands.

These French, Spanish and Portuguese territories (mostly archipelagos) were then colonised, mostly during the 16th century. In some cases, such as La Réunion, the Azores or Madeira, the islands were uninhabited. The early settlers in the Azores came from many European nations –

merchants, sugar cane growers, members of the clergy, and petty criminals – and also included Moorish prisoners and enslaved Africans. In La Réunion, the 20 first settlers arrived by boat from North-western France. They were progressively followed by others, but this early population was far less diverse than in the Azores. Other territories were previously inhabited, e.g., by Caribbean Indians in the West Indies or the Guanche people in the Canary Islands. These were variously fought, forced to emigrate, decimated by diseases imported from Europe, but also enslaved and sometimes deported to other colonies (as Guanches to Madeira).

In French Guiana, the many difficulties faced by early settlers – harsh climatic and cultivation conditions, difficult relationships with Indians – made the process difficult. Settlement campaigns based on the arrival of ‘voluntary’ workers bound by a three-year contract, and the deportation of political prisoners failed. These missing settlers were replaced by slaves.

In all these overseas territories, the new settlers imposed a specific economic model, based on the cultivation of one or a very limited number of crops. Martinique, Guadeloupe, the Canary Islands and Madeira became sugar economies from the 16th century. While their origins were different⁸⁶ and can account for diverse later trajectories in terms of economic development, the structure of these four economies converged. In La Réunion, coffee was cultivated first. It was later (early 19th century) replaced by sugar cane because cyclones had caused severe damage to coffee crops, whereas sugar cane, given its growth cycles, was not sensitive to such events. La Réunion also became, at this time, the world’s main vanilla producer. In the Azores, although sugar cane was planted, the economy remained relatively diverse. The economy of French Guiana was less developed (mainly due to the lack of workers), concentrating on sugar, coffee, spices and chocolate. In Madeira, grapefruit and wine remained important, although much sugar cane was also planted. The economies of the French ORs peaked between the mid-1760s and the end of the 1780s, and began to decline after the French Revolution (1789).

In all territories, slaves were progressively imported to sustain the developing economies. In the Canary Islands, the enslaved native population rapidly declined and was replaced by African slaves. The process was eased by the fact that the Islands, as well as the Azores and Madeira, were a stop-over for slave boats sailing from Africa to the Spanish and Portuguese colonies. The number of slaves in Madeira is

⁸⁶ Noble French families and slaves were sent to the West Indies to grow sugar cane, whereas in the Canary Islands, techniques and processes of the sugar industry (sugar cane and sugar beet) were imported from the Mediterranean area by Sicilians and Genoese businessmen, while some cultivation tasks relied on Portuguese immigrant workers

estimated to have reached 10% of the island's population in the 16th century. Slaves were also extensively used in Martinique and Guadeloupe, as well as La Réunion and French Guiana (although to a lesser extent in terms of number of people). In the Azores, the population of slaves remained low since the structure of the economy never specialised as much in intensive crops.

The 19th century marked a turning point in the history of these economies. Given their location and the chronology of discovery and settlement, the economies of the Spanish and Portuguese islands had developed early but soon faced stiff competition from other colonies when the latter expanded. Recession and the need for alternative sources of growth thus became obvious at the eve of the 19th century. For example, the Canary Islands turned towards cochineal to sustain their economy, whereas Madeira concentrated on wine.

In the French territories, the Revolution and the invasion of Martinique by England deeply shook the economic model. Although the complete abolition of slavery took a long time, the movement started during the Revolution, in the 1790s. Slave trade was forbidden in 1817 and slavery abolished in 1848. This put an end to a fundamental basis of the colonial economy, but not to the cultivation of sugar cane. Soon afterwards, this crop faced increasing competition from beet sugar produced in Europe. In French Guyana also, this period was a turning point: in addition to the abolition of slavery, gold was discovered in 1855 in the East of the territory. This was the beginning of a gold rush and the end of agricultural activities, due to the lack of available workers. In La Réunion, the crisis in the 1870s left many agricultural workers unemployed. In response, France implemented major public works projects, providing these workers with jobs. The strong employer role of public authorities (whether the National state or local authorities) remains a strong component of OR economies.

Madeira and the Azores were granted their autonomy in 1976, following the democratic revolution of 1974, and are the only two Portuguese "autonomous regions". In Spain, the Canary Islands gained their current status of Autonomous Community in 1982, after the establishment of a democratic constitutional democracy in Spain, and enjoy a higher degree of autonomy than most of the other 16 Spanish Autonomous Communities. In contrast, Martinique, Guadeloupe, French Guiana and La Réunion were granted the status of 'départements' in 1946, at the end of World War II. As such, they remain parts of the French territory, and laws and rules apply equally over the whole territory. However, the 1958 French Constitution states that certain legal documents can be adapted to suit the characteristics of the OR facing specific constraints.

In all 7 ORs, the economic structure has followed comparable major trends: downturn of agricultural activities in terms of their contribution to GDP (but agriculture remains important as a traditional, cultural and environmental basis); increasing importance of services, especially tourism; and strong influence of the public sector (major employer). However, there are important disparities. In some OR, tourism, for example, represents over 30% of GDP (notably the Canary Islands), whereas it remains relatively low (Azores) or even residual (French Guiana) in others. Overall, it appears that ORs follow a trajectory that is influenced by their status of overseas territories, but that this common status is less strong than their economic ties with France, Spain or Portugal. The Canary Islands followed Spain's monetary policy in the 1980s and built a strong tourism sector partly on this basis. Free trade zones created in the Azores and Madeira constitute a strong economic asset for these two archipelagos. In the French Antilles and La Réunion, agricultural activities, such as sugar cane and banana plantations, have been strongly supported through policy choices. In French Guiana, the economy is driven by special activities since President De Gaulle decided to establish the National Centre for Spatial Studies there in the 1960s. In all four French ORs, the public sector is a particularly strong economic actor.

b) Recognition of a common, specific status in European treaties

The European Union started recognising "remoteness" as a concept during the 1980s, and thus progressively took account of the specific features of the concerned regions. The guidelines for this approach were set out in "Specific Orientation Programmes for Remoteness and Insularity" – POSEIDOM for the French overseas départements (1989), POSEICAN for the Canary Islands (1991) and POSEIMA for the Azores and Madeira (1991). Since 1989, cohesion policy has been mobilised to offset the economic and social disparities affecting these regions. They benefitted from an increased level of financial support from the Structural Funds and, for the Azores, Madeira and Canary Islands, from the Cohesion Fund.

In 1992, the specificities of the French ORs, the Canary Islands, Madeira and the Azores were detailed in the Declaration annexed to the Treaty of Maastricht. This recognition was confirmed in 1999 when article 227-2 of the EC Treaty was replaced by article 299-2 (Amsterdam Treaty). This details the handicaps acknowledged as specific to the ORs, such as remoteness, insularity, small size of territories, difficult topography and climate, and economic dependence on a limited number of products.

Given these handicaps, the article also explains how specific measures can be taken in order to determine the conditions in which the Treaty is applied to these regions, thereby opening the way for possible derogations and for OR status.

In March 2000, the European Commission published a report listing measures to be implemented in application of article 299-2⁸⁷. In June 2002, the European Council of Seville invited the Commission to submit a report containing an overall and coherent assessment of the specific characteristics which affect the situation of the ORs. It also invited the Council and the Commission to press ahead with the implementation of the dedicated Article of the Treaty and to adopt suitable measures to take account of these regions' special needs. Accordingly, since 2004, the EU has developed and followed an integrated strategy, based on an active partnership between the EU institutions, national governments and the ORs.

The specific status of ORs and the associated integrated strategy were confirmed by the Treaty of Lisbon (article 349), which maintains the need for a specific treatment for these regions. Initially, the main priorities pursued were to improve accessibility, competitiveness and regional ties for the ORs. More recently, the Commission has been willing to foster local development in ways that benefit the EU as a whole. The aim is to generate wider interest in the regions and, hopefully, turn their handicaps into assets⁸⁸. For example, ORs have geographical and geological characteristics that make them excellent laboratories for research in a number of fields, including climate change, and have unique geostrategic locations. Their biodiversity and exceptional marine ecosystems hold great promise for innovation in pharmaceuticals and agronomy.

Although the ORs share many characteristics with all other overseas territories depending on EU Member States, the Treaties establish a clear-cut difference between ORs and Overseas Countries and Territories (OCTs). ORs are an integral part of the EU territory, whereas OCTs are part of their mainland country, but not of the EU. This difference is fundamental. Whereas EU law applies to OR territories (although with adjustments and derogations), it does not apply in OCTs. ORs benefit from EU regional policy as do all other EU regions, whereas the relationships between OCTs and the EU are organised through an association agreement, aiming to promote the economic and social

⁸⁷ *Commission report on the measures to implement Article 299(2) - the outermost regions of the European Union, COM/2000/0147 final*

⁸⁸ *The outermost regions: an asset for Europe (COM2008), Study of Biodiversity as a development factor for Outermost Regions of Europe. (BIODERUP - INTERREG IIIC 2007*

development of these territories, and establish strong economic relationships with the EU.

Although EU law applies to the ORs, it is acknowledged that some handicaps weigh on these regions, justifying the need to take specific actions to cope with these handicaps and their effects.

EU laws apply in their totality, except for very few topics, mostly concerning tax and competition (European Commission, 2004 & 2007a). These derogations have been accepted by the European Commission because they constituted the continuation of specific advantages previously granted by the nation-states (France, Portugal, etc.). These derogations include specific indirect taxation (VAT rates, dock dues in the French ORs, Tax on Imports and Deliveries in the Canary Islands⁸⁹) as well as more a flexible regime for State aid and tax incentives. As regards environmental legislation, time-limited targeted derogations can be obtained on specific issues, such as waste and water management or quality standards of imported oil.

Several special treatments and compensation programmes favour the ORs. Although the GDP per capita of the Canary Islands and Madeira is now above 75% of the Community average, the two regions still benefit from additional funding during the 2007-2013 period. In addition, assistance rates from the Structural Funds have been increased to 85% for all ORs (regardless of their classification as convergence or competitiveness objectives regions). A specific additional ERDF allocation compensates for the handicaps and constraints of the ORs which cause additional production costs (e.g., transport, storage, maintenance). This allocation amounts to €35 per inhabitant per year (a total of €979 million) over the current programming period and comes on top of any funding for which these regions are otherwise eligible. However, this allocation is expected to roughly decrease over the next programming period.

The ORs benefit from specific instruments or conditions:

- Continued assistance from the compensation fund (POSEI Fishery) to counter the effects of additional costs which increase marketing costs for certain fishery products. The levels of funding have remained unchanged, but funds are granted in a more flexible manner;

⁸⁹ The Octroi de mer (translation 'dock dues') and the AIEM (Arbitrio sobre Importaciones y Entregas de Mercancías) apply to imported as well as to local products. Local authorities are allowed to grant local products tax exemptions or reductions, which creates taxation differentials between these products and imported ones. Tax differentials can only apply to a set list of products and must not exceed fixed proportions. This system was design to support local productions and help local economic actors face ORs' specific handicaps.

- Continued support to agricultural activities through the reformed POSEI (the legislative proposal was adopted by the Council on 30 January 2006);
- Special treatment through the European Agricultural Fund for Rural Development (EAFRD): access to specific rates of assistance.

The Community framework for the sugar sector provides the ORs with compensation for loss of income caused by falls in sugar reference prices and continue financial support for the sale of raw sugar to the mainland (€15 million).

See Annex 23 for a detailed list of policy documents and strategies dedicated to the ORs.

c) Evolution of the European overseas territories: status changes

As mentioned above, OR status is a geographic specificity that has appeared as a result of a political process, through which territories that are geographically disjoint from the European continent have been designated as fully-fledged components of the EU. Accessing this status or abandoning it thus requires validation at the EU level. The Treaty of Lisbon has simplified the process for status change: a unanimous decision of the European Council is now sufficient to modify the list of ORs. The change in Saint Barthélemy's status was voted in this way. Saint Martin and Saint Barthélemy obtained their separation from Guadeloupe a few years ago. Whereas Saint Martin has been willing to remain an OR on its own, Saint Barthélemy requested a status change to become part of the Overseas Countries and Territories. The European Council voted in favour on 1 January 2012.

Before the Treaty of Lisbon was adopted, any territory with a French Overseas Département (DOM) status was also an OR. Indeed, the list of Outermost Regions detailed under article 299-2 comprised "the French DOM". In the new treaty, French ORs are named one by one, with no mention of their national status. As a result, a DOM can no longer be automatically considered as an OR. In addition, a new status for French overseas territories was created recently, the "Collectivité", that grants more legal autonomy than the "Département". As exemplified by the case of Saint Martin, Collectivités can become ORs, as long as they do not use their autonomy to adopt legislations that are contrary to EU law

Being part of the EU territory and enforcing EU law may require great efforts, notably in fields such as environmental and security. Some territories consider this as too much of a burden, even in comparison with

the related advantages. However, for some others, access to the full range of EU funding instruments (particularly Structural Funds), as well as to the specific compensatory instruments dedicated to the ORs, are a strong incentive to keep their OR status or, if relevant, to evolve towards OR status.

Mayotte recently became a DOM and now wishes to become an OR. As mentioned above, previously, accession to DOM status would have granted Mayotte OR status automatically. Today, this would have to be validated by the European Council. Some islands in the Netherlands Antilles (Bonaire, St Eustatius and Saba) may also opt for the OR option within a few years, although others (Curaçao, Aruba and Saint Maarten) have confirmed they would not.

Geographic specificities: handicaps and assets

a) From political determination to geographic approach

Section A shows how political the definition of OR actually is. The current group of ORs was not created on the basis of geographic specificities. The status as an OR depends on this region's (as well as on the State's) vision of what the territory's position should be within the EU. It is only once this initial choice is made that geography and specificity start to matter. Indeed, it is clear that ORs collectively share at least a certain number of characteristics that are strong contextual elements for them, and to which the Treaty directly or indirectly refers. ORs are, first, remote from continental EU. Besides, as noted by Planistat Europe & Bradley Dunbar (2003)⁹⁰, these territories are all both insular and mountainous, except for French Guiana, which can be characterised as sparsely populated. In addition to these specificities, it is important to consider other geographical factors, which are very informative for these regions and sometimes unique at the European level. Table 12 summarises the specific geographical constraints that best describe the ORs:

⁹⁰ Planistat Europe & Bradley Dunbar Associates. 2003. *Analysis of insular and Outermost regions of the European Union*. Final report to the European Commission, Contract n°2000.CE.16.0.AT.118.

Table 12 Geographical constraints of Outermost Regions

Regions	Remoteness	Insularity	Double insularity	Small territory	Complex territorial morphology	Specific climatic conditions	Natural risk
Azores	X	X	X	X	X	X	X
Canary Islands	X	X	X	X	X	X	X
Guadeloupe	X	X	X	X	X	X	X
French Guiana	X			X	X	X	
Madeira	X	X	X	X	X	X	X
Martinique	X	X		X	X	X	X
La Réunion	X	X		X	X	X	X
Saint Martin	X	X	X	X	X	X	X

ORs have strong common determinants. Except for double insularity, which concerns only some regions, all other geographic specificities are shared by almost all ORs. The case of French Guiana is specific because it is not an island, and is very large. However, it is almost completely covered by the Amazonian forest: the main inhabited area (the coastal region) is thus an enclave with reduced contact to neighbouring territories, which could arguably be compared to an island.

b) Geographic specificities and related handicaps

Remoteness is a key feature of these regions, as they are distant from their respective Member States and thus from the European continent. Some are even isolated within their own regional environment (Table 13).

Table 13 Characteristics of remoteness of Outermost Regions

Regions	Distance from the capital of the Member State	Time difference (summer / Winter)	Distance from the nearest continent (km)
Azores	1500	- 1 hour	1 450 (Africa - Morocco)
Canary Islands	2000	- 1 hour	250 (Africa - Morocco)
Guadeloupe	6800	- 6 / - 5 hours	620 (South America - Venezuela)
French Guiana	7500	- 5 / - 4 hours	N/A
Madeira	1000	N/A	650 (Africa - Morocco)
Martinique	6850	- 6 / - 5 hours	450 (South America - Venezuela)
La Réunion	9400	+ 2 / + 3 hours	1 700 (Africa - Mozambique)
Saint Martin	6800	- 6 / - 5 hours	620 (South America - Venezuela)

Given their status, these regions have strong and frequent relationships of several kinds with their Member States as well as with the EU. Remoteness represents a handicap in terms of accessibility, both technically and financially.

Except for French Guiana, all ORs are islands. Four are archipelagos: the Canary Islands, the Azores, Madeira and Guadeloupe. The Azores are composed of nine islands extending over 650 km. The Canary Islands are composed of 13 islands, of which 7 are inhabited, extending 460. As for Guadeloupe, composed of two islands (Grande Terre and Basse Terre), several islands or groups of islands are administratively attached to it: la Désirade, Marie-Galante, les Saintes. Saint Martin and Saint Barthélémy, previously attached to Guadeloupe, are now separate administrative entities. Madeira is composed of two main inhabited islands, administered together with (but separately from) the uninhabited Desertas and Selvagem archipelagos.

Insularity can be considered as another dimension in remoteness. It necessarily brings accessibility and transportation issues, and various

types of constraints as regards resources (e.g., energy water generation and storage/use, waste management). Double insularity makes these issues even more acute, and creates additional ones: internal accessibility issues must be addressed (by boat or air, which is more expensive); it is often necessary to duplicate infrastructures (e.g., for health or education); and it is also expensive to maintain several small structures. What is true for public infrastructures is equally true for private ones, and represents a burden for the development of economic activities (notably industrial activities).

Most ORs are relatively small in terms of area: less than 3,000 km² in average, if French Guiana is not considered. In some cases, this area is far smaller (801 km² for Madeira), if not extremely small (53 km² for Saint Martin). French Guiana is an exception, since it has an area of almost 85,000 km². However, 96% of this is covered by an extremely dense (and mostly protected) tropical forest, which reduces the land available for urban or even agricultural human settlement and economic activities. As most of the population is condensed on the coastal area, it is arguable that French Guiana is effectively also a small territory. Equally, the populations of all ORs are quite small, though it should also be noted that the population of the Canary Islands, in particular, is larger than some EU Member States (Table 14).

Table 14 Area and population of Outermost Regions

Regions	Area	Number of inhabitants	Date of census
Azores	2,346 km ²	246,646	2011
Canary Islands	7,493 km ²	2,117,519	2011
Guadeloupe	1,628 km ²	401,554	2009
French Guiana	83,846 km ²	232,223	2010
Madeira	801 km ²	267,302	2011
Martinique	1,128 km ²	396,404	2009
La Réunion	2,512 km ²	816,364	2009
Saint Martin	53 km ²	35,692	2009

This factor, combined with insularity (except for French Guiana), or even double insularity, and remoteness, has major impacts. One key

consequence is that their economic market is extremely limited, and that they depend strongly on imported products.

All insular ORs are of more or less recent volcanic origin. Most have a rugged topography, and some have very high summits (the Piton des Neiges, 3,070 m, in La Réunion; Mount Teide, 3,718 m, in the Canary Islands). As a consequence, access to certain parts of these already isolated and insular territories is especially difficult. This creates some additional issues, notably in terms of providing the concerned populations with public services. Although the situation in French Guiana is different, the result is the same: as mentioned above, over 90% of its area is covered by tropical forest. Although these areas are very sparsely populated, it remains necessary to provide their inhabitants with at least minimum services. Protected areas (national parks, reserves, etc.) cover a large proportion of the area of all ORs, limiting the land available for cultivation, industrial activities and human settlement. This can be considered as a handicap in terms of developing certain economic activities, and is certainly a challenge in terms of resource and waste management.

As most of the ORs are in the wet intertropical zone, they generally have warm and wet climates, and some are also subject to particular climatic phenomena: heavy and violent rains, persistent fog, violent wind, salty wind. Because of their insular and mountainous characteristics, they experience very strong spatio-temporal variations. Certain sub-regions experience drought and are regularly threatened by forest fires (especially with strong winds).

Most of the ORs are strongly exposed to natural risks and vulnerabilities, which regularly provoke important damages and impose continuous attention. These risks are:

- Tropical storm risks and coastal risks bounded to the passage of cyclones (storm tides and cyclonic swells, floods),
- Volcanic hazards,
- Seismic risks of landslides and tidal waves,
- Risks of erosion and floods.

Due to its geographic position and specificities, French Guiana is less vulnerable to these natural hazards. However, the local authorities have implemented risk management plans in order to anticipate erosion-related landslides and floods. In addition to these occasional risks, climatic characteristics create some daily technical difficulties in all ORs: due to the wet and salty climate, the life expectancy of machines (both industrial

machinery and private vehicles) is reduced, and it is necessary to use specifically resistant (and thus expensive) materials for buildings.

Conclusion

The group of ORs was constructed according to political criteria. Their initial coherence is founded on a shared vision of the role these regions are willing to play beside their homeland country within the EU. This is what distinguishes ORs from Overseas Countries and Territories, whose geographical characteristics are very often similar. Similarly, cohesion within this political group is far more reinforced by the existence of common, specifically designed, policies than by the fact of sharing certain geographical characteristics.

However, European institutions need to take into account the geographical characteristics of its different ORs when designing policies to promote a balanced and sustainable development in these areas. Although ORs are certainly not strictly comparable with one another, they share an important number of structuring elements, the combination of which effectively makes them different from all other continental EU territories. It is thus arguable that closely examining these characteristics and their impacts is essential to better understand how these regions are structured and how they cope with their respective and/or common challenges, and to determine how they can best be supported.

3.3 Cross-analysis of delineations

The delineation of geographically specificities has been an extensive and crucial step for the TPG to consider the demographic, economic and environmental characterisation of these territorial specificities. This chapter has two objectives: to briefly summarise basic information on area and population resulting from the respective delineations; and to analyse how GEOSPECS areas overlap in ESPON space and in the EU.

Synthesis of delineations at EU27 and ESPON space levels

As indicated in section 1.1, the delineation of various geographic specificities is based three types of definition principles:

- “Given” either geographically or politically: Outermost Regions and islands;
- “Based on threshold” values: mountain (morphological) and sparsely populated (demographical) regions;
- “Based on driving time-distances” to a line: coastal and border regions.

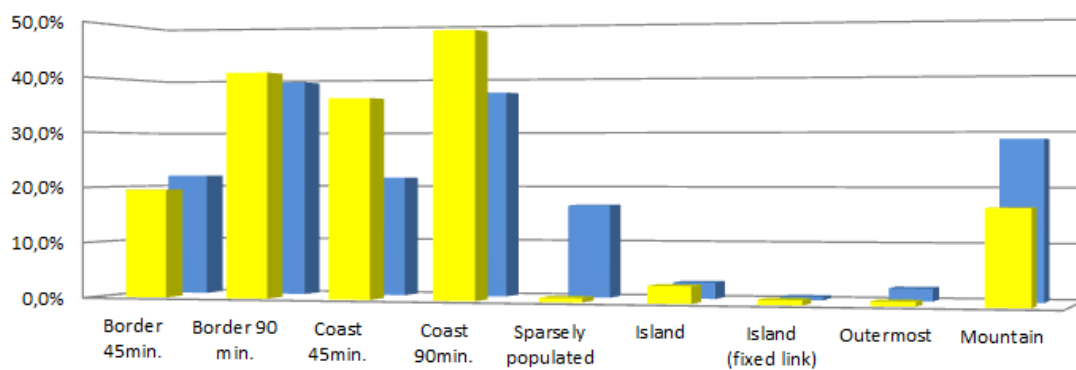
The TPG has chosen not to make a general delineation of border areas and coastal zones, considering that these are defined on the basis of different types of proximity (socio-economic, environmental etc.) to a borderline or a coastline. Admittedly, in its analyses, the TPG has mainly considered areas within 45 and 90 minutes travel time from to a borderline or a coastline. However, these thresholds do not cover all types of border and coast effects; differences in wealth and legislation between neighbouring countries can, for example, have an effect on national economies as a whole. ‘Border area’ is therefore a complex notion, analysed in detail in section 3.2.5.

As shown in Figure 9 (EU27) and Figure 10 (ESPON space⁹¹), the relative importance of GEOSPECS specificities varies depending on whether the one considers their spatial extent or their population.

Considering their spatial extent, mountain areas occupy the largest share of EU27 territory (see Figure 9) with 28.7% of the area. Next come areas within 45 minutes from borders and coasts, with about 22% of the EU 27 territory, while sparsely populated areas total 16.7%. There is a major difference between these four largest categories, and the three other

⁹¹ Excepting “Macedonia” and “Bosnia and Herzegovina” where no LAU1 or LAU2 digital maps were available, making delineation process impossible.

ones. Islands without a fixed link total only 2.9% of the EU27 area, Outermost Regions 2.3%, and islands with a fixed link 0.6%.



	Border 45min.	Border 90 min.	Coast 45min.	Coast 90min.	Sparsely populated	Island	Island (fixed link)	Outermost	Mountain
UE27 (Pop)	19,5%	40,7%	36,0%	47,9%	0,8%	3,1%	0,9%	0,8%	16,9%
UE27 (Area)	22,0%	39,4%	21,6%	37,3%	16,7%	2,9%	0,6%	2,3%	28,7%

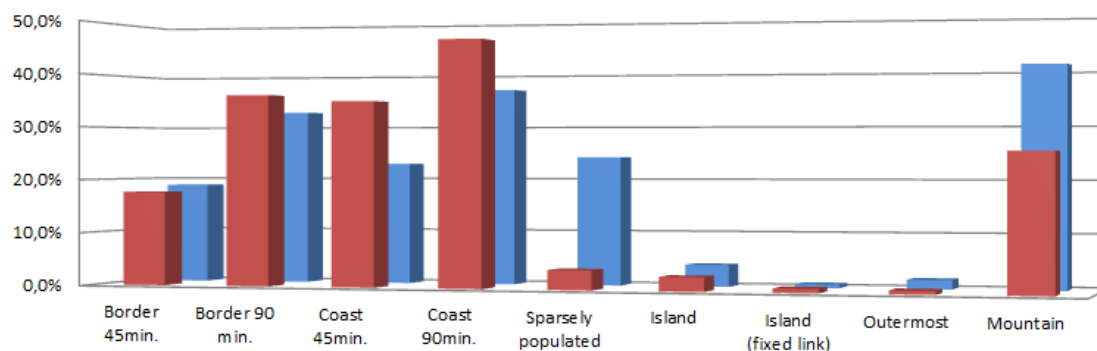
Sum of percentages may exceed 100% due to the fact that many specificities overlap

Figure 9 Proportion of population and area covered by various types of geographic specificities (EU27)

Another way to interpret the relative importance of various specificities consists of taking account of the proportion of the EU27 population that lives within each GEOSPECS category. From this perspective, areas with 45 minutes from the coastline host the largest share of the EU27 population (36%), followed by areas within the same distance from borders (19.5%) and mountain areas (16.9%).

An alternative classification of GEOSPECS categories can be made on the basis of the ratio between the proportions of area and population. On one hand, there are geographic specificities where the population tends to "concentrate" (coasts, borders and islands) and, on the other, geographic specificities that tend to be more thinly populated than the European average (SPAs and, to a lesser extent, mountains). Outermost Regions are in a contrasting position, as they include both relatively densely populated islands and the sparsely populated rainforest of French Guiana.

The overall patterns are similar when one considers the ESPON space as a whole (see Figure 10). Nonetheless, some significant changes can be observed in the relative importance of the mountain, sparsely populated and island categories, reflecting patterns of geographic specificity in ESPON countries not belonging to the European Union.



Sum of percentages may exceed 100% due to the fact that many specificities overlap

	Border 45min.	Border 90 min.	Coast 45min.	Coast 90min.	Sparsely populated	Island	Island (fixed link)	Outermost	Mountain
■ ESPON (Pop)	17,6%	35,9%	34,7%	46,0%	3,7%	2,6%	0,8%	0,7%	25,4%
■ ESPON (Area)	18,8%	32,9%	22,9%	37,0%	24,2%	4,0%	0,7%	1,7%	41,3%

Figure 10 Population and area within various types of geographic specificities (ESPON space)

As shown in section 3.2.3, major parts of Iceland, Norway and Turkey comprise sparsely populated or poorly connected municipalities⁹². Similarly, for mountains, (see section 3.2.1) Switzerland, Liechtenstein, Iceland, Norway, Western Balkans and Turkey all have a particularly high proportion of mountain areas⁹³. The proportion of mountainous areas therefore rises from 28% in the EU27 to 41% when considering the entire ESPON area.

Regarding islands in general, the fact that the share of area is more than one-third higher in the ESPON space than in the EU, while the share of population is 15% lower is mainly due to the inclusion of Iceland and, to a lesser extent, of the relatively sparsely populated islands of Norway. In parallel, the relative weight of the Turkish population in the ESPON space and the limited population of Turkish islands contribute to reduce the relative share of island population.

Comparison of GEOSPECS delimitation with ESPON typologies

As mentioned in section 1.2, the TPG has sought to maximise congruence with ESPON typologies, but it has nonetheless been necessary to adopt significantly different methods to create meaningful delineations for the analysis of development opportunities and challenges. The comparison of

⁹² IS : 72'814 habitants & 94'715 km²; NO : 1'050'784 habitants & 256'014 km²; TR : 16'709'234 habitants & 326'202km²

⁹³ AL: 23'291 KM² & 2'050'514 habitants; CH: 38'234 km² & 6'501'651 habitants; IS: 86'810 km² & 68'384 habitants; LI: 160 km² & 35'168 habitants; ME: 13'089 km² & 670'734 habitants; NO: 267'466 km² & 2'655'169 habitants, RS: 38'462 km² & 3'986'789 habitants; TR: 643'988 km² & 48'308'333 habitants; XK: 10'903 km² & 2'337'024 habitants.

the delineations of GEOSPECS categories at the LAU2 level in GEOSPECS with the NUTS 3 typologies of ESPON provides information on the impact of these methodological differences on the number of persons and areas identified as geographically specific. It should also be noted that the GEOSPECS project's delineations include Turkey as well as most of the Western Balkans⁹⁴, which the ESPON typologies only covered these for border areas and SPAs.

In the case of border regions, the maps 1, 2, 7 and 8 of Annex A show the differences between a political/administrative and a geographical approach to the same specificity. The ESPON typology, for example, identified coastal NUTS3 regions participating in cross-border cooperation programs around the Baltic Sea, the English Channel, and the Mediterranean Sea as border regions. The extent to which the socio-economic dynamics in these maritime border areas can be compared to those observed along terrestrial borders can be questioned. Considering terrestrial border areas, the areas within 90 minutes of the border lines (Annex A, Map 2) fit more closely the border cooperation areas identified by the ESPON typology than the areas within 45 minutes (Annex A, Map 1), illustrating that border cooperation extends beyond areas of daily mobility to a border. However, maps representing the proportion of population that lives within 45 minutes of the border (Annex A, Map 7) are more informative when it comes to identifying areas where being close to a border is a major component of regional life and identity. This mainly concerns border areas in a central part of Europe, stretching from the Benelux countries to Romania, as well as Northern Ireland.

Coastal regions have been delineated on the basis of the proportion of population within 10 km from the coast in the ESPON typology, while GEOSPECS has considered different time-distances to the coast. The ESPON typology was subdivided in four classes (low, medium, high and very high share of coastal population). With regard to the daily mobility maximum travel time of 45 minutes, there are major variations within the classes with "low" and "medium" shares of coastal populations, as the proportions of population living in LAU2 within 45 minutes from the coast range from respectively 0.4% and 20.4% to 100% (Figure 11). This is an effect of the variable quality of transportation networks connecting the coast and the inland. Interestingly, the non-coastal regions identified in the ESPON typology also contains 35 NUTS 3 regions where more than 80% of the population is within commuting distance of the coast. These regions are all in the United Kingdom, the Netherlands, Belgium and Germany.

⁹⁴ Excepting "Macedonia" and "Bosnia and Herzegovina" where no Lau1 or Lau2 digital maps were available, making delineation process impossible

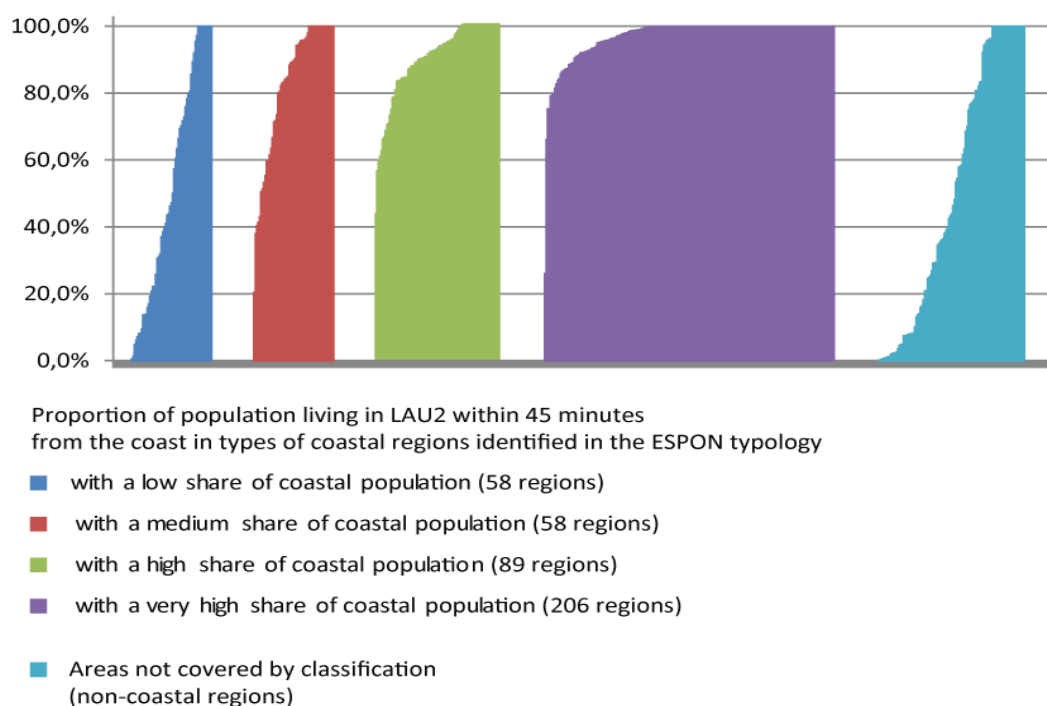


Figure 11 Proportions of population living in LAU2 within 45 minutes from the coast in the four classes of coastal regions of the ESPON typology

The mountain delineation of GEOSPECS includes Turkey, the Western Balkans, Reunion and Iceland, which are missing in the ESPON typology (Annex A, Map 5; Annex A, Map 12). The two delineations are methodologically similar, as they are based on very similar grids of mountain areas. However, these are applied at different levels (LAU2 and NUTS3, respectively). This explains why the patterns are relatively similar when considering the proportions of mountainous area and population at NUTS3 level (Annex A, Map 5; Annex A, Map 12). The comparison between these maps of proportions of mountain population and area makes the distinction between regions with populated mountains (e.g. Alps, Apennines, Massif Central) and with populated piedmonts (e.g. Pyrenees). It appears important to maintain this distinction in the analyses, as the social and economic realities of regional “mountainousness” will be significantly different in each group of regions.

Attempts to map SPAs at the NUTS3 level makes the limitations of this scale of analysis obvious. Most “archipelagos of sparsity” (see section 3.2.3) disappear, e.g. along the Irish coast and the Portuguese-Spanish border, as well as in the Pyrenees, the Alps, Bulgaria, and the Baltic countries. In the Nordic countries, comparing the share of population (Annex A, Map 11) and area (Annex A, Map 6) in SPAs at the

NUTS 3 level shows the different degrees of intra-regional disparity. While most of the territory of Norrbotten and Västerbotten in Northernmost Sweden has been defined as SPA in GEOSPECS, the proportion of the population living in these LAU2 units is very low.

Overall, these comparisons demonstrate the need for multi-scalar analyses to understand patterns of geographic specificity.

Cross-analysis of delineations

A major difficulty that arises when trying to assess whether a geographical specificity is associated with particular sets of development potentials or limitations is that several specificities often overlap over the same region.

Due to the large number of potential overlaps - 49 if one includes areas within commuting distance of urban areas - the TPG has mainly focused on overlaps that are most likely to reinforce or reduce development constraints in GEOSPECS areas (see Figure 12).

Mountains have been considered by the TPG as one of the most relevant categories for cross-delineations. Indeed, mountain massifs act as barriers that have often influenced the geographic context for social and economic development in all other categories, e.g. through additional infrastructure costs. The rough terrain of mountainous coasts, for instance, generally makes them less suitable for human settlement and use. Similar effects can be observed on islands, Outermost Regions and in sparsely populated areas. Mountains also reinforce border effects by adding topographic barriers to administrative ones. Finally, rough terrain limits the range of potential daily commuting distances to urban areas.

In contrast, accessibility to urban areas favours development potentials within all kind of territories. It is of particular relevance in geographic specificities where settlement patterns tend to be sparse, such as

	Border areas	Coastal zones	Mountain areas	Islands	Sparsely populated areas	Outermost regions	Access to urban areas
Border areas							
Coastal zones							
Mountain areas							
Islands							
Sparsely populated areas							
Outermost regions							
Access to urban areas							

Figure 12 Identification of most relevant overlapping categories

mountain areas and islands (see Figure 10). Indeed, urban areas act to concentrate demographic and economic activities upon which regional development strategies can build. Based on this rationale, one could think of the importance of PUSH for SPAs. This cross-delineation is, however, of no relevance because, using a threshold of FUA over 100,000, no such PUSH can be found in SPA. In the case of coastal zones, this tends to concentrate a large proportion of the population on small areas: PUSH (especially those over 750,000) represents precisely the backbone of this concentration process. In most cases, they do not only imply concentrations of people, goods and economic activities, but also act as interfaces with the global economy, hosting major harbours. Their role is therefore of particular relevance not only for the coastal zone itself, but for entire national economies.

Finally, crossing coastal zones with SPAs provides an interesting and complementary perspective on coasts. Indeed, this geographic specificity is, overall, characterised by the highest ratio of population to area (see Figure 10) among GEOSPECS categories. In that sense, looking at the less populated parts of coastal zones provides the TPG with useful elements on factors of attractiveness for the category.

Table 15 Overlaps between GEOSPECS categories (areas)

The table reads as follows (using the figures in red font colour as examples):

ESPON_Area	Border area (within 45 minutes)	Border area (within 90 minutes)	Coastal area (within 45 minutes)	Coastal area (within 90 minutes)	Sparsely populated and PC areas	Island without fixed link	Island with fixed link	Outermost region	Mountain area	Urban area > 100 000 inh.	Urban area > 750 000 inh.
Border area (within 45 minutes)		100.0%	10.9%	20.5%	38.6%		0.1%	4.7%	31.6%	34.2%	11.5%
Border area (within 90 minutes)	57.1%		13.0%	23.5%	25.5%		0.4%	3.3%	29.9%	40.4%	13.9%
Coastal area (within 45 minutes)	8.9%	18.6%		100.0%	26.8%	14.6%	2.9%	3.6%	38.3%	40.8%	13.2%
Coastal area (within 90 minutes)	10.4%	20.8%	61.9%		21.5%	10.8%	1.8%	2.3%	38.6%	39.5%	12.7%
Sparsely populated and PC areas	29.9%	34.6%	25.4%	32.9%		7.0%	1.0%	5.9%	55.9%	0.2%	0.0%
Island without fixed link			82.7%	99.0%	42.3%			6.7%	71.9%	16.7%	3.0%
Island with fixed link	3.8%	17.5%	100.0%	100.0%	34.6%				39.9%	23.3%	15.0%
Outermost region	51.2%	62.8%	48.8%	48.8%	83.8%	15.9%			12.2%	0.6%	
Mountain area	14.4%	23.8%	21.3%	34.6%	32.9%	7.0%	0.6%	0.5%		17.6%	3.7%
Urban area > 100 000 habitants	18.3%	37.9%	26.7%	41.7%		1.9%	0.4%	0.0%	20.8%		30.4%
Urban area > 750 000 habitants	20.3%	42.9%	28.4%	44.0%		1.1%	0.9%	14.1%	14.1%	100.0%	

- Within border areas (1st row), 10,9% of the area is also a coastal area (3rd column)
- Within coastal areas (3rd line), 8,9% of the area is also a border area (1st row)

Table 16 Overlaps between GEOSPECS categories (population)

ESPO _N _Population	Border area (within 45 minutes)	Border area (within 90 minutes)	Coastal area (within 45 minutes)	Coastal area (within 90 minutes)	Sparsely populated and PC areas	Island without fixed link	Island with fixed link	Outermost region	Mountain area	Urban area > 100 000 inh.	Urban area > 750 000 inh.
Border area (within 45 minutes)		100.0%	14.8%	25.6%	0.9%		1.4%	0.1%	22.1%	84.7%	48.1%
Border area (within 90 minutes)	49.1%		17.7%	26.9%	0.7%		1.2%	0.0%	19.3%	84.8%	51.9%
Coastal area (within 45 minutes)	7.5%	18.3%		100.0%	1.9%	7.1%	2.3%	1.9%	17.5%	77.5%	46.5%
Coastal area (within 90 minutes)	9.8%	21.0%	75.3%		1.6%	5.7%	1.7%	1.5%	19.9%	76.7%	45.6%
Sparsely populated and PC areas	4.4%	6.9%	18.0%	20.5%		0.9%	0.9%	0.9%	77.0%	0.3%	0.0%
Island without fixed link			94.2%	99.3%	1.2%			25.3%	54.5%	56.7%	16.7%
Island with fixed link	31.2%	53.2%	100.0%	100.0%	4.1%				6.2%	73.1%	53.6%
Outermost region	1.5%	1.5%	96.5%	96.5%	4.8%	95.1%			75.2%	23.3%	
Mountain area	15.4%	27.2%	23.8%	36.1%	11.1%	5.6%	0.2%	2.1%		42.7%	17.0%
Urban area > 100 000 inhabitants	20.6%	41.9%	37.0%	48.6%		2.1%	0.8%	0.2%	14.9%		58.4%
Urban area > 750 000 inhabitants	20.0%	44.0%	38.0%	49.5%		1.0%	1.0%	10.2%	10.2%	100.0%	

The table reads as follows (using the figures in red font colour as examples):

- Within border areas (1st line), 14,8% of the population lives in a coastal area (3rd column)
- Within coastal areas (3rd line), 7,5% of the population lives in a border area (1st column)

4. Quantitative analyses

4.1 Quantitative characterisation of areas with geographic specificities

4.1.1 Mountain areas

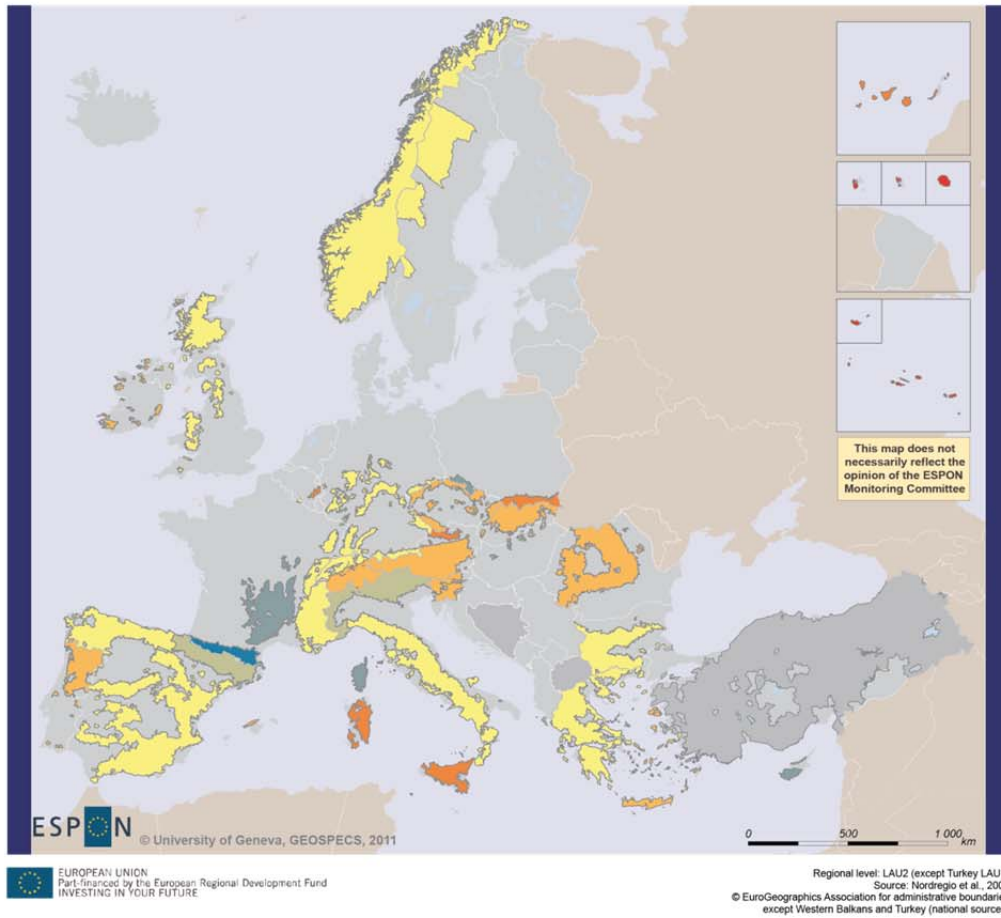
In 2010, the European Environment Agency published a report on Europe's mountains (EEA, 2010). This report covered the ESPON space, using a delineation of mountains that is very similar to the one used for Geospecs, and included analyses at a high spatial resolution (mainly 1 km²). Accordingly, this section will not present quantitative analyses on themes that have already been covered in the EEA report at a comparable spatial resolution and based on recent data, such as population, land covers and the distribution of protected areas; the comprehensive analyses on these themes in the EEA report can be regarded as complementary to what is presented below.

Population: Age structure

While the EEA (2010) report presents data on population number and density, and changes in these, it does not present data on age structure, though such data were presented in European Commission (2004).

With regard to persons under 15, analysis at the level of national massifs (Map 25) suggests particularly low proportions compared to national averages in three French mountain areas (Pyrenees, Corsica, Massif Central: proportions respectively 14, 15, 16% compared to the national average of 18%), the Polish middle mountains (17% vs. 20%) and Cyprus (19 vs. 21%). In contrast, the most significant differences from national averages are positive, again for France, in mountains of the Indian Ocean and Caribbean islands (27, 23 vs. 18%). Other particularly high proportions are in Portuguese Atlantic Islands (20 vs. 16%), the Polish Carpathians (23 vs. 20%), Sardinia and Sicily (17 vs. 14%). At the LAU2 scale (Map 26), only some similar relationships are apparent; the diversity of situations within each country and massif tends to predominate. Nevertheless, particularly low proportions are generally found for most of the French Pyrenees, Corsica, and Massif Central; and particularly high proportions for the mountains of the Outermost Regions and the Polish Carpathians. However, other patterns also appear. In Spain, there is quite a clear differentiation between the mountains of the north and east,

Proportion of children in mountain areas



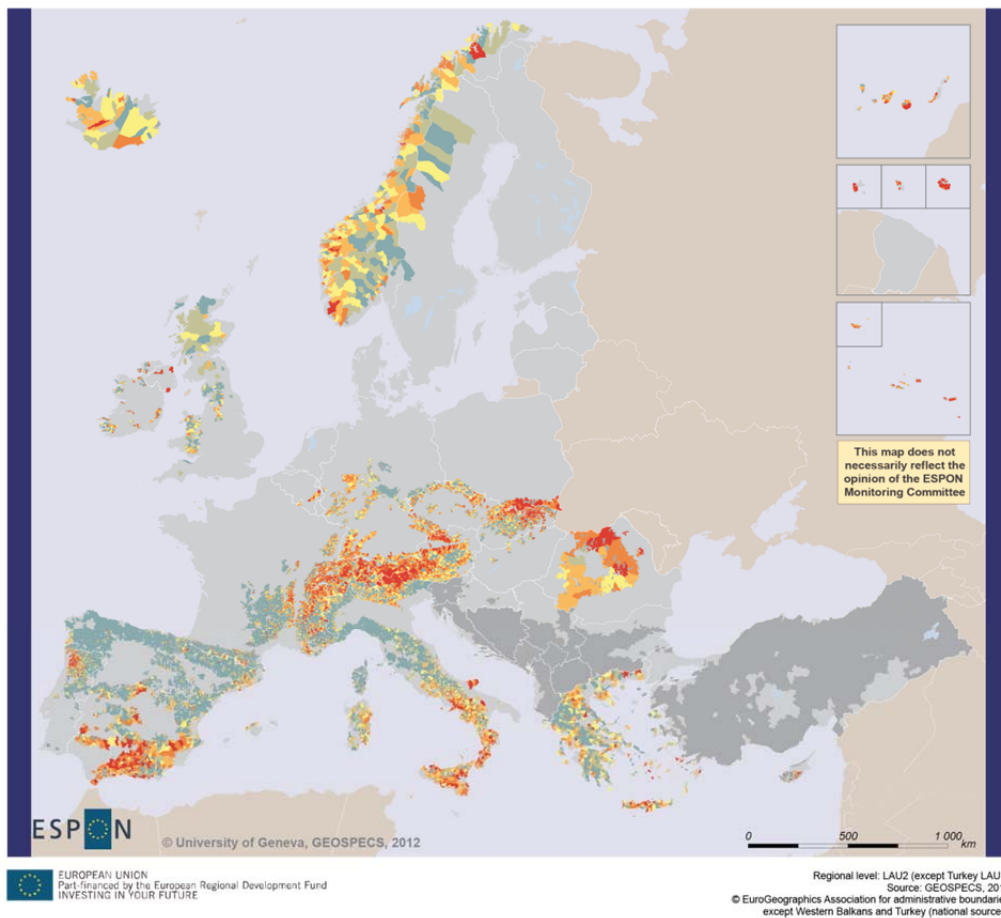
Difference between proportion of mountain massif inhabitants under 15 years old and national average

In percentage points



Map 25 Proportion of children in mountain massifs

Proportion of children in mountain areas



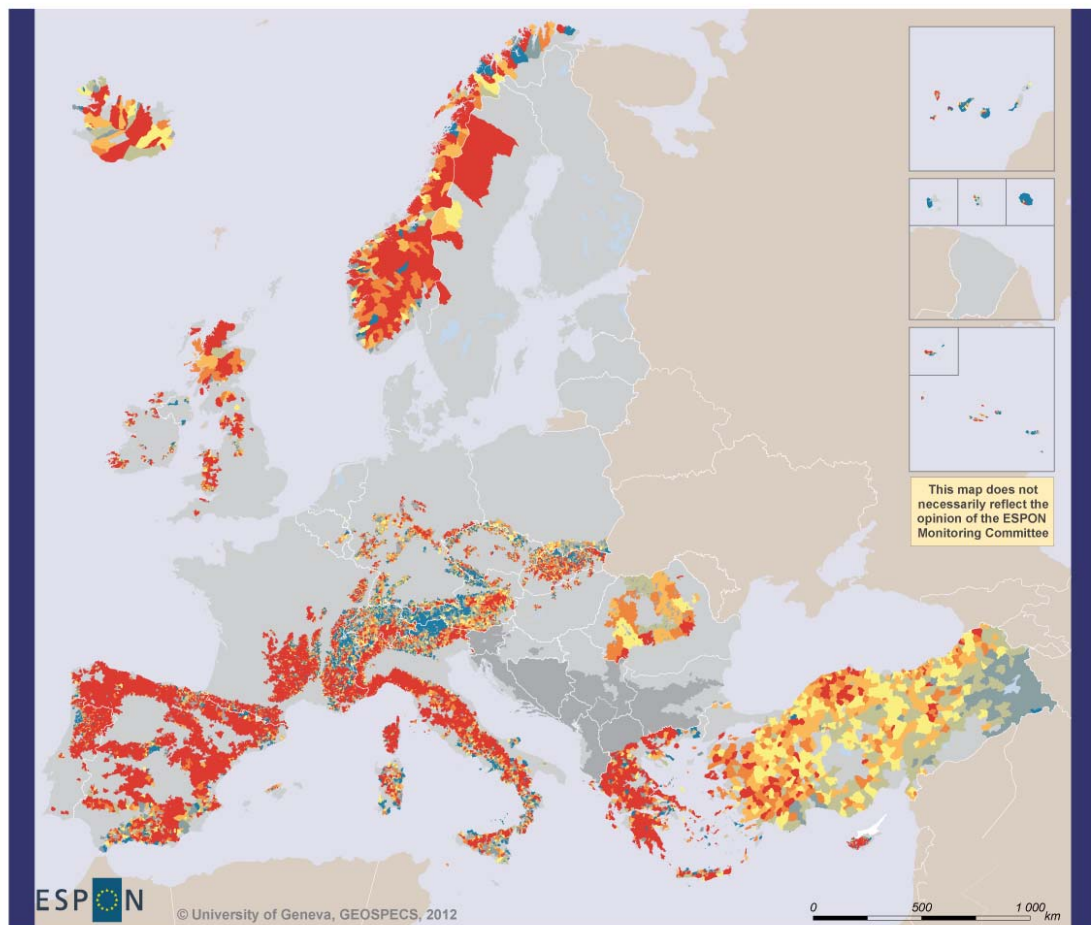
Difference between proportion of mountain LAU2 inhabitants under 15 years old and national average

In percentage points



Map 26 Proportion of children in mountain municipalities

Proportion of persons over 59 y.o. in mountain areas



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: Nordregio et al., 2004
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Difference between proportion of mountain massif inhabitants over 59 years old and national average

In percentage points



Table 17 Proportion of persons over 59 y.o. in mountain municipalities

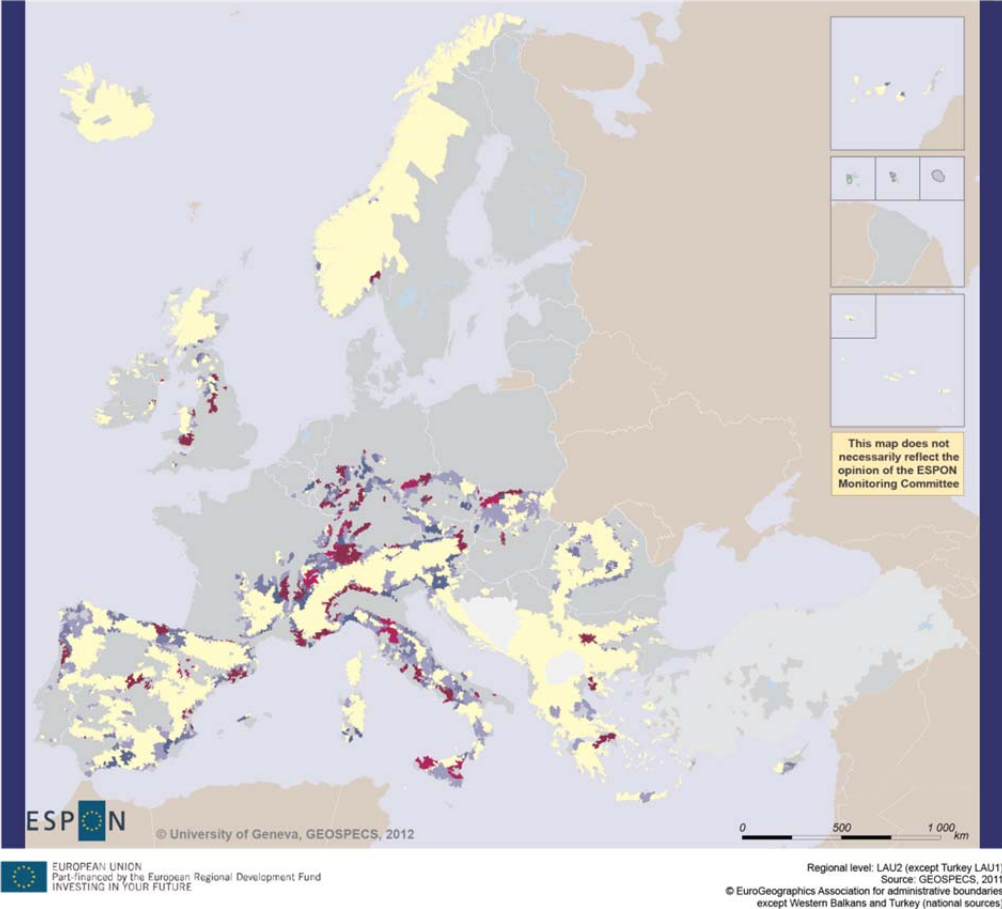
with lower proportions, and those of the south, with high proportions. Similarly, in Italy, proportions are generally low in the northern and high in the southern Apennines. In Greece, coastal and island mountain areas tend to have higher proportions.

With regard to persons over 60, there are relatively few national massifs where the proportions are particularly low compared to the national averages: notably on the islands in the Outermost Regions, as well as Italy's Mediterranean islands. However, there are a considerable number where proportions are comparatively high. Notably, these include the three French massifs with particularly low populations under 15 (Pyrenees, Corsica, Massif Central: respectively 32, 26, 26% compared to the national average of 21%) and Cyprus (25 vs. 16%), suggesting particular challenges for these regions in terms of future population and providing services for ageing populations. For the over-60 population, such patterns are also found at the LAU2 scale (Table 17). Across most of Europe's mountains, the proportion of the population over 60 is markedly greater than for countries as a whole. Only on the islands in the Outermost Regions and in the region comprising the western Alps of Austria and adjacent parts of the Italian Alps, parts of the French Alps, and the mountains along the German/Czech border, and around some major urban centres, are clearly large groups of LAU2s where the proportion over 60 is markedly lower than national averages.

Influences of urban areas

A key issue recognised in the report for the European Commission (2004) was the influence of urban areas close to mountains and in mountains, for flows in two directions: of commuters to the urban centres; and of people from the urban areas for recreation. Map 27 shows the relationships between urban areas and mountains. For relatively narrow mountain massifs, particularly those of the Central European middle mountains, almost entire massifs are within commuting distance of urban areas. This also applies to large proportions of the northern Alps and much of the Apennines, Sicily, and the Slovak Carpathians. Nevertheless, it is notable that 28% of the population of the Alps, and 16% of the Apennines is not within commuting distance of any such centre. However, for many massifs, the accessible proportion does not extend far into the mountains – for example, the Pyrenees, the Romanian Carpathians – while in others, the distribution of accessible urban areas is rather patchy. This is particularly true for the Balkans/southeast Europe, where only 23% of the mountain population is within commuting distance of an urban area. This is a smaller proportion than for any other massif with nearby urban areas (i.e., excluding the mountains of Iceland and Indian Ocean islands); those

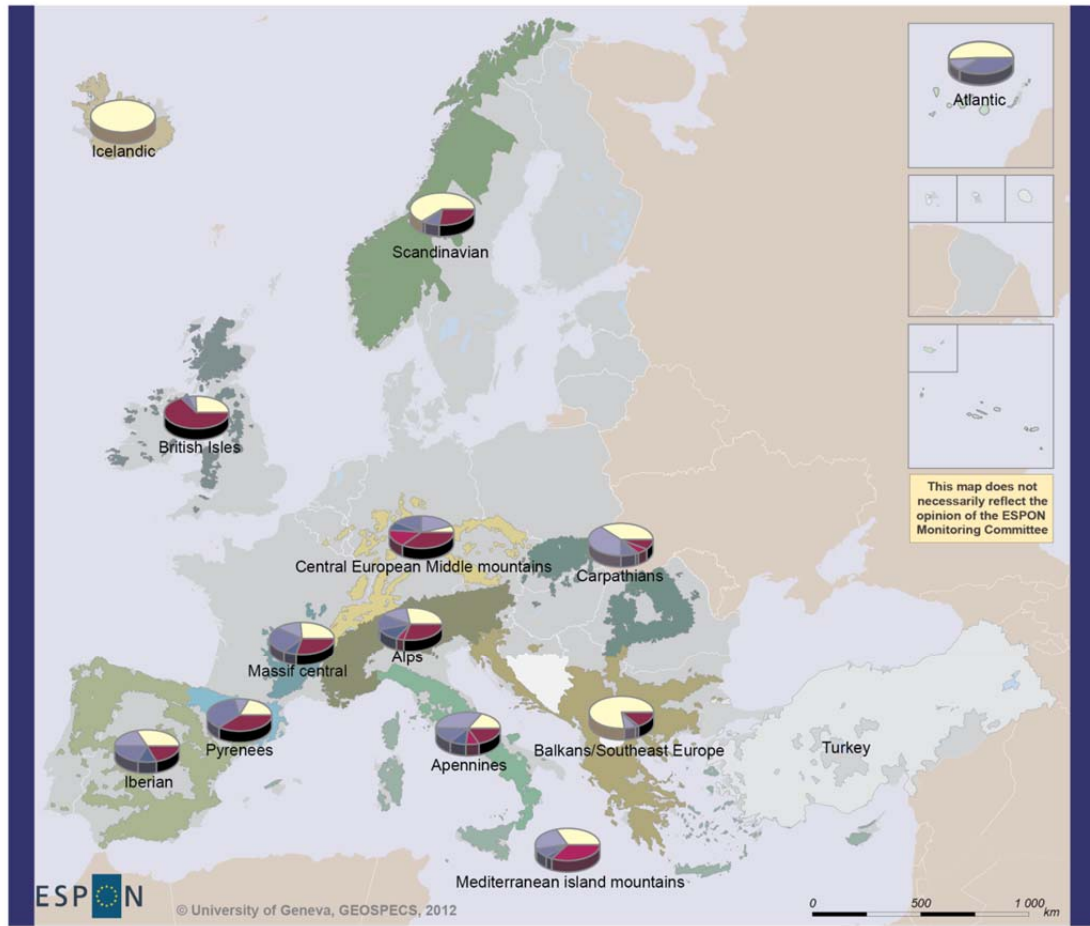
Mountain LAU2 and potential commuting area (PUSH)



LAU2 in mountain areas within commuting distance of cities, classified according to the number of inhabitants of their Functional Urban Area

- Beyond commuting distance of cities
- Within commuting distance of cities**
 - 100 000 to 249 999 inh.
 - 250 000 to 499 999 inh.
 - 500 000 to 749 999 inh.
 - 750 000 to 999 999 inh.
 - 1 million inh. or more
- Non-ESPON space
- Non-mountainous parts of ESPON space
- Mountain areas with no data on urban areas

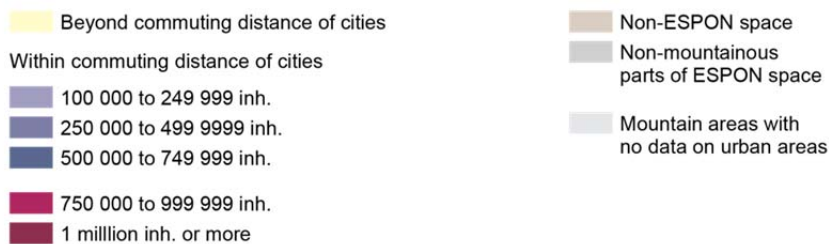
Map 27 Mountain municipalities and PUSH



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Proportion of massif population within commuting distance of cities, classified according to the number of inhabitants of their Functional Urban Area



Map 28 Massifs and PUSH

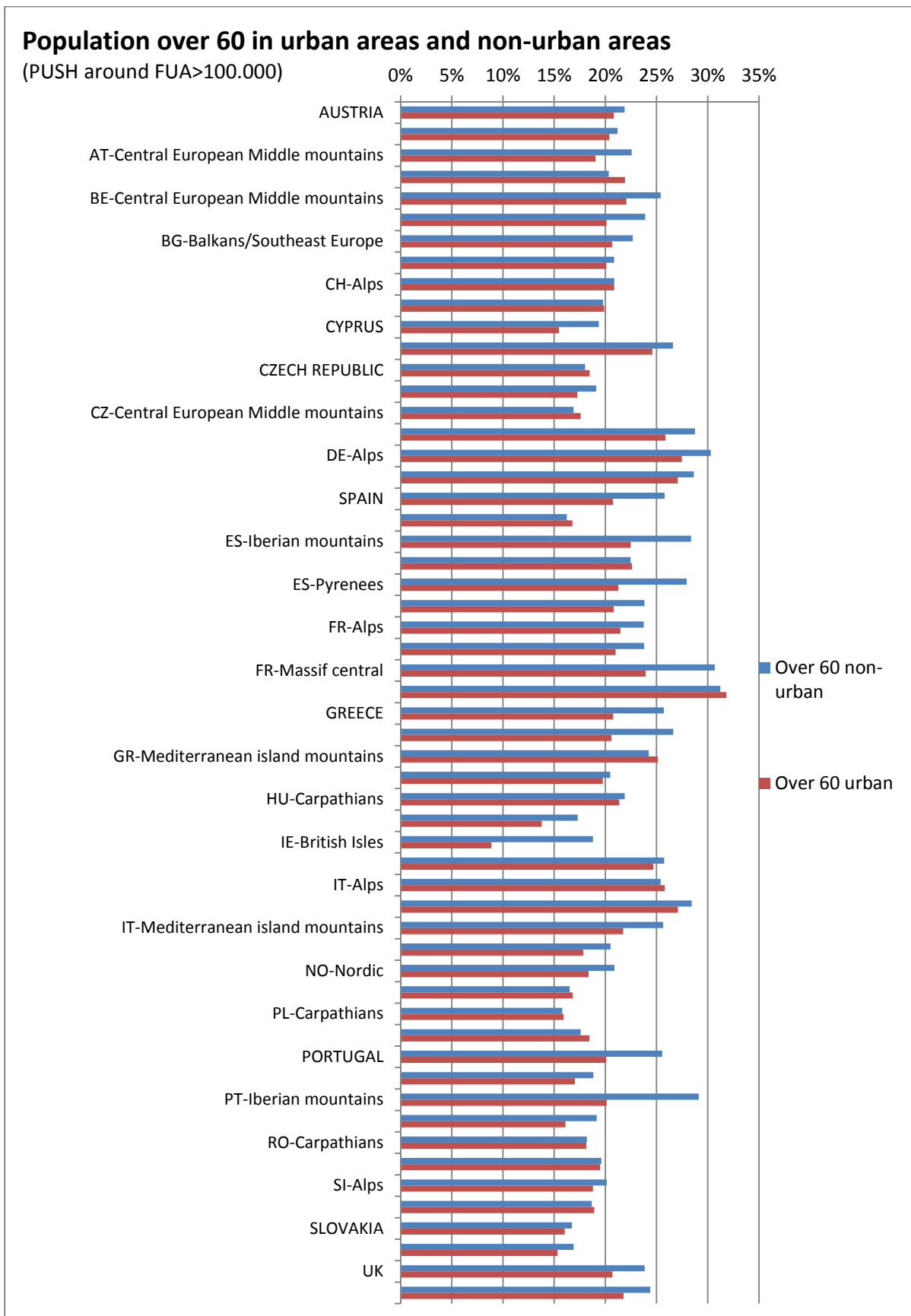
with the next lowest proportions are the Scandinavian mountains (39%), though this is a high proportion in relation to the mountain area; followed by the Atlantic islands mountains (49%), the Carpathians (62%), Mediterranean islands mountains (67%), and Iberian mountains (68%) (Map 28).

Analysis of the relationships between functional urban areas (FUAs) and age structure shows some clear patterns. This analysis was undertaken for the national parts of massifs, recognising that many relevant forces are at the national scale. The discussion below focuses on the national

parts of massifs where the difference in proportions of the respective age classes was more than 2% between urban and non-urban areas. Considering all FUAs with a population over 100,000 vs. areas outside these, in most cases, proportions of children under 15 were similar (i.e., 2% or less). However, for five areas, the differences were greater, with a higher proportion in the FUAs: 5% for Cyprus; 4% for the mountains of Ireland and the Portuguese mainland; and 3% for the Massif Central. At least for these massifs, this suggests a trend for families with children to live nearer or within urban areas. However, these statistics need to be put in their national contexts. In Ireland and the Portuguese mainland, the urban proportion in mountain areas is markedly higher than for the national population, supporting the hypothesis. This is not the case, however, for the Massif Central or Cyprus, where the urban proportion in the mountains is lower (and the non-urban proportion is even lower) than the national average. More detailed analyses, preferably over time would be required to evaluate these hypotheses. For only one national massif was there a marked difference in the other direction: the Jura of Switzerland, where the proportion of mountain children in non-urban areas (21%) was 4% higher than that in urban areas (17%). This finding appears robust in comparison to the national non-urban/urban differential (18 vs. 17%), though a reason is difficult to suggest.

A much more marked, and opposite, pattern is found for the population over 60. In these cases, the proportion in non-urban areas is typically higher, in some cases quite significantly: e.g., for the mountains of Ireland (10%), the mountains of the Portuguese mainland (9%), the Massif Central and Spanish Pyrenees (both 7%), and the Spanish Iberian mountains (6%). In all of these cases, this relationship accentuates national differences (0). Similar relationships are found across all massifs and all countries, with very few minor exceptions (never more than 1% in the other direction), but the difference is comparable to that at the national level and may therefore not be of importance. These findings need to be explored in more detail. However, at least for the five national massifs mentioned above, these data suggest that the rural parts of mountain areas are ageing faster than those living in the urban parts. Combined with the findings presented above, this implies growing challenges for the delivery of services of general interest, especially those that are health-related, in the non-urban parts of mountain areas.

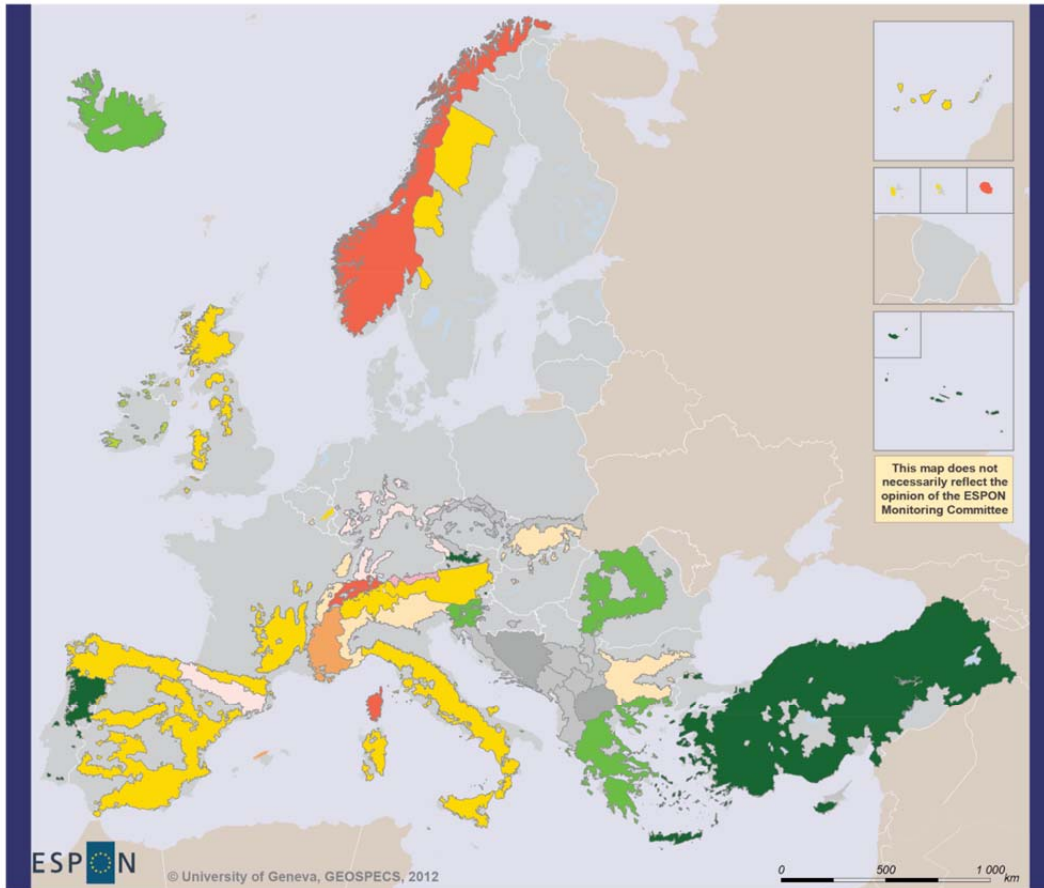
Figure 13 Patterns of employment



Map 29 presents the relative importance of employment in the three sectors for the national parts of massifs. This suggests a complex pattern, with the primary sector dominant in the mountains of the Azores and mainland Portugal, Cyprus, the Greek islands, and Turkey. However, NACE data show that the importance of employment in agriculture (and, in some countries, forestry) varies considerably: 61% of total employment in the mountains of Turkey, 23% in Cyprus, and 21% in Portugal and the Greek islands. Employment in the primary sector is also important in the mainland of Greece (15%), the Romanian Carpathians (13%), Iceland (12%), and Slovenia (10%). The tertiary sector accounts for most employment across Europe's mountains. It is particularly important in the mountains of Norway, where the most important NACE categories are health (18%), trade (14%) and real estate (11%); Corsica (public administration 18%, trade 15%, health 12%); and the Swiss Jura (trade 13%, health 11%), where manufacturing is the most important NACE category (14%). Elsewhere the tertiary sector is not quite as dominant. There are many national parts of massifs where the tertiary and primary sectors are more important than the secondary sector (yellow colours: Spanish Iberian mountains, Apennines, Italian islands, central and eastern Alps, British Isles, Swiss Alps) and others where the secondary sector is comparatively more important (pink colours: Spanish Pyrenees, French and Italian Alps, all Central European middle mountains, Bulgaria).

Given common statements about the importance of tourism in the economy of mountain areas, it is worth noting that there are very few national parts of massifs where employment in the NACE category 'hotels and restaurants' reaches at least 10%, almost all on islands: the Spanish Mediterranean (20%) and Atlantic islands (16%), Greek islands (13%), and Cyprus (10%); as well as the German Alps (14%). However, only for the very first of these is it the first-ranked category. Also of note is that, in the national parts of most massifs other than those mentioned above and the French islands (where public administration is the most important sub-sector), the two most frequent NACE categories are manufacturing and trade, usually in that order.

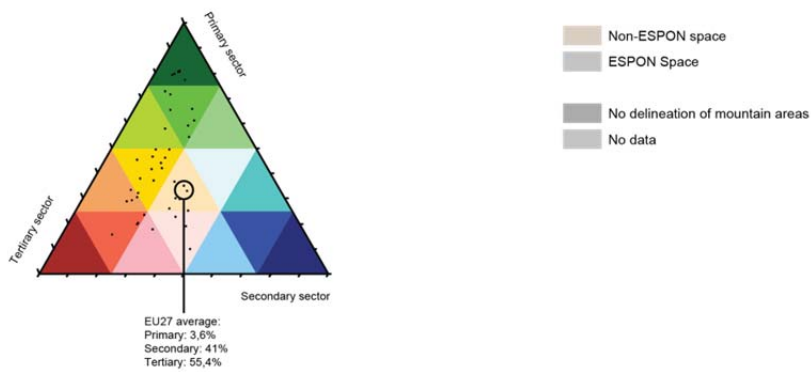
Such highly aggregated data hide very substantial variation, as shown for the Carpathians in Map 30. The dominance of agriculture is clear in most of the Romanian part, though there are also areas where either mining or manufacturing is important. Conversely, in the Slovak and Hungarian Carpathians, the overall dominance of the service sector is clear, including the importance of tourism in and around the Tatra and Fatra mountains.



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

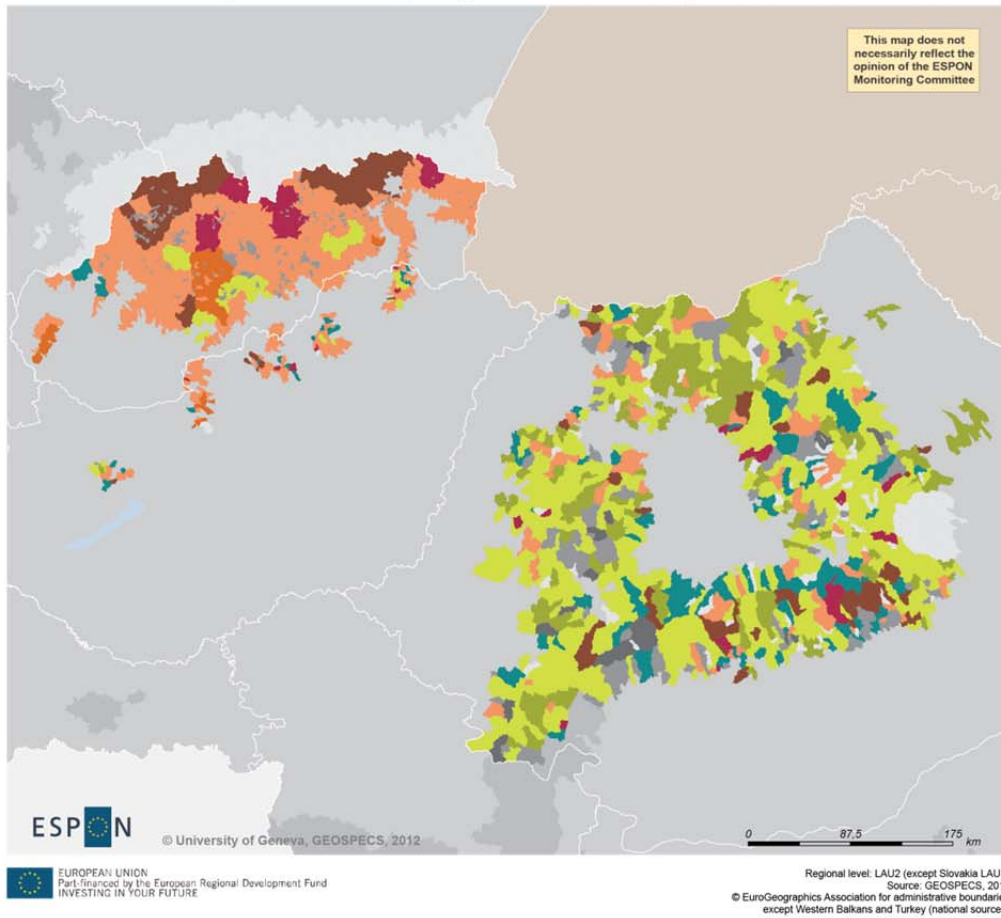
Regional level: Mountain massifs
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Deviations from EU27 average



Map 29 Employment structure by massif

Cluster analysis of employment in Carpathian LAU2



Ascendant classification of Carpathian LAU2 based on employment by NACE category

Major deviations from average profile - overrepresented sectors

- Agriculture
- Manufacturing and electricity
- Mining strongly overrepresented
- Mining more weakly overrepresented
- Construction
- Private and public services services
- Hotels and restaurants and education

Minor deviations from average profile - overrepresented sectors

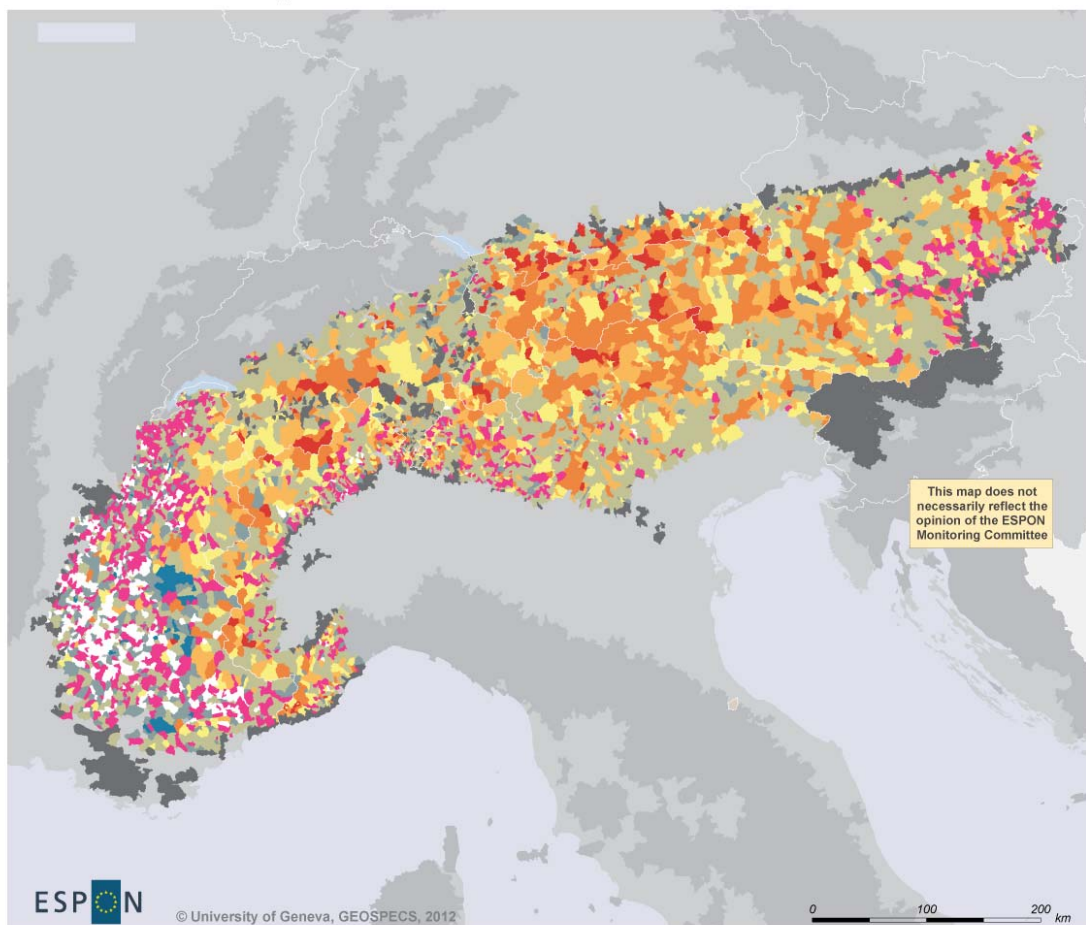
- Close to average profile - agriculture
- Close to average profile - services

Other

- Lakes
- Mountain areas outside the Carpathian mountains
- Non-mountainous areas
- No data

Map 30 Zoom on municipal employment in the Carpathians

Comparing different indicators of the local importance of tourism

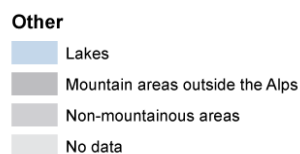
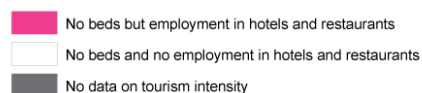
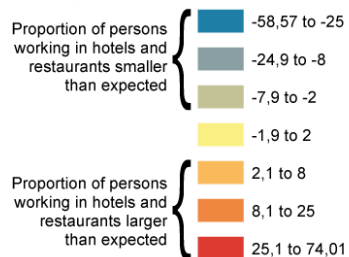


EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2
Source employment data: GEOSPECS, 2011
Source tourism intensity data: Alpine Convention
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Residuals from linear regression of tourism intensity (number of beds/inh.) and proportion of persons working in hotels and restaurants

Deviations from regression model including LAU2 with beds only



Map 31 Zoom on the importance of tourism in Alpine municipalities

Given the often-stated importance of tourism in the economy of mountain areas, a specific analysis of this sector was undertaken for the Alps, using both NACE data and data on tourism intensity provided by the Permanent Secretariat of the Alpine Convention. The resulting map (Map 31) shows that the importance of tourism in terms of both employment and accommodation varies very significantly at all spatial scales. Nevertheless, the importance of tourism in providing employment in the central Alps of Austria as well as southern Germany, in particular, is clear. Two other patterns are notable: first, the large number of municipalities in the French Alps that are not involved in the tourism sector at all; second, both in the French Alps and on the edges of the Alps in Italy and eastern Austria, there are municipalities with no hotel beds, but where the sector provides employment, both in restaurants and in providing services to those who are not staying in hotels. Many of the latter communities are close to large urban centres, from which residents and visitors presumably come to enjoy mountain food, drink, landscapes and air.

Access to airports

An important issue relating to both the quality of life and the potential for economic development, particularly through tourism, is the availability of airports. Due to the challenges of the terrain – for both flight and landing – airports in mountain areas tend to be limited, so that mountain inhabitants often have to travel outside the mountains to an airport. For the mountain inhabitants of Europe as a whole, 69% do not have access to an airport within 45 minutes, compared to 43% of those living outside mountains. 0 shows these relationships at the national scale. In almost all countries, access to an airport for mountain inhabitants is less than the national average; the exceptions are Bulgaria and Hungary, where part or all of the national capital region is in an LAU2 defined as mountain. Only in two countries does more than half of the mountain population have access to an airport within 45 minutes: Belgium and Switzerland – the former because the mountains are small, and the latter because of particularly good transportation systems. Differences between mountain and non-mountain populations are particularly large in Portugal (13 vs. 44%), Slovakia (8 vs. 20%), Norway (10 vs. 29%), Romania (7 vs. 17%), Germany (34 vs. 62%), and Italy (34 vs. 62%). However, these figures also show the difference in provision of airports between the newer and older states of the EU.

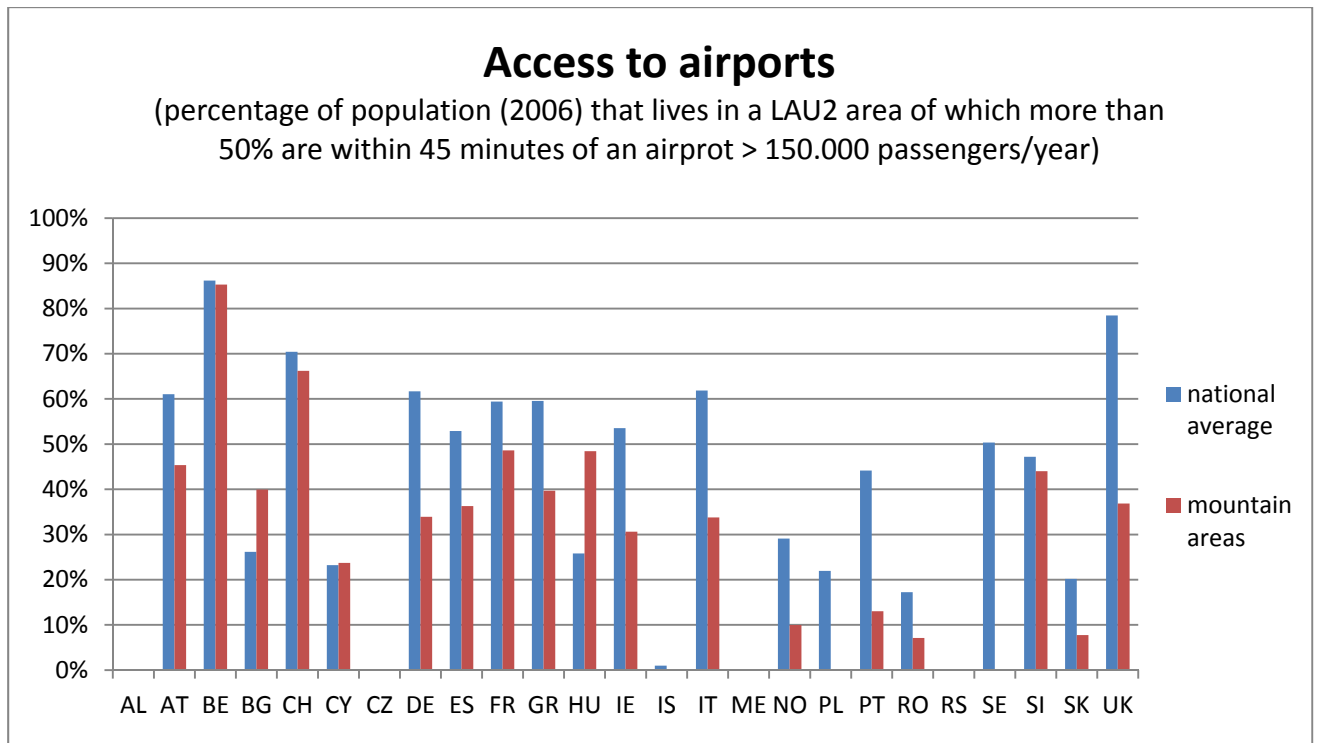


Figure 14 Accessibility to airports

Cross-analyses

Mountains and borders

Across the ESPON space, 10% of the area is occupied by both mountain and border areas (Table 18). One small country, Liechtenstein, is completely covered by both specificities. In absolute terms, the two countries with the greatest overlap are Sweden (84,861 km²) and Norway (59,024 km²), in both cases just below 20% of their area. However, in these sparsely-populated mountains, the population in these areas is rather low. A second group of countries –with large overlaps in terms of total area but, depending on the size of the country as a whole, not necessarily in terms of proportion of national area – are those whose mountainous borders are wholly or partly in the Alps. The population of these overlapping areas varies from 6.4 million in Switzerland (86% of the national population) to 3.3 million in Italy (6%). The scale of overlap is similar for Spain. In terms of area, the overlap is also notable in Slovakia, in both absolute and relative terms. It is notable that in only one country, Bulgaria, is the proportion of the national population within this overlap markedly greater than the proportion of the national area within it. In all other countries, the proportions are similar or the relationship is in the opposite direction. While it might be hypothesized that proportions of populations along the mountainous borders of former socialist countries might be significantly lower than the proportion of the national area, this

does not seem to be the case. Overall, there are no obvious factors that might explain these patterns. In terms of land covers, the mountainous parts of borders have more forest (42% vs. 31% for non-mountain borders), scrub (18% vs. 8%), and no vegetation, mainly in rocky mountains (9% vs. 1%) and less agricultural land (22% vs. 48%) and artificial surfaces (3% vs. 5%).

Table 18 Mountain/border overlaps (only countries with at least 20,000 km²)

Country	Mountain/border overlap (km ²)	Mountain/border overlap (% of national area)	Mountain/border overlap (population)	Mountain/border overlap (% of national population)
Sweden	84,861	19	70,184	1
Norway	59,024	18	746,078	16
France	49,124	8	3,497,492	6
Austria	44,112	53	3,668,316	44
Spain	43,341	9	2,772,714	6
Switzerland	33,772	82	6,374,636	86
Germany	33,093	9	4,917,041	6
Italy	32,748	9	3,298,546	6
Slovakia	28,742	59	2,581,194	48
Greece	25,883	20	1,119,057	10
Czech Republic	24,975	32	2,352,405	23
Portugal	20,621	22	1,107,802	11
Romania	20,429	9	1,246,195	6
ESPON space	573,689	10	39,572,557	8

Mountains and islands

Across the ESPON space, 2% of the area is occupied by mountains on islands. There are only four countries for which this overlap of specificities covers more than 10% of the national area: Iceland (85%: 86,811 km²); Cyprus (46%: 4286 km²); Greece (13%: 11,436 km²) and Italy (12%: 36,003 km²). For two of these, the proportion of the national population living on the mountainous parts of these island states is significantly less than their proportion of the national area: Iceland (22% population [66,617], 85% of area) and Cyprus (15% [115,007]; 46%), showing that most settlement is on flatter areas. For the other two, both with much larger mountain/island populations, the difference is less: Greece (7% [1.2 million]; 13%): 1.2 million; Italy (7% [4.0 million]; 12%). It is also

worth noting the opposite relationship in Spain, the country with the second largest mountain/island population (1.9 million) who comprise 4% of the national population but live on 1% of the national territory. In France, with the third largest mountain/island population (1.2 million), the proportion is 2% for both population and area (11,435 km²). In terms of land covers, the mountainous parts of islands have more scrub (37%, vs. 27% for non-mountain parts of islands), unvegetated land (23% vs. 10%) and glaciers/snowfields (6% vs. 0%). Conversely, they have less agricultural land (19% vs. 37%), forest (9% vs. 12%), wetland (3% vs. 7%) and artificial surfaces (1% vs. 4%).

Mountains and coasts

Across the ESPON space, 14% of the area is occupied by both mountain and coast. There are 14 countries for which more than 10% of the national area is covered jointly by mountains and coast (Table 19). Of those with high proportions, some of these are mountainous island countries (Iceland, Cyprus) or countries with many mountainous islands (Greece, Norway, Italy, Croatia, UK). Also notable in absolute terms are the overlaps for Spain and Turkey. In terms of population, it is notable that over half of the 40 million people in this overlap in the ESPION space (excluding Turkey, for which data are not available) are in two countries: Italy and Spain. In general, the proportion of the population living in the overlap is greater than the respective proportion of the national area, sometimes very markedly (e.g., Iceland, Cyprus, UK, Ireland). This clearly relates to the challenge of providing infrastructure in the challenging terrain where these two specificities overlap. Nevertheless, there are some countries where the difference between these proportions is small, for instance Norway, where there has been considerable investment in the development of infrastructure along coasts, including the construction of many tunnels through mountains. This is also true in Spain, where the usual relationship is reversed, with the overlap including 19% of the national land area, but 24% of the national population. Similar relationships, though of lesser magnitude, are found in Albania and Portugal. In terms of land covers, mountainous coasts have more scrub (27% vs. 9% for no-mountainous coasts) and more unvegetated land (16% vs. 1%); the latter may often reflect past human exploitation, such as the denuded mountains found along much of the Mediterranean coast. Conversely, mountainous coasts have less agricultural land (23% vs. 51%) due to the challenges on cultivation on steep terrain, and fewer artificial surfaces (2% vs. 6%) due to challenges of construction.

Table 19 Mountain/coast overlaps (only countries where at least 10% of national area overlaps)

Country	Mountain/coast overlap (km ²)	Mountain/coast overlap (% of national area)	Mountain/coast overlap (population)	Mountain/coast overlap (% of national population)
Iceland	85,294	83	66,241	22
Greece	84,622	64	4,231,740	38
Norway	184,677	57	2,315,344	50
Cyprus	4,286	46	115,007	15
Italy	115,515	38	13,248,086	23
Croatia	19,132	34	N/A	N/A
Slovenia	6,360	31	421,153	21
UK	63,648	26	3,530,791	6
Montenegro	2,753	20	136,594	20
Spain	98,454	19	10,949,786	24
Albania	4,770	17	711,536	22
Turkey	113,032	15	N/A	N/A
Portugal	11,525	13	1,555,211	15
Ireland	7,876	11	136,322	3
ESPON space	834,427	14	40,021,216	8

Mountains and SPA

Across the ESPON space, 14% of the area is occupied by mountains which are also SPA. Half of this is within three Nordic countries, the most in Norway (224,191 km², 69% of national area), followed by Sweden (87,826 km², 20%) and Iceland (82,528 km², 80%). However, the country with the greatest overlap between these specificities is Turkey (296,634 km², 38%). The only other countries where the overlap between these specificities is notable are Spain (59,150 km², 12%), the UK (16,153 km², 7%) and Bulgaria (11,238 km², 10%). Given the definition of SPAs, the population of these areas is not very large (though it should be noted that population data for Turkey are not available): the only countries with populations over 100,000 in these areas are Norway (941,630, 20% of the national population), Spain (512,958, 1%) and Bulgaria (199,369, 3%). In terms of land covers, the mountainous parts of SPAs have significantly less forest (22%, vs. 52% for non-mountain parts of SPAs), but more agricultural land (16% vs. 12%), scrub (27% vs. 18%), and unvegetated land (25% vs. 3%).

Protected areas

The recent EEA report (EEA, 2010) includes a chapter on protected areas, including analyses, at both massif and national level, of the coverage of sites designated under both national and EU legislation. One issue that this report addressed was the relative proportion of nationally-designated areas within and outside mountain areas. As Figure 15 shows, the proportion inside mountains is generally greater in all countries, though to varying extents, and not in Austria or Spain. Considering the common statement that the designation of protected areas under national legislation may reflect the ease of designation rather than, necessarily, the need to maintain biodiversity (a topic also considered in detail in EEA, 2010), the occurrence of nationally-designated protected areas in mountain border areas was analysed. The definition of these areas is described above. The results of the analysis show that the proportion of nationally-designated areas in mountain border areas is only greater than for the national mountain area for four countries: Romania, Greece, Norway and the UK (though the latter is along a rather short border with Ireland). For other countries, the proportions are similar, or the reverse situation is found. It would therefore appear that, at least at the national scale of analysis, proximity to a border is not a factor increasing the likelihood of designation.

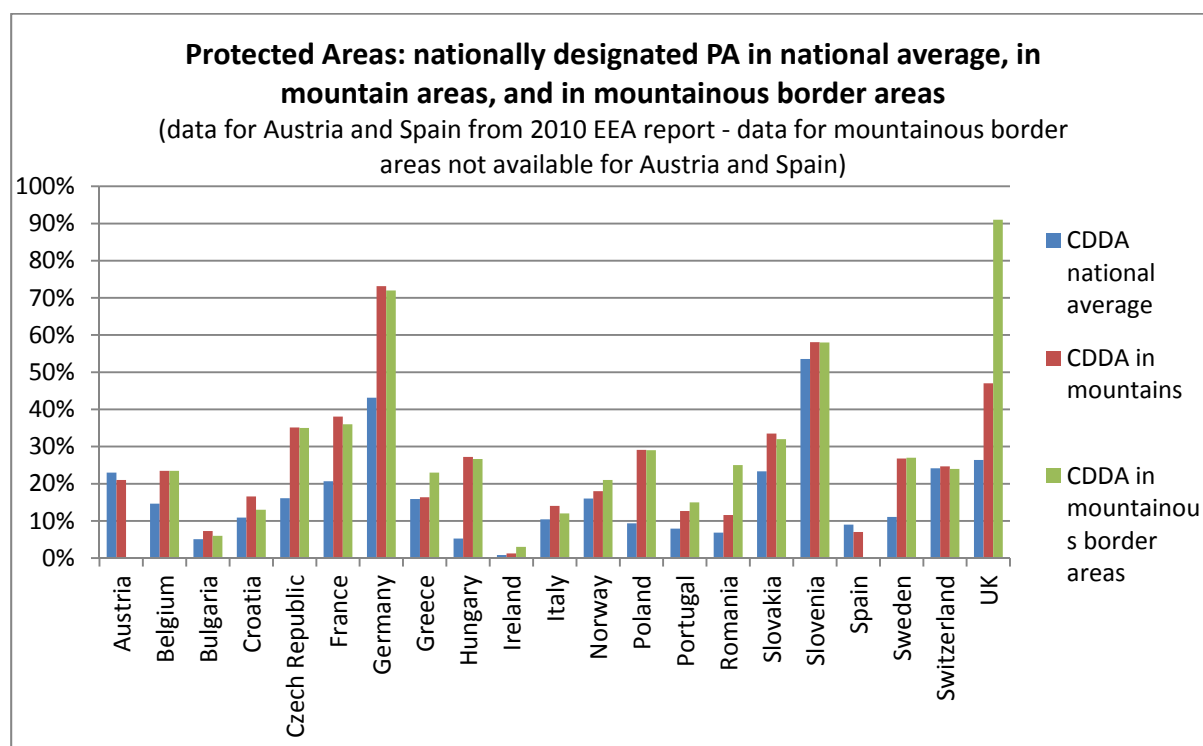


Figure 15 Protected areas in mountainous border areas

4.1.2 Islands

Approximately 5.6% of the total ESPON territory is composed of islands, amounting to 274,931km². These islands host 20.5m inhabitants, equivalent to 4.1% of the total for the territory.

Island territories are all characterised by their predominance of coastal areas, peripherality and detachment from centres of human activity. It is however important to recognise differences to the extent to which these conditions may prevail upon specific island territories. This note argues this case through an analysis of geographical, accessibility, demographic, economic and land use data for a total of 292 islands in the ESPON territory (0), covering a land area of 271,038 km² with a population of approximately 20.1m inhabitants⁹⁵. The database, which has been specifically compiled for the GEOSPECS project, is constructed upon data units at the LAU2 level⁹⁶, which provides for a more detailed assessment and correlation of other geographic specificities, population, economic and land use conditions within different island territories.

By far the largest number of islands is considerably small both in terms of land area (less than 1000km²) as well as population size (less than 100,000 inhabitants). Having said this, however, there is a greater number of total municipalities in islands that exceed 1000km² in size and in those whose population range between 100,000 and 1m people. By assessing the average annual sunshine hours one can conclude that the majority of the small islands, in terms of land area and population size, are located in the north whereas the larger islands are predominantly found in the southern ESPON regions. The Mediterranean Sea is home to the largest number of islands, municipalities as well as inhabitants, and in it are located the only three islands with a population larger than 1m, namely Sicily, Sardinia and Cyprus. The largest island surface area occupied by islands is however in the Atlantic Sea, reflecting Iceland that occupies 85% of this land area.

Approximately 67.5% of the total island area is mountainous. This feature is, however, true for less than 40% of total islands, most notably in the Mediterranean and Atlantic Seas. In addition, approximately 20% of the municipalities assessed are archipelagos, reflecting very small territories⁹⁷ whose municipality spreads over more than one island. Almost all the islands of the Outermost regions form part of this category although, in terms of surface area, the Mediterranean and Atlantic Seas are more representative of this characteristic.

⁹⁵ Data limitations led to the consideration of an estimated 98% of island territories within the ESPON area in terms of both land area as well as population.

⁹⁶ A total of 3073 municipalities were assessed

⁹⁷ This is true for 35% of total islands analysed

Table 20 Geographical analysis

	Land Area (sq km)	LAU2 territories	Islands	2006 Population	Average annual hours of sunshine	Population density (persons per sq km)
Total	271,038	3,073	292	20,087,600	6,857	68.7
Island area < 1000 sq km	40,996	876	264	3,630,267	5,493	85.9
Island area > 1000 sq km	230,042	2,197	28	16,457,333	7,401	65.6
Not sparsely populated	158,281	2,852	269	19,724,795	6,904	115.4
Sparsely Populated	112,758	221	23	362,805	6,254	3.1
No fixed link	233,316	2,783	225	15,451,288	7,070	63.1
Fixed link	37,722	290	67	4,636,312	4,812	103.2
Atlantic	120,684	541	58	3,118,967	4,690	23.4
Baltic	27,742	185	44	4,077,220	4,874	119.7
Mediterranean	98,617	2,136	102	10,908,553	7,728	106.4
North Sea	6,079	77	48	298,759	4,027	50.5
Norwegian and Barents Seas	12,671	44	32	190,507	3,570	15.9
Outermost Region	5,245	90	8	1,493,594	7,317	281.0
Not mountainous	87,849	1,258	179	11,360,672	6,604	116.7
Mountainous	183,190	1,815	113	8,726,928	7,033	45.7
Archipelago	39,374	626	105	5,787,599	6,077	134.7
Not Archipelago	231,665	2,447	187	14,300,001	7,057	57.5
PUSH < 100,000	222,502	2,019	280	7,751,751	6,421	33.2
PUSH > 100,000	48,536	1,054	12	12,335,849	7,693	231.5
Island population < 100,000	58,814	676	267	2,447,045	5,245	40.7
Between 100,000 and 1m	155,376	1,597	22	8,456,455	7,445	47.8
Island population > 1m	56,848	800	3	9,184,100	7,047	154.8

In terms of sparsity, almost half of the total land area on islands is considered to be sparsely populated, a feature most commonly present in mountainous areas, although this is concentrated in a very few number of islands and municipalities. In terms of land area, this trait is most prominent in the Atlantic Sea, predominantly Iceland, whereas the majority of sparsely populated islands are located in the Norwegian Sea. Although most municipalities assessed are not sparsely populated, only approximately one third of these provide their inhabitants with the possibility of reaching an urban area with a population potential exceeding 100,000 people within a 45 minute time span (PUSH>100,000)⁹⁸. This characteristic is mostly true of the larger islands, since it is only possible to achieve this population potential on 12 islands, most of which in the southern, sunnier regions.

This note delves into various aspects of "islandness" in the ESPON territory broadly categorised under four themes, namely (i) accessibility, (ii) demography, (iii) economic structure, and (iv) land use.

⁹⁸ PUSH around a MUA of which FUA > 100'000 = Potential urban strategic horizon around a Morphological Urban Area of which the Functional Urban Area exceeds 100,000 people

Accessibility

Accessibility is hereby assessed by the extent to which island populations are served in terms of air transportation or fixed links to a mainland. Air transportation is assessed in terms of (i) the proportion of people that are able to access, within 45 minutes, an airport serving at least 150,000 passengers p.a. and (ii) the population potential per islander that is accessible as a result. The latter is broadly affected by three factors, namely the number of airline connections available (as reproduced in Table 21), their frequency, and the destination of these flights. Given the very high correlation between the total population potential and number of airline connections⁹⁹, the latter will not be extensively debated in this assessment. The accessibility brought about by the use of a fixed link will be mainly assessed by the proportion of the island populations corresponding to specific characteristics which are served by a fixed link.

Approximately 22.6% of island populations within the ESPON region can access, within 45 minutes, an airport serving at least 150,000 passengers p.a. A similar proportion, 23.1% is able to make use of a fixed link to a mainland. In general terms, islands not served by a fixed link are generally those with better air accessibility. This indicates that islands are confronted with difficult decisions in choosing the main mode of accessibility, which is critical to optimise cost-effectiveness and development in the long run. This analysis further indicates that at least 54% of island populations are not served by either a fixed link or adequate air connections.

Fixed links are prevalent in small islands by population size where air accessibility is largely inadequate. In terms of location, the incidence of fixed links is most common in northern islands, most notably the Baltic islands as well as those islands located in the North, Norwegian and Barents Seas, with approximately 93% of their total population served by this infrastructure. Air accessibility is by contrast relatively poor in these islands, especially in the North, Norwegian and Barents Seas. In the Baltic Sea, a relatively better access to airports is nevertheless generating a poor outcome in terms of population potential reached by air transportation, which may have strengthened the need for the construction of these fixed links on islands in this sea. The same argument applies to non-mountainous municipalities which, although appearing to be adequately served by air transportation, are only able to access a low population potential by this means of transportation thereby corroborating the need for the construction of fixed links to mainland.

⁹⁹ Correlation coefficient = 0.98

Table 21 Accessibility analysis

	% population accessing an airport of more than 150,000 px/yr in 45 mins	Number of airline connections of more than 150,000 px/yr	Population potentials of non- stop flights from airports	Population potential of non- stop flights from airports per person	% of population served by a fixed link
Total	22.6%	11.4	143,962,398	7.2	23.1%
Island area < 1000 sq km	15.9%	8.2	29,050,762	8.0	21.1%
Island area > 1000 sq km	25.3%	12.7	114,911,636	7.0	23.5%
Not sparsely populated	22.9%	12.0	140,062,048	7.1	22.6%
Sparsely Populated	18.9%	3.6	3,900,350	10.8	47.8%
No fixed link	23.8%	11.6	135,960,121	8.8	0.0%
Fixed link	11.7%	9.4	8,002,277	1.7	100.0%
Atlantic	10.4%	13.8	25,492,491	8.2	5.1%
Baltic	18.6%	14.3	7,830,265	1.9	95.2%
Mediterranean	28.0%	11.6	110,450,423	10.1	2.3%
North Sea	7.4%	1.2	181,840	0.6	65.2%
Norwegian and Barents Seas	3.9%	0.5	7,379	0.0	80.8%
Outermost Region	0.0%	-	-	-	0.0%
Not mountainous	24.1%	12.2	61,616,201	5.4	38.3%
Mountainous	21.6%	10.9	82,346,197	9.4	3.2%
Archipelago	20.4%	20.0	45,238,624	7.8	0.4%
Not Archipelago	23.2%	9.2	98,723,774	6.9	32.3%
PUSH < 100,000	17.6%	7.1	58,623,180	7.6	15.2%
PUSH > 100,000	32.2%	19.6	85,339,218	6.9	28.1%
Island population < 100,000	9.8%	3.1	7,534,873	3.1	35.7%
Between 100,000 and 1m	27.8%	14.6	95,732,119	11.3	14.2%
Island population > 1m	23.2%	12.2	40,695,406	4.4	27.9%

Mediterranean islands, as mentioned earlier, appear to be adequately served by air transportation, possibly reflecting its importance to the tourism industry. Consequently, the number of fixed links is restricted to merely three - built on islands which appear to have particularly poor, if any at all, means of air transportation. The latter is also true for island archipelagos with only one archipelago having a fixed link largely due to an inadequate air transportation service. Air accessibility is relatively worse for those islands whose municipalities are predominantly sparsely populated. In order to counteract this, 21 out of 23 of these islands are served by a fixed link. The same phenomenon is seen in the mountainous islands with those even more disadvantaged in terms of air accessibility having built a fixed link. Air accessibility is relatively better for those municipalities whose inhabitants have the possibility of reaching an urban area with a population potential exceeding 100,000 people within a 45 minute time span (PUSH>100,000). As a result, in order to counteract this deficiency, 90% of all fixed links are on islands with a PUSH that is less than 100,000 people notwithstanding the fact that a lower percentage of total population can benefit from this infrastructure.

Demography

Most islanders in the ESPON area reside on islands in the Mediterranean Sea (Table 22). Notwithstanding this, the Baltic islands have a higher population density possibly reflecting the attractiveness of residing on islands served by a fixed link, given the predominance of this feature in this area. This conclusion can also be derived when assessing the population growth between 2001 and 2006 which was particularly high for municipalities on islands in the Baltic Sea as well as municipalities served by a fixed link. This is further corroborated by the fact that those islands in the Baltic Sea that do not have a fixed link faced a decline in population over the same period. Having said this, however, the decline in population on islands in the North Sea as well as the Norwegian and Barents Seas could reflect the fact that, although fixed links have been built on these islands, other important characteristics that are deemed essential for residential attractiveness are missing. Therefore, although fixed links can help to better an island's economic and residential prospects, they cannot be viewed as an end, or a complete solution, in themselves.

Population density is also particularly high for those municipalities with a total island population that exceeds 1 million. However these areas, represented by merely three Mediterranean islands namely Sicily, Sardinia and Cyprus, have experienced relatively low population growth between 2001 and 2006 broadly in line with all other islands in the Mediterranean Sea. Population growth has mainly taken place in islands of a medium population size (between 100,000 and 1,000,000), which may be indicative of a greater attraction to areas with a relatively lower population density. The same logic can be applied to municipalities on islands with a total land area exceeding 1000km² that appear to have grown by a greater degree than municipalities on smaller, relatively more densely populated islands. However there appears to be a certain threshold that backs this interpretation where sparsely populated areas do not seem to be faring as well as non-sparsely populated areas in terms of residential attractiveness.

Non-mountainous municipalities as well as municipalities close to an urban hub with a relatively large population potential are two other categories that seem to be more attractive for residential purposes as verified by data reflecting total population, population density, as well as population growth between 2001 and 2006. This may be due to better anthropic capital present in these areas including certain services, as previously discussed, which may facilitate the living conditions for residents.

In terms of demographic structure, population ageing is most predominant in the Mediterranean region, including its islands, which has the largest proportion of people aged 60 or over and the lowest

percentage of children under the age of 15. Apart from having a relatively low childbirth rate¹⁰⁰, the ageing of the Mediterranean population may also be due to people being more attracted to residing in warmer climates in their older age.

Table 22 Demographic analysis

	2006 Population	Population density (persons per sq km)	Population growth 2001-2006	% population aged 60 or older	% population aged 15 or younger	% population aged between 16 and 59
Total	20,087,600	68.7	1.53%	19.58%	17.23%	63.19%
Island area < 1000 sq km	3,630,267	85.9	0.61%	18.47%	16.19%	65.34%
Island area > 1000 sq km	16,457,333	65.6	1.74%	19.84%	17.47%	62.69%
Not sparsely populated	19,724,795	115.4	1.55%	19.56%	17.20%	63.24%
Sparsely Populated	362,805	3.1	0.59%	20.59%	18.49%	60.92%
No fixed link	15,451,288	63.1	0.97%	19.28%	17.06%	63.66%
Fixed link	4,636,312	103.2	3.56%	20.74%	17.86%	61.40%
Atlantic	3,118,967	23.4	2.00%	17.17%	17.50%	65.33%
Baltic	4,077,220	119.7	4.19%	20.40%	17.78%	61.83%
Mediterranean	10,908,553	106.4	0.78%	20.77%	15.89%	63.34%
North Sea	298,759	50.5	-0.56%	19.89%	20.36%	59.75%
Norwegian and Barents Seas	190,507	15.9	-1.10%	20.67%	20.28%	59.05%
Outermost Region	1,493,594	281.0	0.27%	13.43%	24.35%	62.22%
Not mountainous	11,360,672	116.7	2.07%	18.82%	16.94%	64.24%
Mountainous	8,726,928	45.7	0.85%	20.53%	17.58%	61.89%
Archipelago	5,787,599	134.7	1.76%	17.06%	18.57%	64.37%
Not Archipelago	14,300,001	57.5	1.44%	20.57%	16.70%	62.73%
PUSH < 100,000	7,751,751	33.2	0.98%	19.88%	18.14%	61.98%
PUSH > 100,000	12,335,849	231.5	1.89%	19.38%	16.63%	63.99%
Island population < 100,000	2,447,045	40.7	0.43%	22.18%	17.06%	60.76%
Between 100,000 and 1m	8,456,455	47.8	2.64%	16.65%	17.84%	65.51%
Island population > 1m	9,184,100	154.8	0.86%	21.36%	16.75%	61.88%

Islands in the Baltic, North, Norwegian and Barents Seas are also characterised by a relatively high proportion of older people. They also appear, however, to have a relatively higher proportion of youths and children than other regions in the ESPON area which may reflect their excellence in offering education and health services given the large share of people employed in these sectors¹⁰¹. In addition, the greater importance attributed to family-friendly measures in northern regions, including the extensive use of childcare centres, could be incentivising people to have more children.

On the other hand, the low percentage of older people in the Outermost regions could reflect their relatively low life expectancy.

¹⁰⁰ http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Fertility_statistics

¹⁰¹ Table 23: Economic Analysis

The greatest proportion of people aged between 16 and 59 are predominantly found on islands with a medium population size (between 100,000 and 1,000,000) and small land area (<1000km²). This age group may be attracted by better work prospects given the relatively higher rate of employment on islands with these characteristics. Islands in the Atlantic Sea also seem to offer better work opportunities than islands in other geographical regions which again may be attracting people of working age to these territories.

Economic Profile

Smaller islands have a slightly larger proportion of people in employment, as smaller communities may tend to result in a greater need for persons to actively participate in the labour market (Table 23**Error! Reference source not found.**). This is most likely to be in the primary sector, which is stronger for smaller islands. Smaller islands are also more dependent on the retail and tourism sector as they rely on their attractiveness and small size to appeal to visitors. Small islands have fewer people working in education and health, which might imply that they rely on the mainland or other larger islands for the provision of these services. Smaller islands are also more diversified than larger ones, which implies that residents on these islands need to keep their employment options open and find it hard to specialise in a few areas. This factor also emerged from the Outer Hebrides case study, where people had to work a number of different jobs in order to reduce the impact of seasonality on their income.

Sparsely populated islands have a higher employment rate, which is mainly being driven by a higher employment rate in the primary sector. They have a comparatively lower retail and tourism industry and a substantially lower share of public employment, which is even lower than that for small islands. This would indicate that these islands fall under the public administration of larger units, however this is partially compensated by the higher share of people employed in health and education. This highlights the fact that the national scale and standards of education and health are often rolled out to all citizens regardless of the economic mass

Table 23 Economic analysis

	Employment Rate out of Total Population	Share of Primary Sector	Share of Secondary Sector	Share of Retail and Accommodation	Share of Public Employment	Share of Education and Health	Index of diversification (1=highest diversification)
Total	30.8%	7.2%	26.2%	31.0%	11.6%	24.0%	0.79
Island area < 1000 sq km	33.1%	10.6%	26.0%	32.4%	10.4%	20.6%	0.80
Island area > 1000 sq km	30.2%	6.3%	26.2%	30.7%	12.0%	24.9%	0.78
Not sparsely populated	30.6%	7.0%	26.2%	31.2%	11.7%	23.9%	0.78
Sparsely Populated	39.4%	13.4%	26.1%	21.9%	9.4%	29.2%	0.85
No fixed link	29.6%	8.3%	25.9%	32.6%	12.4%	20.9%	0.80
Fixed link	35.3%	3.7%	27.0%	26.1%	9.3%	33.9%	0.69
Atlantic	40.2%	8.2%	26.6%	37.2%	9.6%	18.4%	0.72
Baltic	35.9%	2.9%	26.4%	26.2%	9.4%	35.2%	0.67
Mediterranean	27.2%	8.9%	26.5%	32.1%	12.3%	20.2%	0.80
North Sea	34.8%	5.5%	28.4%	29.2%	7.8%	29.1%	0.71
Norwegian and Barents Seas	36.3%	8.9%	27.1%	18.8%	7.2%	38.0%	0.69
Outermost Region	25.0%	4.9%	20.9%	21.9%	21.9%	30.4%	0.82
Not mountainous	33.0%	5.6%	27.1%	30.6%	10.6%	26.1%	0.75
Mountainous	28.0%	9.5%	24.7%	31.7%	13.1%	21.0%	0.83
Archipelago	35.5%	7.6%	25.7%	37.3%	11.7%	17.7%	0.73
Not Archipelago	28.9%	7.0%	26.4%	27.9%	11.6%	27.1%	0.79
PUSH < 100,000	32.5%	10.4%	25.5%	31.2%	11.6%	21.3%	0.83
PUSH > 100,000	29.7%	4.9%	26.6%	30.9%	11.7%	25.9%	0.75
Island population < 100,000	33.6%	11.3%	26.0%	31.3%	9.5%	21.9%	0.81
Between 100,000 and 1m	35.4%	7.2%	27.1%	34.5%	11.1%	20.1%	0.75
Island population > 1m	26.1%	5.8%	25.2%	26.9%	13.0%	29.2%	0.79

of the location. Sparsely populated islands are also more diversified, which indicates the decreased options for specialisation on these islands.

It appears that the choice of having a fixed link takes islands down strategically different development paths. Islands with a fixed link forgo the high presence of a retail and tourism industry (which is substantially lower on these islands) and a lower primary sector in exchange for a higher presence of the manufacturing sector and education and health. The percentage of people employed in health and education on fixed link islands is also substantially higher, but this would in the main part reflect national trends in this regard of countries where such islands are located.

The geographic location of islands around the continent has a substantial impact on their economic performance. Islands in the Atlantic, Baltic, North and Norwegian seas have a higher employment rate than those in the Mediterranean Sea and those in the Outermost regions. The Mediterranean and the Outermost islands also share a common high share of public sector employment. Public sector typically ends up as a residual of lack of employment in other areas. Islands in the Mediterranean have the highest level of primary sector employment (together with the Norwegian Sea), however they hold one of the lowest shares of employment in health and education (together with the Atlantic). The retail and tourism sector is particularly strong in the Atlantic and the Mediterranean islands, which typically draw tourists due to their outstanding natural beauty and favourable climate respectively. The statement that the location of the islands does not seem to impact the manufacturing sector holds for all except the Outermost regions. Islands in the Outermost regions and in the Mediterranean Sea are more diversified than those in the remaining seas, an observation which may be linked to the absence of fixed links.

Islands which contain mountainous areas feature two concurrent geographic specificities. The employment rate in islands with mountains is lower, they have a higher proportion of primary sector (including mining) and a slightly higher proportion of people working in the retail and tourism industry. However, the employment in the manufacturing sector is lower. The employment in the public sector is larger in mountainous islands, but that in education and health is lower.

Islands that form part of a larger administration group of islands, termed as archipelagos in this analysis, have higher employment rates, mainly due to higher primary sector employment. They also feature greater employment shares in retail and tourism while there are lower employment levels in the manufacturing sector. The share of employment in education and health is

substantially lower for archipelagos, as they may often rely on the rest of the islands in the administrative unit for the provision of such services.

Islands with a PUSH of less than 100,000 have a higher employment rate which is made up of a higher presence of the primary sector, a smaller secondary sector and lower health and education employment. The ability of islands with a small PUSH to diversify is also limited as exhibited in a higher diversification index.

Islands' size seems to affect the retail and tourism indicator in a non-linear fashion. The islands with the middle range of population size, between 100,000 and 1m, have the largest manufacturing and tourism and retail sectors. This may imply some economies of scale being accrued, which after a certain population size turn into diseconomies, also as increasing population density would potentially limit growth prospects. These results are however strongly conditioned by the performance of Sicily and Sardinia. This pattern is repeated in the proportion of people working in the education and health industry, which are smallest in the mid-sized islands and biggest in the largest islands as well as the diversification index, which is lowest in the mid-sized islands, higher in the largest islands and largest in the smaller islands.

The relationship between the primary sector share of employment and size is a different matter, as the intensity decreases as the population size increases. Islands with less than 100,000 people have the highest share while those with over 1m have the lowest. This relationship is mirrored in the employment in the public sector, with the smallest islands having the smallest share, and the biggest islands with the biggest share.

Land Use

Smaller islands have larger share of agricultural as well as protected areas than larger islands (0). This ties in to the employment trends where small islands display a larger primary sector. They also had a larger share of artificial surfaces than larger islands. This reflects the existence of a minimum level of infrastructure needed within an inhabited island, which would be proportionately higher for islands with smaller areas.

The biggest difference in land use is found between sparsely populated islands and non-sparsely populated islands, as would be expected. Sparsely populated islands have a substantially lower portion of protected, agricultural and artificial areas. This would imply that islands that face lower population

pressure seem to have a lower need for protecting land. This statistic is also affected by the fact that the most densely populated islands are found in the Mediterranean, and these have a higher level of protected areas.

Areas with a fixed link have a lower share of protected areas but a higher share of agricultural areas, which suggest that improved transport networks encourage agricultural use of land. Since the employment in the primary sector is lower on islands with fixed links, this implies that the type of agriculture present on these islands is likely to be non-subsistence agriculture since this features larger land use and smaller labour involvement. They also have a higher proportion of artificial surfaces linked to the higher presence of the manufacturing sector.

Table 24 Land use analysis

	Share of artificial surfaces	Share of agricultural surfaces	Share of Protected areas
Total	2.6%	26.1%	22.6%
Island area < 1000 sq km	3.3%	29.8%	30.8%
Island area > 1000 sq km	2.4%	25.4%	21.2%
Not sparsely populated	4.2%	41.9%	26.7%
Sparsely Populated	0.3%	3.9%	16.9%
No fixed link	2.1%	23.7%	23.7%
Fixed link	5.6%	40.6%	16.3%
Atlantic	1.0%	5.5%	20.3%
Baltic	6.8%	54.2%	17.2%
Mediterranean	3.7%	46.8%	26.5%
North Sea	3.2%	30.1%	20.4%
Norwegian and Barents Seas	0.8%	6.3%	7.8%
Outermost Region	0.7%	5.1%	71.2%
Not mountainous	5.4%	42.7%	17.7%
Mountainous	1.2%	18.1%	25.0%
Archipelago	3.0%	28.7%	41.0%
Not Archipelago	2.5%	25.6%	19.5%
PUSH < 100,000	1.4%	17.6%	24.3%
PUSH > 100,000	8.0%	65.2%	14.9%
Island population < 100,000	2.2%	25.8%	27.0%
Between 100,000 and 1m	1.8%	14.4%	22.5%
Island population > 1m	5.2%	58.3%	18.6%

The geographic location of the islands has a large impact on the share of agricultural and protected areas. Islands in the Baltic, Mediterranean and North Sea have a substantially higher proportion of agricultural land, while islands in the Outermost regions have a substantially higher proportion of protected areas compared to all the other islands. The islands in the Baltic Sea are the ones with the highest artificial surfaces, related to higher presence of fixed links and consequently manufacturing.

Islands with mountains have a substantially lower percentage of agricultural land, although the primary sector is larger on mountains, which implies that a large proportion of this is mineral extraction. This is also related to the difficulties in using land at high altitudes for agriculture and the increased cost of transporting the goods from mountainous areas. Mountainous islands have a lower level of artificial surfaces, indicating the difficulties of construction on mountains.

Islands forming part of a municipality with other islands have twice the share of protected areas than islands with a single or multiple municipalities, while they also have a higher proportion of agricultural land. This is mainly driven by the high protection levels found on islands in the Mediterranean and Atlantic Ocean. This may also indicate that non-self-determining islands may be encouraged more strongly to preserve natural landscapes, as it may be easy for administering bodies to conserve areas that are distant from the administrative centre.

Islands with a PUSH of over 100,000 have more than three times the amount of agricultural land than islands with a PUSH below 100,000. They also have a higher proportion of artificial surfaces, but a lower percentage of protected areas.

Islands with a population between 100,000 and 1m have the lowest share of agricultural surfaces and artificial surfaces. Islands with a population of over 1m have the highest share of agricultural land, and the lowest level of protected areas. This is influenced by the three islands making up this category. Population size does not seem to be compatible with protected areas, as islands with the smallest population size have a larger proportion of protected areas.

Conclusion

This analysis leads to a number of conclusions in relation to the state of and potential for development of islands in the ESPON territories. Islands with a number of obstacles, due to presence of mountains or being part of an

archipelago often appear to exhibit common traits of higher employment rates, which is fuelled by a larger primary sector, most likely related to agriculture or mineral extraction. They also seem to exhibit the tendency to have a higher diversification index, which is a sign of the inability to specialise in a few areas of comparative advantage. This is in line with the findings from the case studies which exposed the need for islanders to be more flexible in order to be able to generate an income throughout the year, as many of the activities undertaken on an island, be it tourism related, or agriculturally related, are highly seasonal and can only provide employment for a portion of the year. Tourism plays an important role in the economy of islanders. This is especially true for the smaller islands and those that are more densely populated.

The Mediterranean Sea is home to the three islands with the largest populations as well as the greatest number of islanders. It has the highest level of ageing population, a small population growth and very few fixed links. Islands in the Mediterranean have large shares of protected areas, and high levels of agricultural land. There is a large presence of agriculture and tourism, as well as high levels of public sector employment. Fixed links make a difference to an island. Islands which have fixed links are likely to have weaker air connectivity. Fixed links are more frequently found in smaller islands with lower population density. There appears to be a strategic development path being pursued through the establishment of fixed links; islands with fixed links have a more developed manufacturing sector but a lower tourism sector than those without fixed links. However fixed links are not automatically related to increasing population rates; a number of islands with fixed links in the North and Norwegian Seas are losing their population. It appears that a fixed link is not a de facto solution to island connectivity problems but rather a tool that can also make leaving the island easier. The establishment of such a link would need to be accompanied by policies that encourage the inflow of people and businesses.

The high diversification, although by its nature a consequence and not a choice of islanders, is potentially a resource that may encourage further development opportunities. This is also true of the higher level of involvement in the agricultural sector that can be exploited for higher value if the focus is shifted into specialised farming, such as organic farming or viticulture. There is evidence from the case study that this is successfully being done in Sicily.

4.1.3 Sparsely Populated Areas

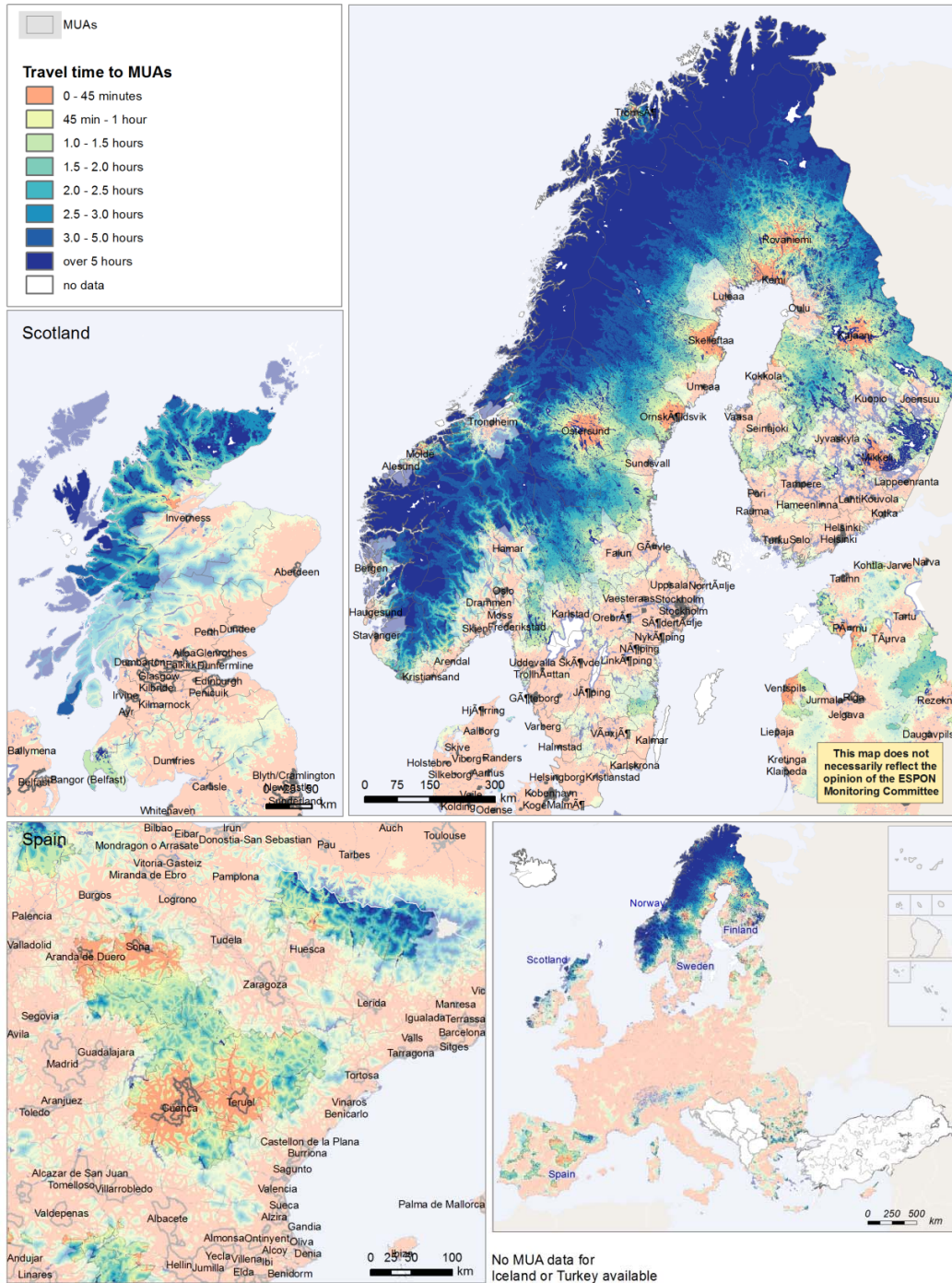
In the GEOSPECS project, Sparsely Populated Areas (SPAs) have been defined and delineated as the areas of Europe that have a relatively low population potential. This definition implies that SPAs cannot be found in close geographic proximity to large agglomerations, i.e. in their commuting catchment area: low population potential is a direct consequence of the long distance to large urban cores. However, parts of European SPAs are in the commuting catchment area of smaller urban cores (Map 32). Hence, the location of SPAs with regard to small or large urban cores is an important characteristic of their territorial context.

Most of the SPAs of the Nordic countries (NSPA) are more than a three-hour driving-distance to the nearest MUA. Moreover, these areas are remote from the main metropolitan areas of these countries, including the capital regions and other agglomerations with more than 500,000 inhabitants (e.g. Gothenburg or Tampere). However, some medium-sized agglomerations are located *at the fringe* of the NSPA, such as Umeå and Luleå in Sweden, Oulu in Finland, and Trondheim in Norway. These mid-sized cities, often endowed with large universities and industries, play an important role as a regional growth centres for the NSPA as a whole. In addition, several mid-sized cities are located *within* the NSPA: Östersund in Sweden, Rovaniemi in Finland, and Tromsø in Norway. Finally, the NSPA includes many smaller towns such as Kiruna and Skellefteå in Sweden, Mikkeli and Kajaani in Finland, and Bodø in Norway.

In Scotland, the SPA is rather remote from the main population concentrations of the Central Belt, which includes Glasgow and Edinburgh. The only MUA close to the Scottish SPA is Inverness. However, only a small proportion of the Scottish SPA is located within one hour of Inverness, mostly along road corridors from Inverness to the North/North-West coast of Scotland.

Compared to the previous two main SPA, the Central Spanish SPA is rather close to large agglomerations, located between the agglomerations of Madrid to the West, Zaragoza to the North, Barcelona to the East, and Valencia to the South. Consequently, and also because there are three small MUA within the area (Cuenca, Teruel and Soria), few places in the Central Spanish SPA are more than 2 hours from an urban core.

Sparsely Populated Areas - Access to MUAs



© Alterra & Nordregio, Geospecs, 2011
 Regional level: GRID/LAU2
 Source: ESPON Database 2013
 Origin of data: ALTERRA 2011, Nordregio, NSIs
 © EuroGeographics Association for administrative boundaries

EUROPEAN UNION
 Part financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

ESPON

Map 32 Access to main urban cores from Sparsely Populated Areas

Demography: a vital issue for SPAs

The phenomenon of sparsity results from different territorial factors deriving from the spatial distribution of human settlement across the territory: remoteness from large agglomerations; small and scattered settlements; and extended areas of wilderness surrounding small towns. Yet, as shown above, these factors vary in their importance for structuring of the different SPAs: 'sparsity' in different parts of Europe, for instance in Arctic Europe, Northern Scotland or Central Spain, although equally labelled as SPAs, in fact relates to very distinct territorial contexts.

As the proportion of population actually living in these areas is relatively low, especially compared to their land area, the weight of these areas i.e. in the national political context can be underestimated. The proportion of the national population for the main sparse areas in the ESPON space varies from 2% in Spain to 24% in Iceland (Table 25).

Table 25 Sparse areas: percentage of their respective national land area and population in 2006.

Country	Sparse areas	
	land	population
Spain	17%	2%
Finland	61%	15%
Iceland	92%	24%
Norway	79%	23%
Sweden	59%	8%
Scotland	26%	2%

Numbers refers to the sparse areas % share of the country

As illustrated by the case studies, most sparse territories (STs) face the demographic challenges of unfavourable age structure and population decrease, mostly due to outmigration. Compared to the situation in their respective countries and to the European average, the STs have a high proportion of elderly people, especially in the Iberian Peninsula where the proportion of young people is also particularly low. In Finland, Sweden and Central Europe, the proportion of elderly people is also high (Figure 16). However, the equally high proportion of younger people improves the potential for labour force replacement. In Iceland, Norway and Ireland, the population is generally younger than the European average. In the Baltic

countries, the interpretation of demographic trends is more complex, due to strong out-migration of the younger working-age population, and the high proportion of young people in the sparse regions has no clear implication for the future labour supply.

Between 2001 and 2006, the population in the ESPON space (excluding Turkey and FYR Macedonia) grew by approximately 0.4% per annum: a total of 9.8 million persons. In the STs of the ESPON space, the development trend was opposite, with a minor decrease in population. However, population changes did not follow the same trend across the STs. In 2006, 3.2 million people lived in sparsely populated LAU2s: a decrease of 62,600 persons compared to 2001. Over the same period, the poorly connected LAU2s were home for 1.8 million people; and the population in those regions was stable. Thus, distance seems to have a greater negative impact on population trends than accessibility.

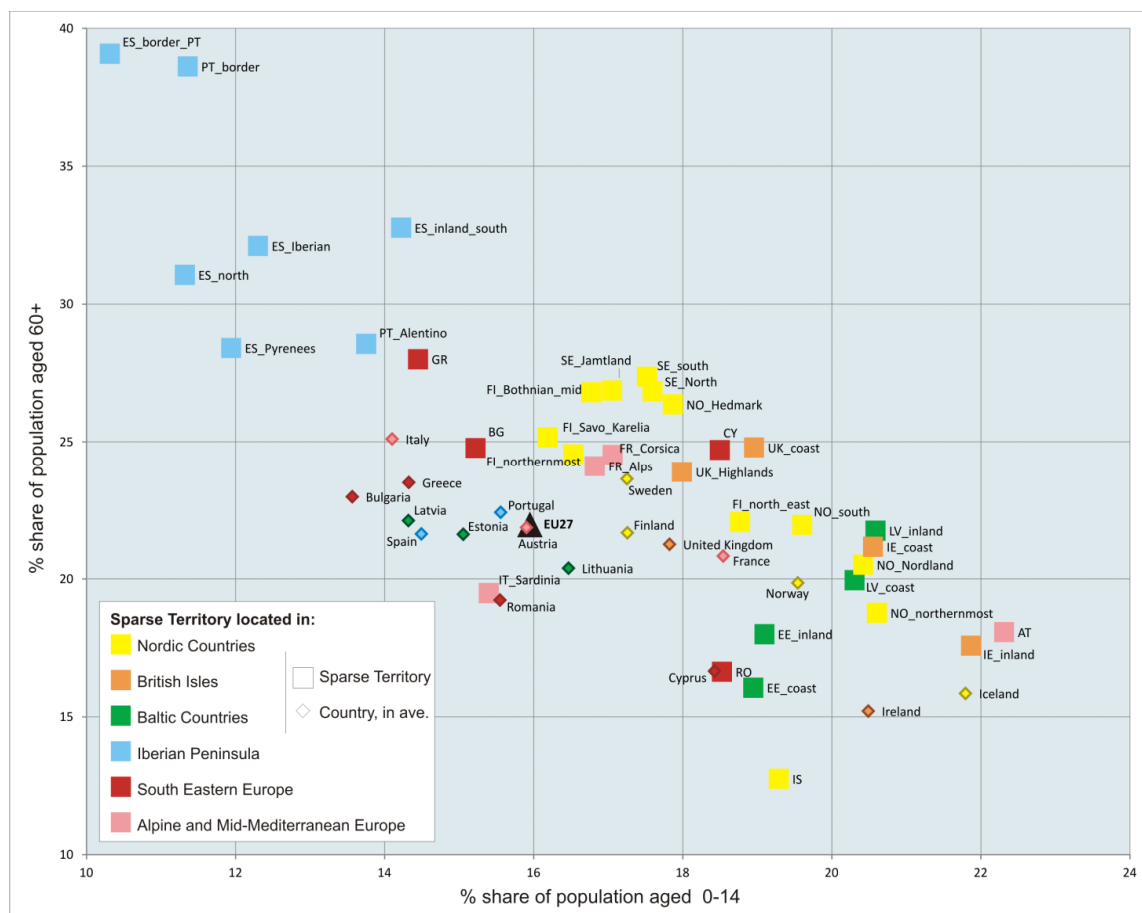


Figure 16 Relationship between the proportion of young and old people in the Sparse Territories and in their respective countries.

Thus, European SPAs show a variety of territorial preconditions, giving them the possibility to take advantage of urban dynamics, with respect to both large agglomerations and small and mid-sized centres, for their local development.

With regard to population change for STs, some broader territorial trends are identifiable. In Northern Europe, the population is decreasing in sparse areas and increasing in dense ones. In Iceland, Ireland and Cyprus, countries that have experienced major population growth in recent years, the total population is increasing in the STs, although not as fast as in the countries on average. In Spain, the smaller STs are experiencing population decreases, while those in the Iberian mountains (Cuenca, Soria and Teruel) and Pyrenees have increasing populations. The Eastern European countries are experiencing overall decline. The other STs show diverse trends. However, whether the overall population development trend is positive or negative, the sparse areas generally perform worse than the more densely populated parts of the same countries.

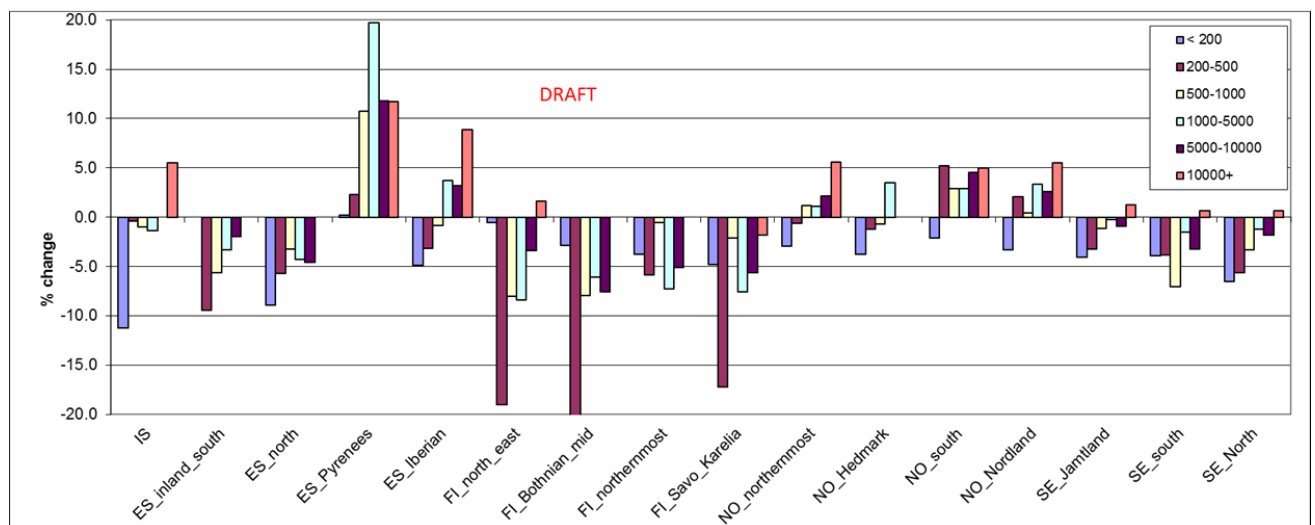
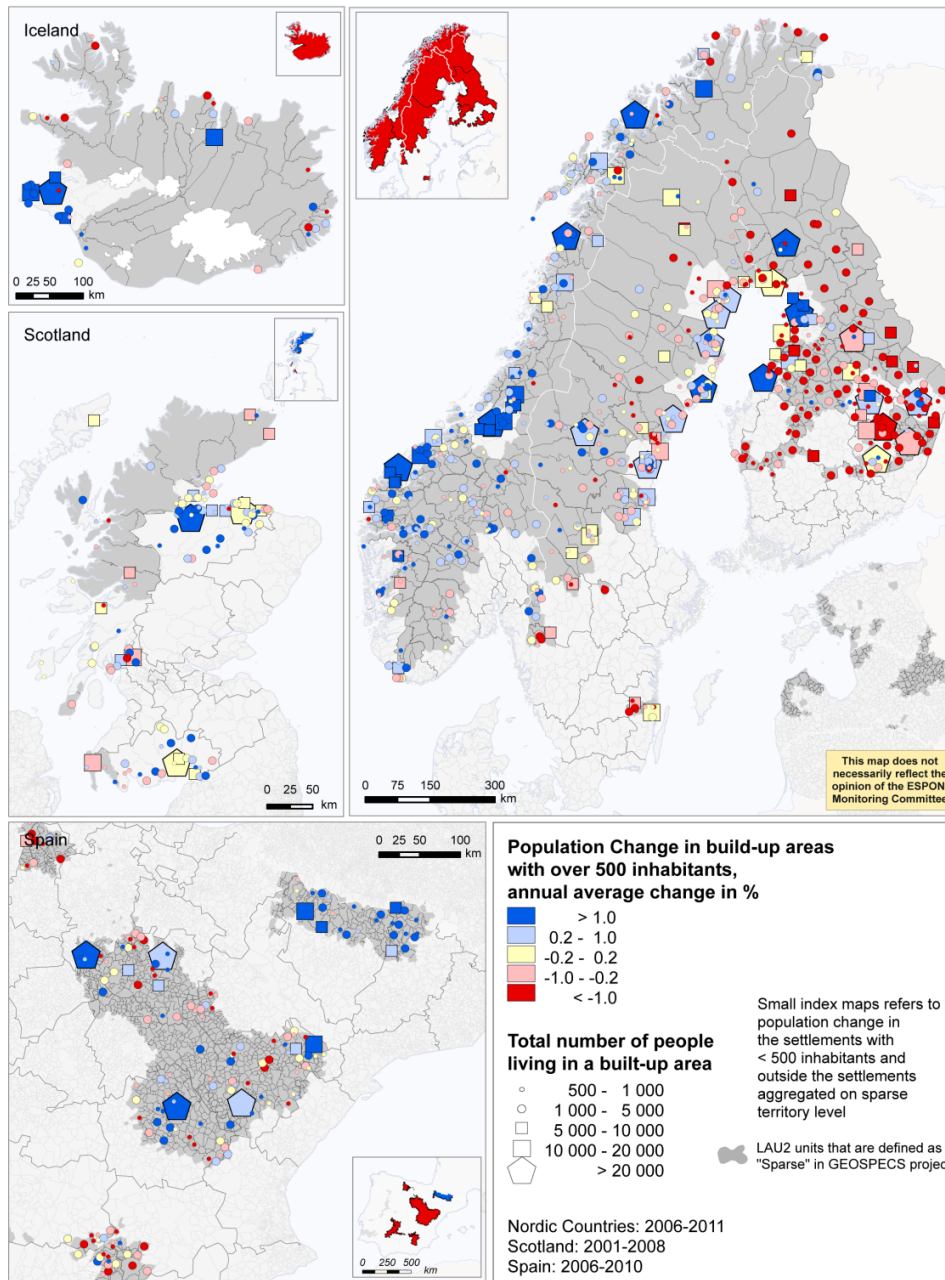


Figure 17 Population change in various sizes of sparse settlement in the largest Sparse Territories in 2006-2011 (ES 2001-2006)

Population Change in Settlements in Main SPAs



Map 33 Population Change in SPAs, 2001-2006

Population dynamics in the SPA show a double trend leading to increased internal polarisation: local or regional centres tend to grow while remote settlements decline.

As shown in Map 33, population trends *within* the STs also vary significantly, with identifiable processes of demographic polarisation. To identify these trends, two factors were evaluated: access to MUAs, and the demographic size of the locality. Of these, proximity to MUAs – and thus the average population potential of the LAU2 – does not, as such, have a clear effect on the demographic development. This can be related to the fact that only 16% of the sparse LAU2s are located – at least partly – within potential commuting areas (PUSH) of MUAs and that, in almost 80% of these, the potential is related to MUA with a population below 100,000 inhabitants, so that the regional effect of these MUAs is not very extensive.

On the other hand, the size of the locality does matter. In this case, a locality is a settlement for the Nordic Countries, and an LAU2 unit for the rest of Europe. A settlement is further defined as a built-up area with more than 200 people and less than 50 (Norway) to 200 metres (Finland and Sweden) between the houses. Figure 17 shows the population development in various sizes of built-up areas (LAU2 data for Spain) within the largest STs. In almost all STs, the largest settlements either have an increasing population or have the best demographic performance in other terms, and the areas around settlements or settlements with less than 500 inhabitants have the greatest population decrease or worst performance.

Is there a generic labour-market profile for the SPAs?

SPAs throughout Europe show a variety of economic profiles; no single type of regional economy is engendered by sparsity. An initial overview of the variety of these profiles can be provided by considering the employment profile of the SPA according to the three sectors of activities (primary, secondary and tertiary), using the STs as analytical units (0).

Several STs – in Southern Norway, Mid and Eastern Finland, Iceland and Central Spain – have profiles that are relatively close to the European average (primary: 9%; secondary: 26%; tertiary: 65%). Another common profile, characterised by a slightly larger proportion of persons working in the secondary sector and correspondingly fewer in the primary sector, can be found in Mid- and Northern Sweden, Mid-Norway, the Highlands and Islands (Scotland) and the Pyrenees. STs with a strong or very strong overrepresentation of employment in the primary sector can be found in the Western and Southern parts of the Iberian Peninsula, South-Eastern Europe (Greece, Bulgaria, and especially Turkey), and Eastern Latvia.

The simple three-sector approach shows that, even if there is no single economic profile across the range of SPAs, there seem to be signs of geographic inertia, i.e., ST located in the same 'corner of Europe' tend to have similar economic profiles. To investigate this issue further, a factorial analysis using NACE 1-digit data at the ST level was undertaken. This confirms that SPAs within one macro-region, i.e. a large territorial ensemble, tend to share a similar economic profile, which differs from that for SPA in other parts of Europe (Figure 4). For example, SPAs in the Iberian Peninsula have quite similar profiles, with a relative over-representation of employment in hotel and restaurants (i.e. services to tourists) and construction. Similarly, for SPAs in the British Isles, the Figure 5: Labour-market profiles in Sparsely Populated Areas related to the EU27 average

Map 34 Employment structure by three main sectors in sparsely populated and poorly connected areas

The sparse territories of Europe show varying employment structure, when compared to the European average and to each other. In the Nordic countries, territories are more specialised in the secondary sector (light green) or a combination of secondary and tertiary sectors (orange and purple). In Southern Europe, sparse territories are more structured around the primary sector (shades of blue). The large variation of economic profiles stresses the necessity to elaborate tailor-made development strategies adapted to the economic structure of each sparse territory.

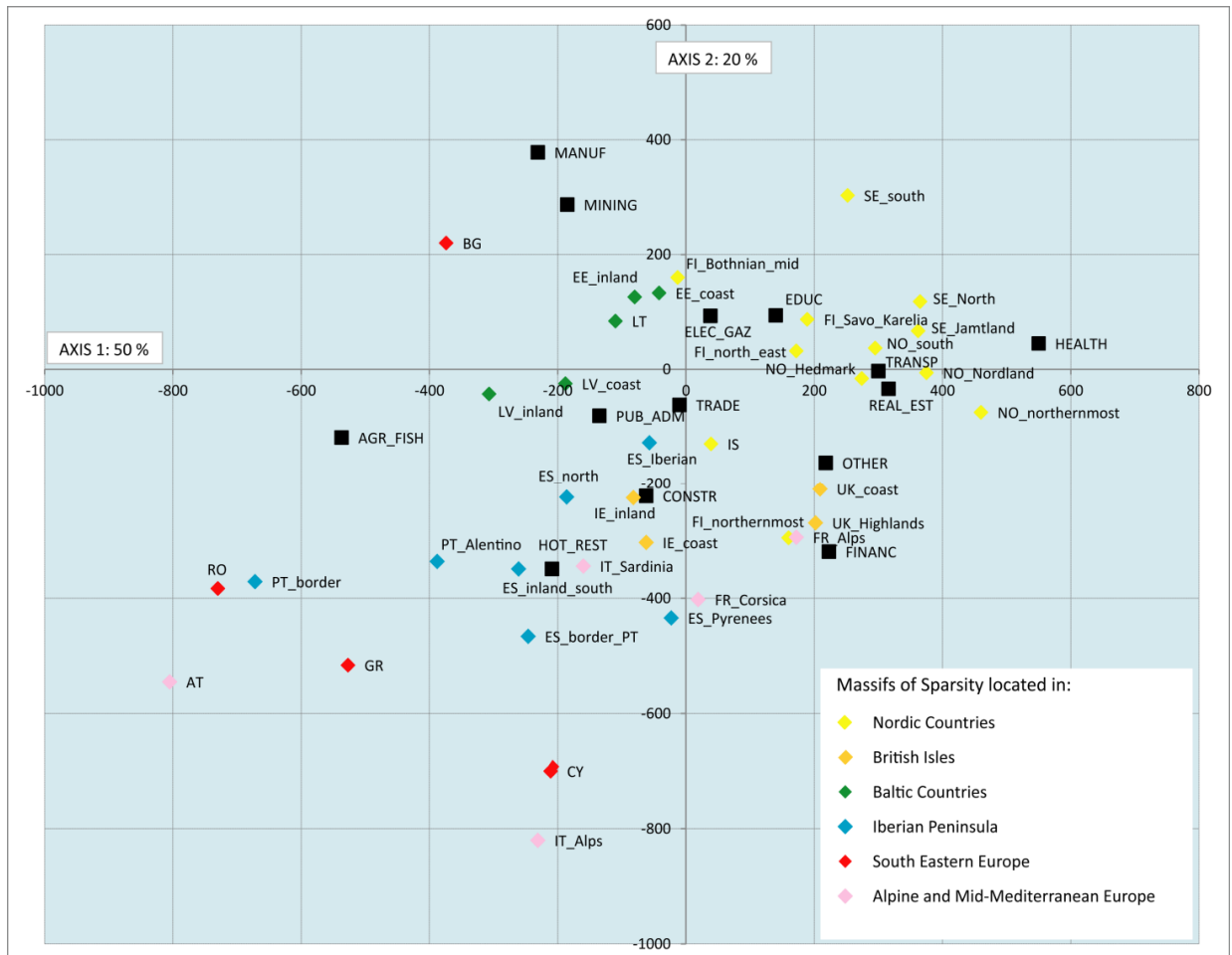


Figure 18 Economic specialisation of the Sparse Territories

Baltic countries and the Nordic countries, the relative importance of employment in the different branches is similar.

Thus, the analysis of the employment structure in the SPAs suggests why an approach to regional economic development based on geographic specificity provides an added value in the debate on territorial and local development, especially when combined with a macro-regional approach. Within such broad European macro-regions, sparse territories have developed rather similar economic structures and profiles because they are, on one hand, subject to similar territorial preconditions and, on the other hand, the object of similar types of public policies and initiatives.

Resource-based economies caught between economic growth and environmental protection¹⁰²

The exploitation of natural resources remains important in the regional economies in SPAs. Although the dominance of such activities is less important in terms of employment, due to modernisation and rationalisation processes in those industries, they are still an important in terms of wealth generated (e.g. GVA) and of maintaining the regional social capital. This aspect has been further described in the three SPA case studies of Torne Valley, Highlands and Islands, and Central Spain.

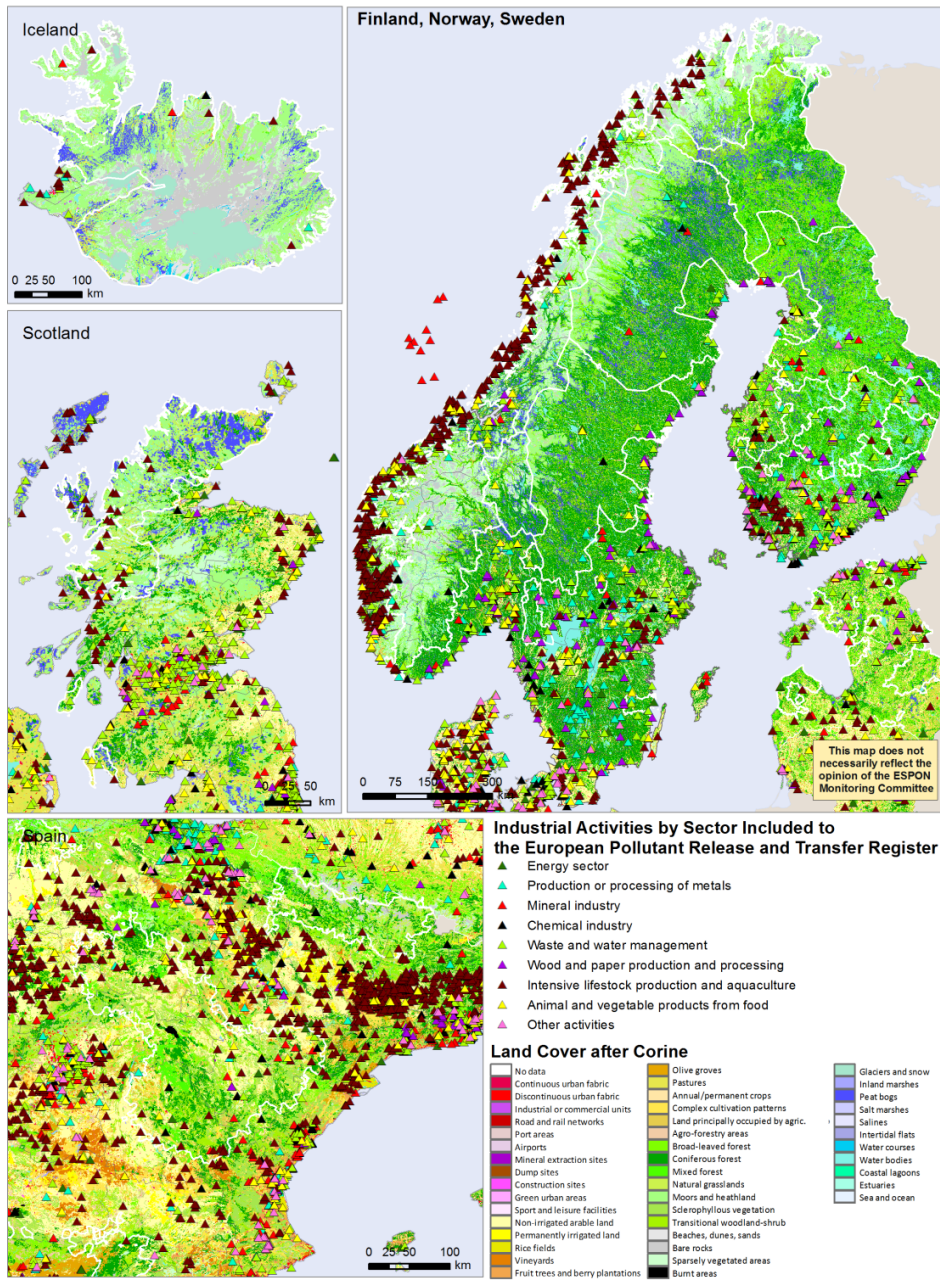
This resource-based development enables local and regional economies to develop a medium- or long-term perspective for their regional development. However, these activities often have environmental impacts with regard both to the methods employed for extraction or production, and to the residues and waste produced by these activities that need to be stored or treated. In SPAs, two main types of such activities can be distinguished. First, activities such as fishing, intensive livestock production and aquaculture, if not highly polluting when taken individually, may have a strong – if diffuse – impact on the environment, as they are often numerous and concentrated geographically. This is particularly evident for the Norwegian coast (aquaculture), the Scottish Highlands (livestock) and, to a lesser extent, the northern part of the Central Spanish SPA (livestock). Second, activities in the mineral and chemical industries and the processing of metals are less numerous and less concentrated geographically (Map 35). However, each plant has a much greater impact on the environment. This is the case in the Swedish and Finnish SPAs, which have specialised in such activities for decades. These activities engender more localised types of environmental impacts.

102

The section uses data of the European European Pollutant Release and Transfer Register (E-PRTR). The E-PRTR is the new Europe-wide register that provides easily accessible key environmental data from industrial facilities in European Union Member States and in Iceland, Liechtenstein, Norway, Serbia and Switzerland.

<http://prtr.ec.europa.eu/Home.aspx>

Land Cover & Industrial Activities



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

ESPON

© Nordregio, Geospets, 2012
Regional level: GRID/Other
Source: ESPON Database 2013
Origin of data: EEA, Corine land cover, E-PRTR
© EuroGeographics Association for administrative boundaries

Map 35 Location of activities included in the European Pollutant Release and Transfer Register in the four main European regions with SPA

**Map 36 Proportion of agricultural and artificial land, and protected areas
in Sparsely Populated Areas**

This tension between resource-based development and the preservation of the environment also challenges the capacity of local and regional economies based on the former to develop activities that are based on high environmental quality, such as forestry or tourism, which is often linked to the relatively 'pristine' or 'wild' ecosystems and landscapes: for instance, much of the NSPA is described as Europe's last wilderness. Thus, a decision to follow an amenity-led development path might jeopardize the long-term potential for other types of activities.

There is therefore a complex and, to some extent, paradoxical relationship between the need to develop human (and industrial) activities in SPAs and to protect the environment. As shown in Map 36, the proportion of artificial and agricultural areas in the land cover of SPAs is low. This is, of course, directly linked to the nature and history of human development in the SPAs, particularly in northern Europe: the low quality of the land and/or climate for agriculture led to few people settling there before the Industrial Revolution, which engendered a lack of critical mass to benefit from the agglomeration economies of the industrial era, thus create self-reinforcing patterns of demographic sparsity. These characteristics lead to the environmental protection paradox of the SPAs: because human activities are not an urgent threat to the quality of the environment, fewer areas have been designated as protected areas than in more central parts of Europe (e.g., Germany, the Netherlands) where the pressure of human activities on the environment is greater. There is therefore more space available for the development of economic activities that may have an impact on the quality of the environment.

Summary and conclusions

SPAs share many *similarities* in terms of territorial development challenges and opportunities. Yet, as the above analysis shows, it appears that many of these issues are not the *same* across the spectrum of European SPAs.

This section has emphasised the features of territorial development that are of most importance for fostering local development in the SPAs: access to urban cores; territorially and structurally unbalanced demographic development; the role of resource-based development in economic growth processes, and the resulting impacts on the environment and other activities which depend on a high-quality environment.

Some SPAs are on the edges of agglomerations with populations of many millions, while others have only access to smaller local and regional centres.

Yet all SPAs suffer from lack of access to employment and service centres due to either inadequate transport infrastructure or physical remoteness.

Some SPAs have witnessed overall population growth, while others have suffered from steady population decline. Yet all are witnessing processes of demographic polarisation towards urban centres – either within the area, nearby, or further away.

Some SPAs have resources that can assure the welfare of their population for decades, while others only have limited production prospects. Yet the long-term sustainability of local economic growth strategies based on both environment-friendly activities and those with environmental impacts may lead to conflicts of interest.

The analysis shows that, for each of these issues, there is no *generic* way to describe how different SPAs are affected by them. This means that policy initiatives aiming to foster territorial development in SPAs cannot be generic. Yet such policies should aim to:

- strive for the development of 'regional' economic strategies based on cooperation within Sparse Territories, where significant synergies can be drawn upon, while some flexibility exists for local economies to find their own competitive advantage;
- develop strategies enabling the expansion of economic and labour-market interactions within Sparse Territories, supported by adapted transport infrastructure and networking initiatives across (regional and/or local) administrative boundaries;
- foster the development of economic activities moving the economies of SPAs “up the value chain”, enabling the combination of traditional industries with more refined processing of products.

4.1.4 Coastal areas

Within the GEOSPECS project, coastal zones have not been delineated as a fixed area because coasts are not only highly dynamic in terms of their natural environment, but display a variety of social and economic patterns at different geospatial scales. In order to capture socio-economic developments and trends that are influenced by their proximity to the sea, GEOSPECS considers coastal areas within commuting distance to the sea (e.g. 45 minutes, 90 minutes) and for LAU 2 that are contiguous to the sea (see Map 37).

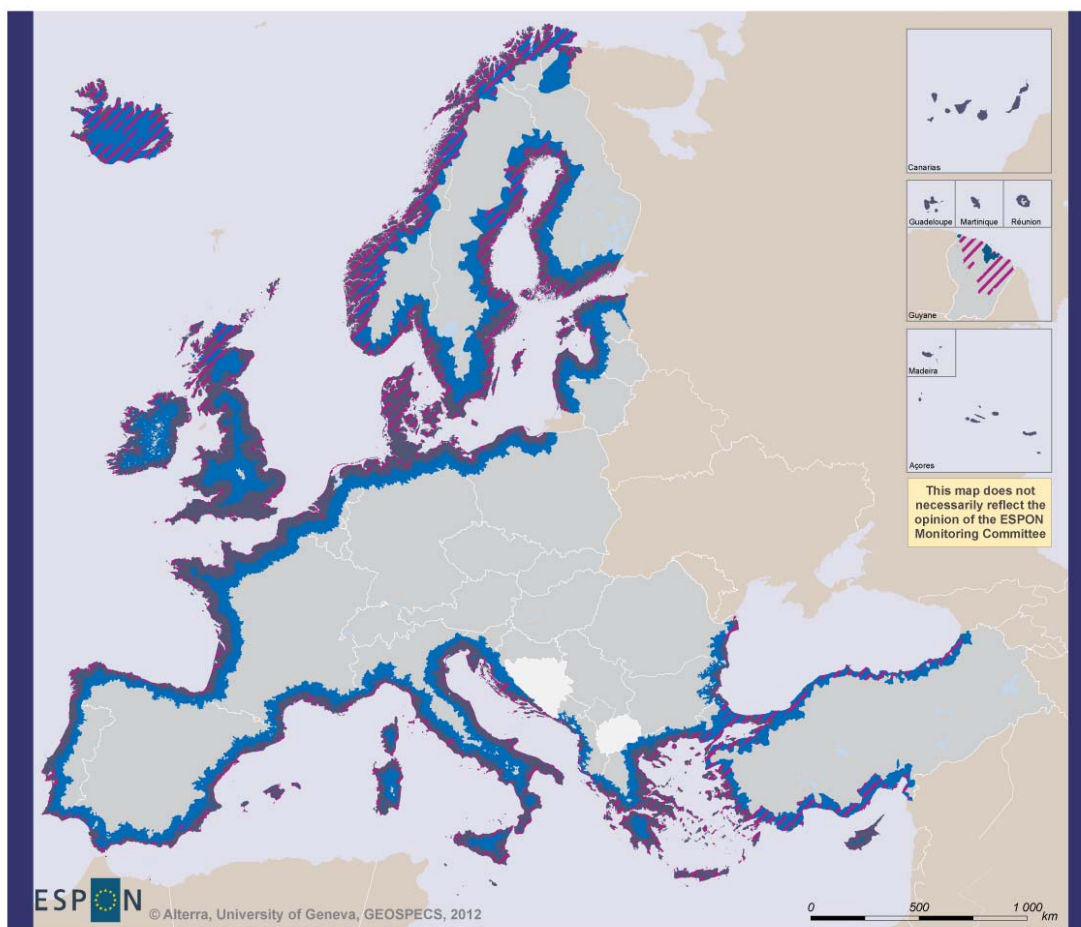
Coastal Population Density

Coastal areas are generally perceived as desirable places to live because of their residential attractiveness, combined with the historic socio-economic development of cities around ports and landing points. In 2006, 177 million people (34.1%) lived within commuting distance (45 minutes) of the coast in the European Union, and 182 million (35.1%) in ESPON space (excluding Montenegro) (Table 26). In general, coastal population densities in the ESPON space are higher than inland population densities.

Table 26 Population densities in coastal areas and the inland in ESPON space

Distance to coast	ESPON space*				
	Area (km ²)	Population 2001	Population 2006	Pop. Density 2001	Pop. Density 2006
45 minutes + contiguous	1 337 500	177 440 000	182 230 000	145	149
Between 45 and 90 minutes	757 800	56 320 000	60 560 000	74	80
90 minutes + contiguous	1 979 700	233 760 000	242 800 000	118	123
Other areas	3 059 700	260 590 000	276 210 000	85	90

*excluding HR, TR, MK



This map does not necessarily reflect the opinion of the ESPON Monitoring Committee

EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2012
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Classification of LAU based on average distance to the coastline



Map 37 LAU2 within 45 minutes and 90 minutes travel distance from the coastal and contiguous to the coastline.

However, these high numbers are not equally distributed along the coasts: there is a considerable variation, from very densely populated coasts to sparsely populated coasts (Figure 19) as well as large areas of uninhabited coast. There are also differences between coastal population densities according to country (Table 27). Some regional seas have densely populated areas, including coastal megacities such as Barcelona (see Map 39), one of the most densely populated cities in Europe, located on the Spanish Mediterranean Sea. However, the same regional seas also contain coastal LAUs that are classified as Populated Area (SPAs) according to GEOSPECS criteria (see Figure 19 ES_ Mediterranean - Spanish Mediterranean Sea). The proportion of coastal LAUs that are also classified as SPA varies dramatically: from coastal areas with a very small percentage of SPAs to others where the majority of the LAUs are also within SPAs, e.g. all of Iceland's coasts (see Figure 19 all LAUs with country code IS) and most of the Norwegian coast (see Figure 19 the LAUs with country code NO).

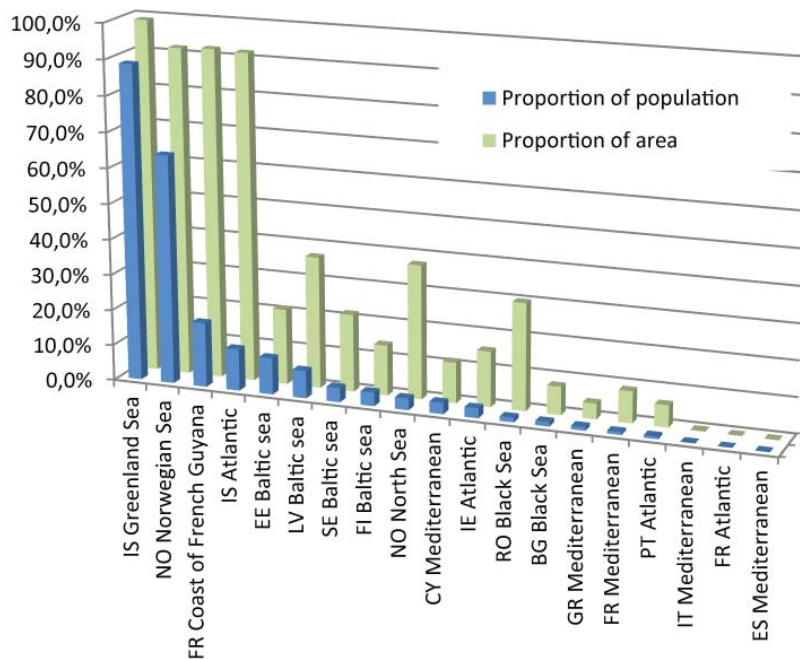


Figure 19 Percentage of population and area in coastal SPA municipalities

Percentage of population and area in sparsely populated areas in LAU 2 within 45 minutes from the coast, by coastal region (country and regional sea).

Coastal population densities also vary from country to country (Table 27), which may reflect, to a certain extent, a country's overall population density.

Table 27 Population densities in coastal areas (LAU2 at less than 45 minutes from the coast or contiguous to the coast)

Code	Country	2001	2006
AL	Albania	-	211,4
BE	Belgium	487,6	496,4
BG	Bulgaria	154,6	154,7
CY	Cyprus	78,5	89,4
DE	Germany	204,1	206,0
DK	Denmark	124,7	143,4
EE	Estonia	57,1	55,8
ES	Spain	298,3	333,8
FI	Finland	53,8	55,2
FR	France	120,2	127,3
GR	Greece	115,8	119,3
HR	Croatia	84,4	-
IE	Ireland	86,1	94,3
IS	Iceland	3,4	3,6
IT	Italy	263,4	269,5
LT	Lithuania	98,8	91,4
LV	Latvia	84,9	82,6
ME	Montenegro	-	49,5
MT	Malta	1251,1	1283,8
NL	Netherlands	537,9	549,2
NO	Norway	21,0	21,6
PL	Poland	178,1	178,9
PT	Portugal	323,7	319,7
RO	Romania	112,1	117,1
SE	Sweden	55,3	56,9
SI	Slovenia	86,6	88,7
TR	Turkey	247,6	-
UK	United	263,4	251,6

Table 28 draws attention to the diversity of the urban coasts, where most of the coastal population in countries such as Belgium, United Kingdom and the Netherlands (country code BE, UK, NL) live within commuting distance of a metropolitan area, some of which located directly on the coast (e.g. London, UK). However, there are differences between these examples when examining the percentage of the coastal area within commuting distance e.g. in Belgium, there is a dramatically higher percentage of coastal area overlapping with commuting distance to the metropolitan areas.

At the other end of the spectrum are a number of coastal countries that either do not have large metropolitan areas with more than 750,000 inhabitants or where these areas are not located within a commuting distance of 90 minutes to the coast. However, in most coastal countries, a large proportion of their coastal population lives in commuting distance of a large urban area (more than 100,000 inhabitants), though these do not necessarily show similarities when examining the coastal area that falls into that commuting distance e.g. Germany (93.6% of population, area of 85.4%) in contrast to Slovenia, with a similarly large percentage population of 90.6 % but an area of only 63.5%.

Table 28 Proportion of coastal areas in commuting distance from PUSH

Country	Within commuting distance of metropolitan area		Within commuting distance of large urban area	
	Population (2006)	Area	Population (2006)	Area
BE	93,9%	91,6%	100,0%	100,0%
UK	72,9%	32,4%	94,5%	61,8%
NL	70,6%	47,4%	99,8%	98,6%
DE	60,7%	34,5%	93,6%	85,4%
PT	59,3%	19,8%	79,5%	48,1%
GR	50,3%	8,1%	63,0%	20,9%
IT	42,2%	17,9%	91,6%	71,7%
FI	40,6%	6,0%	65,2%	19,3%
PL	40,0%	14,4%	82,8%	61,5%
IE	39,4%	6,6%	66,7%	23,9%
DK	38,3%	12,3%	85,7%	67,7%
FR	37,8%	15,2%	87,0%	62,5%
ES	36,5%	9,8%	88,9%	59,8%
SE	35,4%	4,9%	69,8%	28,7%
NO	26,0%	1,6%	56,5%	5,5%
BG	0,0%	0,0%	67,5%	34,7%
CY	0,0%	0,0%	86,4%	66,2%
EE	0,0%	0,0%	56,7%	9,7%
IS	0,0%	0,0%	0,0%	0,0%
LT	0,0%	0,0%	0,0%	0,0%
LV	0,0%	0,0%	66,8%	20,0%
ME	0,0%	0,0%	0,0%	0,0%
MT	0,0%	0,0%	92,3%	78,2%
RO	0,0%	0,0%	74,2%	25,6%
SI	0,0%	0,0%	90,6%	63,5%

Proportion of coastal areas within 90 minutes from the coast and within commuting distance (45 minutes) of a metropolitan area or a large urban area

Metropolitan area defined as a functional urban area with a population of more than 750 000 inhabitants.

Large urban area defined as a functional urban area with a population of more than 100 000 inhabitants.

Economic development and population density

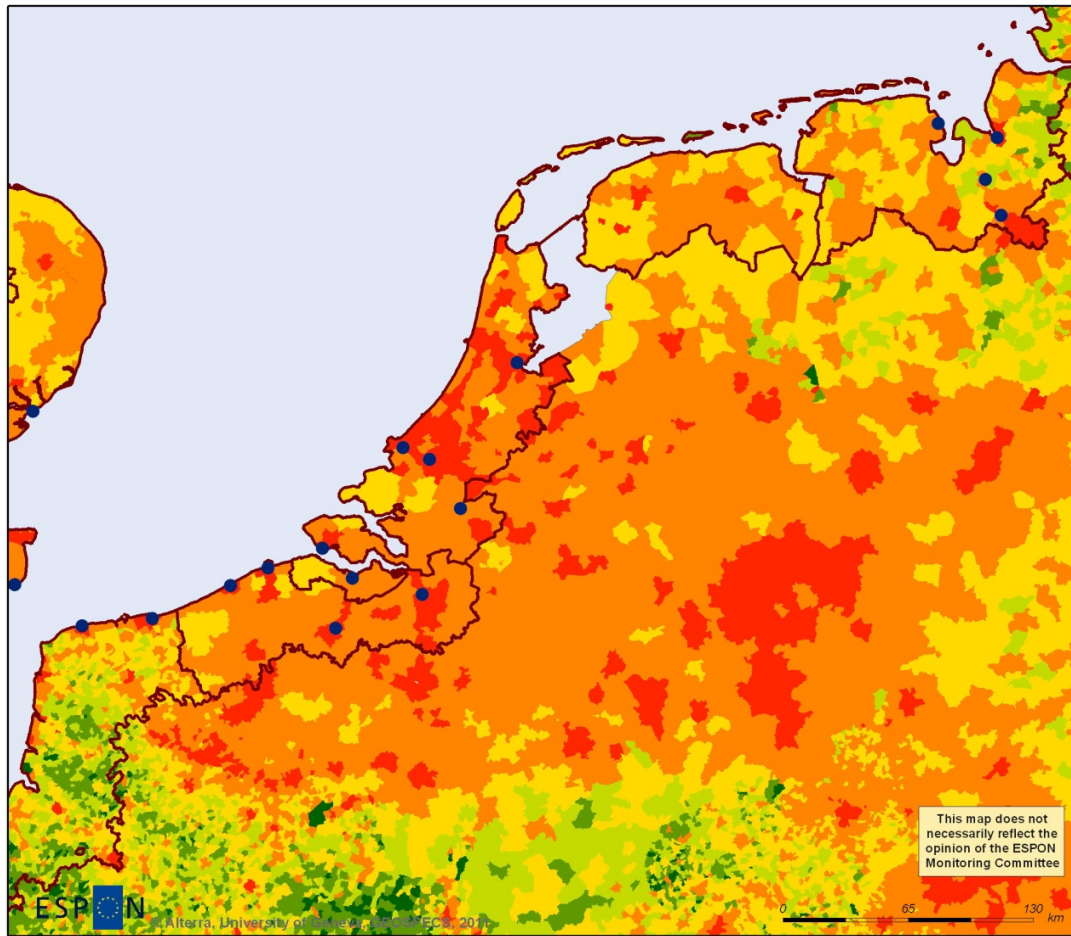
Many coasts are host to a vast array of economic activities: shipping, transportation, heavy industry, aggregate and mineral extraction, aquaculture and fisheries, renewable energy, leisure and tourism. Economic activity along the European coastal zone, however, is highly variable (Cummins et al., 2004). In areas of high concentration of activity, factors such as high population density and access to key infrastructure are more likely to attract industry. Such developments can be seen in Map 38, where the North Sea Coast of Belgium and the Netherlands is characterised both by high population density and a large number of large cargo ports (>4 million tonnes in 2009), showing elevated economic activity. According to the literature, the industrial profile of a coastal region can be influenced by a number of factors including land and property value, access to labour and the residential profile (Rodríguez, 2001). These factors also significantly affect the local economy.

Coastal areas with high economic activity combined with high population densities can also suffer from urban sprawl, e.g. Barcelona, has a high percentage of artificial surface per square kilometre land area indicating the large spatial extent of urbanisation (Map 39). In some cases, the coastal location of a settlement has accelerated such urbanisation in combination with relaxed planning laws, where increased in-migration to the area occurred due to an intensive tourism industry and perceived residential attractiveness, e.g. in Barcelona (Dura-Guimera, 2003; Map 39). Urbanisation and an increase of artificial surface area, although not a specifically coastal phenomenon, can be found in coastal areas of most regional seas. However, countries with a low population density tend to have a high percentage of artificial surfaces per square kilometre at localised coastal hotspots which are not very large. These hotspots correspond with the areas of highest population density in those countries: their capital cities e.g. Dublin in Ireland, Oslo in Norway or Helsinki in Finland. In very densely populated countries, a relatively high amount of artificial surface area can be found over widespread areas on the coast and further inland (see Map 39: Belgium and Netherlands North Sea Coast), i.e., there is no pronounced difference or coastal pattern. However, Table 29 shows that most coastal countries, including Belgium have a higher amount of artificial surface area in the coastal LAUs (on the coast) compared to the coastal area that includes the 45 minutes commuting distance from the actual coastline. Again, there is a spectrum of variation. Along a number of coastlines, this difference is quite clear e.g. Belgium North Sea, French North Sea, Slovenian Mediterranean

Sea, German North Sea, French Atlantic, Dutch North Sea and German Baltic Sea. However, for the majority of coastal regions, the difference is not as pronounced, but can be detected; and only a smaller number of coastal areas show the opposite pattern, namely the Estonian Baltic Sea, Spanish Atlantic Areas, Irish Atlantic and Greek Mediterranean.

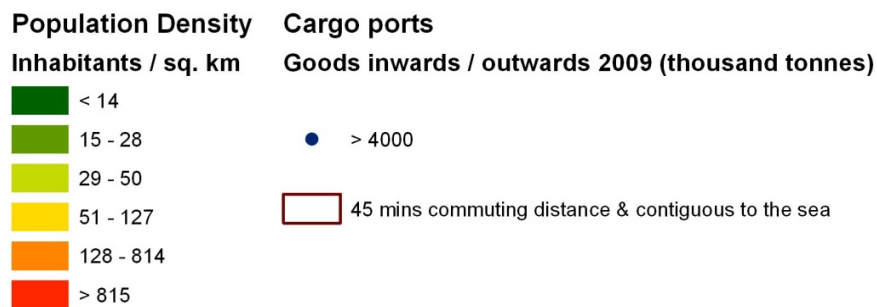
Table 29 Artificial surfaces in coastal municipalities

Coastline	Percentage of land cover grid cells classified as "artificial surface"		Difference (percentage points)
	In coastal LAU2	In LAU2 within 45 minutes from coast	
BE_northsea	39,4%	3,4%	36,0
FR_northsea	23,0%	3,2%	19,7
SI_meditsea	21,4%	6,4%	15,0
DE_northsea	17,0%	4,3%	12,8
FR_atlantic	14,5%	3,5%	11,0
NL_northsea	14,7%	3,8%	10,9
DE_baltsea	15,5%	4,6%	10,9
FR_meditsea	12,4%	4,4%	7,9
CY_meditsea	12,8%	6,7%	6,1
PT_atlantic1	11,2%	6,4%	4,8
LV_baltsea	7,6%	3,0%	4,7
DK_baltsea	7,4%	2,9%	4,5
LT_baltsea	8,1%	3,8%	4,3
IT_meditsea	8,9%	5,3%	3,7
DK_northsea	6,1%	2,8%	3,3
SE_northsea	6,4%	3,5%	2,9
ES_meditsea	10,1%	7,7%	2,4
FI_baltsea	5,3%	3,5%	1,8
BG_blacksea	11,3%	9,7%	1,7
RO_blacksea	4,6%	3,9%	0,7
SE_baltsea	3,5%	3,5%	0,0
EE_baltsea	3,3%	3,8%	-0,5
ES_atlantic (Gulf of Cádiz)	5,9%	6,6%	-0,7
ES_atlantic (Bay of Biscay)	8,3%	9,4%	-1,0
IE_atlantic	3,0%	6,4%	-3,4
GR_meditsea	2,4%	7,0%	-4,7



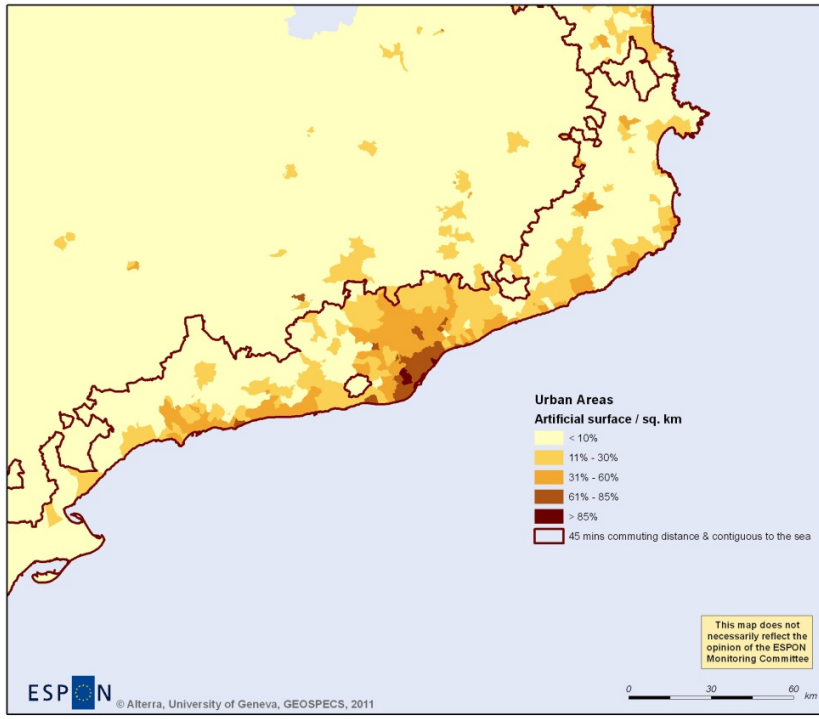
EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPACES, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)



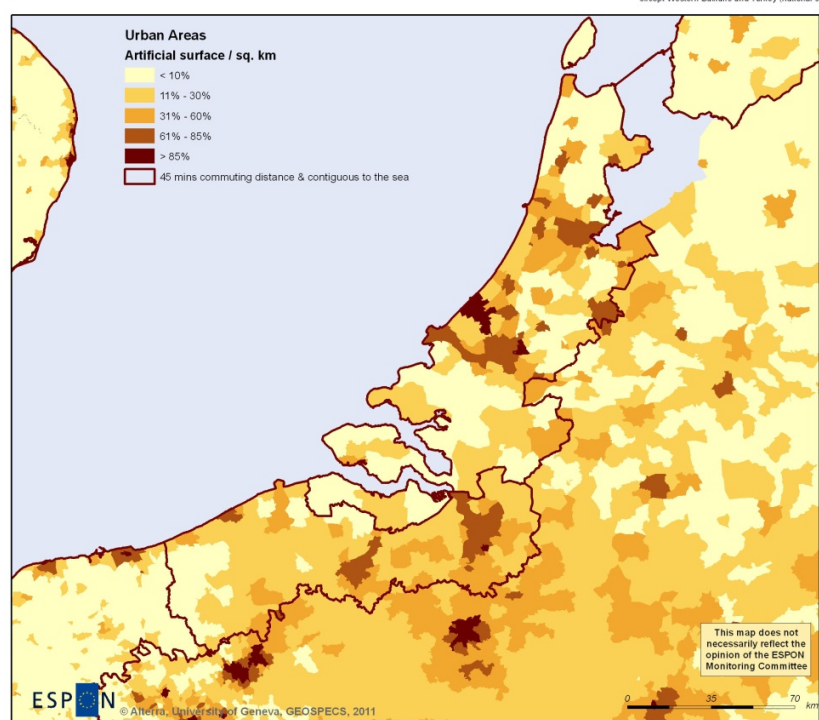
Map 38 Population density and large cargo ports

Population density and large cargo ports (> 4 mill. tonnes of goods transported inwards and outwards in 2009 in the North Sea Coastal areas of Belgium and the Netherlands).



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Map 39 Artificial surfaces in Mediterranean and North Sea coastal area

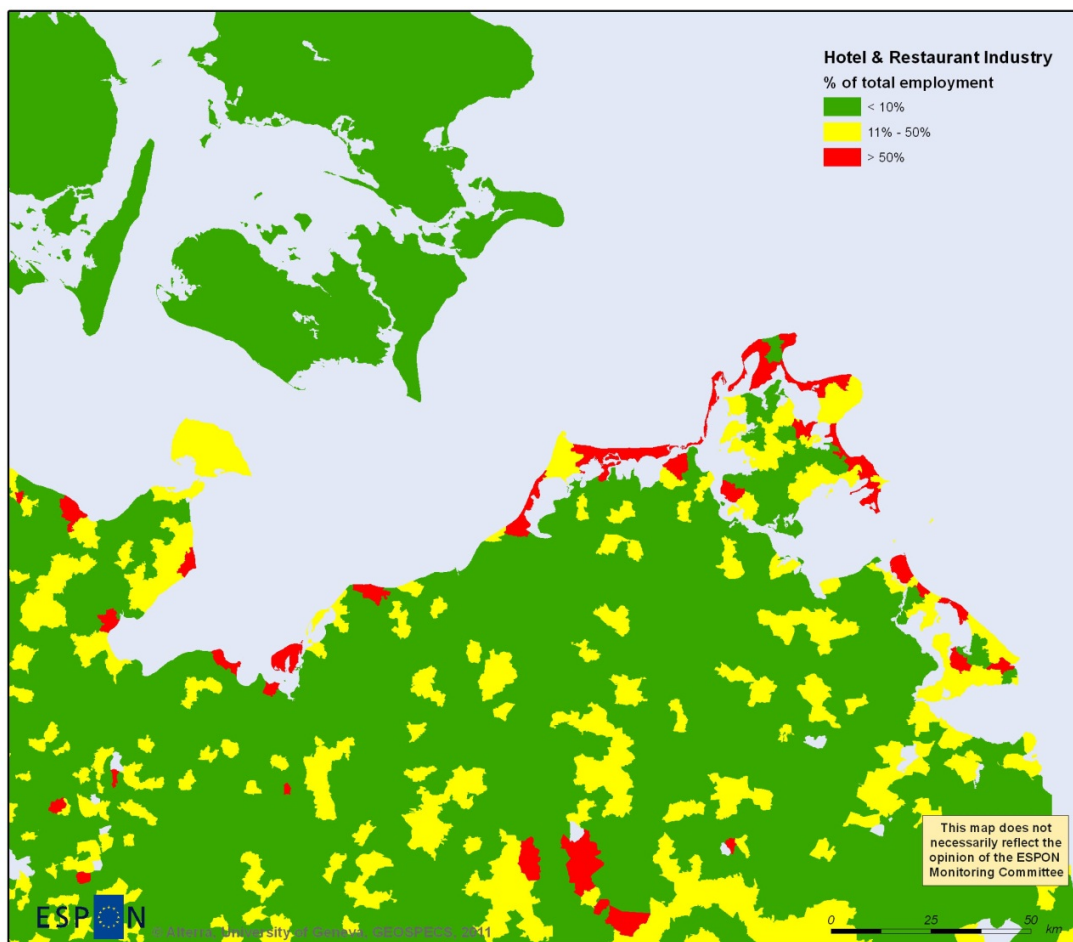
Employment and Tourism

Many coasts are dynamic places in terms of employment, especially as employment trends depend not only on the pervading economic climate but on seasonal trade (e.g., coastal tourism). The structure of employment in coastal regions is not uniform. For example, the agricultural sector accounts for 32% of jobs in Romanian coastal regions, and only 2% in Swedish coastal regions (Eurostat 2010). Unemployment rates are also highly variable in coastal regions. In half of Belgian coastal regions, the unemployment rate is 0.56 times that of the national level, while in Romania it is 1.7 times higher on the coast than nationally. Nevertheless, proximity to the sea is not necessarily the discriminating geographical factor for relative levels of unemployment, which are predominantly determined by the state of individual national economies (Eurostat 2010).

As shown by the deviation between proportions of employment by branch in LAU2 that are contiguous to the coast, within 45 minutes from the coast and the national average value (see Annex 43) there is no general "employment profile" from either a European or a national perspective. Some coastal areas have a strong overrepresentation of the fisheries sector compared to national average values (e.g. Gulf of Cádiz in Spain, Iceland). Only the Danish and French coastal areas along the North Sea have a significant overrepresentation of the manufacturing sector, while transport and storage activities are most over-represented along the coastlines of Slovenia, Cyprus and Belgium.

Coastal areas worldwide are a major destination for tourism, which is one of the fastest growing sectors of the global economy (Creel, 2003). Pressures on the coastal and marine environment and/or way of life can be seasonal and vary significantly in intensity across the EU coastal regions. Good weather in combination with cultural/traditional lifestyles are major factors responsible for increasing numbers of tourists to an area (Rodríguez, 2001). Much of the seasonal employment in coastal areas is in tourism. At a European scale, mountain areas show a more dramatic pattern for the service industry, indicating areas where employment related to tourism is highest. Such differences occur because most coastal regions, in contrast to many mountain areas, also offer employment in other sectors e.g. fishing or port-related activities. However, there is an extremely high percentage of employment in the service industry (Hotel and Restaurant – NACE category H) on the coastline of the Baltic Sea coast (Map 40), indicative of high employment in the tourism industry of some coasts. The figures in Table 30

support this observation: for almost all coastal areas, where data is available, the percentage of employment in NACE Category H is higher for coastal LAU2s than LAU2s within commuting distance of the coast – with exception of the Bulgarian Black Sea and the Dutch North Sea coastal areas where there was no difference. Some coastal areas show again a more dramatic pattern e.g. Cyprus and Slovenia. Such patterns can be explained by the desire of tourists to spend their vacation directly or very close to the actual coastline because of the sea views and to take part in recreational activities that directly involve the sea and/or are close to the sea.



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Map 40 Hotspots of employment in the service industry in Baltic Sea Coast of Germany

Table 30 Proportion of employment in tourism

Coastline	Percentage of employment in Hotels and Restaurants		Difference (percentage points)
	In coastal LAU2	In LAU2 within 45 minutes from coast	
ES_Canary islands	17,25%	-	-
CY_meditsea	11,50%	6,70%	4,7
ES_atlantic (Bay of Biscay)	10,00%	9,40%	0,6
SI_meditsea	9,80%	6,40%	3,4
BG_blacksea	9,70%	9,70%	0
ES_meditsea	9,20%	7,70%	1,5
PT_Madeira and Azores	7,48%	-	-
ES_atlantic (Gulf of Cádiz)	6,80%	6,60%	0,1
IT_meditsea	6,00%	5,30%	0,7
FR_meditsea	5,30%	4,40%	0,9
DE_baltsea	5,30%	4,60%	0,6
DE_northsea	4,80%	4,30%	0,5
FR_northsea	4,70%	3,20%	1,5
FR_atlantic	4,70%	3,50%	1,3
BE_northsea	4,60%	3,40%	1,2
LT_baltsea	4,10%	3,80%	0,3
SE_northsea	3,80%	3,50%	0,3
NL_northsea	3,80%	3,80%	0
SE_baltsea	3,60%	3,50%	0,2
FI_baltsea	3,60%	3,50%	0,1
IS_atlantic	3,24%	-	-
LV_baltsea	3,20%	3,00%	0,3
IS_bargreen	3,15%	-	-
DK_baltsea	3,10%	2,90%	0,2
DK_northsea	2,80%	2,80%	0,1
NO_Norwegian Sea	2,61%	-	-
NO_northsea	2,61%	-	-

Only countries with employment by place of work included: Estonia, Greece, Ireland, Portugal, Romania and UK excluded.

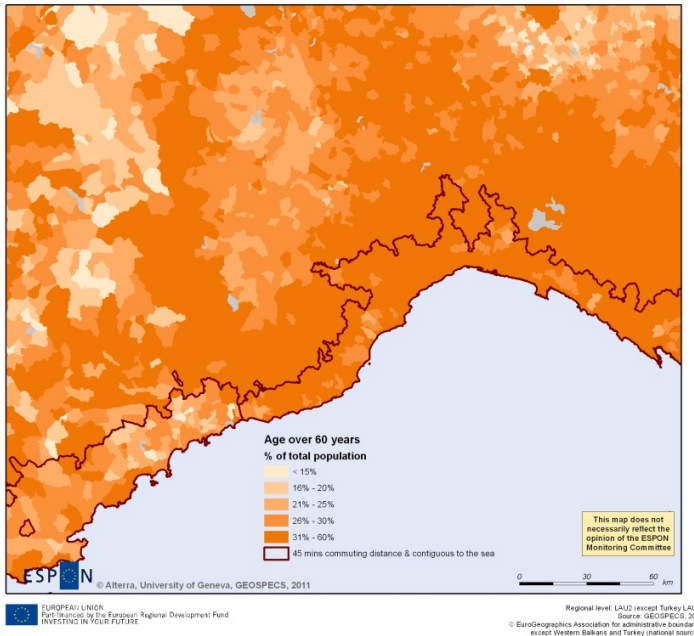
Coastal population and age

The highest percentage of people aged over 60 resides on the German coasts of the North and Baltic Seas (see Figure 20 - focused area North Sea Coast of Germany). Similar to the pattern of employment in the service industry for the Baltic Sea, the areas with the highest percentage are located directly on the coastline for similar reasons as tourists, such as the sea view, but also because a certain level of services and infrastructure ensures a certain standard of living. Coastal areas with high percentage of people aged over 60 (Map 41) have a similar pattern to coastal areas with a high percentage of employment in the service industry (Map 40). These areas also coincide with coastal areas with a relatively high percentage of overall population density. However, coastal areas favoured for retirement are not the coastal megacities but smaller coastal settlements, which can increase the urbanisation of an area.

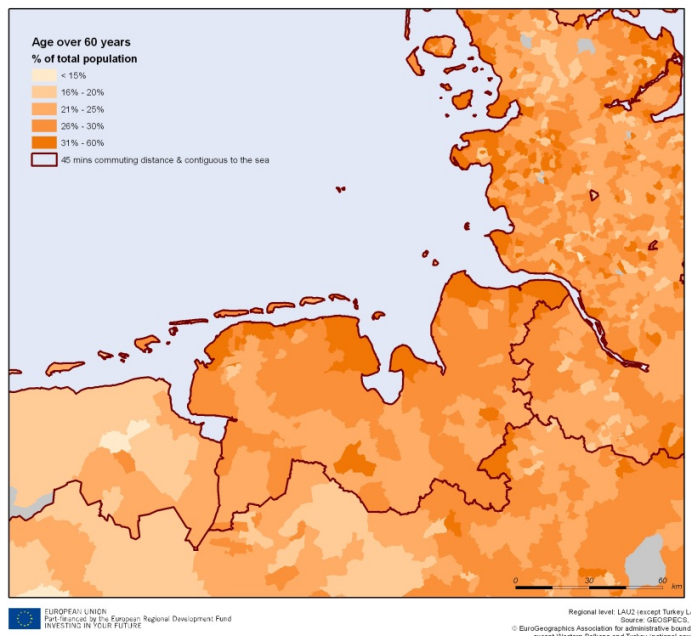
Factors such as good infrastructure and services attract retirees to certain locations to maintain their lifestyle; another important factor that attracts many retirees is climate. Map 41 shows the French Mediterranean coast, known for its warm sunny climate and the relatively large area with a high percentage of people over 60.

These numbers again have to be seen in context with the figures for the entire country as they may reflect just a countrywide pattern of an ageing population. Figure 20 shows that a number of countries do have a higher percentage of people aged 60 and over inhabiting their coastal areas compared to the entire country such as most of the German coasts, the French coasts, some Spanish Atlantic Coasts, UK coasts, the Italian Mediterranean coast and the Belgium coast among others. However, in a number of coastal areas the opposite patterns is evident e.g. especially in the Outermost Regions, along some Spanish Atlantic coast and the coastal areas of the Bulgarian Black Sea. Figure 20 again demonstrates that there is not just one pattern but a range that sometimes along the same regional sea shows contrasting values e.g. for the different Spanish Atlantic Coastal Regions.

French Mediterranean Sea Coast



German North Sea Coast



Map 41 Percentage of the population aged 60 in the North Sea Coastal areas of Germany and the French Mediterranean Coastal area.

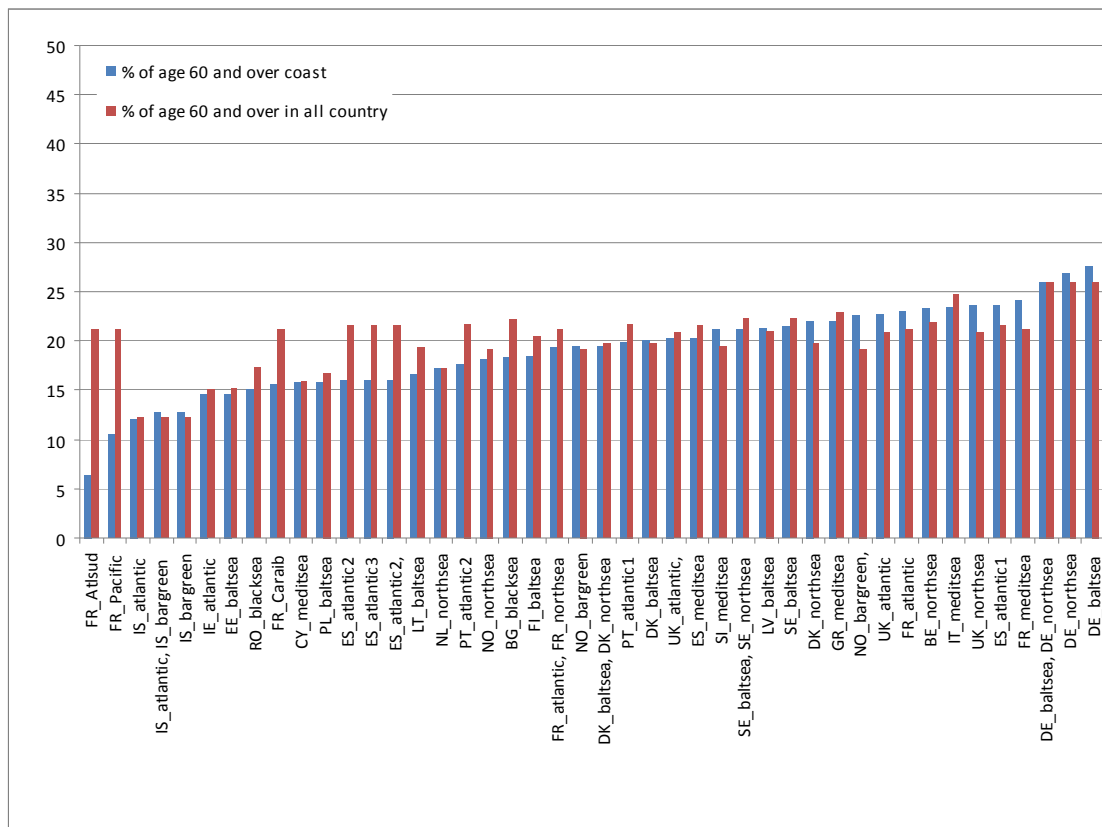


Figure 20 Percentage of population aged 60 and over in coastal LAUs (country and regional sea) and in the entire country.

Conclusion

Coastal socio-economic structures and trends are not uniform across Europe and the ESPON space, but display a range of developments, sometimes with significant contrasts. While, on average, population density is higher in the coastal areas than the inland parts of individual countries, high numbers of inhabitants are not equally distributed across the coastal regions of the ESPON space; there is a range from extreme densely populated to sparsely populated areas. The latter face similar overall challenges as their inland counterparts, while their coastal location may be an opportunity in terms of coastal tourism or an added challenge in terms of added isolation of the region. Issues related to urbanisation are not specifically coastal, e.g. urban sprawl in densely populated areas and spatial manifestation of inequality (DeVerteuil, 2009) or disruption of ecosystem connectivity due to infrastructure development and other associated activities (Pinoa and

Marullb, 2012). However, it is important to understand the influence of the coastal location on such developments: for example, the proximity of the sea in a region may have accelerated the urbanisation process or set such developments in motion as in-migration to the area increased either because people were attracted by employment in the coastal tourism industry or because they came to retire to the area because it is coastal.

In general, coastal areas are locations of a great variety of economic activities, especially around ports; however, in some coastal regions, certain sectors of employment e.g. coastal tourism and especially the associated service industry are predominant. These areas, similar to mountain regions, are over-dependent on that often seasonal sector and vulnerable to any changes in visitor numbers or spending behaviour of tourists, which can be caused by a variety of factors, including climate change or economic recession. Predominantly large employment numbers in the tourism and service industry can be found on coasts with a warm climate, which also attract higher numbers of senior citizens for retirement. In general, population ageing is due to longer life expectancy and decreasing birth rates (Gervais-Aguer, 2006; Bryden, 2000). However, Gervais-Aguer (2006), in a study of migration of British seniors to France, argues that the increase in population ageing due to the migration of older people can be significantly attenuated by a younger labour force remaining in the host region. Conversely, in-migration of elderly people to the coastal zone can address population imbalances (i.e., overpopulated urban areas versus sparsely populated rural coastal zones) and can be an opportunity (Bryden, 2000). On the other hand, there is a danger of increased urbanisation of rural coastal areas, which in turn can lead to the problems outlined above.

Challenges and opportunities in terms of the socio-economic development in coastal regions in Europe and the wider ESPON space may not be specifically coastal in their nature, but may be increased or initiated by their coastal locality. There is no single coastal pattern that applies across the ESPON space, but a range of coastal areas that are influenced by their proximity to the sea.

4.1.5 Border areas

This section presents the main findings resulting from a quantitative analysis of LAU 2-level data gathered by GEOSPECS for border areas. The quantitative analysis focuses mainly on the “core border areas”, for which we assume that the existence of a politically-defined border has a high influence on all kinds of socio-economic and socio-cultural exchange relations. These core border areas are generally consist of two sub-groups: (1) a large group of areas which are contiguous to a border and in which this borderline can be accessed within a maximum travel time of 45 minutes and (2) a very small group of areas which are still contiguous to a border but in which the time needed to reach this border exceeds the 45-minute threshold.¹⁰³

In addition, “adjacent border areas” were also included in some parts of this analysis (i.e. assessment of the urban potential, see below). They comprise places which are not contiguous to a border and in which the closest border can be accessed in a travel time between 45 and 90 minutes. For these areas, we assume that the existence of a politically-defined border has only a low influence on all kinds of socio-economic and socio-cultural exchange relationships.

Basic features of the “core border areas”

The core border areas in which a politically defined borderline can be reached within a 45-minute travel time (see: Annex 46) cover 661,000 km²: 14% of the total surface of the EU27 including Norway, Iceland, Switzerland and Liechtenstein.¹⁰⁴ Those border areas cover around half or even much more of the total national territory of 8 countries;¹⁰⁵ in 13 other countries, the levels of coverage are well below the overall average of 14% (i.e. ranging from 0%-10%).¹⁰⁶ In total, 99,343,000 persons live in these border areas: 20% of the total population of the countries covered. In 9 countries, about half or even more of the total population live in border areas¹⁰⁷ while, in 17 other

¹⁰³ This is often due to a poorly developed road network which in principle allows accessing a given border, but not within a 45 minutes travel time.

¹⁰⁴ No data was available for Albania, Croatia, Kosovo, Montenegro, Serbia and Turkey.

¹⁰⁵ Luxembourg and Liechtenstein (100%), Belgium (92%), Slovenia (72%), Slovakia (61%), the Netherlands (60%), the Czech Republic (52%) and Switzerland (49%).

¹⁰⁶ Cyprus, Iceland & Malta (0%), Norway (1%), Sweden & United Kingdom (3%), Spain (4%), Finland & Italy (5%), France (7%), Denmark (8%), Bulgaria (9%) and Ireland (10%).

¹⁰⁷ Luxembourg & Liechtenstein (100%), Belgium (84%), Switzerland (75%), Slovenia (68%), Slovakia & Austria (66%), the Netherlands (51%) and the Czech Republic (49%)

countries, the proportions are clearly below the overall average of 20% (i.e. from 0%-17%).¹⁰⁸ When adding to these border areas the contiguous border areas (see: Annex 47), the following changes can be observed: while the overall proportion of the area covered by the now enlarged set of border areas increases significantly (i.e. from 14% to 22%), the overall share of the population living in all these areas remains largely unchanged (i.e. from 20% to 19.9%).

At the level of individual countries, however, this inclusion of border areas produces some noteworthy effects, especially in case of the two country groups. First, a change occurs in the group of countries in which territorial coverage by border areas is well below the overall average. Norway, Sweden and Finland drop out of this group because the inclusion of contiguous areas leads to a strong increase of the overall proportion of the national area covered by border areas. Second, in the group of countries with the lowest shares of border population in their total population, although the overall country-composition remains unchanged, in some cases there is a slight or even substantial increase of the share of the border population covered.¹⁰⁹

Basic land-cover patterns & degrees of “naturalness”

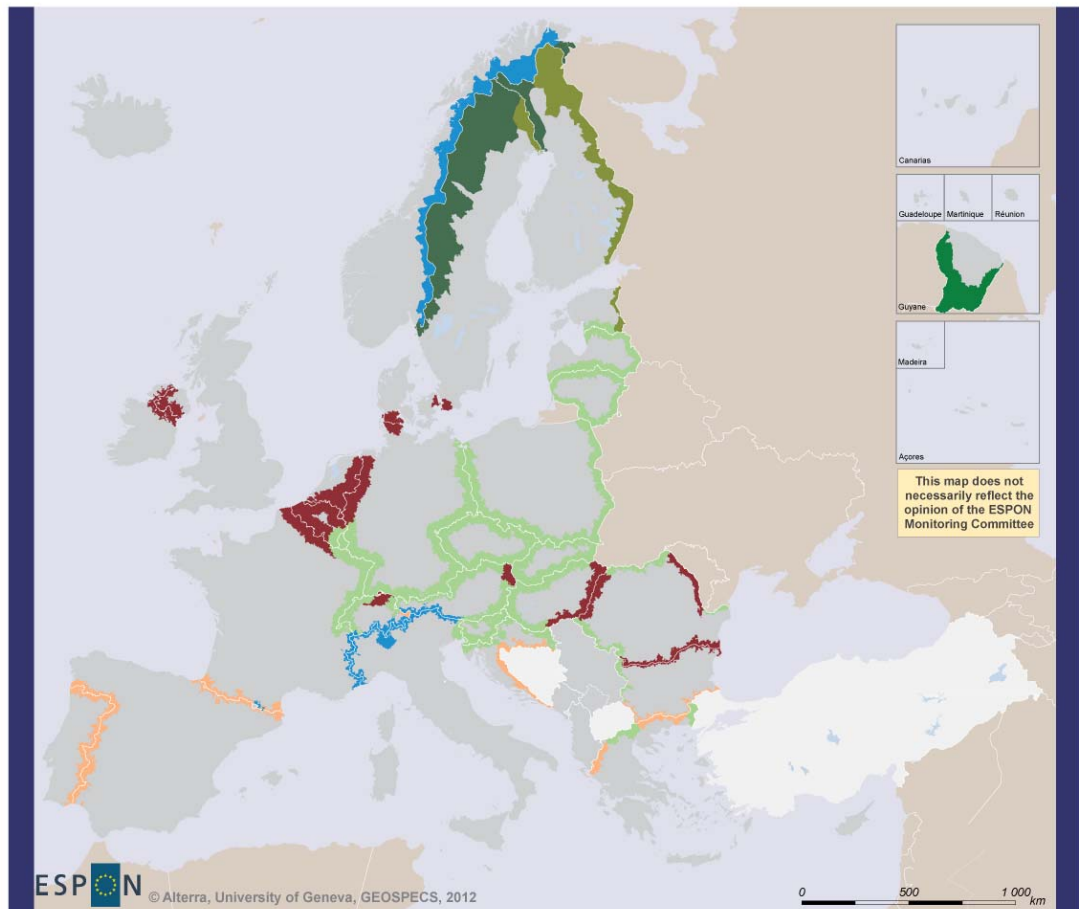
A mapping of the predominant land-cover patterns on the territory of core border areas in the EU27/EEA and Switzerland (see: Map 42) gives an overall impression about their basic landscape characteristics and also allows general assumptions to be made regarding their potential degree of “naturalness” (see Annex 3 for more details).

The majority of the core borders areas is predominantly rural and sometimes even consists of important proportions of undeveloped “open spaces”, as the land cover categories “agriculture”, “forests”, “wetlands”, “scrubland/no vegetation” and “unvegetated land/glaciers” are over-represented. These areas are located at various internal and external EU land borders, and these

¹⁰⁸ Cyprus, Iceland & Malta (0%), Sweden & United Kingdom (1%), Norway (2%), Denmark (4%), Spain, Greece & Finland (5%), Portugal (6%), Ireland (9%), Bulgaria (10%), Italy (11%), France (15%), Estonia & Poland (17%).

¹⁰⁹ Norway (from 2% to 6%), Sweden (from 1% to 3%), Finland (from 5% to 7%) and Bulgaria (from 10% to 13%).

Classification of land cover patterns in border areas



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Ascendant classification of land cover patterns in LAU2 within 45 minutes from borders

Main overrepresented types of land cover

- | | |
|--|--|
| ■ Forests strongly overrepresented (French Guiana) | ■ Lakes |
| ■ Forests and wetlands | ■ Non-ESPON space |
| ■ Wetlands and scrubland | ■ No data |
| ■ Unvegetated areas and glaciers | ■ ESPON Space |
| ■ Scrubland | |
| ■ Agriculture and Forests weakly overrepresented | |
| ■ Artificial surfaces in combination with agriculture | |

Map 42 Predominant land cover pattern in core border areas

Other interesting and complementary aspects can be highlighted by mapping individually some of the main land-cover categories (see: Annex 49).

land cover categories are either similar on both sides or different on each side¹¹⁰ of the border. For the border areas with a predominance of agriculture and forests, one can assume a medium degree of naturalness, because human interventions are already significant and have led to a visible alteration of the natural environment (i.e. existence of cultural self-maintained systems and/or cultural-assisted systems). In addition, a high or even very high degree of naturalness exists in a few border areas where human interventions are nearby absent or reduced and where a high proportion of different types of natural environments exists (i.e. "natural systems", "sub-natural systems", "quasi-natural systems" or "semi-natural systems"). This tends to be the case especially for the less densely populated border areas of Scandinavia and the high mountain border areas located in the South-West and Centre or the East of the EU, but also for the ultra-peripheral border area of French Guyana.

A smaller but still important group of core border areas has an particularly strong presence of man-made land covers (i.e. mainly built environment, but also very high proportions of fields and pastures), as the land cover category "artificial surfaces in combination with agriculture" is here clearly over-represented. These areas are located at land borders, most often in the West and North of the EU (e.g. UK-IR, BE-FR, BE-NL, DE-BE-NL DE-NL, DE-DK, DK-SE) but sometimes also in the Central-South and Eastern part of the EU (e.g. DE-CH, AT-SK, HU-RO, RO-BG). This land cover category is most often similar on either side of a border and only in a few cases different on both sides (i.e. DE-CH, AT-SK). The naturalness of these border areas tends to be low, very low, or even absent (i.e. mainly in cities and urban agglomerations), because all sorts of human interventions are very intense (or extreme), which has led to a significant alteration (or complete loss) of biotic elements and also to an intense/very intense (or extreme and complete) fragmentation of natural habitats. As a consequence, their territory consists mainly of "highly intervened systems" and "semi-transformed systems" and, in the densely populated urban areas, even of "transformed systems" and completely "artificial systems".

¹¹⁰ e.g. FI-NO, SE-NO, SE-FI.

Basic economic activities

The result of a factor analysis which was carried out on the sector-specific employment structure of all core border areas (Figure 21) reveals a number of interesting geographical patterns for their basic economic activity:

- In the central-left part of the matrix is a very dense cluster comprising many border areas with a relatively diversified economic structure. Here, the active population is primarily employed in a variety of categories belonging to the tertiary sector¹¹¹ and also some categories belonging to the secondary sector (e.g. construction, electricity and gas, manufacturing). These border areas are most often located in the "old" EU15 Member States.
- Above this dense cluster is a smaller group of border areas where employment is concentrated more on some specific elements of the tertiary sector such as "financial intermediary services" and the diverse segment of "other services". This appears to be the case for the border areas of Luxembourg (e.g. importance of financial services and services of extra-territorial organisations) and also for several of the northernmost border areas in Norway, Finland and Sweden (e.g. importance of community, social and personal services, and household activities).
- Below this dense cluster is a larger group of border areas where employment is mostly concentrated in the main categories of the secondary sector (i.e. construction, electricity and gas, manufacturing). This group consists of border areas which are located both in some of the "old" EU15 Member States (e.g. Germany, Austria, Italy, France) and in several of the new Member States (e.g. Slovakia, Estonia, Hungary, Bulgaria, Romania).
- In the middle and right part of the matrix is a larger group of border areas where employment is mostly concentrated in "mining & quarrying" as well as "agriculture, fishing, livestock, hunting & forestry". These border areas are most often located in the new Member States (e.g. Bulgaria, Romania, Slovenia, Latvia, Lithuania Hungary), but also in some of the more peripheral "old" EU15 Member States (e.g. Portugal, Greece).

¹¹¹ e.g. wholesale & retail trade, hotels & restaurants, transport & communications, financial intermediation, real estate, public administration/defence & compulsory social insurance, education, health & social work, other community, social & personal service activities

If one looks within the matrix at the distance between two border areas belonging to the same border (see: Annex 50), some general geographical patterns can be observed for potential cross-border differences in the employment structure. Although such differences between the sectoral employment structure of border areas exist along all EU27/EEA borders, they are the most significant along six of these borders (i.e. GR-BG, PT-ES, SI-HU,

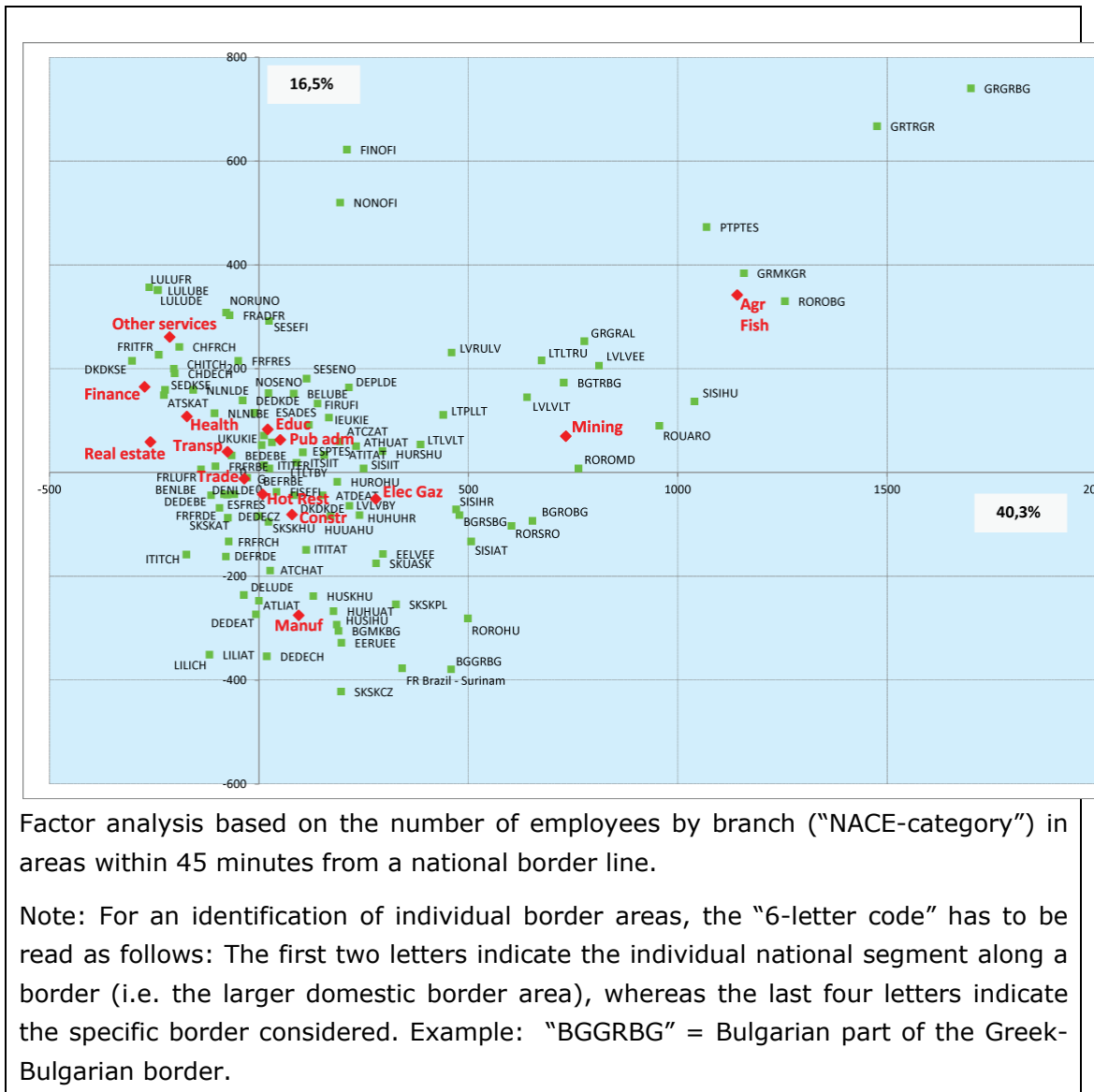


Figure 21 Factor analysis of the sector-specific employment in border areas

RO-BG, LV-EE, SL-AT) and smallest along another 11 borders which most often separate "old" EU15 Member States from each other or from Switzerland and Norway (i.e. FR-DE, FR-BE, DK-SE, DE-BE, NL-BE, IT-AT, CH-AT, NL-DE, NO-FI, FR-ES, SK-HU).

Urban potentials¹¹²

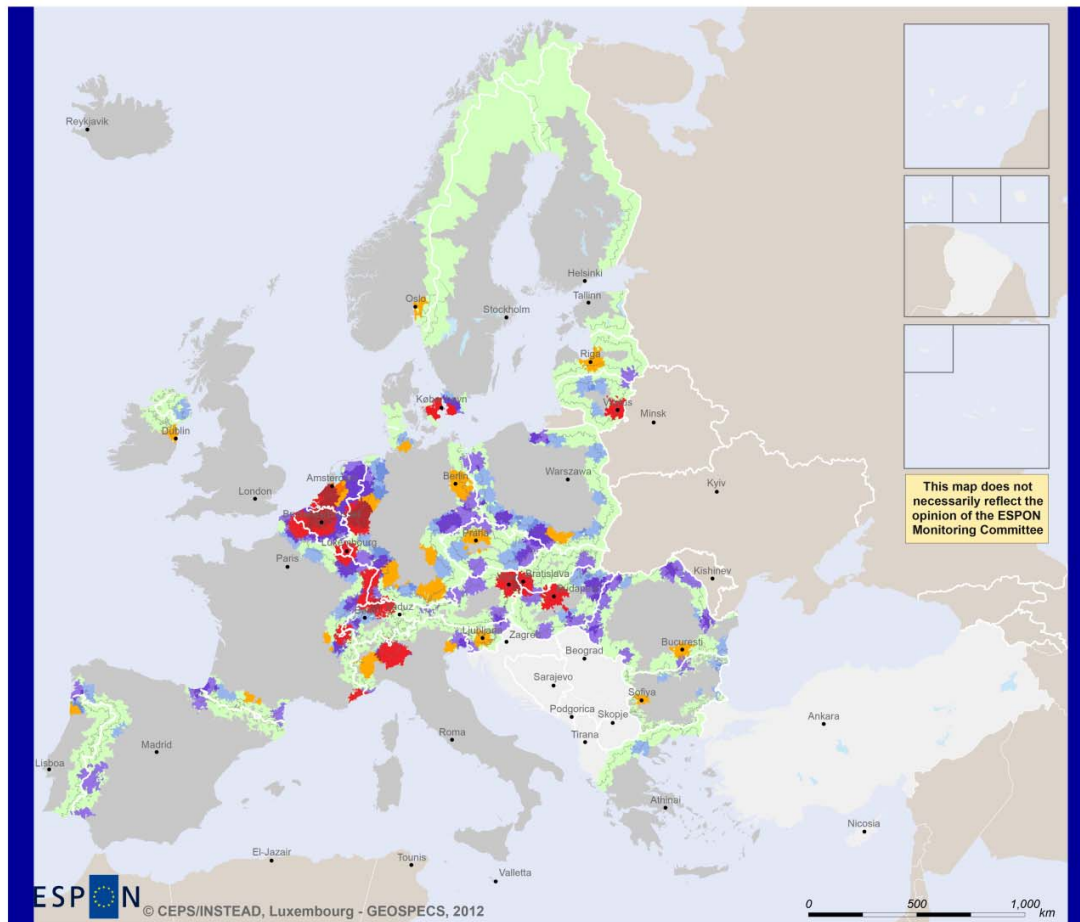
The urban potential, understood as the influence an urban centre is likely to exert over a given area, was assessed in relation to the notion of PUSH (Potential Urban Strategic Horizons) for "core border areas" and "adjacent border areas". From this basis, the LAU2 municipalities within these two categories were classified according to a descending hierarchical method (see: Annex 51). A mapping of the urban potential of functional border areas across Europe illustrates the following geographical patterns (Map 43).

(1) In terms of location, the majority of core border areas with metropolitan potential (in red on the map) are found in North-Western Europe, notably along the borders between the Benelux, France, Germany and Switzerland. They are polarised by cities located close to a border (most are even cross-border agglomerations), which is notably the case for Lille, Luxembourg, Strasbourg, Basel, Geneva or Copenhagen. Here, cross-border functional as well as an institutional integration exists¹¹³. There are also some metropolitan centres located at a distance from the border, although still within a core border area, which do not have any significant cross-border potential (e.g. Brussels, Cologne, Düsseldorf, Milano, Vienna or Budapest).

(2) Adjacent border areas with metropolitan potential (in orange) are particularly well represented in Germany (i.e. metropolitan centres like Berlin, Munich, Hamburg); the other cases are scattered across the continent. These urban poles located within an adjacent border region can exert a metropolitan influence on core border areas, but such metropolitan spill-over effects not primarily linked to the border tend to take place mostly in the borderlands east of Berlin or in South Bavaria (Munich).

¹¹² This section presents the main findings of an "internal working paper" elaborated for the GEOSPECS border group: Sohn, C. / Stambolic, N. (2012): *Typology of border regions according to their urban potential*. CEPS/INSTEAD, February 2012.

¹¹³ ESPON (2010): *Metroborder. Cross-Border Polycentric Metropolitan Regions*. Final Report. Luxembourg, ESPON, 2010. Sohn, C. / Reitel, B. / Walther, O. (2009): *Cross-Border Metropolitan Integration in Europe: The Case of Luxembourg, Basel and Geneva*. In: *Environment & Planning C: Government and Policy* 27: pp. 922–939.

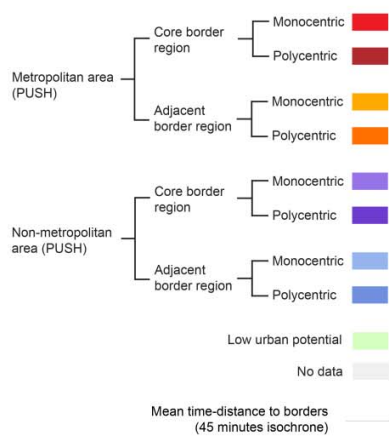


ESPON © CEPS/INSTEAD, Luxembourg - GEOSPECS, 2012

EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source of data: Alterra, University of Geneva, GEOSPECS, 2012
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Urban potential typology



Map 43 Typology of functional urban areas in border areas

Border areas with urban potential that is not metropolitan (in purple and blue) are distributed all over Europe, but with a higher concentration in the borderlands of the Benelux, France, Germany, Poland, Czech Republic, Hungary and Romania.

(4) Finally, the border areas which show a low urban potential (in green) are particularly located in Scandinavia, the Baltic countries, the eastern part of Poland, and mountainous regions such as the Alps and the Pyrenees.

In order to complete the characterisation of the urban potentials of European border areas, two demographic variables (the resident population and population change) were analysed.¹¹⁴ This allows a better assessment of the importance of the urban potential of border areas at a European scale and also unveils interesting overall patterns as well as national specificities.

The resident population of all European core border areas located less than 45 minutes of travel distance from a borderline is 102 million in 2006 (see: Annex 52). Among these, 45% (45.7 million) are in a border region with metropolitan potential and 35% (36.2 million) in a border region with non-metropolitan urban potential. In total, almost 80% of the population living in border areas can thus be considered as urban. If one further extends the level of coverage also to municipalities located not more than 90 minutes away from a border (i.e. "adjacent border areas"), this logically increases the population covered (to 209 million) but does not significantly change the distribution among the three main categories considered.

The analysis of the population distribution by country reveals sharp contrasts. In absolute terms, Germany, followed by Belgium, France, Italy, Switzerland and the Netherlands, are the countries with the highest numbers of people living in border areas with metropolitan potential (almost 80%). In contrast, the Baltic countries and East European countries such as Poland, Czech Republic, Bulgaria and Romania have a very low population potential for this category of border areas. There is less of a contrast in the distribution of population in non-metropolitan urban border areas, with East European countries such as Poland, Czech Republic and Romania showing rather high values. Surprisingly, the country with the highest number of inhabitants in border areas with low urban potential is Germany (3.6 million).

¹¹⁴ In order to simplify the analysis, the 8 categories presented in the typology were aggregated into 3: metropolitan potential, non metropolitan urban potential and low urban potential.

Population change reflects the socio-demographic dynamics of border areas and also, to some extent, their attractiveness. More specifically, a positive growth rate tends to demonstrate the existence of a metropolisation/urbanisation process (strong potential) whereas a negative rate reflects a process of urban decline (low potential) or rural exodus. Our analysis of population change was based on population statistics collected at LAU2 level for 2001 and 2006 (see: Annex 53)¹¹⁵ and shows that there is a clear trend towards an increase of population within the border areas that have a metropolitan potential. At the European level, this represents more than one million inhabitants in a period of 5 years (+2.4%). In contrast, the population of border areas with an urban potential that is not metropolitan appear to be rather stable (+0.3%), and the population of rural border areas declined (-0.6%). In total, European core border areas experienced an increase of population of 1.1% between 2001 and 2006.

When considering the data on population change at the country level, one can establish a clear distinction between two groups of countries as far as major trends are concerned. One group is the East European countries, most of them having joined the EU recently, which show on average a population decline in their border areas (-1.4%). This is basically also the case on a state level, except for Slovenia, where the population grew. On the other hand, the older EU Member States (plus Norway and Switzerland) experienced a positive population growth both on average (+2.1%) and on an individual basis (except Finland and Greece). The contrast between the two groups of countries is confirmed once the different categories of urban potential are taken into consideration. In Western Europe, border areas with urban and metropolitan potentials experienced a clear increase of population, whereas within East European countries the border areas with metropolitan potential are almost stable and the two other categories are declining.

Conclusion

An important conclusion which can be derived from our analysis of basic land-cover features and degrees of naturalness as well as of patterns for economic activity and urban potential is that, by and large, two different main groups of core border areas exist in the EU:

¹¹⁵ Due to some inconsistencies in the dates of reference and in the definition of territorial units, the results should be considered as orders of magnitude of the changes rather than as precise values. The lack of reliable data in 2001 for Lithuania, Portugal and the United Kingdom has resulted in the exclusion of these countries from the calculation of demographic change.

- The first group covers a larger number of border areas which are most often located along borders in the central area of the former EU15. They have frequently a diversified economic structure or are more specialised on particular value-added elements of the secondary and tertiary sector (e.g. manufacturing, financial services), but they all show degrees of naturalness which are mostly medium and low or even very low. This group also hosts most of EU's core border areas with metropolitan potential, but also many core border areas with a non-metropolitan potential.
- The second group comprises border areas with a generally less diversified economic activity structure (i.e. strong focus on specific elements of the primary, secondary or tertiary sector), but also with degrees of naturalness that are most often medium and sometimes also high/very high. Several of these areas are located at the more peripheral borders of the former EU15 (e.g. ES-PT, borders of Greece, northernmost Scandinavian borders), but more frequently they can be found along the internal or external borders of the new EU Member States. This group hosts mostly core border areas with a non-metropolitan urban potential or with a low urban potential, although some exceptions can be observed (i.e. in Hungary, Slovakia, Lithuania).

Two more specific conclusions, also having important theoretical implications, can be derived from our identification of urban potentials and from the analysis of associated demographic trends:

- First, it appears clearly that a border context is not incompatible with the development of competitive urban centres, as suggested by the classic and neoclassic location theories.¹¹⁶ The strong population growth experienced in metropolitan core border areas might even illustrate some kind of social and economic attractiveness within these specific areas. Although these conclusions will later be further corroborated by our case studies on the "cross-border metropolitan regions" of Geneva and Luxembourg (see: section 5.2.5), it is now indeed the first time that they can also be evidenced by the findings of a large-scale empirical analysis.

¹¹⁶ For a comprehensive overview see: Hansen, N. (1981): *The Border Economy*. Austin: University of Texas Press, 1981.

- Second, the strong contrast between West European countries and East and Central European countries highlights the determining role of open borders in the urbanisation of border areas. Whereas among "old" EU Member States, borders have undergone significant changes since the 1980s, resulting in an affirmation of their interface function to the detriment of their barrier and control role, this trend is much more recent among the new EU Member States. The rise of metropolitan as well as of urban potentials of border areas is thus triggered by the opening of borders and the new opportunities that arise for their economic, cultural or political development.

4.1.6 Outermost Regions

Population and socioeconomic patterns

There are significant contrasts in the population densities of the Outermost Regions (ORs): both among ORs and in most cases, also within each OR (Map 44). In Martinique and Guadeloupe, population density is relatively high throughout the islands, highest in the capitals (Fort-de-France in Martinique, Pointe-à-Pitre and Basse-Terre, where administrations are located, in Guadeloupe).

French Guyana, in contrast, is very sparsely populated, with the great majority of inhabitants concentrated in a few areas: Cayenne and the Kourou area (the Space centre attracts technicians and other workers) on the Atlantic coast; Saint-Laurent-du-Maroni in the west (on the Maroni river, Surinamese border); and Saint-George de l'Oyapock in the east (on the Oyapock, Brazilian border). The administrative areas (LAU2) are exceptionally large in French Guyana: for example, although the population is concentrated in the city of Saint-Laurent, a very large area (statistically attached to Saint Laurent) appears as more densely populated than more southern territories, although they are covered with rainforest and almost empty. In fact, almost the entire territory of French Guyana should be coloured in very light yellow, with only darker spots on the areas mentioned above.

The population of La Réunion is concentrated on the coasts (relief is very sharp, already a few kilometres inland), except for the south-eastern area, corresponding to the main lava flow area. Again, administrative divisions have an impact on statistics and mapping: most communes consist of a littoral string and a mountainous area, so that the coastal population density 'overflows' to the sparsely mountainous areas.

The Canarian and Azorean archipelagos are characterised by strong contrasts between densely populated capital islands (Gran Canaria and Fuerteventura in the Canary Islands, Saõ Miguel and Terceira in the Azores) and the other sparsely populated islands. The urban areas appear clearly since they concentrate a large proportion of these regions' populations. This is also true for Madeira, where the contrast is strong between the Funchal area and the north-western cape.

Map 44 Population densities of the Outermost Regions

a) Age structure

The dynamics of demography are generally positive in the ORs. With the exception of the Canary Islands, OR birth rates are higher than birth rates in their respective homelands. Demography is generally more dynamic in the French ORs than the Spanish and Portuguese ones, and particularly strong in French Guyana, with a birth rate of 27.7 ‰ in 2008 (France: 12.9 ‰). The proportion of the population of French Guyana below 15 years old is very high: 35-49% in most Communes, mainly along the borders with Brazil and Suriname. The latter administrative entities are not the most populated in absolute numbers, but host many immigrant populations among whom average birth rates are particularly high (among other reasons, because many Surinamese and Brazilian women come to French Guyana to give birth in good technical and social conditions).

In La Réunion, the proportion of population below 15 years old in most communes varies from 27% to 34%, and the birth rate in 2008 was 18.8 ‰. Demography is also dynamic in the French Antilles (Guadeloupe and Martinique), although to a lesser extent. Birth rates are close to the French average: 14.3 ‰ in Guadeloupe and 13.4 ‰ in Martinique, compared to 12.9‰ for France. The proportion of children and teenagers in Guadeloupe is slightly higher than in Martinique. In both Guadeloupe and Martinique, young people are concentrated in urban areas: Pointe-à-Pitre, Petit-Bourg and Sainte-Rose in Guadeloupe, Fort-de-France mainly in Martinique.

The Canary Islands have the oldest population of the ORs, especially in rural, isolated areas and on the smallest, Western islands of La Palma, La Gomera and El Hierro (less than 20%). In Fuerteventura and Lanzarote, a higher proportion of young people (20-30%) is found in major urban areas, such as Puerto del Rosario, Arrecife. The Canarian birth rate is 9.9‰, lower than the Spanish average and, by far, the lowest of all ORs. The fact that many retired or near-retired Europeans have immigrated to the Canary Islands in recent decades has contributed to lowering the average age (notably on the two main islands of Tenerife and Gran Canaria). However, immigration for work is also dynamic, and has attracted many young people who came to work in the archipelago. Hence the relatively high proportion of young people in urban centres.

In the Azores, young people are clearly concentrated in the urban areas of the main island of Saõ Miguel, as well as of Terceira (although to a lesser extent). The birth rate in the archipelago is 11.4‰, i.e. higher than in the Canary Islands, but immigration is less dynamic.

Map 45 Percentage of population below 15 in the Outermost Regions

b) Levels of education and available revenues

The population of the French DOMs is the youngest, and quite often has low qualifications, especially in remote, rural areas such as southern French Guyana, the island of Marie-Galante in Guadeloupe, and the volcanic areas of La Réunion. However, the situation is contrasted: whereas the proportion of population with no qualifications is above 50% in a small number of areas of La Réunion, in most communes this proportion is less than 16%. In all communes of French Guyana and Guadeloupe, and almost all of Martinique, this proportion is above 16% (Map 46).

People holding higher education diplomas mainly live in urban areas, where the proportion of households with high available revenues is also high (Map 47). The correlation appears clearly in Tenerife (Canary Islands), for example: on the western part of the island, the proportion of unqualified people is very high, and revenues are lower than on the eastern part, where the proportion of qualified people is much higher.

It appears that available revenues are proportionally higher in the Canary Islands, and spatially more distributed, than in the French DOMs. In La Réunion, Guadeloupe and Martinique, as well as in French Guyana, higher revenues are concentrated in the main cities (Saint Denis, Pointe-à-Pitre, Fort-de-France and Cayenne), as well as in specific residential areas: smart residential suburbs of Fort-de-France (Schoelcher, Case-Pilote) and Le Diamant in Martinique, south of Basse-Terre in Guadeloupe (where local administrations and hence well-paid civil servants are located).

Map 46 Outermost Regions: people without a diploma as a proportion of the total population

Map 47 Outermost Regions: income per household

c) Structure of employment

The economies of the ORs are characterised by the strong (if not predominant) role of services. However ORs do not compose one homogenous group in terms of economic structuring, but rather three: the French, the Spanish and the Portuguese ORs (Map 48, Map 49, Map 50). Employment in the French DOM is very strongly reliant on public services: public administration, education and health. Manufacturing and financial activities follow. As opposed to what one could assume, tourism does not appear as a key employment sector. French Guyana shares these characteristics with the three other DOMs, although gold mining makes its economic profile a little more specific.

In the Canary Islands, jobs are concentrated in the hotels and restaurants sector on the two islands of Lanzarote and Fuerteventura, whose main activity is linked with tourism, while activity is more diversified in the two capital islands of Tenerife and Gran Canaria, being oriented towards the private sector, with tourism as a major contributor, but also including transportation, trade, construction, and real estate.

The Portuguese ORs, and especially the Azores, seem to follow a more rural pattern, being more dependent on agricultural and fishing activities than any other OR. In addition, the Azores are the OR with the lowest proportion of protected areas, which is of course related.

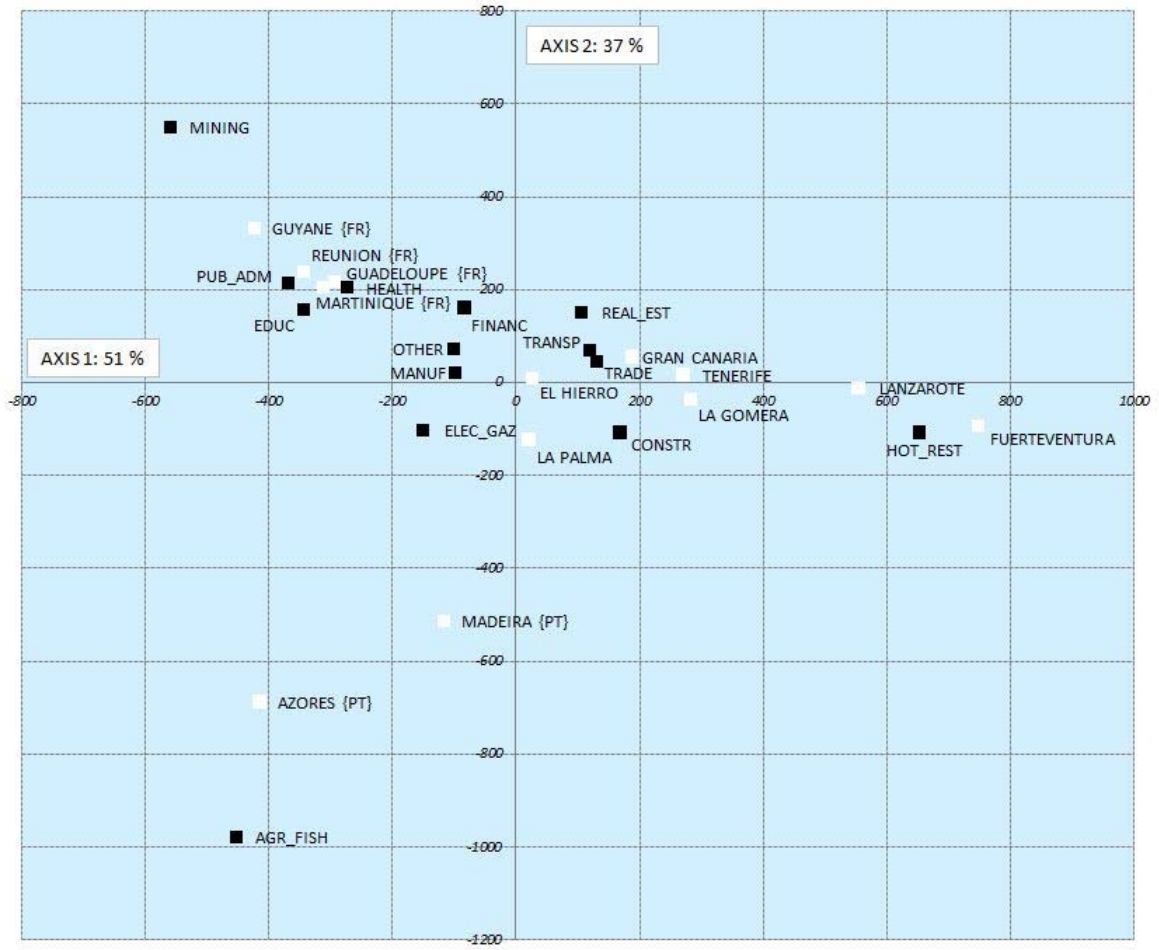
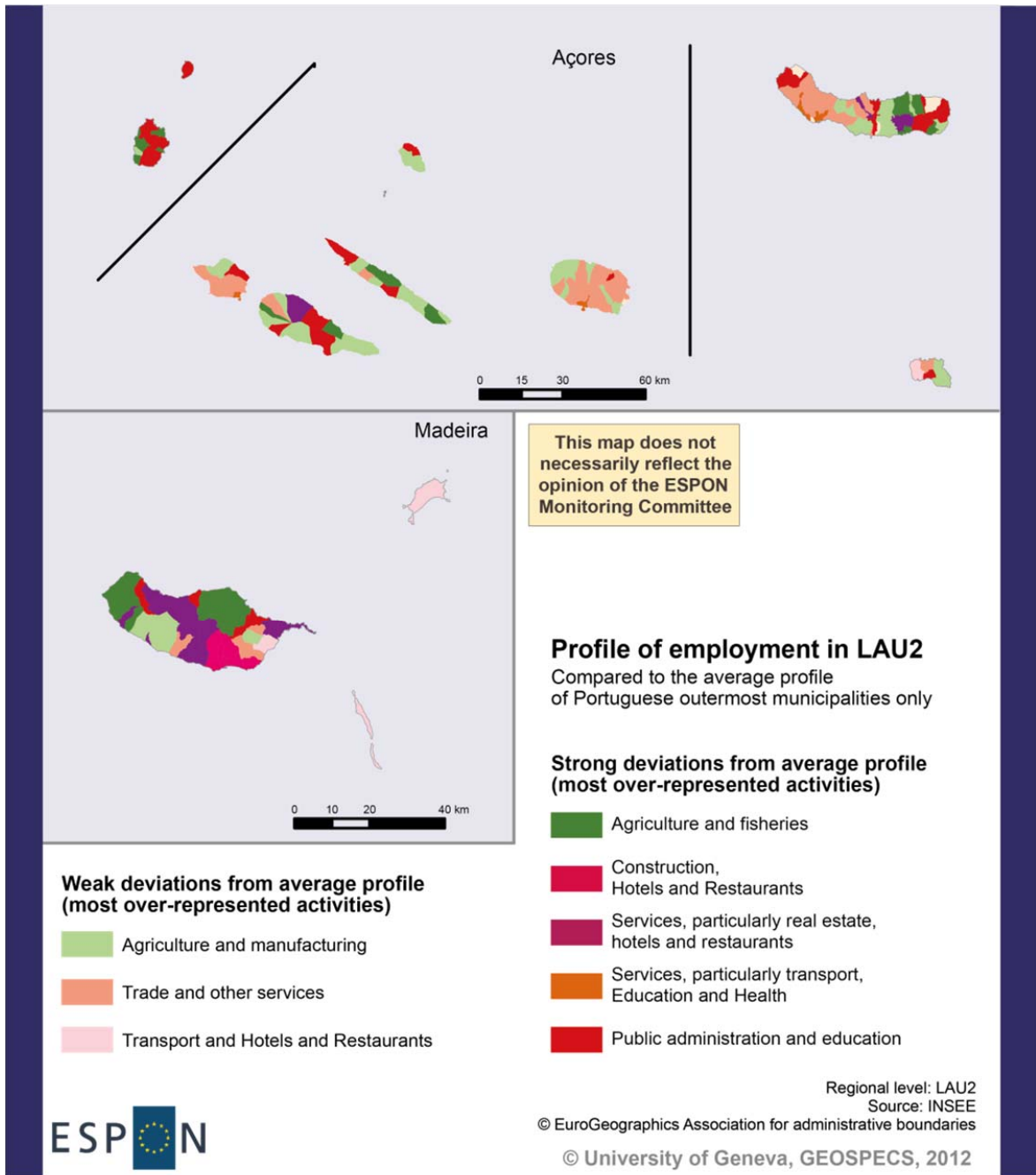


Figure 22 Structure of employment in the Outermost Regions.

Map 48 Profile of employment in the French Outermost Regions.



Map 49 Profile of employment in the Canary Islands.



Map 50 Profile of employment in the Portuguese Outermost Regions

Topography, land use and spatial connections

a) Land cover

Most Outermost Regions share two major characteristics in terms of land use. First, a very high proportion of their territories is designated as protected areas (over 40%, except for the Azores, and up to almost 80% in La Réunion) (Figure 23).

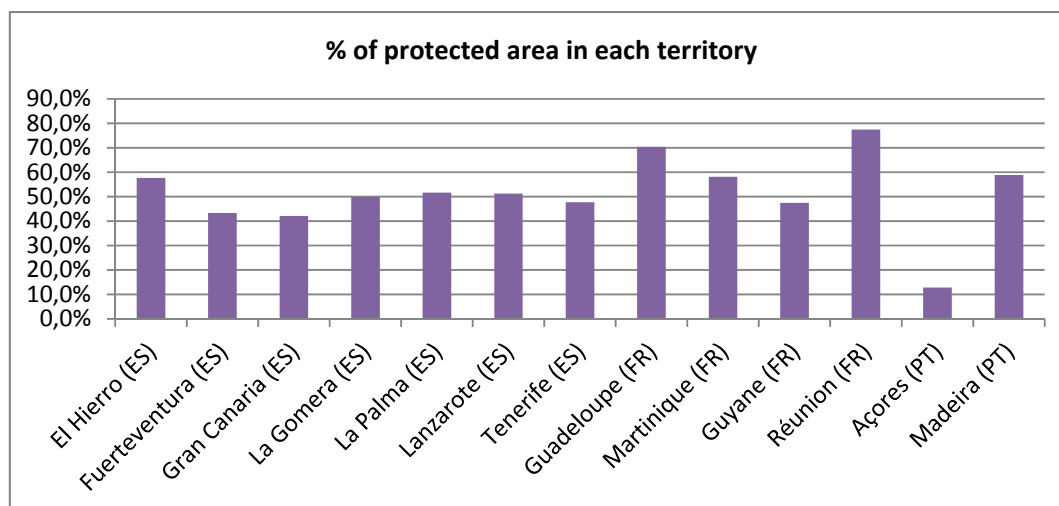


Figure 23 Percentage of each Outermost Region designated as protected areas.

The second characteristic is that urban areas are very concentrated (and thus densely populated, as mentioned above). This is due to several factors, including the high proportion of protected areas but also, in most cases, topographic characteristics that limit the development of densely populated areas to small parts of the territory. Most ORs are mountainous islands (some as archipelagos), which limits urban areas to sometimes very narrow coastal zones. Moreover, the economies of these ORs are still characterised by the cultivation of traditional crops (especially sugar cane and vines), that occupy an important proportion of their land. As for French Guyana, 96% of the territory is covered by rainforest, which leads to the same result: settlements are concentrated along the coast.

The result of these land use patterns (Map 51, Map 52) is that strong pressure is exerted on a small proportion of the total area of the ORs, in some cases exacerbated by major seasonal peaks (e.g., the high tourist period in the Canary Islands). This generates major land management issues, e.g., energy

Map 51 Land cover and protected areas on the Portuguese Outermost Regions.

Map 52 Land cover and protected areas on the Canary Islands.

generation and consumption, water use and treatment, waste management, traffic congestion and pollution.

b) Compartmentalized territories: accessibility and access to public services

The topographic characteristics of the ORs have consequences in terms of transportation and accessibility, both between ORs and the rest of the world and within each OR. As discussed below, as ORs are generally only slightly integrated into their regional environment, their relationships and exchanges with their homeland and with other EU Member States are particularly important. With regard to openness and connectivity, all ORs are not equal. The two capital islands of the Canarian archipelago (Gran Canaria and Tenerife), as well as of Madeira and the Azores, are well served by major air line connections. However, this is not the case for smaller islands, such as El Hierro or La Gomera which, though they have an airport, are served only by internal lines (Figure 24).

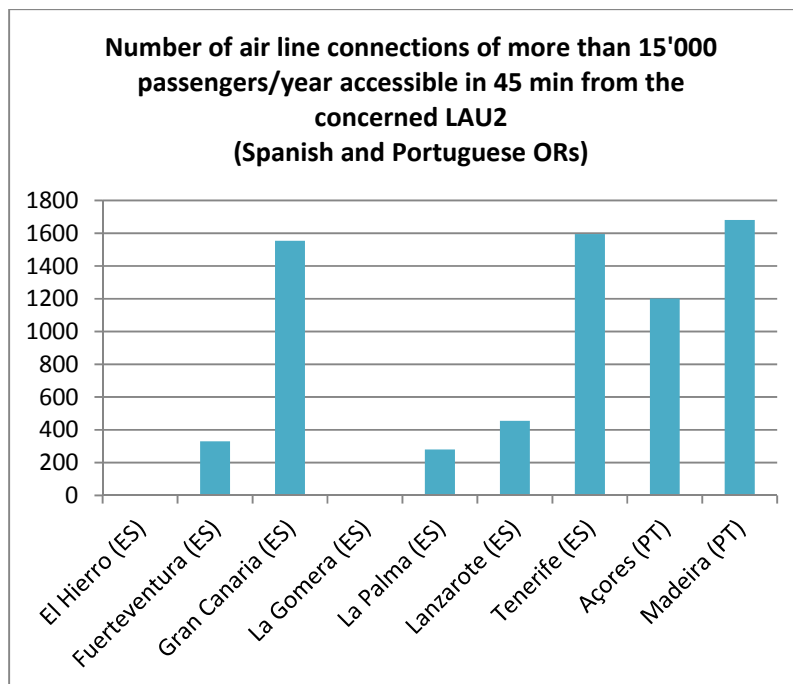


Figure 24 Number of airline connections from Spanish and Portuguese ORS.

For the French DOMs, information on the airports of Saint Denis in La Réunion and Cayenne in French Guyana provides an idea of the range of situations in terms of flight connections and travel opportunities. For the latter, it is remarkable that there are no flight connections with Brasilia or São Paulo in Brazil, or with the neighbouring State of Suriname. The number of internal lines is also rather low, especially in a territory where most areas are only accessible by air or by river (the latter being extremely time consuming – speed is reduced, trajectories are necessarily not optimal and travel from the coast to the interior requires upriver navigation).

	Rochambeau Airport Saint-Denis, La Réunion	Felix Eboué Airport Cayenne, French Guyana
Number of passengers in 2011	2.1 million	435,440
Number of companies, Of which non-French	5 2	3 0
Number of destinations Of which internal French Regional (non French) International hubs	22 0 6 cities (Paris: CDG and Orly) + Mayotte & New Caledonia 11 (Seychelles, Mauritius, Madagascar, South Africa) 4 (Paris CDG, Bangkok, Sydney, Johannesburg)	11 3 Paris Orly + Martinique & Guadeloupe 5 (Brazil [Amapá and Pará states only], Haiti, Santo Domingo, Florida USA) 1 (Miami)

Difficult internal accessibility and compartmentalization is a widespread challenge among ORs. In most LAU2 territories, the entire area is accessible within a 45-minute drive from the coast. The exceptions are French Guyana (see above) and La Réunion, where relief is very sharp with a very limited number of passes suitable for vehicles and a whole area (Cirque de Mafate) is

not served by the road network. However, all ORs have internal connection issues. As all ORs apart from French Guyana and La Réunion are archipelagos, it is a major transportation challenge to provide all inhabitants with access (easy and regular access) to the whole region – and especially to its major urban areas where most services and goods are available.

The challenge to provide public services, for example health care, in these regions thus depends on several factors: the availability of technical infrastructures and specialised workforce; their spatial distribution; and the existence of more or less efficient transportation networks and means. Figure 13 shows that the number of doctors available for 1000 people (ratio at NUTS2 level) is variable among ORs. In the Spanish and Portuguese archipelagos, it is relatively high. In principle, if the doctors are spatially well distributed, this large number can mitigate the challenges of access; however, in Flores and Corvo, the most Western islands of the Azores, for example, the number of doctors is rather low. In French Guyana, although internal connections are difficult, this proportion is also very low. Telemedicine solutions are gradually being developed overcome this lack, and to provide the population in all areas with satisfactory access to health care.

Map 53 Outermost Regions: numbers of doctors per 1000 inhabitants

Regional integration

Study of the employment structures of the ORs leads to the conclusion that each region is closer to its homeland than to other ORs. The data below tend to show that each region is also closer to its homeland than to its regional neighbours with regard to the level of development, conditions of life, and trade relationships. Several factors contribute to explaining this situation. ORs benefit from support from their homeland and from the EU, which is not (or far less) the case for neighbouring countries. This obviously has a positive impact on their level of development and on local conditions of life, as well as the wages of civil servants, of whom the proportion in these regions is particularly high. As for trade relationships, in spite of distance, the homeland and the EU remain the most natural partners. The use of a single currency and the absence of customs duty facilitate this, while other factors are barriers for external trade relations. Among these, European norms are first: goods produced by neighbouring countries often do not meet the EU standards and thus cannot be used in the ORs. In response, these countries adopt high duty tariffs and sometimes even norms that contribute to blocking imports from the ORs. Administrative procedures and the reliance of the French DOMs on the French national state for international relations issues also do not facilitate regional integration. Despite these common factors, major differences appear between the four geographic zones concerned.

a) The Caribbean area

This area comprises the 2 French DOMs of Martinique and Guadeloupe (and arguably also French Guyana), as well as their immediate neighbours: British, Dutch Antilles and other Caribbean independent islands. Data is provided below for some of these neighbours. In this area, life expectancy is rather high and birth rates are similar (Figure 25). Life expectancy in the French Antilles is slightly less than the French average, but the same as in Anguilla (UK) and higher than in other neighbouring islands. The birth rate is slightly higher than in France, but rather lower than among neighbours.

Major differences appear when one looks at the GDP per capita in the area (Figure 26). It is significantly lower in the French Antilles than the French average GDP per capita, but also significantly higher than in other neighbouring regions or states. In this respect, it appears clearly that the situation of the French Antilles is far more favourable than that of the British islands of Anguilla and even more Montserrat. Differences in terms of both national and European institutional statuses can account for these contrasted situations.

In terms of trade balance, the situation of the French Antilles also appears as peculiar in the regional environment: the economies of both islands are far less open than those of their neighbours (Figure 27). Martinique and Guadeloupe are less dependent on imported goods than their neighbours (less than 25% of GDP vs. over 60% in all other territories) and barely more than their homeland. Both islands are relatively bigger than their neighbours and rely far less on tourism; thus, they have more available space to produce (and receive financial and fiscal support by France and the EU for this), while their needs are more or less restricted to those of their own populations, which explains their relatively lower dependence on imports. Moreover, around 75% of goods are imported from France and the EU, which limits the openness of these ORs to their immediate environment.

In contrast, exports are very limited, whereas they represent 35 to 65% of GDP in the other territories. Regional exports represent only 2 to 3% of Martinique's and Guadeloupe's overall exports. However, it should be noted that data for the French Antilles do not include services (and hence tourism), whereas they do for all other territories. The strong weight of imports in the neighbouring islands is very strongly related to tourism, as the main source of foreign currency.

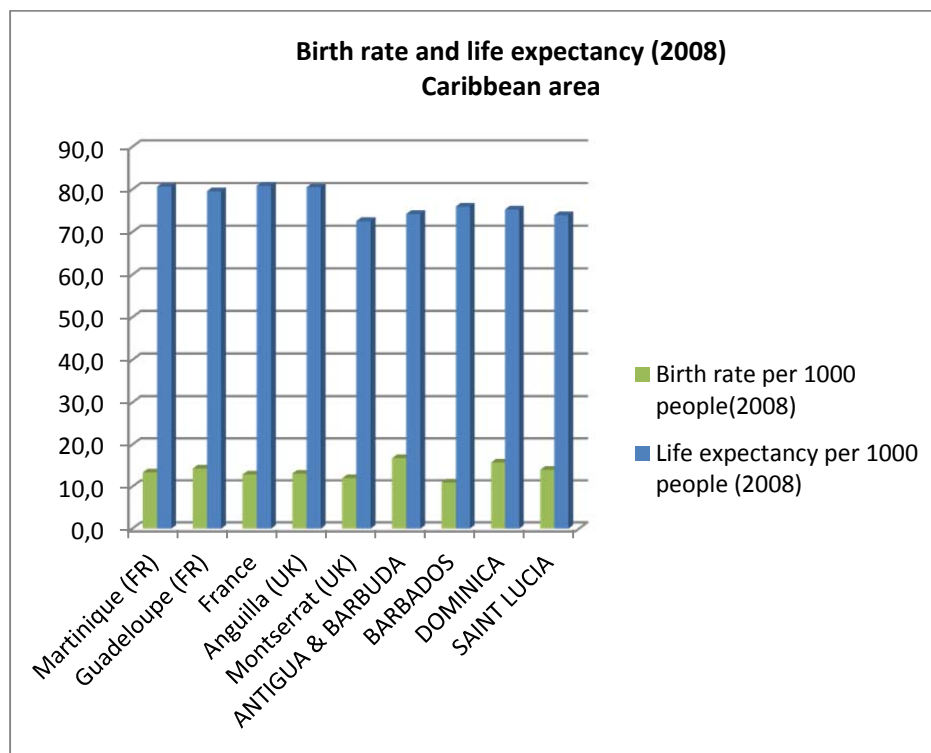


Figure 25 Birth rates and life expectancy on Caribbean islands and in France

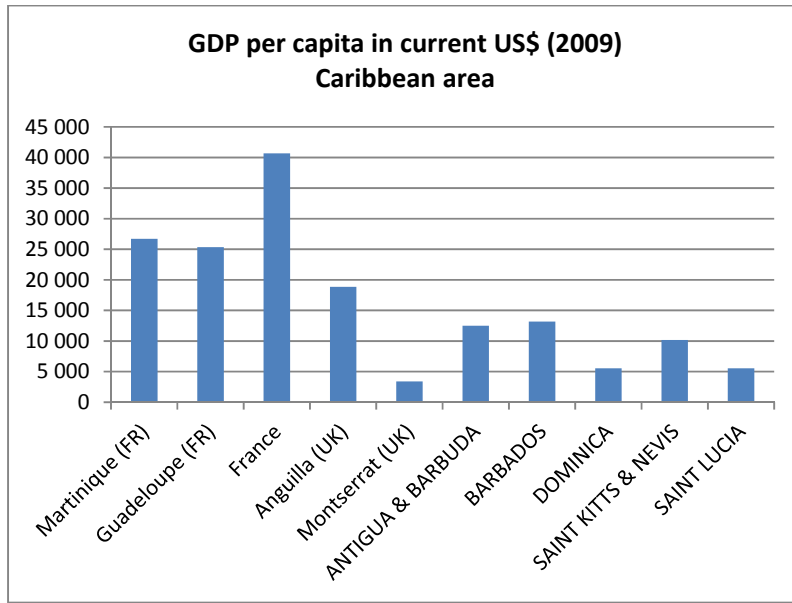


Figure 26 GDP per capita (US\$) on Caribbean islands and in France

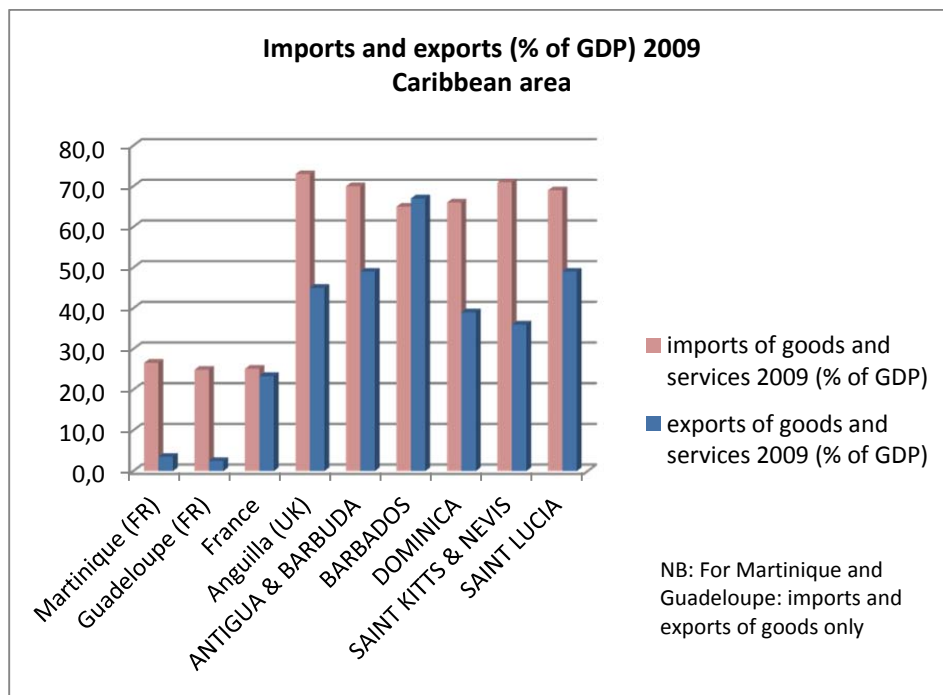


Figure 27 Imports and exports on Caribbean islands and in France

b) The Guyana Shield area

This area comprises French Guyana and its direct neighbours: Suriname and Guyana to the west, and the Brazilian states of Pará and Amapá to the east. The Caribbean Arc, including Martinique and Guadeloupe, is a secondary level of regional environment.

Life expectancy is high in French Guyana; it is slightly lower than the French average but significantly higher than in the neighbouring countries (Figure 28). Among the reasons that can explain this situation, one is the availability of high-level health care. The regional birth rate is very high: more than twice as high as the French average, but also higher than in the neighbouring countries/states. Both factors explain the dynamics of demography in this region, as well as immigration, particularly from Brazil and Suriname.

The average GDP per capita is much lower than the French average, and lower than in Guadeloupe and Martinique. It is, however, four times higher than in the neighbouring countries of Suriname and Guyana and the neighbouring Brazilian states of Pará and Amapá (Figure 29). Nevertheless, French Guyana's GDP is somewhat artificially pushed up by the spatial activities of the Kourou space centre. Given the small size of the population, the average GDP per capita is not completely representative of most inhabitants' conditions of life.

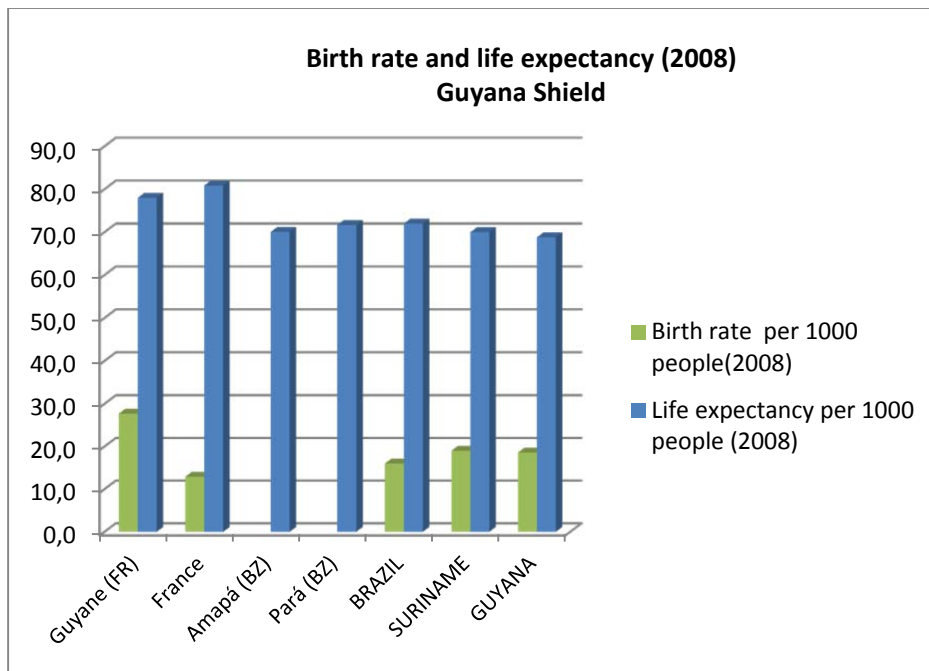


Figure 28 Birth rate and life expectancy, Guyana Shield and France.

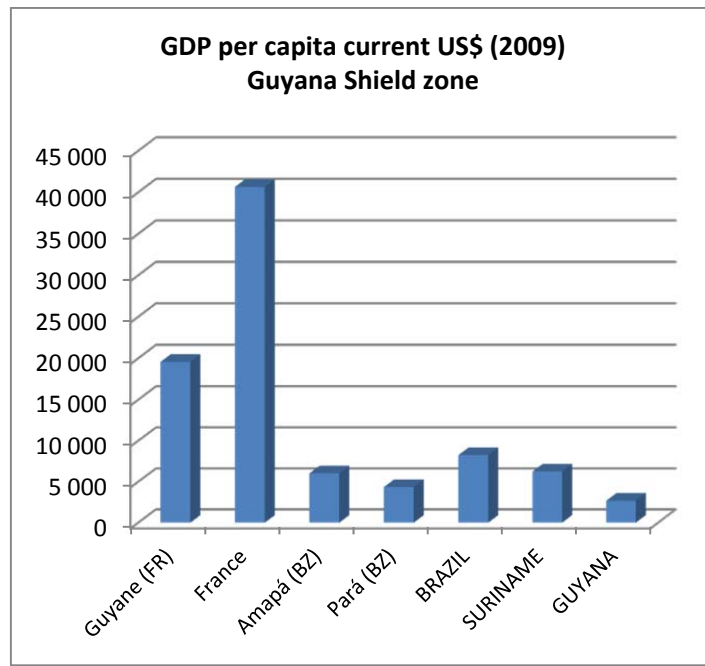


Figure 29 GDP per capita (US\$), Guyana Shield and France.

French Guyana is, however, a demographically dynamic enclave in a far less developed regional environment. This is also evident from trade relationships. French Guyana is extremely reliant on imports, essentially from France (41% of the total of exports in 2009), the EU (25%) and the French Antilles (10%). Imports from Central and Latin America only represented 10% in 2009. In particular, French Guyana imports oil and fuel from Martinique and Trinidad and Tobago. Exports are very limited and concentrated on gold, wood, fish and plastic elements. Guyana's main clients are, again, continental France, the EU and the French Antilles. The Central and Latin America zone absorbs less than 3% of the region's exports.

c) The Indian Ocean area

This area comprises La Réunion, as well as its nearest neighbours: Mauritius and Madagascar, and the countries of south-eastern Africa (Malawi, Mozambique, Zimbabwe and South Africa). The situations of these territories are particularly diverse.

In demographic terms, among the neighbours of La Réunion, Mauritius is definitely the one whose general profile is most similar (Figure 30). La Réunion has a high birth rate with regard to the French average, but this is significantly lower than the rates of most of its neighbours. Life expectancy is very close to the French average, and higher – if not much higher – than in the other countries. In this domain, La Réunion is clearly a French territory within a completely different environment, where access to French-standard healthcare is of utmost importance.

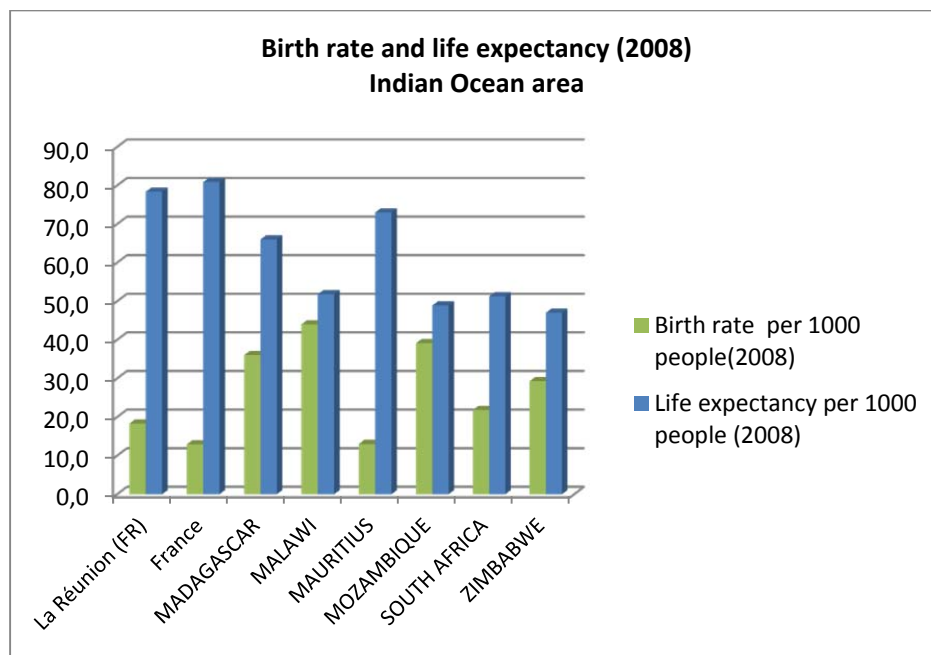


Figure 30 Birth rate and life expectancy: Indian Ocean area and France.

The average GDP per capita in La Réunion is slightly lower than in the French Antilles. The population in La Réunion is more numerous than in Martinique or Guadeloupe, and part of it is particularly isolated (in the volcanic, mountainous "cirque" areas notably). The unemployment rate is very high: 27.3% vs. a French average of 9.3% (2009). The GDP per capita in La Réunion is, however, well above those of the neighbouring countries. In Mauritius and South Africa, the most developed of these countries, GDP per capita is around 5000 US\$ (2009 data), i.e. almost a fifth of the level in La Réunion (Figure 31).

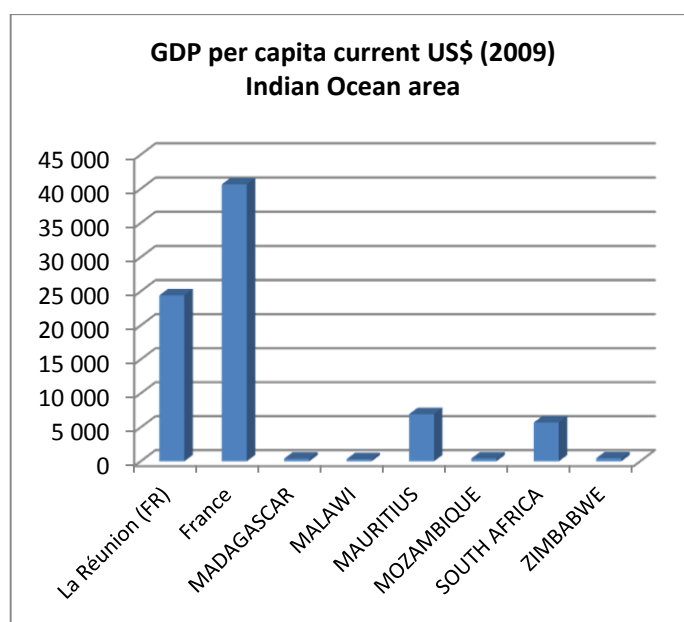


Figure 31 GDP per capita (US\$): Indian Ocean area and France.

In terms of trade relations, La Réunion (as other French DOMs) is far less open than its neighbours. It is very dependent on imports, more than France as a whole. However, despite the small size of the territory and its limited production capacities, the proportion of imports on the regional GDP amount to less than 30% of GDP, vs. 40% to over 60% in the area (Figure 32). The industrial base in La Réunion is stronger than in the other DOMs, but the production is almost completely absorbed by the population (import-substitution type of production) and exports are close to zero.

Imports entering La Réunion predominantly come from continental France and the EU (80% combined), vs. around 5% from the regional area. Within the regional area, South Africa is the main provider of La Réunion (mainly coal and intermediary products). Exports are mainly directed towards France and the EU, the second and third clients being Madagascar and China.

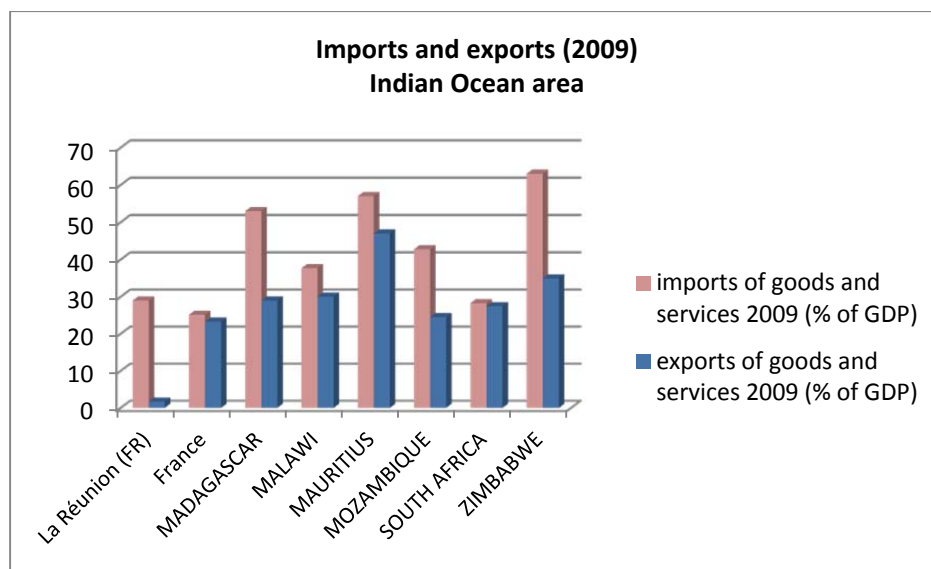


Figure 32 Imports and exports: Indian Ocean area and France.

Mauritius is also a main trade partner for La Réunion, although these relations are tense: both islands produce similar products, but production costs (especially wages) are much higher in La Réunion and EU external trade agreements (Economic Partnership Agreements) lead to the increasing opening of La Réunion to its regional competitors' markets with limited compensation to date. The agreed progressive reduction of Mauritian tariffs is still partial and the overall situation is increasingly unfavourable to La Réunion.

d) The Eastern Atlantic area

This area comprises the Portuguese ORs of Madeira and the Azores, the Spanish Canary Islands, as well as the neighbouring countries of Western Africa: Cape Verde, Morocco, and Mauritania. Some data are available for the contested region of Western Sahara. Given the location of the Azores, this area is very broad and probably less significant as a regional ensemble than the three others. Besides, due to the proximity of the EU, the relations of the ORs with other European Member States are all the more important.

Birth rates in the three ORs are very similar and very close to the averages of their respective homelands. As noted above, the Canary Islands are the OR with the lowest birth rate (below 10‰), below the Spanish average. Birth rates in the neighbouring African countries are two to three times as high, which accounts for radically situations in terms of demographic dynamics. Life expectancy is slightly higher in the Canary Islands than in

Madeira, but both are several years ahead of life expectancy in the area (Figure 33).

As for the French DOMs, ORs clearly are developed European territories in a less developed environment. Mauritania, although rich in natural resources, has one of the lowest GDPs in Africa; life expectancy is less than 60, and the birth rate is almost 35‰.

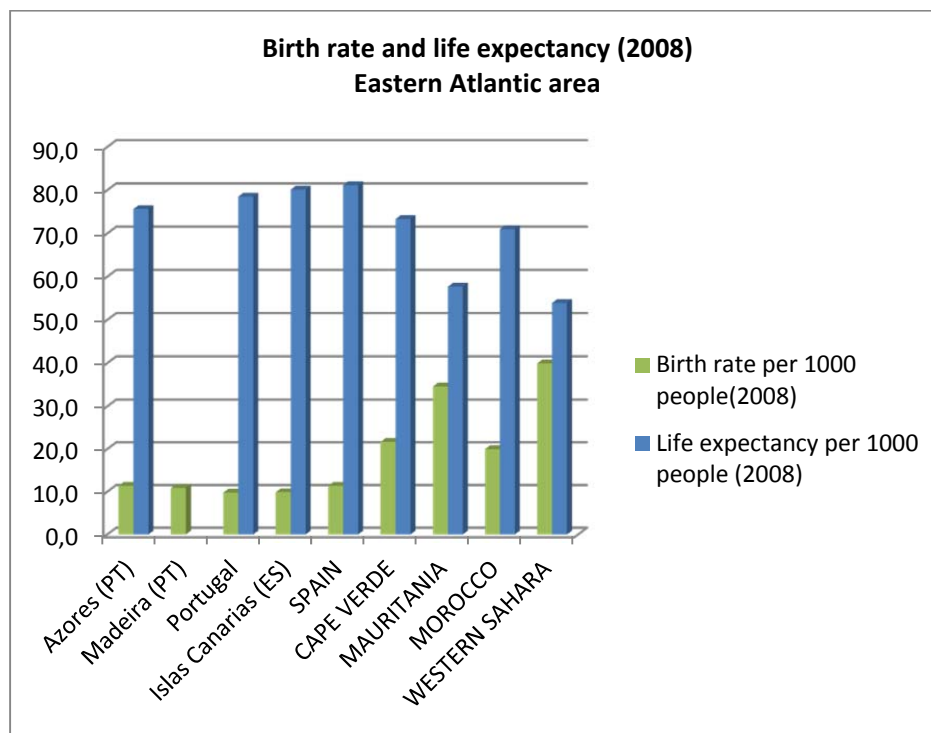


Figure 33 Birth rate and life expectancy, Eastern Atlantic area, Portugal and Spain

The gap between the ORs and their African neighbours in terms of GDP per capita is extreme: less than 5000 US\$ for Cape Verde and Morocco in 2009, against 20,000 for Madeira, and above 25,000 for the Azores and the Canary Islands (Figure 34). GDP per capita for the Azores is equivalent to the Portuguese average, but that of Madeira is much higher (over 5,000 US\$ per capita above the national average). The region strongly relies on tourism, as do the Canary Islands, and has developed an advantageous fiscal system that draws in foreign financial and industrial trade companies. GDP per capita in the Canary Islands is lower than the Spanish average – although the difference is far smaller than between the French DOM and the French

national average. The Canary Islands have followed a strong development path based on tourism. This trend is, however, losing its impetus (see case study on the Canary Islands) and wages remain among Spain's lowest.

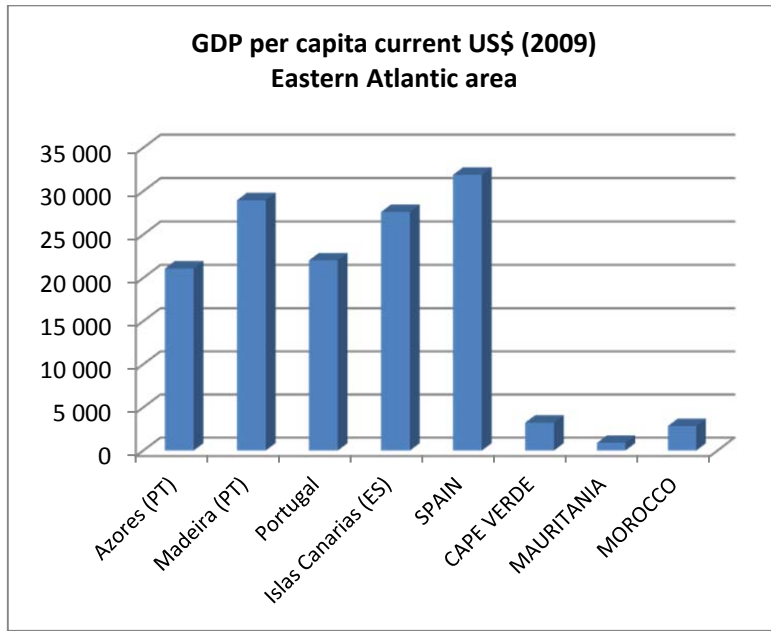


Figure 34 GDP per capita (US\$): Eastern Atlantic area, Portugal and Spain

With regard to trade relations (Figure 35), the economy of the Azores is very closed, whereas the Canary Islands follow a pattern that is apparently classical for ORs: imports represent almost 30% of GDP (slightly more than the Spanish average) while exports are very limited (around 5%), as production is absorbed by the local market.

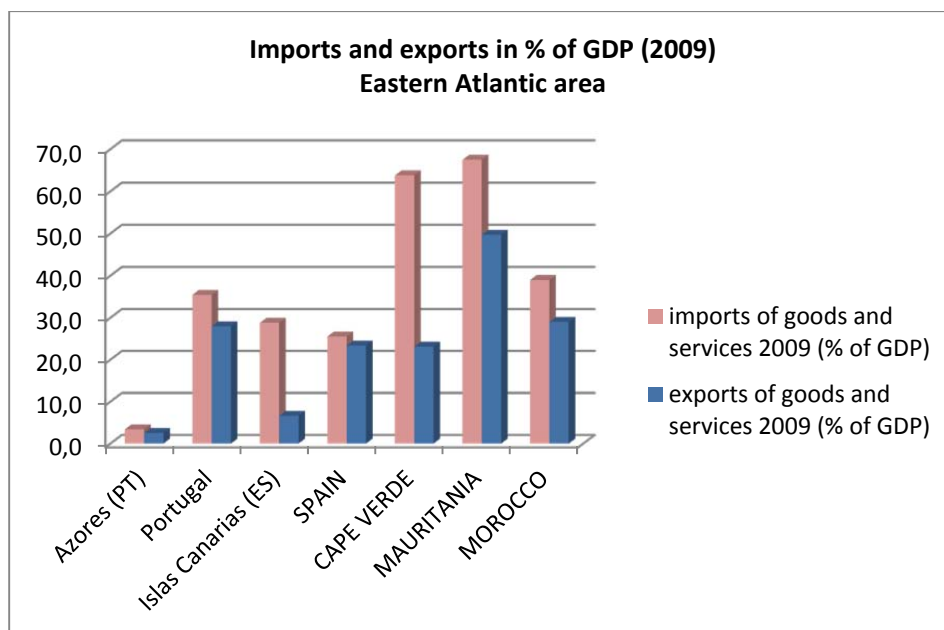


Figure 35 Imports & exports: Eastern Atlantic area, Portugal and Spain

In the area, neighbouring countries are far more dependent on imports, but they also export more (mainly natural resources). Trade relations between the ORs and their neighbours are very limited, although initiatives have been taken to establish and tighten links, particularly between the Canary Islands and Morocco. It must be noted that these initiatives are taken in a context where national authorities on both sides try to regulate illegal immigration.

Conclusion

The seven Outermost Regions (8 with Saint Martin, now administratively distinct from Guadeloupe) form a somewhat heterogeneous group in terms of geographical and topographic characteristics. Seven are islands, of which 6 archipelagos, one is a continental territory; four are located on or off the coasts of the American continent, three off the Western African coasts in the Atlantic Ocean and one off the Eastern African coasts in the Indian Ocean. All of these territories are - or are composed of - small, mountainous land areas whereas French Guyana is an immense territory with relatively flat relief. The French Antilles and La Réunion are located in tropical climate areas (although respectively in the Northern and Southern hemispheres), French Guyana is very close to the Equator, whereas the Spanish and Portuguese ORs are located North of the Cancer Tropic.

In spite of these diverse situations and specificities, the ORs share some structuring features and challenges. All of these regions are remote from the European continent and from their national homeland, to which they are tightly attached (administratively, economically, sociologically, historically...), and relatively little integrated in their wider region. From a socioeconomic point of view, ORs really are EU-regions in remote areas: development indicators show that, as well as trade exchanges data. ORs indeed exchange mainly with their homeland and the EU, but very little with their immediate environment.

As for their inner characteristics - the populations of these territories are, in average, young if not very young (French Guyana is a specific case in this sense, demography being particularly dynamic there). Due to several factors, in part at least linked to topography and soil use, this population is unevenly distributed throughout these territories. Remote, uneasily accessible or protected areas are very sparsely populated, whereas coastal areas and mainly urban centres are hosts to a very numerous and dense population. This creates some land use challenges that all ORs have to face, although for different reasons: energy, water, waste management...

These characteristics also make inner communications difficult. 96% of French Guyana is covered by rainforest, which means that most of the region's territory is only accessible by river navigation or internal aerial transportation (slow or costly). In the Canary Islands, composed of 7 inhabited islands, connections between two non capital islands (especially if small and not located in the same province) can prove complicated. This of course makes it a challenge for local authorities to provide their citizens with satisfactory access to public services (health and education in the first place).

4.2 Synthesis of quantitative findings

Given the wide range of geographic specificities covered by GEOSPECS, quantitative analyses are necessarily limited to the most important aspect for each of them. Considering the diversity of GEOSPECS areas, in terms of development issues and relevant scales of analysis, heterogeneous sets of maps and analyses are presented for each geographic specificity. The TPG does not consider it meaningful to compare territorial patterns and trends observed within different geographic specificities. The objective of the present section is to describe how the different geographic specificities can be approached quantitatively, based on their respective characteristics.

Data availability has largely influenced the analyses carried out within GEOSPECS. However, given the novel character of the data that have been compiled and the indicators that have been constructed, the TPG has only explored a small proportion of the potential innovative quantitative analyses that could be envisaged. Data at the level of the ESPON space's 125,049 LAU2 units¹¹⁷ open new perspectives for multi-scalar analysis.

Units of analysis

In order to undertake Europe-wide analyses for GEOSPECS areas, subdivisions in units of analysis were needed:

- Mountain areas were subdivided in 16 massifs (see section 1.2.1), adapted from the subdivision used in the European Environment Agency's report on Europe's mountains (EEA, 2010). These massifs are more extensive than those used in the 2004 DG REGIO Mountain Study (Nordregio, 2004), which focuses on identifying mountain units recognised by national stakeholders. However, the smaller number of massifs makes European comparisons easier.
- For islands, the TPG has identified 319 islands and island municipalities. Multiple islands belonging to one municipality have been considered as one unit, substantially decreasing the number of island units identified in the data set. This rationalisation applies to Greek islands which form part of the same municipality, as well as to a number of islands in Norway, Finland and Sweden. Multiple municipalities which form part of

¹¹⁷ Excluding Macedonia and Bosnia and Herzegovina, for which LAU2 delineations have not been compiled.

one island have been grouped together. Where part of an island is covered by one or more insular municipalities, while another part is covered by a municipality which is partly on the mainland, the municipalities that are entirely insular are the only ones considered.

- Sparsely populated areas (SPAs) have been subdivided into 39 "Sparse territories", defined as "clusters" of SPAs that form relevant geographical units for developing a spatial analysis of SPA and coherent territories for developing integrated 'regional' economic spaces (see section 3.2.3 of the scientific report).
- For coastal areas, the TPG has identified areas within 45 minutes and within 90 minutes of individual coastlines. These areas overlap, as a single municipality can be within these travel times from multiple coastlines (e.g. in Denmark, a number of LAU2 are within 45 minutes of both the Baltic Sea and the North Sea). The coastal areas have also been subdivided by country.
- Similarly, the TPG has identified areas within 45 minutes and within 90 minutes of each border between two countries. These areas overlap, as a single municipality can be within these travel times from multiple borders (e.g. Basel is within the border areas between Switzerland and Germany and between Switzerland and France). Border areas have been subdivided by country.
- Each Outermost Region has been considered as one unit of analysis.

The units of analysis have been analysed as both geographical units for which overall indicators can be calculated, and territorial contexts for the assessment of internal disparities.

Issues and themes

This section identifies how TPG members have applied different methods to analyse similar themes and issues in different GEOSPECS categories.

Age structures and demographic trends

For a number of geographic specificities, comparisons between age structures in GEOSPECS areas and national average values show contrasting patterns. In mountain areas, some massifs have significantly lower proportions of children (e.g. Pyrenees and Massif Central in France, Polish Middle mountains), while others have high proportions of children

(e.g. Polish Carpathians). Similarly, areas within 45 minutes of a coastline may have higher proportions of elderly people than the national average (e.g. in Greece and along the North Sea in the UK), or lower proportions (e.g. in Bulgaria and Latvia). In the Outermost Regions, French Guyana stands out due to exceptionally high birth rates (27.7 ‰, compared to 12.9 ‰ on average in France), as well as children, 35 to 49% in most LAU2. At the other end of the scale, the Canary Islands have relatively high proportions of elderly people, especially in rural and isolated areas.

Demographic trends have particularly been analysed in SPAs, as population decline is a particularly important issue in areas that run the risk of falling below critical population thresholds for maintaining service provision levels and a sustainable labour market. Unfortunately it has only been possible for the TPG to compile LAU2 data on total population for the years 2001 and 2006. Current initiatives to compile harmonised LAU2 population figures for previous decades would, if successful, make it possible to carry out a wide range of statistical analyses in GEOSPECS areas.

Patterns of employment

Multi-scalar analyses of patterns of employment have been produced for a number of GEOSPECS categories. In ORs, factorial analyses of employment patterns shows that the French, Spanish and Portuguese ORs have distinct profiles, respectively characterised by an over-representation of public services (France), hotels, restaurants and construction related activities (Spain) and agriculture and fisheries (Portugal). To identify internal structures of employment within ORs, it is thus more meaningful to produce ascendant classifications of LAU2 employment profiles with these national groups, than across all ORs.

Similarly, in mountain areas, a first map compared the relative weights of the primary, secondary and tertiary sectors of activities in Europe's 16 massifs subdivided into their national parts and showed, for example, the relative over-representation of agriculture in the Romanian Carpathians. An ascendant classification of LAU2 employment structures in the Carpathians confirmed this contrast between its Slovak and Romanian parts, but also makes it possible to identify the more local contrasts and similarities across national boundaries.

In SPAs, the focus on local contrasts seemed less relevant, as the main urban areas are per definition excluded from this GEOSPECS category. The combination of a comparison of the relative weights of the primary, secondary and tertiary sectors and a factorial analysis of employment structures by branch shows that employment profiles are relatively similar

within large trans-national areas such as the Nordic countries, the Iberian peninsula, and south-eastern Europe. This suggests that, from the point of view of employment structures, sparsity could more meaningfully be approached within these trans-national areas.

For coastal areas, there is no general “employment profile” from either a European or a national perspective. Some coastal areas have a strong overrepresentation of the fisheries sector compared to national average values (e.g. Gulf of Cádiz in Spain, Iceland). Only the Danish and French coastal areas along the North Sea have a significant over-representation of the manufacturing sector, while transport and storage activities are most over-represented along the coastlines of Slovenia, Cyprus and Belgium. Considering this diversity of situations, a general factorial analysis is less meaningful; it mainly reflects differences in national employment structures.

Tourism

Tourism is evoked as an important sector of activity and/or potential development opportunity for most GEOSPECS areas. In the quantitative analyses, the proportion of employment in hotels and restaurants (NACE branch H) is often used as a proxy for the relative importance of tourism. The example of the Alps, where this indicator could be crossed with the number of beds per LAU2 (see section 4.2.1), shows the added value and limitations of each of these proxies. Close to major cities, one finds many municipalities with significant proportion of employment in “branch H”, but no accommodation. Conversely, in many intermediate areas between the outer borders of the Alps and the attractive high-altitude skiing resorts, many LAU2 have proportions of employment that are relatively lower than one might expect, considering the number of beds. This gives some indication of the differentiated effect of a number of tourists (estimated on the basis of the commercial offer for overnight accommodation) and employment. It also illustrates that the leisure economy also includes services for neighbouring urban areas, for owners of second homes, and for the local permanent population in GEOSPECS areas.

The trans-national comparison of employment in tourism in ORs makes it possible to highlight the relative weakness of the tourism sector in the French ORs, which contradicts the general perception of these regions in France.

The analysis of tourism for islands has identified different patterns according to groups of islands, distinguishing not only between the more tourism-intensive Mediterranean islands and the rest, but also showing

that medium-sized islands with a population of 100,000 to 1 million inhabitants have the largest proportions of employment in tourism.

In coastal areas, the focus is on the concentration of tourism activities in a limited number of LAU2 contiguous to the coast. Employment rates in hotels and restaurants are almost systematically higher along the coastline than within the area within commuting distance from the coast. The extent of these differences gives an indication of the extent to which tourism is concentrated on the coast. However, differences between portions of the coastline also play a role, calling for detailed analyses of individual coastal areas to identify those with the highest degree of concentration of tourism in a limited number of locations.

Accessibility

Access to urban areas and to key infrastructure such as airports is of key importance, and can generally be considered as having a greater direct influence on socio-economic patterns and trends than geographic specificities. Different analyses have therefore subdivided GEOSPECS areas on the basis of their access to urban areas. In the analysis of Northern SPAs, Sparse Territories with a relatively better access to urban centres have been analysed separately. The analysis for islands separates them according to their total population. Mountain massifs have been characterised on the basis of the proportion of area and population living within commuting distance of cities of different sizes, showing major differences between, for example, the Carpathians where only 23% of the mountain population is within commuting distance of an urban area, and Central European middle mountains which are almost entirely within commuting distance of such centres. Cross Border Metropolitan Regions have been analysed separately from other border areas (see Annex 36) and a separate typology of these areas has been produced.

Comparisons of access to airport between mountain areas and national average values show that the proportion of people living within 45 minutes of an airport is almost systematically lower in mountain areas than for each country taken as a whole. However, the extent of this difference varies considerably.

Conclusions

The different ways in which the same indicators have been processed and interpreted illustrate the various types of concerns in different GEOSPECS categories. Furthermore, there have been important variations with regard to the scales of analysis considered relevant, the ways in which different levels of analysis are related to each other, and the territorial

contexts used to produce comparisons. This demonstrates that GEOSPECS areas cannot be analysed as one group, as well as the diversity within each GEOSPECS area with regard to many variables.

The GEOSPECS project therefore demonstrates that quantitative analyses of each geographic specificity should be carried out as a separate project. At the same time, these analyses require compilations of LAU2 data and data processing which are most efficiently carried out at the level of the ESPON programme as a whole. This calls for an alternative organisation of data collection and quantitative analysis.

5. Case studies

5.1 Overview of case studies

The aim of the case studies is to relate the findings of the quantitative, European-wide analysis of GEOSPECS categories to the regional level, i.e. to obtain a more in-depth understanding of challenges, opportunities and development processes in specific regions. These qualitative enquiries attempt to identify local methods of dealing with geographic specificities, i.e. overcoming challenges related to them and exploiting their potentials.

The topics investigated in the case studies were inspired by the transversal themes. The questions for analysis can be found in the analytical matrix (section 2.1.).

GEOSPECS carried out 15 case studies (2 for mountain areas, 2 for islands, 2 for SPAs, 2 for coastal areas, 2 for OR, 2 for Inner Peripheries and 3 for border areas). Since several of the case study areas feature more than one geographic specificity (i.e. overlaps of different categories), the case studies are particularly apt to demonstrate what the presence of geographic specificity means for the local population. 5 “additional cases” were added – these are not a full case study, but rather a targeted analysis of one particular topic. The “additional cases” shall compensate for a lack of case studies in the EU12 and candidate/pre-accession countries (seeing that the TPG does not dispose of sufficient language capacity to conduct full case studies in these countries).

A detailed version of all case studies can be found in the Annexes 24-42.

Map 54 Overview of case studies

5.2 Case study reports

5.2.1 Mountains: Case study reports

Highland Council area, Scotland

Many geographic specificities overlap in the Highland Council area. First, the Highlands are obviously a mountainous area. Second, most of the outer boundaries of the Council area are coasts. Thirdly, it includes some islands, of which the Isle of Skye is best known. Finally, with an average population density of 9 persons per km², the Highlands are among the most sparsely populated areas in Scotland and Britain, and even Europe. While one might argue that the mountainous terrain is a factor accounting for the sparseness of population, historic events have also strongly contributed. Before the 19th century, the Highlands were home to a much larger population depending on subsistence agriculture, including transhumance. The Highland Clearances forced thousands of people to emigrate to the lowlands or overseas. These processes were partly linked to agricultural changes throughout the UK, but also to other factors, such as the Industrial Revolution and the outlawing of the traditional Highland way of life after the unsuccessful Jacobite rising of 1745. Current settlement patterns remain strongly influenced by these events in the 18th and 19th centuries.

Today, the combination of geographic specificities influences the socio-economic structure of the area in many ways. On one hand, the "attractive", "unique" landscape serves to attract tourists and amenity migrants, making tourism the most important branch of employment after the public sector. On the other hand, the provision of services of general interest is much more expensive in a setting where people live in dispersed small settlements. The higher costs for transportation, in terms of time and money, due to the rugged terrain, reinforce these challenges. In addition, the area (apart from Inverness) is less attractive for businesses than an urban agglomeration, and the resulting lower number of employment opportunities means that many young people move away.

It must be kept in mind that there are strong regional variations in the economy of the Highlands. A successful core around the Moray Firth (including Inverness) has to face different challenges than the more outlying areas.

Tourism: In the Highlands, tourism is a significant part of the local economy, accounting for 13.5% of employment (excluding self employment), and around £584 million in overnight visitor expenditure. About 2.34 million overnight trips are made to the Highlands each year. The landscape is key in attracting visitors. According to the survey "The Visitor Experience" (Harris Interactive, 2008), 90% of visitors declared

that “scenery” was an important or very important factor in choosing Scotland as a holiday destination – making it the most important factor overall. The landscape also serves as a backdrop – or even “resource” – for a number of outdoor activities, ranging from mountain biking to canoeing, from rock climbing to bird watching. A study from 2003 found that 63% of visitors to the Highland Council area participated in some sort of sporting activity. The most popular were low-level walking of between 2 and 8 miles (46%), or over 8 miles (11%) and hill walking (21%). However, tourism in the Highlands is very seasonal, with almost two-thirds of UK and 84% of overseas visitors between April and September (Highland Area Tourism Partnership, 2006).

Transport and access to services: It is particularly the dispersed settlement pattern that creates additional costs for the local authority: “Highland has the greatest length of roads and the largest number of bridges to maintain of any other local authority in Scotland” (Highland Council, 2009). The sparse population not only creates challenges for the maintenance of an adequate road network, but also makes the provision of public transport unprofitable in most cases: “Bus services are far less frequent in the region. The ability to run profitable services has been weakened by the dispersed settlement pattern. [...] The region’s rail network is limited, offering no coverage of the region’s north-west and with infrequent services on most lines” (Scottish Government, 2008). Thus, local people are forced to rely on private cars for their mobility. The table below shows that, across Highland, accessibility to public transport is lower and car dependence is higher than the average for Scotland. Therefore those without cars in the largely rural areas can face issues of social exclusion.

	% of households (2005/06)			
	People who drive every day	1 or more cars	Greater than 14 mins to nearest bus stop	Less frequent than 1 per hour bus service
Highland	47%	78%	9%	20%
Scotland	41%	68%	3%	4%

Figure 36 Accessibility indicators in Highland; Table taken from: Highland Council, 2009

The mountainous terrain works to reinforce the challenges deriving from sparseness. Much of the road network across rural areas is characterised by winding single carriageway roads with passing places, resulting in relatively long journey times. The mountainous terrain also increases the

efforts that are necessary to keep them passable: “In the Scottish Highlands, the combination of hard metamorphic and igneous rocks, glacially steepened valley slopes and high rainfall is ideal for generating debris flows and slides” (Transport Scotland, 2008). Landslides affecting the road network occur somewhere in the Highlands almost annually. Many affect only minor routes – but these can be locally very significant, in some cases being the only access routes to remote communities (Transport Scotland, 2008).



Image taken from: Transport Scotland, 2008

The delivery of Services of General Interest is doubtlessly more challenging in sparsely populated areas than in others, a situation which has led to complaints by the affected regional authorities. Highland Council has stated that it incurs additional costs in excess of £12 million per year to provide services to the 26% of its population which live in supersparse areas¹¹⁸, i.e. that it spends about £12 million more than it would need to if those people lived in an area similar to the lowland coastal town of Nairn. In addition, some services are delivered at lower levels in the supersparse areas, and Highland Council estimates that it would cost it more than £800,000 to bring these services up to the levels provided in other, more densely populated, areas (Highland Council and Argyll and Bute Council, 2004).

ICT: “Telecoms connectivity is inherently more commercially attractive in urban areas due to the lower deployment costs per user. In the Highlands and Islands, as with most rural areas, it is more challenging to put forward a convincing case for widespread telecoms connectivity provided by the private sector” (Highlands and



Loch Barraglom, Great Bernera
Photo: Gary Faux

¹¹⁸ The definition used in this study for a “supersparse area” was anywhere which was more than 40 km (25 miles) by road from any settlement with a population of 7,000 or more in the 2001 census.

Islands Enterprise, 2009). Nevertheless, the Highlands and Islands do not compare unfavourably with the rest of the country: ADSL coverage (at any speed) is 95%, compared to the UK average of 99.8%. In fact, levels of ADSL coverage in the Highlands and Islands are better than rates in many major economies (e.g., Japan, Spain, Italy, Germany or the USA). This is in large part due to significant public sector investment in telecoms, such as the projects "Broadband for Scotland", "The Broadband Reach Project" or "Connected Communities".

Due to this high level of broadband coverage, the area has been quite successful in attracting a number of *call centres* (and associated employment opportunities). Pilot projects exploring the opportunities for *teleworking* are underway. As for other sectors: There is evidence that the use of ICT in the Highlands in the field of further education is much stronger than in other areas: in 2005, a study found that "currently the University of the Highlands and Islands do as much videoconferencing as all the rest of the universities in the UK put together" (Rennie & Mason, 2005). Also, take-up of courses offered by the Open University (a national distance-learning institution) is particularly high in the Highlands (Price et al., 2002).

Demography: The population of Highland was over 219,000 people in 2008. The population is ageing: the number of people aged 65 and over currently varies between 25% and 12% (Highland Council, 2009a). This age structure is attributed, on one hand, to a trend of retirement to rural areas by people who can afford to buy property and, on the other, the outmigration of young people in search for higher education and employment opportunities (The Royal Society of Edinburgh, 2008). Even though the region is considered to be family-friendly, there are real concerns about poor job availability, low wage levels and a lack of career progression opportunities among young people. In addition, opportunities for higher and further education are considered to be inadequate. Finally, a lack of access to necessities such as housing and transport also work as drivers of migration (Highlands and Islands Enterprise, 2009).

The Highlands are doubtlessly "attractive". One indicator is the large number of houses being acquired by incomers, whether as a second home or as a new home by someone recently retired (or, of course, by those who want to come to work). For example, average house prices in the Highland Council area rose by 134% between 2000 and 2005, from £ 59,796 to £ 140,041 (The Royal Society of Edinburgh, 2008).

Renewable energies: The Highland Council area is extremely well placed for the development of renewable energy initiatives using wind, water, tidal current, and wave power –all of them relying directly on geographic specificities. Potential for *hydropower* is not yet fully exploited in the Highlands. Scotland is also among the top locations for *marine energy*,

with around 25% of Europe's tidal stream resource and 10% of its wave resource (Forum for Renewable Energy Development in Scotland, 2009). This is because west-facing sites generally have the greatest wave energy resource, as the prevailing wind direction and the area of greatest fetch are westerly. The level of *wind* resource in the Highlands is amongst the best in the world, with wind speeds averaging nearly 8.5 m/s annually for most good sites (Highland Council, 2006). Offshore wind turbines also profit from high wind speeds.



A frequently-cited *obstacle* to the adequate exploitation of these resources is the lack of capacity in the national grid: grid capacity is very limited in North and North-West Scotland, where much of the offshore potential (wave, tidal, wind) is located. This is mainly due to the distance to major industrial centres and cities where the demand is greatest. A risk exists that the development of the grid will not proceed as quickly as the development of energy sources (OWIG, 2010; The Royal Society of Edinburgh, 2008; Forum for Renewable Energy Development in Scotland, 2009; Nick Forrest Associates Ltd, The Scottish Institute of Sustainable Technology (SISTech), Black & Veatch Ltd, 2008).

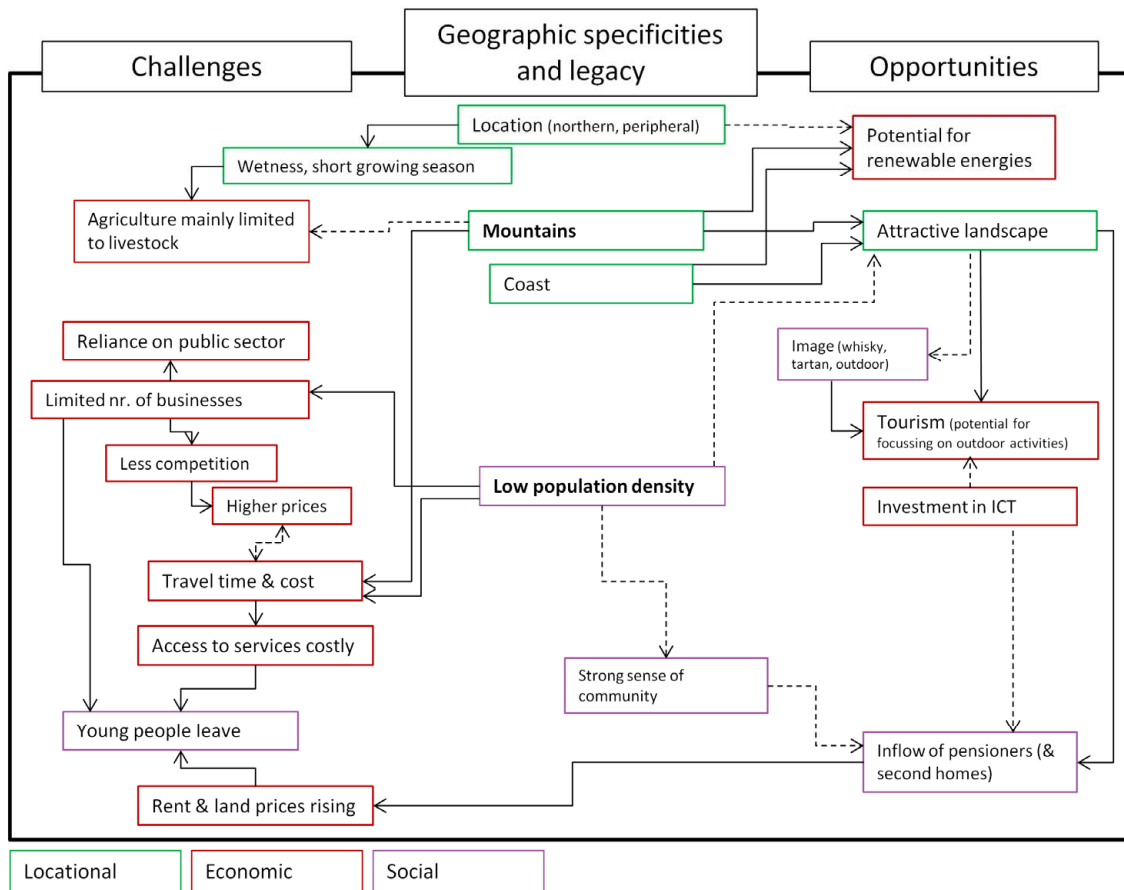
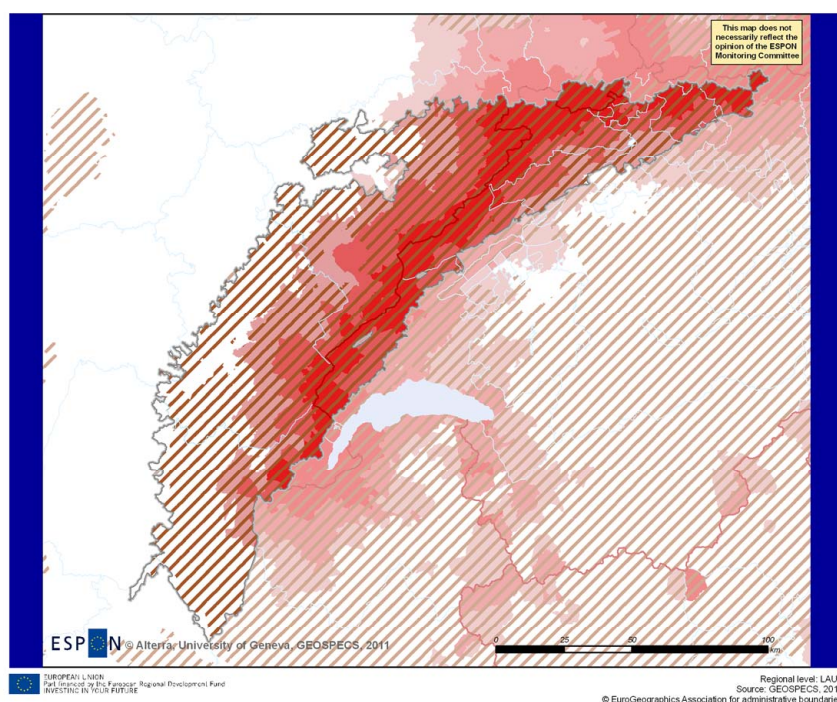


Figure 37 Nexus model: Highland, Scotland

Jura massif

The Jura is a middle mountain range (the highest peak reaches 1,720 m) on the border between France and Switzerland. Therefore its limitations (e.g. in terms of access to services or transport infrastructure) are less pronounced than in high mountain areas.



GEOSPECS specificities areas

- Lac léman
- Case study - Jura - delineation
- NUTS0 boundary
- NUTS3 boundary
- Mountain areas**
- Mountain area
- Travel time to the border**
- 0 - 900
- 900 - 1800
- 1800 - 2700

Map 55 Jura massif

Compared to other European mountain areas, the Jura massif has an uncharacteristically high proportion of employment in industry (and a comparatively lower importance of the tourism sector). This is what makes the area successful (if success is measured by low unemployment rates and high incomes). Historically, the emergence of the watchmaking

sector is indirectly linked to the mountains: in the 19th century, the difficult conditions of farming in a mountain area and in a harsh climate meant that many farmers in the Jura were looking to supplement their meagre incomes in the winter months – this offer perfectly met the needs of watchmakers who were looking for manufacturers of parts and pieces.

Ligier (1999) characterized the Jura as being constantly “between” or “next to” something: next to the Alps, between France and Switzerland, between several metropolises. This feeling of being “in between” – or on the flipside, “on the periphery of” something – is definitely symptomatic. During interviews with stakeholders from the area, an impression emerged that the Jura’s position on the border is a more defining feature for the people of the area than the mountainous terrain – although the same language (French) is spoken in both parts of the Jura. Even though the economic “fabric” throughout the entire Jura is relatively homogenous (a comparatively high proportion of employment in the industrial sector, know-how in microtechnology and related activities such as watchmaking, machine construction, etc), the Swiss part of the Jura is home to more companies, and thus offers more jobs, higher wages, etc. For this reason, a significant flow of cross-border workers towards Switzerland has emerged: many well-educated French residents regularly commute over the border to work in Swiss companies. The opposite flow is made up of consumers - profiting from their higher purchasing power due to higher wages and to the CHF-EUR exchange rate. One stakeholder went as far as stating “the French come to work in Switzerland, the Swiss come to consume in France”.

In order to foster cross-border cooperation, the *Conférence TransJurassienne* (CTJ) was formed in 1985. It unites the *Conseil régional de Franche-Comté*, the *Préfecture de Région Franche-Comté* and the Swiss cantons of Berne, Vaud, Neuchâtel and Jura.

Economic structure: The Jura Arc has historically been very industrial –the main occupation from the 19th century was watchmaking, but nowadays more generally the fields of engineering / mechanics / microtechnology. On the French side, one-third of employees were working in the industrial sector in 2003, as compared to the national (i.e. French) average of 18% (Commissariat à l’Aménagement du Massif du Jura, 2006). In the Swiss Jura Arc, the watch industry accounted for about 10% of regional employment in 2005 – in comparison, the hotel business only employed about 1% (Kebir and Crevoisier, 2008).

Several factors have contributed to this situation. Firstly, alternatives are limited: for example, agriculture is not possible to the extent that it would be in non-mountainous areas. The “usable agricultural area” in the French Jura takes up 35% of the surface, compared to the French average of 43.6% (Commissariat à l’Aménagement du Massif du Jura, 2006). A harsh

climate and infertile soils limit high-elevation land use to forestry and pastoralism (Breitenmoser et al., 2007). Historically, the long cold winters, during which snow limited travel and made field work impossible, led to an availability of a labour force in those months: farmers tried to find a second income, and watchmaking was an obvious choice. Watchmaking know-how had come to the Jura Mountains as early as the 1750s with the Catholics who fled from religious intolerance under the Swiss Calvinists in Geneva. From then on, the know-how spread relatively evenly in the entire massif, until the Swiss gained an advantage at the end of the 19th century, when they were first to realize that the time of automatisisation had come (Moine, 2003). Since then, a situation evolved in which employment opportunities concentrate on the Swiss side of the Jura where watchmaking benefits from a distinct quality image, whereas there are a number of businesses in the watchmaking industry on the French side, but these are more limited to subcontracting activities.

The industrial structures on both sides of the border are similar. However, there are important differences between the two countries. For instance, the business tax is between 66% and 93% higher for companies established in France than for companies established in Switzerland (Mission Parlementaire sur la Politique Transfrontalière, 2010). Overall, Switzerland has a Total Tax Rate of 30.1% - compared to France with a rate of 65.8% (World Bank Group & PwC, 2011).

The most formative link between the two sides of the border is the workforce: the flow of cross-border workers shows a compatibility of supply and demand on both across the border. However, these flows are

very much in one direction: from France to Switzerland. The high net incomes in Switzerland attract many qualified French workers, so that the French side of the massif is confronted with a lack of qualified workers in certain sectors (Commissariat à l'aménagement du Massif du Jura, 2006).

In 2009, 30,800 cross-border commuters had a job in the Swiss part of the Arc Jurassien. This is equivalent to a doubling of numbers within over a decade (OSTAJ, 2010).

While the flow of workers is directed from France to Switzerland, a different flow works the other way around: that of consumers. Due to the exchange rate between the Swiss Franc and the Euro – and the value of the Franc has significantly increased in recent months – people working in Switzerland profit from a higher purchasing power. Many Swiss residents living close to the border do their shopping on the French side – where commerce is thriving as a result.

Transport: The Jura is spread between two main development axes, along which the population is concentrated:

- The "Rhine-Rhone" axis: Basel, Mulhouse, Belfort, Montbéliard, Besancon, Dole
- The "métropole lémanique": Lausanne, Geneva, Annemasse, Thonon, Evian, Annecy

Between these two axes, the Jura massif constitutes a geographic barrier that hinders exchange. The main railway lines and roads run parallel to the massif. The frontier region is not very permeable even though the mountains are not very high (Programme opérationnel INTERREG IV France-Suisse, 2007). The topography makes road construction more costly (for example by necessitating more engineering constructions such as bridges and tunnels) (Brasey-Duthe, 2011), but the main obstacle is the *lack of population density*: as the massif is not strongly urbanized, it is not worthwhile having too many connections (Loesener, 2011).

Nevertheless, the accessibility of the massif is satisfactory: no point is more than 45 minutes away from a highway on-ramp, which allows quick connections to surrounding agglomerations (Commissariat à l'Aménagement du Massif du Jura, 2006). Therefore, an improvement of the transport network does not emerge as a major priority for the massif. One stakeholder questions whether a highway (for example) would really improve the lives of the people in the Jura or serve to attract companies – seeing that other factors (such as fiscal policy or a qualified workforce) play a much more important role in the location decisions of companies (Marmier, 2011).

Identity: Ligier, in an extensive description of the identity of the Jura, comes to the conclusion that it suffers from an "inferiority complex" and an "almost unhealthy modesty" – even though the Jura does not lack assets (from its strategic position in the middle of Europe to its industrial

specificities). He traces this underlying feeling back to the Jura's permanent description as being situated "between" or "next to" something: between Switzerland and France, between Rhine and Rhône, between the four metropolises Lyon and Strasbourg, Geneva and Zurich – and, of course, next to the Alps (Ligier, 1999).

A view "from the outside" seems to reveal a relatively homogenous identity. Even though Switzerland has external frontiers to the EU, it is part of the Schengen area, and the border territory between French-speaking Switzerland (La Suisse romande) and France share many common characteristics. This situation is due not only to the large flows of cross-border workers, but also to similar socio-economic and environmental problems. The linguistic unity of the territory is an undeniable factor of cultural unity (Programme Opérationnel INTERREG IV France-Suisse, 2007). The common tradition of watchmaking (and nowadays microtechnology) is also characteristic on both sides of the Jura massif. Worldwide, magazines advertise mechanical watches "made in Switzerland". Even though competitors (from countries such as Japan) try to penetrate the same market, they have not succeeded. In the minds of the consumer, quality watches remain associated with a country – Switzerland – and with certain regions – in particular Geneva and the Swiss Jura (Kebir and Crevoisier, 2008).

Nevertheless, considering both sides of the Jura together, the impression emerges that it would be too optimistic, to speak of a "common identity". One stakeholder compared the Jura to Québec: Even though both areas speak the same language, the countries are different – in their accent, in their history, in their political-administrative setup (Sage, 2011). Another acknowledges that each side of the Jura massif has evolved in its own way, especially after the Second World War, and that "competition" is often mentioned as a catchword when talking to people from the area (e.g. competition for trained personnel, for companies). The *Conférence Transjurassienne* (CTJ) is an important factor in the efforts to "reweave the bonds", but this takes time, and above all, trust (Loesener, 2011).

Natural resources: The Jura massif has ideal conditions for forests: a cool and humid climate, good geological characteristics but only moderate altitudes, which leads to solid and homogenous timber. In the Swiss Jura, 48% of territory is forested – compared to the Swiss average of 30% (OFEV, 2010). In the French Jura, 43% of area is forested - compared to the French average of 28% (Commissariat à l'aménagement du Massif du Jura, 2006). There is even an initiative to attain an AOC label for coniferous wood from the Jura – claiming that this wood deserves a quality label due to its extraordinary robustness. The label would apply equally to wood from the French and Swiss Jura (www.aocboisdujura.ch).

Forests could even be regarded as part of the identity of the Jura massif: a particularly typical landscape is the "pâturage boisé" ("forested grazing land" – in France the term "pré-bois" is more frequent). It is part of the culture and heritage of the area, and has even been called the "emblem" of the Jura Arc (Magnollay, 2011). On the one hand, this half-open landscape offers a home to a diversified flora and fauna; on the other hand, it has been perceived as an "attractive" landscape, thereby indirectly benefiting the tourism industry (Conférence TransJurassienne, 2008). However, this is a cultural landscape which requires continued human management. These landscapes are threatened in many areas: the less productive grazing areas are being abandoned and thus becoming overgrown with bushes, whereas the more productive areas (especially close to farms) are used more intensely for dairy cows.

*Image taken from: Conférence
Transjurassienne, 2008*

Figure 38 Nexus model: Jura massif

5.2.2. Islands: Case study reports

Sicily

Description of the case study area and its geographical specificity

The Italian region of Sicily consists of one large island, Sicily, and a cluster of smaller islands including Mozia, the Stagnone Lagoon, Pantelleria, Ustica, the Aeolian Islands, the Pelagian Islands and the Egadi Islands. The region size totals an area of 25,711km², with a population of just over 5 million, and a population density of 196.4 persons/km². Sicily is found at the South-western periphery of Italy and is separated from mainland Italy through the Strait of Messina, which is about 3km wide at the north of the island, and 16km wide at the southern end of the island. The island of Sicily is characterised by a hilly landscape.

Most residential and tourism related settlements are based in coastal areas while the agricultural industry is concentrated in the centre. Sicily, and the smaller islands, are characterised by highly active volcanoes which also serve to enrich the soil on the islands.

Islands are faced by both challenges and opportunities for economic and social development. Its geographic characteristic, i.e. it being surrounded by sea, is not the sole feature that distinguishes an island from other territories. In fact, several behavioural traits also add to their uniqueness with the term "*insularity*" encompassing these more fully. "*Insularity*" is therefore used to define the broader and more encompassing characteristics of "*islandness*" and is understood to imply that the following three conditions are met:

In the main part surrounded by the sea;

- Dependent on centres of economic, social and cultural activity outside the territory;
- Peripheral in relation to the main centre of economic, social and cultural activity.

The interaction of these three conditions, which often accentuates the permanent and severe handicaps which islands face, will be considered when assessing how the economic, social and environmental structure and trends of Sicily have been affected by the islands' insularity. Desk research was supplemented by field work in the preparation of this case study with a questionnaire being sent out to a number of stakeholders.

Economic, Social and Environmental processes related to the geographic specificity

The extent to which islands are affected by their geographic specificity depends on their degree of insularity. Sicily's relatively large size may have mitigated the negative effects resulting from its "islandness" characteristic although the other aspects of insularity still prevail and have had an impact on its development. In addition, a number of these challenges are shared with the entire South of Italy. Although not an island, and therefore not surrounded by sea, Southern Italy also exhibits signs and consequences of peripherality as well as dependence on the centre of Italy. Of course the third dimension of insularity, solely present in islands, adds another dimension to their development challenges making this somewhat different to other southern regions on the mainland.

Due to its islandness and location at the centre of the Mediterranean, Sicily has had a turbulent history which involved a number of conquests by foreign empires. This has led to the islanders having had little control over their destiny and having always depended on an external centre of economic influence and power. The Italian unification in 1861 was met with great resistance by Sicilians who considered it a form of occupation and exploitation. This has had deep repercussions on the way Sicily interacts with the main centre of governance in Italy and may have led to the emergence of the Mafia as a way of social organisation. According to Prof. Salvatore Lupo, the consequential inability of central government to control Sicily has led to an informal relationship between the official power structures in Rome and the underground economy in Sicily.¹¹⁹ This turbulent history has affected the psyche of the islanders who feel a very strong link to the Sicilian identity whilst feeling separated from the rest of the country and continent. Notwithstanding this cultural detachment, Sicily has always depended on others for economic support.

This dependence on the rest of the country manifests itself in a higher than average public sector employment in Sicily. The Sicilian economy is in fact characterised by a predominance of the service sector – 33.2% as against a national value of 20.6% - and a low presence of industry. This may be linked to the island's insularity, whereby the detachment from mainland has led to an insular mind-set, making people more risk averse and unwilling to set up new enterprises. In addition, a detached local government has led to transport inefficiencies and a higher cost of doing business. The creation of a fixed link through the Strait of Messina would improve accessibility. However, the project faces opposition by those who feel that the beauty of the landscape will be jeopardised and ecological damage to the area will ensue.

¹¹⁹ <http://www.h-net.org/reviews/showrev.php?id=29352>

The existing obstacles in setting up one's business lead to a higher rate of unemployment in the region and the relatively large number of emigrants in search for better job opportunities in the north of Italy. Those who choose to remain in Sicily do so either to work in a pre-existing family business, also reflecting the strong family ties that are still predominant, or because no opportunities to do so come their way particularly due to a low educational background.

Other strong sectors when compared to Italy's average include agriculture and fishery. Their current strength is also directly related to its islandness, which has resulted in a stronger attachment to historically important traditions such as fishing and farming. The Sicilians have taken advantage of their inherited assets in agriculture and have expanded to organic and agri-tourism markets. Tourism is undoubtedly also a very important sector. This, together with transport and communication, amounts to approximately 23% of Sicily's GVA with the smaller islands depending disproportionately more on the Tourism Industry as they are strongly linked with being a sun and sea destination due to their geographical location and islandness.¹²⁰ This often leads to seasonality of employment that is typical of island economies. Unfortunately it has also resulted in strong environmental pressure on sensitive coastal areas, including the common disregard of protected areas. Ironically, however, environmental preservation appears to be the main reason put forward against the development of renewable energy plants for which great potential exists in Sicily.

Development opportunities and challenges

The research into Sicily as a case study has resulted in five nexus models being developed. The historical legacies inherited by the Sicilians, due to insularity characteristics, have resulted in a number of development opportunities and challenges which interact with each other to influence the social and economic realities of the islands. These are briefly described below.

¹²⁰ SMILIES – Small Mediterranean Insular Light Industries Enhancement & Support; 'Local Studies Sicily', Project co-financed by ERDF; URL: http://www.regione.sicilia.it/cooperazione/print/doc/Sicily_Local_study.pdf

1. Detached Governance

Sicily has been exposed to a turbulent history which is characterised by the domination of different empires and a struggle for self-governance. This colonial dependency may be mirrored in the inclusion of the islands into Italy as a whole country. These realities have resulted in Sicily experiencing a significant physical distance from the centre of governance. The importance of the physical distance to this centre is superseded by the peripherality and dependence that Sicilians perceive in the governance structure. The effect of this situation is a diminished sense of ownership of the islands that is felt by the islanders. The perceived ineffectiveness of local government on the islands has contributed to the underground governance structures that have emerged as an alternative and more effective way of organising the region. The ineffectiveness of regional government to adequately invest in sufficient infrastructural projects has led to problems with the rail and road networks. These two elements combined have led to high costs of doing business which has led to high and volatile levels of unemployment.

Detached governance can also bring about low levels of interest in environmental preservation and low incentives to invest in projects with a long-term benefit to the region. "External" initiatives are also viewed with great suspicion due to the insular mind-set cultivated by this peripherality and dependence, and which has been amplified by schemes such as the "Fund for the South". Within this, there may be the opportunity to cultivate increased ownership through fiscal federalism.

2. Idyllic Image

The fact that islands are surrounded by the sea, and therefore detached from the landmass, seems to translate in a mental detachment from everyday life. Sicily has strong associations with an idyllic image of peace, tranquillity and a more old-fashioned way of life. Its location in the Mediterranean Sea and climatic conditions further contribute to this 'paradise on earth' image. This image has been well exploited by Sicily in terms of the tourism industry, where sun and sea tourism plays a central part. It has also served as an attraction to residents to remain on the islands and for new residents to migrate to Sicily. This image has also served to attract individuals with an artistic flair; writers, poets and artists have found the islands an ideal place to allow their creative minds to wander.

This image can, however, serve as a barrier to island development. The image of paradise often hides the underlying suffering that islanders may have to bear, inhibiting the understanding of the true development challenges of islands by policy makers. The reality that visitors encounter during their holidays on the islands does not mirror everyday life for residents. The opportunities that are yet to be fully exploited in this regards are refocusing the image to include centres for creativity on the islands through rebranding exercises, development of niche industries and the establishment of scholarships in the arts.

3. Migration Crossroads

Sicily, like other Mediterranean islands, has been at the crossroads of many civilisations due to their insularity and the inability to remain autonomous. Net immigration into Sicily is positive; however this disguises the large amounts of young male Sicilians leaving the islands to seek employment on the Italian mainland. This is due to the large influx of immigrants from Eastern Europe and North Africa. While trickles of migrants pose little pressure on social structures and have been able to integrate in the past, large numbers such as those registered in recent years, can be overwhelming as they instigate an unwelcome speed of change.

The opportunities brought about by this historic legacy are that, apart from amplifying the labour force, migrants may enhance the thought process on the islands. Often, great innovation is instigated by fusing traditional experience and knowledge with new ideas and attitudes. If exploited correctly this brings with it substantial innovation opportunities, including in governance approaches, particularly if a selective approach is adopted to attract the human capital. This can contribute to an effective renewal and enhancement of the social fabric.

4. Coastal Settlements

As a result of being an island community with strong ties to the sea, as well as the mountainous characteristics of the islands, Sicily is largely characterised by coastal settlements. The limitations that such a legacy imposes include the strong environmental pressure on sensitive coastal areas, which risk being ruined forever in the absence of appropriate intervention. In addition, the mountains themselves may act as a barrier to social and economic interaction between different localities in Sicily, actively dividing areas of land from each other. The sea acts, in a similar way, as a barrier to further development outwards. These characteristics

can be better exploited, and their limitations better managed, with stronger and better-focused governance which aims more directly at concrete sustainable development goals.

5. Legacy of Dependence and Exploitation

Historically, Sicily has been viewed as a suitable area for exploitation and use. This can still be seen today with the location of a high proportion of power plants on the island that service economic activity on the mainland. Since the companies are owned by national enterprises, there is no real revenue benefit from locating the plants in Sicily, except for an impact on jobs which is mitigated (in whole or in part) by the environmental repercussions. This feeds into the low sense of ownership of the islands, where Sicilians feel that their destiny is not really in their hands and their land is not theirs to administer. This fuels the low level of entrepreneurship as people are unwilling to risk capital without a sense of security. This lack of ownership also leads to a low level of respect for natural and cultural assets. This is out of sync with the strong sense of identity that the Sicilians feel as a region, which seems stemmed in the dependence cycle.

Generalisations from the case study

Sicily is a particular case study for islands, being the largest island in the Mediterranean and having its own mass of economic and social activity, which pushes it to the very end of the spectrum of insularity. However, from the analysis above we can still see that Sicily faces some challenges arising from its insularity.

Another strong issue that arose from this study, which is shared by many islands that are not island states, is the feeling of peripherality to the centre of governance. Feeling detached from the main decision-making body leaves islanders feeling powerless to influence their own future and often results in a lack of ownership of the official system of governance. Sicily is an extreme case in point where this led to the creation of a large underground system of governance. While this is one of the observations that is specific to the area, the process which contributed to this is by no means unique to Sicily.

The sensitivity of environmental assets on islands is highlighted in this case study, but is a problem shared by many islands. The limited natural resources usually lead to heavy exploitation of the few assets that islands do have – often in order to boost their tourism industry. The triumph of economic needs over environmental ones is clear in Sicily, although

efforts are being made to reverse the trend. The constant battle for finding a sustainable route to development is tricky for islands and is amplified by the delicate ecosystems that are generally nurtured by the detachment from the mainland. The case of Sicily in particular shows the implications of a mountainous central territory with a consequent pressure for economic activity concentrating on the environmentally vulnerable coastal areas. This issue detracts from the benefits which a relatively large landmass can convey to an island.

The large emigration outflow of the native population is also a challenge that many islands face. The restrictions in education and employment opportunities, and the inability to commute to mainland on a daily basis, due to the unavailability of reliable and swift links, means that islanders often need to move away from their towns of origin in order to pursue their education or careers. This problem is present to some degree on all islands.

The physical detachment from mainland is a characteristic that all islands share, with this detachment often being reflected in the psychological make-up of islanders and an inward-looking mentality. While the thirst for improvement is strong on islands, the feeling of separation between 'us' and 'them' is predominant resulting in a sense of 'we know best' about the optimal development paths¹²¹. There are also strong barriers to change on islands, particularly those brought about by "external" sources, as the inherited characteristics are seen almost as a scar to be worn with pride. This idea is reiterated by Sociology Professor Manuel Castells who describes this phenomenon as a 'resistance-based' identity.¹²² This is one of the reasons why changes, such as the introduction of a fixed link to mainland, are often met with rejection by islanders, who are torn between the wish to reduce connection time and improve economic prospects on the islands and the longing to retain their separation.

¹²¹ RASMUSSEN J., 'Islands: Centres hubs, spheres and ... - metaphysical islandscapes in social theory'; URL: http://www.keg.lu.se/IGUislands/J_Rasmussen_paper_draft.pdf

¹²² CASTELLS M. (2006), 'Globalisation and Identity: A Comparative Perspective', Barcelona; URL: http://www.llull.cat/rec_transfer/webt1/transfer01_foc01.pdf

Figure 39 Sicily: Nexus model

Outer Hebrides

Description of the case study area and its geographical specificity

The Outer Hebrides are found at the westernmost periphery of Europe, located about 70 kilometres west of mainland Scotland and stretch for 130 miles. They overlook the Atlantic Ocean and comprise a chain of more than 100 islands and small skerries with a total of 15 inhabited islands. The Outer Hebrides have an area of approximately 3000 square kilometres, a population of approximately 26,500 and enjoy a cool temperate climate.¹²³

Islands, such as the Outer Hebrides, constitute one type of geographic specificity that is understood to create both challenges and opportunities for economic and social development. Although the geographic characteristic, i.e. it being surrounded by sea, is one feature that distinguishes an island from other territories, there are other traits that

¹²³ <http://en.wikipedia.org/wiki/Hebrides>; http://en.wikipedia.org/wiki/History_of_the_Outer_Hebrides

add to the uniqueness of these areas, with the term “*insularity*” encompassing these more fully.

For the purpose of this case study, “*insularity*” is understood to imply the following three conditions:

In the main part surrounded by the sea;

Dependent on centres of economic, social and cultural activity outside the territory;

Peripheral in relation to the main centre of economic, social and cultural activity.

It is the interaction of these three conditions that will be considered when analysing how the economic, social and environmental structure and trends of the Outer Hebrides have been affected by the Islands’ insularity. The distance from and dependence on centres of economic, social and cultural activities outside the islands’ territory often amplify the permanent and severe handicaps that result from the regions being physically cut off from mainland. These difficulties are even greater for the smaller islands within an archipelago that are faced with the problem of “double insularity”. Desk research was supplemented by field work in the preparation of this case study with a questionnaire being sent out to a number of stakeholders.

Economic, Social and Environmental processes related to the geographic specificity

The dependence of the Outer Hebrides on centres of economic activity outside its territory and its peripherality from these centres, implies that economic activity is limited, with a large proportion of locals employed in the public sector. Those employed in the private sector work in very small enterprises with a great incidence of people employed in their family business. In addition, the peripherality of the Outer Hebrides results in a lot of activity being characterised by sporadic demand and seasonality of employment. This results in the need for people to invest in their education and skills in order for them to be employable all year round.

The desire to invest in one’s education is the main cause reported for outward migration from the Islands, particularly affecting the younger age cohort¹²⁴. In addition, the remote islands’ status, limited employment

¹²⁴ HALL AITKEN (2007) *Outer Hebrides migration study*, for Comhairle nan Eilean Siar, Western Isles Enterprise and Communities Scotland; URL: <http://www.cne-siar.gov.uk/factfile/population/documents/OHMSSStudy.pdf>

opportunities on the Islands as well as the predominantly rural nature of its communities have also explained this population decline as being inextricably linked to the area's geographic challenges¹²⁵. This has led to the Outer Hebrides experiencing the biggest population decline of any Scottish local area over the last decade. Some of those who migrate choose to return to the Outer Hebrides in their older age as a result of the strong sense of identity and belonging to the islands. This strong community spirit, a perceived safe environment, and preserved traditions are all benefits attributable to the first characteristic of insularity, i.e. surrounded by the sea. The limited influence from the "outside world" has allowed this region to retain traditions that are considered to be a heritage to locals including the widespread use of Gaelic.

The persistence of this emigration has led to the Outer Hebrides having one of the lowest population densities, at 8.5 persons/km², of all Scottish health boards¹²⁶. In addition, approximately 78.9% of the Outer Hebrides population live in areas classified as very remote-rural compared to 3.0% in Scotland as a whole. Such remoteness and sparsity factors present challenges for community development. As a result, problems of inadequacy of goods and services provision exist. In fact, more than three quarters of the population of the Outer Hebrides are classed as living in 'access deprived' areas compared to 15% in Scotland as a whole, as measured by the SIMD geographic accessibility domain.

Recent migratory patterns have also lead to increases in costs per capita. The cost of health services, for instance, is substantially higher than on mainland Scotland. Certain segments of the population need to travel long distances to be given adequate care and in many cases need to be taken to a hospital on mainland since the number of interventions offered are limited. In addition, outward migration has led to a number of schools closing down since smaller numbers are enrolled each year. ICT has been used to reduce this dependence by providing tele-health as well as distance learning courses, although broadband connectivity is still relatively weak in certain areas. Dependence on ICT also seems to be creating a social divide with people who are not computer literate feeling marginalised. Transport infrastructure within the island is also considered inadequate, entailing a greater use of private transportation. This again results in social exclusion, particularly with respect to the elderly and disabled people, who may have no other means of mobility.

¹²⁵ http://www.ohcpp.org.uk/Single_Outcome_Agreement.pdf

¹²⁶ The Scottish average is 65.2 persons/km²; Source: THE OUTER HEBRIDES COMMUNITY PLANNING PARTNERSHIP (2009) *Forward Together, Single Outcome Agreement 2009-2010*; URL: http://www.ohcpp.org.uk/Single_Outcome_Agreement.pdf

The rise in international oil prices is increasing energy costs for the Outer Hebrides particularly given their dependence on imported oil¹²⁷. This led them to investigate avenues for investment in renewable energy sources, although the strong sense of environmental preservation may limit this potential. The Outer Hebrides is home to a vast number of protected areas, although locals believe such protection to be not necessary given the culture of Hebrideans that favours environmental protection without necessitating regulation. In fact the feeling of imposition from external sources is expressed by most locals.¹²⁸

Development opportunities and challenges

Five nexus models, delineating both limitations and opportunities stemming from the insularity of the Outer Hebrides, have emerged from this case study as described hereunder.

1. High cost of doing business

The geographical distance from customers, certain material inputs, as well as employment and knowledge hubs all explain this inherent disadvantage. The high cost of doing business mainly reflects greater transport costs, problems concerning transport reliability, low access to resources, as well as a small market size which limits the possibility to generate economic activity solely to service the local economy and that necessarily implies the need to incur further costs to export a substantial part of the produce. The limitations to economic development that stem from this historical legacy include a relatively higher rate of unemployment on the Outer Hebrides when compared to the national and regional average¹²⁹¹³⁰, a relatively larger number of people working in the public sector as a result of low private sector activity that relies strongly on local services and small scale tourism¹³¹, a duplication of public sector activities due to its distance from the centre of governance and service provision, insufficient diversification of the economic base that makes the Islands more vulnerable to economic shocks, as well as one reason explaining the current migration outflow in search for better job opportunities.

¹²⁷ Economic and Community Benefit Study – Scottish Government/ Halcrow Group Limited – January 2009

¹²⁸ GEOSPECS field research

¹²⁹ <http://www.scotland.gov.uk/Resource/Doc/187960/0052049.pdf>

¹³⁰ <http://www.cne-siar.gov.uk/factfile/labourmarket/unemployment.asp>

¹³¹ Hall Aitken and Ionad Nàiseantanah-Imrich (2007), *Outer Hebrides Migration Study Final Report*

2. Small tight-knit communities

Small tight-knit communities tend to be inward-looking, which can result in a loss of development opportunities due to limited interaction with mainland. The smallness of the community and population size results in the absence of critical mass and the likelihood of atypical employment opportunities¹³². This may also stimulate migration outflows which would curtail demographic regeneration. Social problems, including drinking problems, have also been assigned to islands mainly due to the perception of isolation, as well as the idea that tight-knit communities often lead to intrusion and social claustrophobia – a phenomenon mainly raised by the younger generations.

On a positive note, traditional economic activities, such as crofting, have proven to be successful due to a sharing culture that existed, and still exists today. This allowed residents to build a strong social support system that is also conducive to return migration. The small workforce has led to residents becoming more flexible so as to engage in different employment opportunities. ICT has helped locals “escape” from their small community in order to express themselves with relative anonymity. This “dependence” on ICT for economic and social activities provides great avenues for further development although it is important for authorities to ensure that people who are not able to make use of this technology do not feel, or effectively become, marginalised.

3. Emphasis on nurturing human capital

The Outer Hebrides places great emphasis on its human capital, particularly with respect to health and education. This leads to a large number of residents, particularly in the younger age bracket, migrating in order to better their education and employment prospects. Notwithstanding this, the nurturing environment that is said to exist is encouraging emigrants to return to their land of origin in their older age. ICT, which is used as a tool to improve education through distance-learning programmes, and health, through online consultations, is however creating a social divide since residents have unequal access and know-how.

The recent increase in house prices particularly when compared to the salaries offered on the Islands, may be putting pressure on house prices, which has also been highlighted as a reason for the outflow of migration of young couples. On the other hand, development opportunities are seen in

¹³² This may include part-time employment, fixed-term contracts, temp agency workers, self employed and persons in flexible jobs

the possibility of attracting back to the Islands people who left for education or work reasons, with the knowledge and/or expertise gained off their shores that could spill-over to the rest of the community. Policy should, therefore, aim to address this challenge. Negative quality of life effects can be attributable to two aspects, namely (i) the higher proportion of female emigrants that contributes to population imbalance and an ageing population, (ii) the importance given to ICT that is also leading to an increased outflow of migration since locals are more aware of the opportunities available outside the Outer Hebrides. The latter, however, also serves to improve locals' quality of life since it allows them to benefit from improved specialist healthcare and online education.

4. *Strong identity*

The strong identity witnessed in the Outer Hebrides is reflected in the preservation of a number of traditions, including the use of the Gaelic language, as well as relatively strong religious ties. This has given rise to a number of development opportunities, particularly for the tourism industry to exploit this almost intact traditional heritage. In addition, the potential to exploit niche educational opportunities, given the widespread use of Gaelic, exists. The strong religious influence on the Hebridean community may have led to the good social ethic present to date, which in turn may have resulted in the quality of life assets that are said to exist, including a strong environmental preservation as well as low crime levels and drug use. However, locals as well as immigrants often complain that the strong community identity creates barriers to integration for those who choose to act differently from the mass.

The limitations posed by a strong community identity, which may result in an inward-looking society that is less susceptible to embracing change, has led to the creation of media stereotypes depicting a society with sociological problems and that are extremely close-minded as a result of their strong protestant adherence. This damaged the community's confidence which in turn has led to a fear of failure, particularly in the take-up of entrepreneurial activities. This is reflected in relatively low activity rates, although the Hebridean authorities have created a number of programmes aimed at encouraging entrepreneurial activity, particularly in the younger age cohort.

5. *Geographical location*

The geographical location of the Outer Hebrides, at the far western end of Europe, is in itself a historical legacy that is characterised by particular

climatic conditions, low development pressures as a result of its distance from mainland, as well as well-preserved natural areas and fish reserves. The main opportunities stem from the islands' environmental assets. The Outer Hebrides are also optimally located to take advantage of wind, wave and tidal energy. However, the feeling of exploitation in the development of alternative energy sources has resulted in locals opposing such development projects. In addition, the large number of protected areas gives rise to development restrictions with possible negative consequences on house prices. Structural development may, therefore, be constrained by conflict that appears to exist between environmental preservation and the possibility of developing renewable energy plants. The Outer Hebrides are also faced with limitations stemming from accessibility problems, for instance in the case of energy networks, that result in added costs to business and households alike. This accessibility problem is amplified for smaller islands that are faced with the problem of double insularity.

Generalisations from the case study

The extent to which islands are affected by their geographic specificity depends on their degree of insularity. As a result, only some of the findings that emerge from this case study can be applied to all islands.

Given the dependence of islands on centres of economic activity outside their territory and their peripherality from these centres, one can conclude that islands are, in most part, highly dependent on the public sector with a large proportion of their citizens employed in the civil service, including the military. Those employed in the private sector generally work in very small enterprises with a great incidence of people employed in their own family business. In addition, the peripherality of islands results in a considerable amount of activity characterised by sporadic demand and seasonality of employment. This is also true for tourism, a sector that employs a substantial number of people on most islands. This seasonality and sporadic demand encourages people to become multi-skilled so as to be employable all year round. In addition, most islands are perceived to be optimal locations for the development of renewable energy sources.

Accessibility problems are in most part common to all islands with strong dependence on a ferry service in the absence of fixed links. For islands in northern Europe, this service may prove to be unreliable in the winter months due to inclement weather. In addition, inter-island public transportation is generally of sub-standard level given the low population density on some islands, raising the difficulty and cost of servicing remote areas. This results in islanders being more dependent on their personal

means of transportation which results in two additional problems, namely (i) social exclusion of citizens that have no private vehicle or are not able to drive; (ii) high costs of transportation since fuel tends to be costlier on islands. Problems of inaccessibility, as well as a lack of critical mass, also result in islands facing higher costs for goods and services. Health provision, for instance, is often inadequate with most people having to be transported to mainland for most procedures. The same is true of education with a limited number of courses offered to citizens.

These reasons, among others, often result in a number of people choosing to leave islands. This creates problems of an ageing population given that people often choose to emigrate during working age and return in their old age for retirement purposes with obvious repercussions on the sustainability of pensions and health systems. The most attractive attributes of residing on islands, and those most likely to attract locals back to their hometown, is reported to be a strong tight-knit community, preserved traditions, as well as a safe environment and beautiful landscape. However, the closeness of the community may also be a factor driving locals away from the island given a feeling of intrusion and claustrophobia expressed by the younger cohorts.

The case study brought to light the fact that islanders often feel that decisions taken at the core are too distant from their reality and that their opinion is often disregarded. This policy "imposition" has often led to locals rejecting policy determined at the level of central government. Regional policy would allow islanders to feel "ownership" of the policy designed that may therefore lead to their more successful implementation. In addition, policy should also aim to reduce islands' dependence on mainland and not merely attempt to mitigate the "islandness" problem through accessibility concerns.

Figure 40 Outer Hebrides: nexus model

5.2.3. Sparsely populated areas: Case study reports

Torne Valley

The Torne Valley (Finnish: Tornionlaakso, Norwegian/Swedish: Tornedalen) is a cross-border region in one of the most sparsely populated areas of Northern Europe. It is named after the Torne River, which flows from the Scandes through the river valley and into the Gulf of Bothnia. Geographically, the municipalities/LAU2s of (from south to north) Haparanda, Övertorneå, Pajala and Kiruna in Sweden, and Tornio, Ylitornio, Pello, Kolari, Muonio and Enontekiö in Finland are the core region. Culturally and historically, the region can be expanded with the four Norwegian municipalities of Storfjord, Kåfjord, Kautokeino and Nordreisa, and the Swedish municipality of Gällivare. This case study refers to the *Torne Valley* as the expanded delineation of these 15 municipalities. The regional context of the Torne Valley has also institutional bases, as 14 of these municipalities (excluding Gällivare) form the border region of Tordendalsrådet/ Tornionlaakson neuvosto, one of the Nordic Council of Ministers Cross-Border Co-operation Committees.

The Torne Valley is characterised by geographic specificities of sparsity, mountains, coastal, municipalities with a significant island component, and border areas. About 114,000 people live in the region, resulting in an average population density of 1.5 people/km². Thus, it can be argued that sparsity is the main factor that has contributed to shaping the region's socio-economic development.

Socio-economic development

In 2010, economic development was relatively good; the increase in company turnover and employment, in particular, was faster than in many other regions in the countries, due to new activities, mostly related to mining or tourism. Even from the European point of view, the regional employment and unemployment rates are close to the average; compared to their respective national averages, both the unemployment rates and participation in various labour market measures are high.

The main sectors of employment are linked well to local assets. The natural resources provide opportunities for agricultural activities (mostly reindeer herding and fishing), forestry activities, and energy production (especially hydro-electricity). The unspoiled natural environment, with its unique geographic and cultural assets with Arctic elements, and preserved regional culture are important assets for tourism.

Metals and minerals are the main building blocks of on-going and expected developments in the region's employment and economy. The expansion, in terms of both turnover and employment, in the mining industry has been remarkable; most likely, employment in the mining sector will double by 2015, due to the opening of new mines in Pajala and Kolari. The impacts of mining on other sectors are of importance, as it is estimated that one new job in mining will generate two new jobs in other sectors. The expanding mining industry will also create investments in infrastructure, logistics and construction. On the other hand, mining projects, as well as other planned larger development projects in energy production and tourism, depend on external financing and foreign investors and are thus heavily dependent on international markets and the economic situation. Furthermore, the environmental impacts and possible resource management conflicts relating to mining activities make it hard to estimate the real employment and economy effects.

The main potential of the tourism industry is in adventure and experience activities. To date, the majority of tourism-related activities, especially outside the major resorts, are seasonal (e.g., skiing); but these can be seen as complementary to other economic activities, particularly primary production.

The main challenges to labour market development consist of the limited size and relative geographical isolation/segmentation of the local labour markets, a high long-term unemployment rate, labour mismatch and a level of dependency on natural resource extraction that is partly connected to the lack of "female jobs". The high seasonality of activities, especially within tourism, is also challenging, though the cross-border dimension can be seen as an advantage. These factors, combined with the aging population, are a challenge for providing services of general interest (SGIs) equally and profitably in the region; for example, the aging population have both increasing accessibility and health care needs, and the lack of education possibilities is increasing the outmigration of already low proportion of young people. There is also a challenge to find a qualified labour force to deliver SGIs, especially within the health care and primary education sector, but also for other social services.

Transport and ICT developments

The possibilities to provide SGIs equally and economically in a changing demographic and economic situation also relate to the character of the services. The mobility and accessibility of people and goods are challenged by the geographic realities, harsh climatic conditions, lack of public transport, and high transport costs. Thus, for example, within numerous local government services, such as employment and economic

development offices and the police, the role of *e-services* is crucial. In education and health care, the possibilities for e-services are more limited. The development of e-services limits, but does not eliminate, the need for travel in the sparsely populated areas.

People are dependent on private cars. Freight transport, on one hand, depends on good connections to foreign markets because the regional economy is strongly export-oriented and, on the other hand, on consumer goods imported to region, including the smaller settlements. The main freight flows to/from the Torne Valley follow a North-South axis. A well-functioning railway system and good maritime transport connections are crucial for the region's export-intensive industries of ores, timber, paper, pulp and metal and engineering industries. The rail network has reached its capacity in many places, leading to high sensitivity to disturbances. For the maritime traffic, the Bay of Bothnia is the logistic centre, but the importance of a year-round deep sea harbour in Norway will probably increase even more in relation to mining products. Air transport is crucial for passenger mobility, but most connections are only to national hubs and capitals.

To increase accessibility, new transport axis and projects, both north-south and east-west, have been planned but little implemented. An important transport project would be the further development of the Bothnian corridor linking the Swedish and Finnish sides of the Gulf of Bothnia and connecting the east-west and north-south trans-national axes in Sweden, Finland, Norway and Russia. In this sense, the Torne Valley could play a crucial role as a crossroads for freight transport from the European Arctic regions and Eastern markets.

Demographic structure and change

Long distances and scattered settlements characterise the human landscape of the Torne Valley. As the municipalities generally have large land areas, a better picture of the distribution of the population is at the settlement level (built-up areas). There are only two core cities in the region with over 10,000 inhabitants, Kiruna and Tornio. These cities, together with all the other five built-up areas with over 2,000 inhabitants, house over 50% of the region's population. Thus the settlement pattern is characterized by relatively densely populated inner cities and other settlements, either along the Torne River or near mines, and almost unpopulated hinterlands.

An age structure with a high proportion of old people, a lack of women (especially of working age) and out-migration are the main demographic challenges. The reasons mostly relate to a lack of education possibilities, a

low proportion of qualified jobs, and a high proportion of seasonal jobs. The lack of centres of regional importance as such is also a factor, as even the regional centres of Luleå, Rovaniemi and Tromsø are far away.

Over the last ten years, the population has decreased -0.7% per annum, i.e., by about 8000 people. However, at the municipal level there is quite a large spectrum of change: generally between the city municipalities, with natural increase or stable natural change, and the more rural municipalities in Finland and Sweden with natural decreases. Almost all municipalities had a negative average net migration balance over the last ten years. As 10% of the regional population change their place of living within the municipal boundaries during the year, the average annual net migration rate of -0.5% describes only a small part of the mobility. The high mobility is related to the large proportion of seasonal employment and the lack of higher education possibilities. In the Swedish Torne Valley, immigration has played an important role.

Out-migration from the region is selective in terms of both gender and age groups. In the working-age population, there are only 89 women to 100 men. The Finnish and Swedish sides of the Torne Valley have similar age structures. Compared to national averages, the municipalities are characterized by a low proportion of children and the younger working-age population, while the proportions of older working-age population and elderly population are high. The aging of the population, with a rapidly growth in the number of retirees, will hit the region rather heavily during the coming years. In addition, the proportion of children and younger people is low, especially outside the main cities. On the Norwegian side of Torne Valley, the population structure is similar to the national average but, as the Norwegian population is generally younger, the picture is rather different.

Identity and social cohesion

The Torne Valley is often cited as a region of its own. This highlights its cultural cohesiveness, in which the multilingual environment, family relationships, and the historical background, in particular, play a major role. The Finnish-speaking minorities in Norway and Sweden and the indigenous Sámi people in all the three countries are, in some areas, the majority of the population. Finnish was the majority language on both sides of the valley until the 20th century, and a minority language on the Norwegian side. Sámi was a minority language all over the region. In recent years, the linguistic and cultural unity on the Finnish and Swedish side of the River Torne has been recognised as Meänmaa (=our land). Meänmaa does not have as strict geographical focus as the Torne Valley

(as a word), and the movement is more popular on the Swedish side of the river, as it highlights Tornedalians as a linguistic minority as well as the cultural unity across the river. In addition, the rights of the Sámi people have increased and been more on the political agenda in recent years.

Environment: economic potential and protection

The Torne Valley has rich natural resources, from large mineral deposits, forests and renewable energy sources to natural landscapes characterized by river valleys, forests, and mountains. These are a major asset for the region's economic, employment and residential attractiveness.

There is a mutual dependency between the Torne Valley and the rest of Europe with regard to supplies of goods and natural resources. In recent decades, the global demand for minerals and metals has grown significantly, together with world market prices. Already almost 90% of the European demand for iron ore comes from Northern Sweden. Northern Sweden and Finland also contribute significantly to the production of gold, silver, zinc and copper in the EU. In the coming years, iron and other ore production – both expanding production in existing mines and opening new ones – will most likely drastically increase, creating new jobs and regional growth. In Northern Norway, the expanding oil and gas activities also affect regional development.

The existence of mineral resources can be a challenge in relation to other natural resource-related potentials such as forestry, reindeer herding, tourism, and also nature protection. The environmental impacts of the mines on nearby ecosystems can be significant, and thus environmental impact assessment is a crucial element of planning new mines. Large areas are under different types of protection, such as national parks and reserves. This spectrum of various types of protected areas provides evidence of the region's environmental value, but also implies the need for guidelines for development plans, as different types and levels of protection allow different types of other resource uses in the area.

The Torne Valley is a significant producer of renewable energy. To date, hydro-electricity is the dominant energy source, but there is also an important potential for wind power, especially in the mountain areas, as well as biofuel production from the forests and other sources. The main obstacle is the limited capacity of the existing power grid.

Conclusions

The Torne Valley is located in the middle of Europe's largest sparsely populated 'territory'. Thus, it has all the 'regular' natural attributes of SPA: a harsh climate; the role of topography (mountains and Torne river) in the settlement process; the role of natural resources in local economic development; and imbalances of both gender and age in the demographic situation. There are also challenges related to the provision of services, especially in the parts between the local centres. In this respect, new forms of governance – such as inter-municipal partnerships, public-private partnerships, cross-border service areas or better use of e-services – may provide means to make service provision less costly for the providers and more efficient and accessible for the customers. The availability of large areas of unspoilt nature may act as a driver for developing adventure or experience tourism. The long-term sustainable use of resources is important. The ongoing development projects, mostly related to mining activities, can be seen as both a potential and a challenge for the region, as the sparse regions require an economic boost to turn the demographic and socio-economic trends to a positive direction; but the necessary investments, relying on external capital, are heavily dependent on the global situation.

The development of cross-border relations in the Torne Valley acts as a driver for local economic development, especially by forcing actors to think 'outside the box', as they need to integrate two (at least) different economic systems. Contrary to most other SPAs, the Torne Valley can position itself as an interface region for a wider trans-national area extending beyond the Arctic Circle, the Barents region. Although the cross-border dimension allows the development of new types of businesses and personal services, the region has also new prospects concerning the exploitation of natural assets. This is the main focus of future development, as shown by the future opening of mines in Pajala and Kolari. Consequently, it is likely that the extraction of underground assets will play an important role in the region's medium- and long-term development. The long, even historic, traditions of cooperation have created rather similar working and social cultures, and thus linguistic or currency related obstacles are not as critical as in many other cross-border regions.

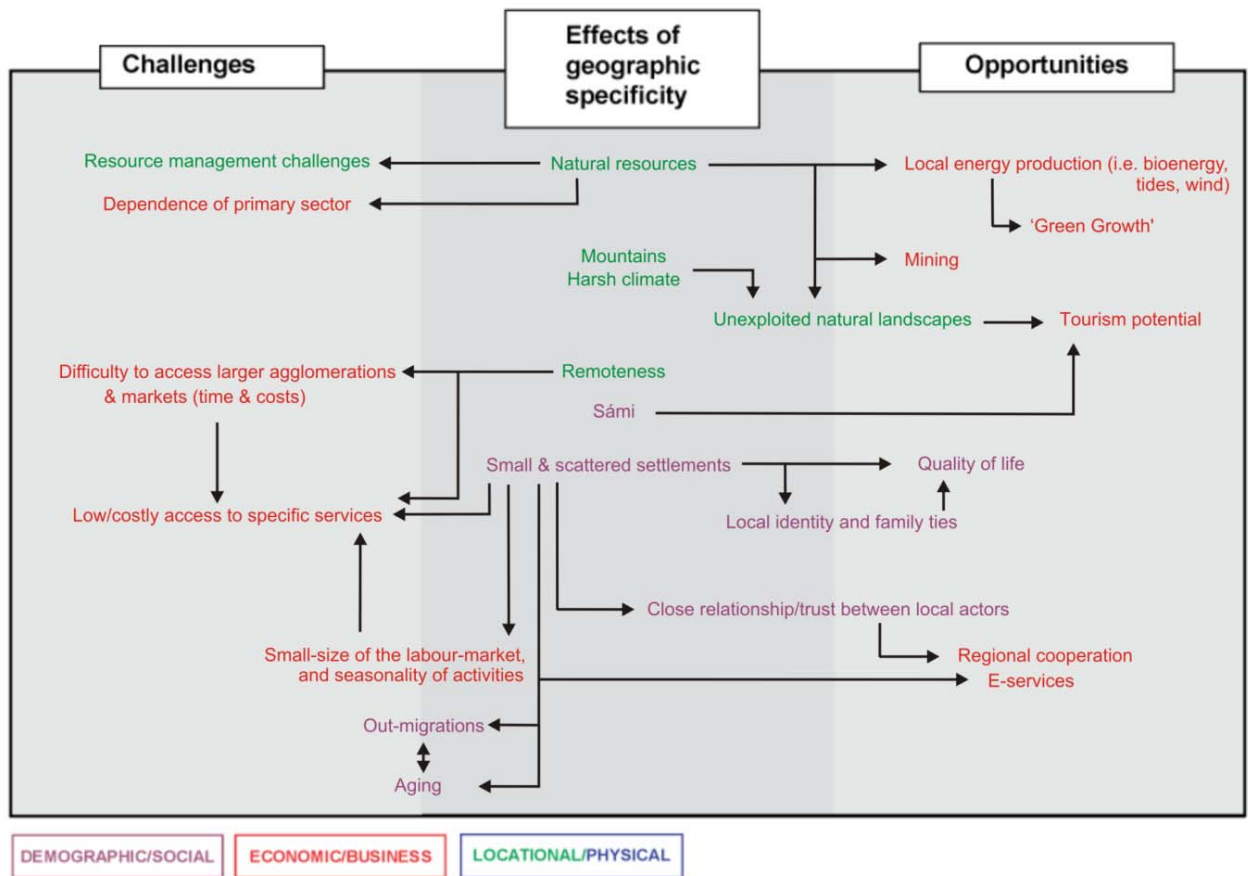


Figure 41 Torne Valley nexus model

Central Spain: Cuenca, Soria and Teruel

The issue of *sparsity* represents an important issue in the context of Spanish regional policy. 9.5% of Spain's land area can be classified as *sparsely populated* at the LAU2 level, using the delineation used in the GEOSPECS project, and 7.7% of the land area can be characterised as *poorly connected*. However, despite the spatial significance of the phenomenon, sparsity has never been approached in a direct way in Spanish regional policy. In the national context, the terms that have been used traditionally are *Less favoured Areas*, or more recently *depopulating areas*, often related to *rural development*.

This case study addresses the development challenges and opportunities of the territory consisting of the provinces of Cuenca, Soria and Teruel. These provinces belong to three different NUTS2 regions (*Comunidad Autonoma*, Autonomous Community), the main regional administrative level in Spain. Cuenca belongs to Castilla-La Mancha, Soria to Castilla y León, and Teruel belongs to Aragon. However, these three provinces

belong to one Sparse Territory, located between the cities of Madrid, Zaragoza, Valencia and the region of Catalonia.

Cuenca, Soria and Teruel have traditionally been disadvantaged regions with remarkable population decreases in Spanish context. In recent years, all three provinces have witnessed an increase of total population and, since 2009, Cuenca has been above the population density threshold of 12.5 inh./km² by which the Green Paper on Territorial Cohesion defines sparsely populated regions. However, this population increase is concentrated in the regional centres and other cities.

Sparsely populated regions need also to be analysed in relation to the national territorial context and its urban system. SPAs in Spain are surrounded by some of the country's largest cities in terms of population (Barcelona, Madrid, Valencia and Zaragoza). Thus, their location between the most important poles of attraction - in terms of economic activity, services and socio-economic development - is one of their largest challenges, but also their main opportunity.

Socio-economic development

Teruel and Soria have had some of the lowest unemployment rates in Spain, both before and after the crisis. The unemployment rate in Cuenca is also below the national average. The youth unemployment rate in these regions is also lower than in Spain on average. The main reason is the economic structure of the regions. The main sectors of employment - agriculture and public services are not so influenced by economic turbulence. Agriculture is still significant in the Spanish SPAs in terms of both economic output and employment: gross value added and jobs in agriculture sector are of much higher than the Spanish average, and the role of service sector is less. Moreover, these provinces have a good level, for Spain, of welfare production. Hence, the provinces are not lagging in socio-economic terms.

Nevertheless, agriculture is heavily subsidised, essentially through Pillar II of the CAP. The relative importance of Pillar II suggests the need for efforts to support rural communities to diversify to other activities: either other land-based activities (e.g. forestry) or activities with potentially greater value-added (e.g. processing of agricultural goods, tourism).

The mining sector has been historically an economic engine for the provinces of Soria (Castilla y León) and Teruel (Aragón). However, a number of mines have been closed or are expected to be in operation only until 2018 after the recent decision of EU industry ministers to cut coal mining state subsidies. This process is expected to have serious effects on both direct and indirect employment in the affected areas.

Many localities in these SPAs have a population structure with a large proportion of elderly people, compared to the Spanish and EU averages. On one hand, aging of the population leads to an increasing need for health and caring services. It also adds challenges in terms of accessibility. Policy makers and planners assume that most local travel is by car, and thus the mobility problems of people who cannot, or can no longer, drive are not addressed. On the other hand, the decreasing number of children is of concern, particularly in the most remote settlements. The closing of schools has large impacts for their development that the transport of pupils to the closest settlement cannot solve.

One potential solution to address the issues of service provision is related to structure and administrative reforms in Spain. A new intermediate level, *comarca*, between those of municipalities (LAU2) and provinces (NUTS3) has been established in order to deal more appropriately with such issues. Other potential actions are operationalised through public-private partnerships. Although the issue of provision of basic services has improved in some parts of these SPAs, it occurs mainly in the local centres, while the situation of rural remote areas has worsened in comparison.

In addition to the landscape, the civil, military and religious heritage of the regions are seen as assets for attracting visitors. The well-preserved and significant cultural and monumental legacy of the old medieval city of Cuenca and the Mudéjar architecture in the city of Teruel has led to the designation of these cities as UNESCO World Heritage Sites. However, most tourism to the area is domestic, often short-term and with important seasonal variations (mainly in summer).

Transport and ICT developments

Traditionally, Spain's road and rail transport infrastructures have been highly polarized towards the main agglomerations, with dense transport corridors between them. Thus, areas in between have limited access to these main communication infrastructures, even if they seem to be near in purely geographical terms. This is the case for the case study region, as it is surrounded by some of Spain's major agglomerations. Even if the travel distances from the SPAs to these major Spanish cities are beyond the daily commuting possibilities (45 minutes), the inadequacy of the transport infrastructure makes these time-distances longer than expected. In that respect, important developments are planned, especially to improve the connectivity of the local centres of the sparse territory to the surrounding agglomerations. A new motorway is planned for the capital

cities of Teruel and Soria, to improve their access to Madrid and other important cities such as Burgos, Zaragoza and Valencia. Some rail transport will be improved: the line from Zaragoza to Valencia via Teruel will be developed, and a new track from Soria to the Madrid-Zaragoza line is planned. However, such improvements, although favouring the case study area as a whole, may weaken the relative accessibility of its remote rural parts.

The concrete example of the creation of a company in Teruel that started on-line sales of its cutlery shows the potential of ICT in mitigating the effects of physical remoteness for business development, and thus as a source of growth for the local business community. Being in the on-line market may thus enable firms to reach out to customers beyond the regional economy; in the case mentioned above, mainly in Latin America. This experience cannot serve, as such, as a blueprint for the development of firms throughout the case study region. However, it provides a concrete example of how access to ICT can help development opportunities to materialize and lead to growth.

Demographic structure and change

The provinces of Cuenca, Soria and Teruel have experienced overall gains of population during the last decade, especially due to positive net migration bolstered by immigration. This trend follows four decades of rural exodus that have affected all Spanish SPAs significantly, with a loss of up to 40% of the population. This exodus particularly affected young people who moved toward major cities and other regions looking for better socio-economic conditions and job opportunities. The result was a loss of young people from the SPAs, exacerbated by the fact that, compared to previous decades, many young people who left the regions did not return. The return migration of elderly people in recent years has accentuated this unbalanced demographic structure. As out-migration was dominated by women, this had a significant effect on the gender balance in the case study region.

Even though the total population in the SPA regions as a whole has increased in recent years, the imbalance between urban and rural municipalities has continued to grow. The main increase in population has taken place in the largest settlements in the regions and their close surroundings. At the same time, the population of most small settlements has decreased.

The increase in total population in the SPAs is essentially a result of increasing immigration, as both domestic net migration balance and natural population change are negative in all the SPAs. Thus, the case

study regions appear to be *transitory labour-markets* for newcomers. This can be due to the relative importance of the primary and secondary sectors in these SPAs, providing opportunities for low-skilled jobs, for which the competition with 'born Spaniards' is less than in the service sector in metropolitan regions.

In conclusion, the most important demographic processes in the SPAs are ageing, increasing gender imbalance and internal migrations which have increased disparities *within* the Sparse Territory; these processes have occurred in small and dispersed localities, while the main local centres have experienced the opposite trends. Thus, SPAs are faced with the societal repercussions of both demographic loss from their rural parts, and growth of its local centres.

Social cohesion and identity

The Sparse Territory of Central Spain encompasses three regional Communities, which form a strong level of government in the Spanish policy system. Being both divided by the administrative system and peripheral in regional terms, the recognition of sparsity as a major issue for policymaking has led to the development of alternative, grassroots movements, the most emblematic being "Teruel Existe" ("Teruel Exists") and "Soria Ya!". These movements, representing bottom-up approaches striving for better territorial governance for the SPAs, aim to draw the attention of regional and national policymakers towards the specific needs of the SPA to ensure long-term local development.

Environment: economic potential and protection

Spain has some of the most important mineral resources in Western Europe. However, those of potentially global importance are not within the Spanish SPAs. In Teruel and Soria provinces, the exploitation of coal is still substantial. Due to the large scale of its exploitation, the activities have left their mark on the local landscape and cultural heritage.

Compared to other regions in Spain, a relatively large proportion of the SPAs is forested, and the cover has been increasing due to land abandonment. Forests and forestry resources are mostly considered in context of decreasing agricultural land use and potential for biofuel production. Wind energy is also a promising prospect for the production of renewable energies.

The forests and other natural and semi-natural landscapes also have natural value, and potential for larger scale recreational and tourism activities. As for all European SPA, the case study region is characterized

by a limited extent of human activities and large untouched spaces, so that few areas are subject to a direct environmental impacts. Even if the number and land area of formally protected areas is small, a remarkable share of these SPAs has been designated within the Natura2000 network – especially the mountain area between Cuenca and Teruel. The main challenge of the protected areas is related to the conservation of their biodiversity and the spatial connections between natural areas, as the number of endangered species has risen in recent years.

Even though the SPAs are famous for some of their agricultural products, such as wine, olive oil and ham, major challenges such as water availability, soil depth, and temperature variations do not permit large-scale exploitation and development of agricultural production. In this context, the development of niche agricultural products seems to be the way forward; one of these niches is ecological agriculture.

The Nexus Model and concluding remarks

The case study shows that the challenges the Spanish SPAs are similar to those of other SPAs in Europe (i.e. Northern Scotland and Northern Norden). Demographic decline, relative geographical and functional isolation, and the small size of the local and regional economies seem to be structural constraints for the growth potential of these areas. With regard to development opportunities, the case study emphasizes the fact that natural assets ought to play an important role for the diversification of local and regional economies in the Spanish SPA. Interesting development prospects are, for instance, small-scale ecological agriculture, wind energy and biomass. Other traditional activities, such as mining, have more limited prospects due to environmental constraints.

This case study region contrasts with other SPAs in Europe in terms of their close geographical proximity to main agglomerations, as it is located between the cities of Madrid, Barcelona, Valencia and Zaragoza. Historically, this 'strategic' position has turned out to be a disadvantage for the region, as the major investments, especially in terms of transport, were made around or through the SPAs in order to connect these cities.

Another point of distinction is the rather weak governance position of the Spanish SPAs. Located at the margin of three to four regions and provinces, it is difficult for the local actors to make their voices heard in a highly regionalized governance system. This situation is rather different from the Scottish and Nordic cases, where formal authorities have prerogatives on the topic, through respectively the Council of Highlands and Islands and the NSPA Network. Being fragmented and peripheral with regard to the regional policy system, the development of grassroots

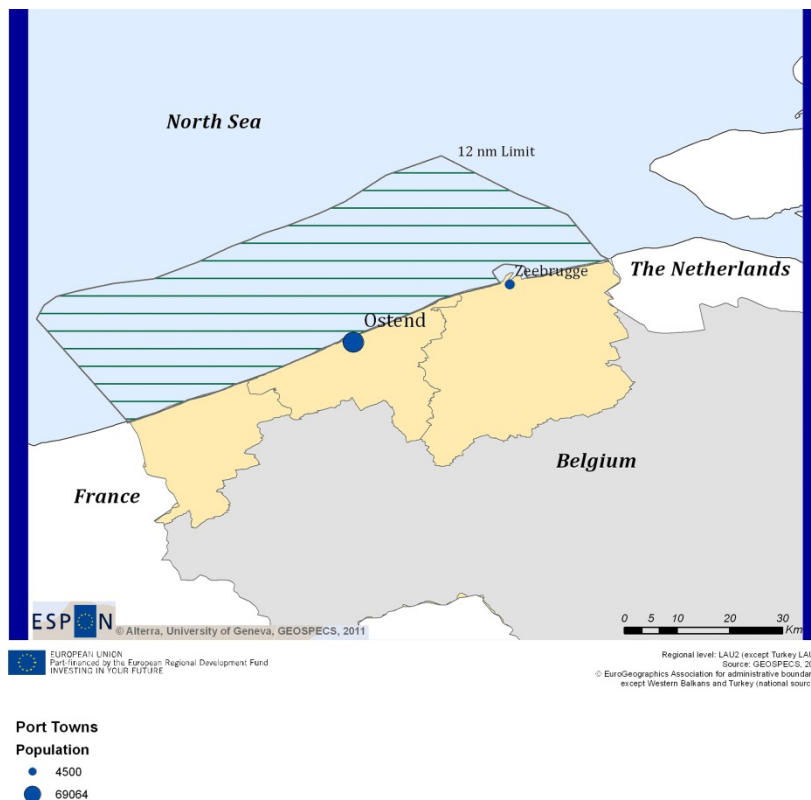
movements have managed, to a certain extent, to put these areas 'back on the map' by supporting projects that improve their connectivity. Yet, to date, this mainly benefits the regional centres, such as Teruel or Cuenca, which have shown signs of growth, at the expense of the more rural remote parts of these SPAs.

Figure 42 Central Spain nexus model

5.2.4. Coastal areas: Case study reports

Belgian coast

The Belgian coast borders the North Sea. The boundaries of this study area are those of the NUTS 3 administrative areas that have a border with the sea. The two ports of Zeebrugge and Ostend are the main industrial centres along the coast, which hosts one of the densest levels of human and industrial activity in Europe (CARLISLE et al., 2008; LE ROY et al., 2006). Approximately 0.4 million people (4% of the Belgian population) reside in the ten municipalities of the immediate Belgian coast, with an added summer influx of 0.3 million people (LEBBE et al., 2008). The Belgian part of the North Sea lies in the centre of some of the most heavily used marine spaces in the world (LE ROY et al., 2006; DOUVERE et al., 2007). Activities include merchant shipping, extraction of marine aggregates, energy production, military, fishing, aquaculture and tourism (KELLENS et al., 2011; BELPAEME et al., 2011; BOGAERT et al., 2009). The intensive use of the coast and offshore environments has led to problems of ecosystem health.



Map 56 Case study area: Belgian coast

Economic structure: In 2006, Belgian maritime activities directly employed 49,000 people and a further 81,000 indirectly (NELISSEN & NEVALA, 2006). Historically, agriculture and fishing dominated the coastal economy (CARLISLE et al., 2008). The continued growth of urban zones

and transport infrastructure is increasingly encroaching on agricultural land. Though the Belgian part of the North Sea is an important spawning and nursery ground for several commercial fish species (e.g. sole, plaice, dab, cod and whiting) (LE ROY et al., 2006; DOUVERE, 2005), fishing activity has undergone severe downscaling as a result of stock depletion, overcapacity and poor policy measures (BELPAEME et al., 2011). Fishing as a sector now contributes only 0.02% to GDP (DOUVERE, 2005). Marine aggregates also represent a growing element of the Belgian coastal economy (VAN DEN EYNDE & NORRO, 2009; LANCKER et al., 2007). Sand, and to a lesser extent, gravel exploitation on the Belgian Continental Shelf began in 1976 and has since quadrupled to approximately 1.9 million m³ per year (VAN DEN EYNDE & NORRO, 2009). However, the dominant sector is tourism, followed by shipping.

Tourism: Though it has experienced recent decline, tourism remains the largest economic sector on the Belgian coast (BELPAEME et al., 2011; FLEMISH GOVERNMENT, 2010; CARLISLE et al., 2008). In 2006, an estimated 9,000 people were directly employed in tourism (NELISSEN & NEVALA, 2006), and a further 10,000 people indirectly (BELPAEME et al., 2011). This amounts to approximately 24% of the coastal region's employment (BELPAEME et al., 2011). Much of the tourism activity of the coast is centred around soft recreation: cycling, walking, horse riding and pleasure cruising (BELPAEME et al., 2011). The maritime heritage also draws visitors. The history of Flanders is intertwined with that of the sea, as evident in land reclamations, the abundance of maritime architecture (e.g. lighthouses, fishermen's houses, hotels, museums), the history of maritime trade, and the long military heritage (BELPAEME et al., 2011).

The tourism industry has had several far-reaching effects on the physical environment of the Belgian coastal zone. The most immediate is the urbanisation of the coastal strip. Historically, small settlements dotted the coastline, but gradually these settlements became connected. The modern Belgian coastline is essentially a large, linear conurbation (CARLISLE et al., 2008), characterised by a severe alteration of the natural environment and significant ribbon developments of apartment blocks (BELPAEME et al., 2011; DE RUYCK et al., 2001). Due to the intense pressure placed on the coast by tourism, it is believed that as much as half of the coastal dunes have disappeared (KELLENS et al., 2011).

Accessibility & transport: Due to its centrality and function as a 'crossroads' for the European core economic area, the Belgian coast derives much of its Gross National Product (GNP) as a focal point for distribution and logistics (BELPAEME et al., 2010; CARLISLE et al., 2008). Ports play a large role in the economy of the country as a whole. Foreign trade accounts for over two thirds of Belgium's GNP (LAGNEAUX, 2005). With many of the major roads becoming heavily congested, it is widely considered that ports and river transport offer a valuable alternative for

the transport of goods, both internally and internationally (LAGNEAUX, 2005). In 2003, the direct value-added (VA) of Belgium's maritime ports amounted to almost €11.5 billion, and employment was approximately 239,000 full-time equivalents (LAGNEAUX, 2005). The dense road infrastructure is an integral part of the success of Belgian ports. A high capacity road network transports goods efficiently and quickly from the coast to the hinterland of Belgium, where the main population centres such as Brussels and Ghent are located.

Important industry has also developed around the Belgian maritime ports. The metal-working industry is the most significant industry in the port of Ostend. In Zeebrugge, naval activities and electronics manufacturing are the largest VA contributors (LAGNEAUX, 2005). However, the shipbuilding industry has experienced the most dramatic decline in the last few decades, falling from over 10,000 employees in 1975 to around 900 in 2003 (NELISSEN & NEVALA, 2006).

Demography: Population densities on the coast vary from 350 to over 2000 per km² (BELPAEME et al., 2011; KELLENS et al., 2011). Prior to the substantial rise of tourism around the mid-20th century, the coastal strip was relatively sparsely populated. Nowadays, in some resorts, the proportion of second homes is as much as 80% of the housing stock; on average, it is around 40% (BELPAEME et al., 2011).

The population is ageing. This trend is the consequence of two factors: the influx of retirees and the outflow of younger people. As a result, there has been an increase in property prices. Recent government policy has attempted to realign the demographic structure with the provision of affordable housing.

Owing to the low-lying nature of the polders of the coastal hinterland, both the permanent and transient populations on the Belgian coast are constantly at risk of flooding and storm surges (KELLENS et al., 2011; MERTENS et al., 2010; LEBBE et al., 2008; VERWAEST et al., 2008). Human habitation along the coast has led to radical structural changes to the natural coastline in the form of hard coastal protection, which accounts for two-thirds of the coastline (VERWAEST et al., 2008).

Biodiversity: The Belgian coast, though very small, comprises a diverse range of geological features that form important habitats (BOGAERT et al., 2009). The offshore environment contains a sequence of sandbanks in the shallow sea, while onshore the coast is mainly made up of sandy beaches, mudflats, salt marshes, sand dunes, fossil sand dunes and polders, many of which are Natura 2000 sites designated under the EU Birds and Habitats Directives (HERRIER et al., 2005). However, many of these features are interrupted by artificial coastal protective structures, such as dikes and seawalls, and other hard structures, such as buildings and

roads. Of the 67 km coastline, 35 km is protected by dikes (DE RUYCK, 2001).

Many human activities have had impacts on the natural environment of the Greater North Sea coasts. Most notable are the effects of fisheries and eutrophication, but changes in the environment caused by exploitation of mineral resources, shipping, chemical contamination, construction, tourism and dredging are also important (OSPAR COMMISSION, 2000). Of the terrestrial systems, salt marshes and sand dunes are most vulnerable. The Zwin tidal inlet is an example of an ecologically important area that is also of economic importance. The Zwin is one of the most visited tourist attractions along the Flemish coast. It is one of the most popular birdwatching areas in Belgium, and one of only two intertidal saltmarshes in the coastal zone. Today the Zwin is mostly silted up, as sedimentation made it too shallow for navigation (CHARLIER, 2011). It is in danger of complete siltation due to past beach replenishments at Knokke-Heist in 1977 and 1986, and the construction of new container terminals in the adjacent harbour of Zeebrugge (DEVOS, 2008).

Renewable energies: In the Belgian marine environment, wind energy is one of the most important economic sectors (LE ROY et al., 2006). The number of wind turbines installed in Flanders increased approximately five-fold from 1997 to 2007 (TOLON-BECERRA et al., 2011). Belgium currently has the fourth highest installed offshore wind capacity in Europe, with a total capacity of 188 MW (LEUNG & YANG, 2012). Though the high wind speeds in the Belgian offshore zone are conducive to electricity production, the sector is still to be fully developed (ODE VLAANDEREN, 2008). As a result of a Royal Decree in 2004, 263.7 km² were reserved for the generation of electricity in the Belgian part of the North Sea (BRABANT et al., 2011).

Studies have demonstrated that the most significant obstacles relating to the installation of new wind turbines are issues of social acceptance at a local level (VAN ROMPAEY et al., 2011; TOLON-BECERRA et al., 2011). Concerns include aesthetic impact, bird mortality, noise and flicker. Such challenges provide ample opportunity for further growth in the offshore wind farm development and to meet renewable energy targets.

Climate change: Over 85% of Belgium's coastal zone is below 5m in elevation (VAN DER BIEST et al., 2008). Mean sea levels have risen at an average of 15 mm per decade over the last century (LEBBE et al., 2008). Projected regional sea-level rise is thought to be of the order of 40 to 70 cm by 2100. Studies have also estimated increases in storm frequency by about 30%, and winter rainfall by 10% (LEBBE & VAN MEIR, 2000). Hence, Belgium is considered to be one of the most vulnerable countries in Europe in terms of the potential impacts of climate change (EEA, 2006).

Climate change is expected to increase flood risk, storminess and beach erosion along the Belgian coast (INGLE & DE SUTTER, 2009; MERTENS et al., 2008a; VAN DER BIEST et al., 2008). Despite the natural and artificial defence structures, the polder hinterland is highly vulnerable to changes in sea level and inundation due to storms. Rising sea levels may result in the salination of groundwater resources: this is considered a major risk in Belgium's coastal plains (LEBBE et al., 2008).

The economic costs of the effects of sea level rise are considerable. About €25 million is spent each year on maintenance of, and investment in, coastal defences along the Belgian coast (LEBBE et al., 2008). For example, between 2004 and 2007, the Belgian coast was replenished with 2.7 million m³ of sand (EUROPEAN COMMISSION, 2009). A number of expensive projects are currently being conducted, including the improvement of the coastal protection at Ostend at a total cost of €55 million (EUROPEAN COMMISSION, 2006).

ICZM: Many perceive the lack of integration in coastal management policies between various government levels and municipalities as the most serious failure in tackling coastal zone issues (DE RUYCK et al., 2001). The governmental institutions responsible for the management of the coastal zone are vertically and horizontally fragmented; this, coupled with the regulatory split between land and sea management, creates obstacles to achieving adequate integrated coastal zone management (ICZM) (BOGAERT et al., 2009). However, as an EU Member State, Belgium has agreed to adopt the principles of the 2002 Recommendation on ICZM. In reality, coastal zone management in Belgium has existed since the beginning of the 1990s. The Recommendation has ensured closer consultation and stronger integration of coastal zone management, and has led to closer cooperation inside and between federal, regional (Flemish) and provincial administrations. There have been a number of important steps in the Belgian ICZM process, including the establishment of an ICZM 'Coordination Point' and sustainability indicators for the coast (the Coastal Barometer) and, in terms of protection against the effects of climate change, an Integrated Master Plan for the coastal safety of Flanders.

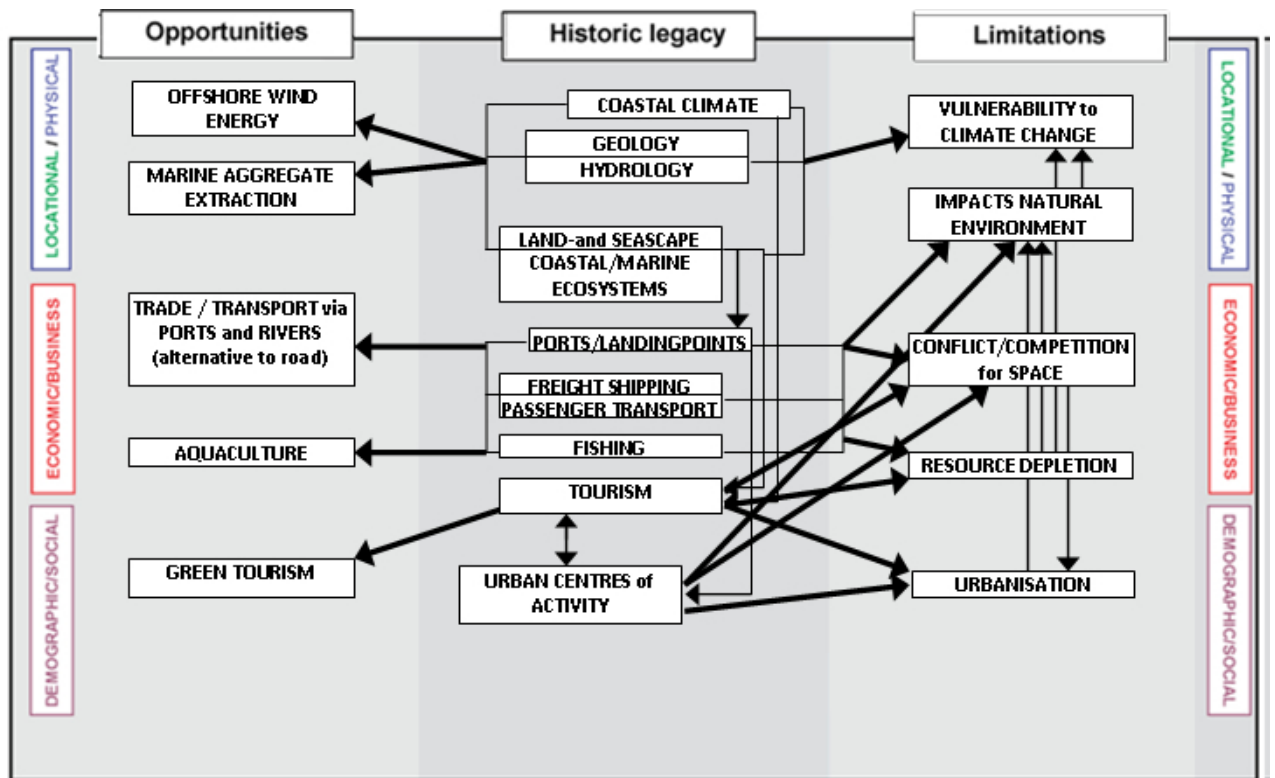
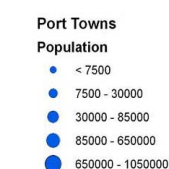
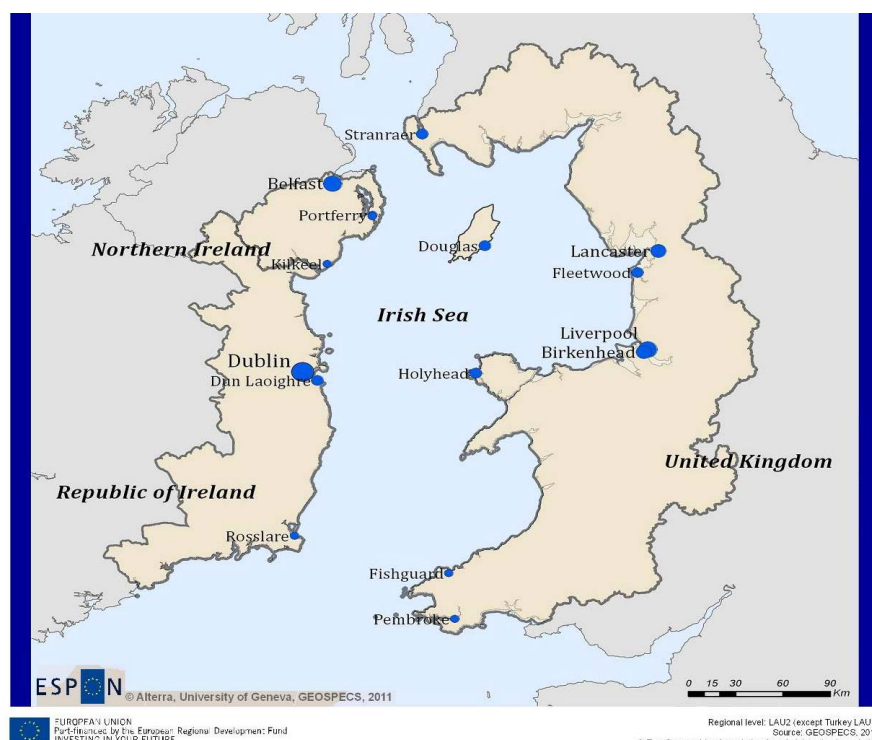


Figure 43 Nexus model Belgian coast

Irish Sea

This partially enclosed sea functions like an inner sea between Ireland, Northern Ireland, Scotland, England and Wales. The shallow sea (20m to 100m depth) borders two international jurisdictions: the Republic of Ireland and the United Kingdom. The case study area is delineated by the administrative boundaries corresponding to the NUTS 3 regions that include the coastal zone framing the Irish Sea.



Map 57 Case study area: Irish Sea

Economic structure: In general, the economy of the Irish Sea region is dominated by shipping (passenger transport and freight trade), tourism and, increasingly, the energy sector. All of these activities rely on the medium of the sea and a coast that can facilitate a variety of economic activities in relation to industrial development, workforce and natural environment.

The Irish Sea includes important fisheries and aquaculture areas (particularly seed mussels) (SUTTON et al., 2008). By 2002, due to declines in stock and quota restrictions, employment in the fishing industry had dwindled to 1-2,000 people, with a turnover of €86 million

(VINCENT et al., 2004). Many fishermen have since diversified into other industries such as tourism and mariculture (DEVOY, 2008). In 2001, the value of the mariculture industry to the Irish Sea regional economies was €18.5 million (VINCENT et al., 2004).

Ports are important for both countries: The vast majority of Britain's trade (95%) is conducted through its ports and, in the Republic of Ireland, 90% of imports and exports came via maritime transport in 2006 (HYNES & FARRELLY, in press). The majority of Ireland's important ports are along the eastern seaboard, primarily as a consequence of historical trade links with the UK. Today, the UK remains the largest importer of Irish goods, and thus Irish ports are vital to the economy of the Irish Republic.

Traditional-style, heavy-manufacturing industries in Ireland (e.g., steel, shipbuilding, and automotive manufacture) were linked to coastal and dockland sites (e.g., Belfast, Dublin and Arklow), but these have either been closed or are of much reduced significance.

Tourism: In the UK, revenue from seaside tourism amounts to approximately £17 billion per year, underscoring the overwhelming importance of tourism and recreation at the coast. Irish marine activities follow a similar overall pattern to those of the UK, although the values are proportionally smaller. Visiting coastal areas and taking part in water-based activities are significant attractions for tourists coming to Ireland (FÁILTE IRELAND, 2007); a survey in 2003 showed that Irish domestic water-based tourism generated nearly half (45%) of the overall domestic tourism returns (MARINE INSTITUTE, 2004). The close proximity of the coastlines of Ireland and the UK makes the Irish Sea accessible to a large number of cruising boats.

However, the importance of tourism is declining with the economic downturn and cheap availability of air travel: Irish Sea resorts such as Morecambe and Blackpool are being abandoned in place of sunnier destinations such as the Spanish Costas, the Canary Islands and France.

Demography: Historically, people settled on the indented European coasts that provided natural harbours, which can be found especially on the coasts of Great Britain and Ireland, encouraging trade, fishing and water transport (HAY, 2003). Ireland's largest urban centres are either port towns or located directly on the coast: 34% of the total population of Ireland (Republic and Northern Ireland) lives within 5 km of the coast, and 50% within 15 km of the coast (DEVOY, 2008). In Great Britain, the major historical settlements were the manufacturing centres of the industrial revolution, and cities developed in areas where natural resources were exploited, not necessarily in coastal areas. While port towns had huge importance for trade, in the English part of the case study area larger concentrations of towns can be found much further inland.

Holiday and second homes catering for domestic and international tourism markets have been built in parts of the case study area that have been traditional holiday destinations. These destinations developed because of their proximity to the coast and the rural coastal landscapes, perceived as attractive (KEAVENEY, 2007). Most holiday and second homes in the Republic of Ireland are within coastal areas, which have had continually higher housing densities than other areas. Studies suggest that this is due to the influence of conducive natural terrain for the construction of homes, and the desire of a newly-affluent society to live in areas of high scenic value (KEAVENEY, 2007).

Much of the in-migration to the coastal zone involved more affluent elderly people and retirees, mostly from larger urban areas. Coastal town populations, particularly in the UK, are skewed towards older age groups (BEATTY et al., 2008). The proportion of the population over 65 years of age residing on UK coasts is 5% higher than the national average.

The general consensus is that the impacts of second and holiday home development are negative, particularly in the Republic of Ireland (NORRIS et al., 2010; KEAVENEY, 2007; QUINN, 2004), resulting in a plethora of "ghost" estates affecting the socio-economic and environmental systems of the coastal zone. One example is Courtown on the Irish Sea coast, the largest resort in north County Wexford. In summer, it is estimated that 3-4,000 tourists stay in the resort, which has a permanent population of under 400 (QUINN, 2004). As a result of the expansion of housing, the water supply and sewage treatment facilities in the Courtown area experienced significant problems. Second and holiday home development impacts also include landscape intrusion, proliferation of septic tanks and groundwater pollution, increased car traffic, urban sprawl, and the decline of smaller coastal villages (NORRIS et al., 2010).

Biodiversity: The coastal areas contain a diversity of habitats such as dunes, machair, salt marches, lagoons, mudflats, and tidal and sub-tidal areas that support unique plant and animal communities (HERITAGE COUNCIL, 2006).

The natural environment faces a number of threats: sea-level rise, coastal erosion and habitat loss resulting from human activities and uses (COOPER, 2009). Coastal and marine habitats suffer from nutrient runoff, caused by farming practices, that can also affect commercial aquaculture sites. Fishing activity is the most important human pressure in terms of its spatial extent and level of impact on the UK marine environment (STELZENMÜLLER et al., 2008). Habitats in the Irish Sea are rapidly being transformed and even destroyed by fishing gear, such as trawls and dredges. Industrial-scale fisheries have largely been responsible for the

reduction of larger fish species to a fraction of their previous numbers and biomass (ROBERTS et al., 2003). Models suggest that Celtic and Irish Seas cod stocks, for example, may disappear completely by 2100.

Natural resource exploitation: Ireland, in particular, is well-suited for renewable energy production given its geographical location, with some of the best wind and wave conditions in the world. Furthermore, the Irish Sea is close to areas of major electricity consumption (i.e. Dublin, Belfast, Liverpool, Manchester, Glasgow), in which adequate electrical infrastructure already exists (SEAI, 2010). Though Ireland's west coast experiences greater wind strength, the cost to transport the energy to these centres of consumption would be considerable. In addition to this the Irish Sea is a relatively shallow sea and, as such, is more conducive to the erection of wind turbines. The Irish and UK governments have recently announced huge increases in developments of onshore and offshore wind farms. It has been estimated that, by 2020, windfarms will occupy 254 km² in the eastern Irish Sea (VINCENT et al., 2004).

Wind energy remains the main form of renewable energy for the future as, in comparison, the Irish Sea is largely sheltered from the primary wave resource of the Atlantic Ocean.

In term of other resources, the Irish Sea possesses significant natural offshore mineral resources: typically in the form of hydrocarbons and marine aggregates. However, there has been relatively little exploration levels in the last decade (DCENR, 2011c). Marine aggregates, such as sands and gravels sourced from the seabed, are an important economic resource (SUTTON et al., 2008), mainly used as infrastructure materials, e.g. for buildings, roads and bridges.

Irish Sea: Nexus of development factors

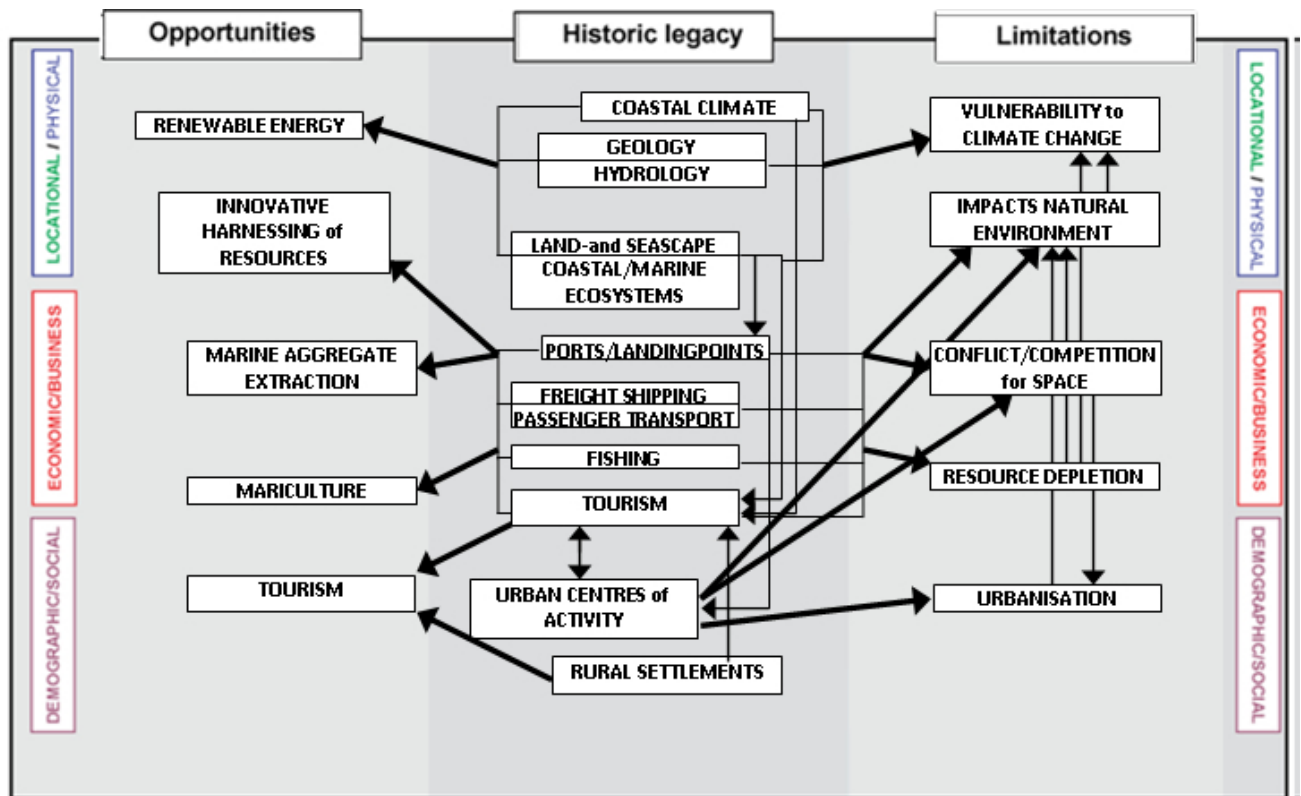


Figure 44 Irish Sea nexus model

5.2.5. Border areas: Case Study Reports

Among the 20 areas which GEOSPECS examined more in-depth in form of a “complete case study” or an “additional case”, four cases addressed border areas and border-related aspects primarily¹³³, and another eight cases also covering internal or external EU-borders analysed such aspects only at a secondary level.¹³⁴ The main findings are now presented for each border area case individually and for the other cases in form of an overall summary.

The Czech-German-Polish border

Along the borders of the Czech-German-Polish “Three Corners Region”, quite significant economic discontinuities exist which have their deeper roots in the transformation processes starting after the fall of the Iron Curtain in 1989/1990. The general transformation of the centrally planned economies into market economies also induced in these border areas deep changes of their economic structure and of their population structure.¹³⁵ In 2009, all three sub-areas of the Three Corners Region still showed generally higher levels of unemployment than the average for their respective countries. A comparison of the border areas also shows a great gap in the per capita GDP between the German sub-region, on the one hand, and the Polish and Czech sub-regions on the other. This GDP per capita gap, as well as the unfavourable economic development in some border areas by comparison with their respective national averages, is also the result of other influencing factors. These are mainly the structural particularities resulting from the transformation of central administrative systems into more decentralised governance systems, but also the effects resulting from an opening of the borders and from persisting linguistic and cultural barriers.

As regards the latter, a number of studies on cross-border co-operation in the Czech-German-Polish area show that these linguistic and cultural barriers result from a long-lasting deficit of cultural and social exchange in the region. They continue to generate strong socio-cultural lines of division in the area which constitute one of the most prominent political

¹³³ The Czech-Polish-German border (case study); the Polish-Ukrainian border (additional case); the Luxembourg and Geneva cross-border metropolitan regions (case studies).

¹³⁴ i.e. Jura Massif, Tatra Region and West Stara Planina (mountain areas); the Irish Sea and the Belgian Coast (coastal areas) and to some extent also Sicily (Islands); Torne Valley (sparsely populated area); French Guiana (outermost region).

¹³⁵ A large number of jobs were lost in the most strongly affected sectors of industry & mining, which caused a generally high level of unemployment and a high rate of out-migration and also a reduction in the number of births.

and societal challenges. If this challenge remains unaddressed, it will not only hamper cross-border interpersonal contacts but also negatively affect the socio-economic dimension of cross-border co-operation. For this reason, the Three Corners Region should much more strongly enhance the multilingual capacities of its population and institutionalise related efforts at concrete places in the border region through corresponding socio-cultural projects. Good examples in this respect are the socio-cultural projects in the Euroregion Neisse, which were funded by the Micro-Project Fund of the INTERREG programmes. Further to this, more efforts also need to be made to improve the social inclusion of ethnic and cultural minorities in the border areas (e.g. the Roma in the Czech Republic).

Another important challenge in the Three Corners Region is demographic change and its associated effects. Demographic shrinkage is particularly faced by the German and Polish border areas, where major financial and institutional efforts have to be made to maintain qualitatively high levels of education and health systems as well as adequate access to supply systems by way of public transport. As regards the health sector, the expected further aging of the population in all three sub-areas of the Three Corners Region necessitates further public investments until 2020 to create a more age-adequate health supply. In the field of education and training, the EU accession of Poland and the Czech Republic has greatly improved the cross-border situation especially with respect to a mutual recognition of school-leaving and training certificates or university degrees – but important challenges remain. Due to a decreasing share of the younger population groups, the number of child care centres and elementary schools has dropped in all three sub-regions over the past years. As this trend is expected to continue, all three school systems will thus have to face a new adaptation process. Against this wider background, it becomes clear that a further improvement of the R&D/innovation capacity in the neighbouring border regions and a strengthening of their overall competitiveness will require a good and comparable level of education in all border areas and a stronger promotion of co-operation between universities and colleges.

As regards the environment in the case study area, important successes were already achieved which help to slowly convert the previously called “Black Triangle” into a “Green Triangle”. The environmental damage caused by previous industrial and mining activities has been reduced years, and also the designation of a large number of protected areas increased, mainly under the impulse of the EU-wide network of protected areas (NATURA 2000). Cross-border co-operation also considerably contributed to this since the mid-1990s, mainly through the large number of measures and organisational structures supported under the respective

EU programmes. However, the future sustainability of the cross-border area requires more efforts to further improve the environmental situation. These efforts should focus on further reductions of the considerable greenhouse gas emissions caused by road traffic in the border areas and on allocating a much higher priority to establishing cross-border requirements for nature and landscape protection and to developing sustainable forms of tourism¹³⁶ (i.e. up to now, much attention was laid on infrastructure projects in the areas of the economy, energy and transport).

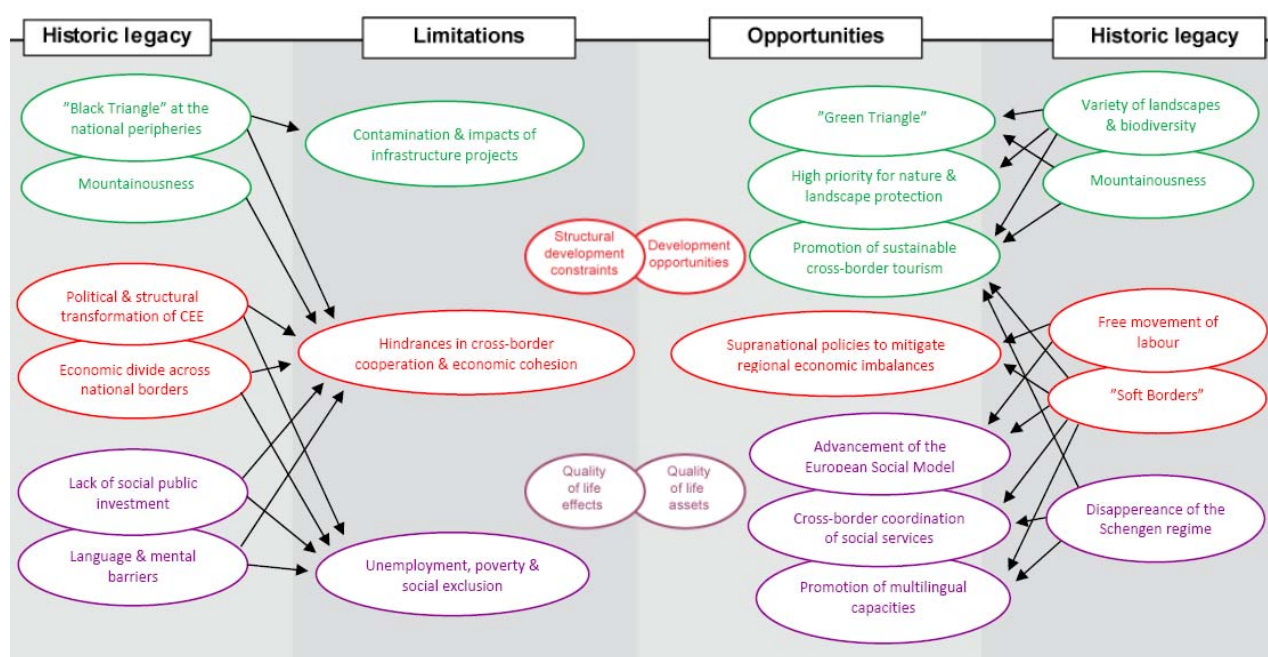


Figure 45 Nexus model: Czech-German-Polish border

The Polish-Ukrainian border

Along the Polish-Ukrainian border, a new line of division has been created within Europe, mostly due to the increased "securitisation" of the external EU borders and a consequence of an application of the Schengen rules following the inclusion of Poland into the Schengen Area in 2007. This line cuts through long-standing and shared cultural, historic and linguistic ties which exist in these borderlands¹³⁷ and also hinders the socio-economic

¹³⁶ Sustainable tourism can be seen as an important cross-border economic and socio-cultural potential in the Three Corners Region. Especially in the Central Mountains, which always have been a favourite hiking, winter sports and local recreation area, tourism has been revived after its collapse at the time of the political change.

¹³⁷ Ukraine means literally "borderland". The areas adjacent to the Polish-Ukrainian border share a centuries-long common multicultural and multilingual history and have always been a place of transit between the East and West. Even today, these borderlands range

development of areas which are already among the economically weakest regions in both countries.¹³⁸ As a whole, this also tends to undermine the general aim expressed in the EU local border traffic (LBT) regulation and the European Neighbourhood and Partnership Instrument (ENPI) regulation: to avoid the emergence of a socio-cultural and economic dividing line at the edges of the Schengen Area.

After the introduction of the Schengen regime, previous positive side effects of the presence of the border (e.g. small cross-border trade) became very difficult, and Ukrainian citizens - as a visible result - have disappeared increasingly from the landscape of border marketplaces in Poland. The Schengen rules also create a significant barrier for interpersonal relations across this border, although the EU Commission aims in general to facilitate the crossing of external EU-borders by locals of neighbouring countries. Despite the conclusion of an agreement on LBT between Poland and Ukraine which came into force on 1 July 2009,¹³⁹ the following suggests that the number of negative effects still seem to prevail over the advantages. The introduction of the LBT agreement had a positive impact on the level of border traffic intensity and on the volume of cross-border traffic, which might also stimulate a revival of border trade and thus mitigate the further economic decline of the border areas. However, the procedures of the LBT agreement for obtaining the required documents are not doing enough to facilitate the process for local residents, and the relatively narrow territory of application (30 kilometres) tends to exclude people with cross-border ties who live beyond this zone. In the first years after the introduction of the LBT agreement, only a small percentage of the total eligible population in the Polish-Ukrainian borderland made use of LBT permits and, throughout 2010, Ukrainian was still the nationality most often refused entry at an external EU border, with most refusals taking place on the Polish-Ukrainian border. Finally, migrants and refugees are frequently refused adequate status and remain irregularly in the borderland while refugees who are legally in the Polish-

among the most diverse zones in Poland and Ukraine in terms of cultural heritage and minority cultures.

¹³⁸ The GDP per capita of the border areas on both sides is about 70% of the national average and they show an increase of poverty and social exclusion of a great number of households, due to an unfavourable situation on the job market and lack of possibilities to earn an appropriate income.

¹³⁹ The LBT agreement allows residents of Ukraine living within 30 kilometres of the border to buy, for €25, a permit to travel up to 30 kilometres in the neighbouring borderland. To obtain this visa, the person needs legitimate reasons for frequent border crossing, such as family links, social, cultural or economic motives, as well as evidence for sufficient funding in relation to the stay.

Ukrainian borderland have become increasingly criminalized and even discriminated against.¹⁴⁰

Although the Polish-Ukrainian border is now an important gateway to the EU, only 6 road crossing points and 4 railroad crossing points are in place along its 535 km length. The existing border crossing points are not sufficient to handle the large transport flows across the border, which happens so slowly that people often have to wait for hours or sometimes, especially for cargo traffic, days. There is only one border crossing check point where pedestrian and bicycle traffic is permitted. Though two new border crossings are planned in order to better process the intensified movement of fans and tourists during the EURO 2012 Football Championship, it is very likely that the associated border security measures will further tighten the permeability of the borderline.

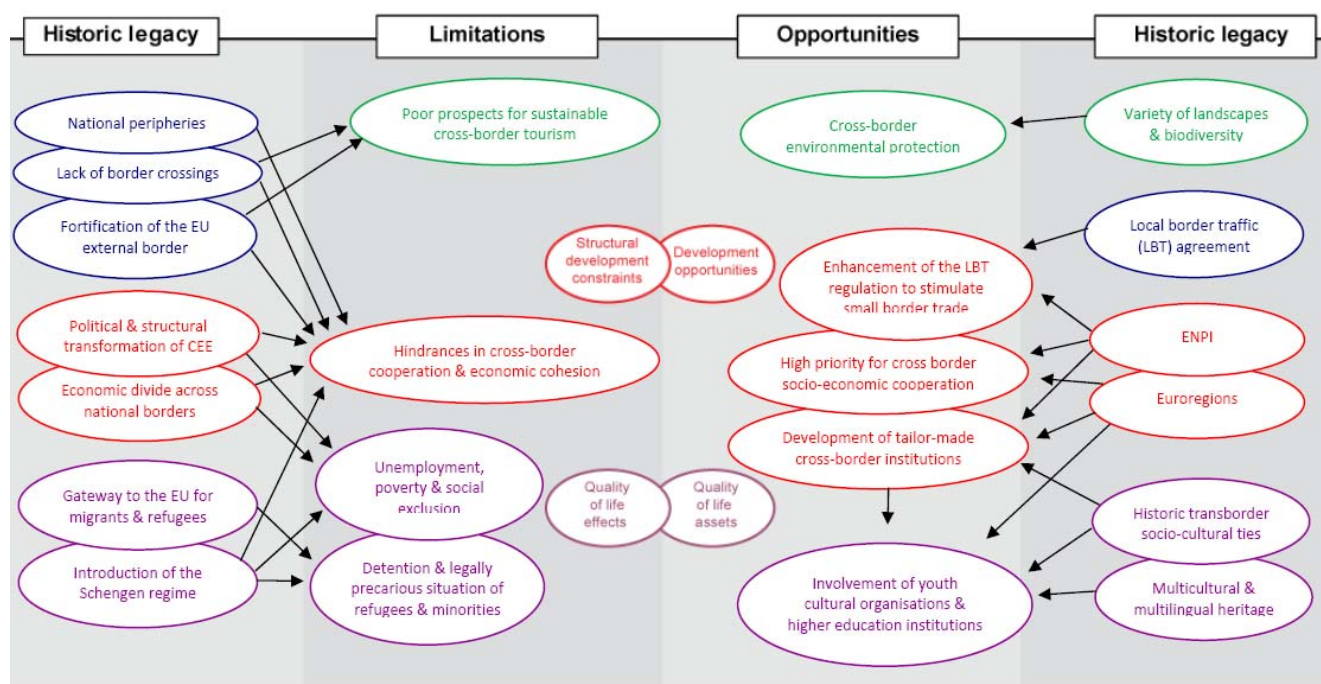


Figure 46 Nexus model: Polish-Ukrainian border

¹⁴⁰ The Ukrainian border guards are allowed to detain persons caught within 50 km of the border in order to examine the purpose of their presence in the borderland. Many asylum seekers spend years in detention or in legally precarious situations, which does not facilitate their integration prospects in the borderland. An arising issue seems to be the rise of xenophobic movements among the public spheres in western Ukraine (i.e. skinheads and racist groups).

The Cross-border Metropolitan Region of Geneva

The cross-border metropolitan region (CBMR) of Geneva has been identified as one of the most dynamic CBMRs in Europe.¹⁴¹ Functionally, the Geneva region is mostly driven by knowledge-intensive services and manufacturing activities. The presence of specialised financial services in private wealth management and commodity trading, as well as international institutions, is a major driver of the regional population and economic growth. Institutionally, Geneva has long considered itself as an international centre without necessarily trying to build a strong hinterland. In recent decades, however, several initiatives have contributed to the development of more regionally-based strategies with neighbouring Swiss (Nyon) and French territories (Pays de Gex, Savoie).

The Geneva CBMR illustrates that the presence of an external EU border, tempered by bilateral agreements between the EU and Switzerland, does not necessarily constitute a limiting factor for the development of the region. The presence of the border seems to be a key factor which pushes Swiss local actors to interact and find solutions with their neighbouring partners in France in order to ensure the smooth operation and attractiveness of the metropolitan centre. Geneva has benefited from its recent cross-border agglomeration project for developing a common vision of the bi-national region and implementing concrete measures to enhance its regional cohesion. Yet the populist appeal of certain political parties running against cross-border commuters has been strongly expressed in the agglomeration of Geneva.

In the Geneva CBMR, the long-standing national peripherality has resulted in some limitations concerning intra-regional accessibility. This is especially true for interregional railway connections. With the opening of borders and the rise of strong functional interdependencies between the urban centres and their cross-border periphery, such an historical legacy might also be interpreted as a stimulus for local and regional actors to cooperate. Another locational historic legacy is the scarcity of land. This factor is particularly relevant due to the position of Geneva as a quasi-enclave and its restrictive planning policy as far as urban development is concerned. Such 'physical' constraints have considerable consequences for structural development, as they result in fierce competition for land use and high real estate prices.

The significant socio-economic performance differences within the Geneva CBMR also offer opportunities to develop new comparative advantages. This holds true for the visible differentials in wages and income (pull

¹⁴¹ ESPON (2010): *METROBORDER. Cross-border Polycentric Metropolitan Regions*. Final Report. Luxembourg, European Spatial Planning Observation Network (ESPON).

factor) as well as for the different unemployment rates (push factor) which are all driving forces for a polarisation of labour flows, resulting in strong cross-border economic interdependencies between the metropolitan core and its borderland periphery. Strong disparities can also be observed with regard to the level and distribution of services to the residents. This has led to an important functional division of space, the urban centre being well-equipped and the periphery offering mainly residential services, but very few jobs. The concentration of both public services and business infrastructure in the core of the metropolitan region is a clear indication of its mono-centric structure. The unbalanced urban development that characterises Geneva mainly results from strong wealth differentials, and has not yet been really affected by redistribution measures enforced by cross-border cooperation bodies. Though it has proved especially competitive in economic terms, this kind of cross-border integration represents a risk for social and territorial cohesion at the regional level.

Finally, differences on either side of the border are also very important when it comes to residential attractiveness. The strong average annual population growth over recent decades strongly affects the real estate market, leading to a long-term shortage of houses and apartments available in Geneva and to the development of extensive suburbs in neighbouring France. However, the knowledge-intensive economy of the CBMR is attracting an increasing number of highly-qualified and innovative individuals from around the world, creating a multilingual and multicultural environment. Such a multicultural and multilingual society can be an asset for stimulating cross-border projects between local, regional and international actors across borders and contributing to greater social cohesion.

Figure 47 Geneva: nexus model

The Cross-Border Metropolitan Region of Luxembourg

The Luxembourg CBMR is located in the heart of the Greater Region, a cross-border institutional cooperation between Luxembourg, Lorraine (France), Wallonia (Belgium), Saarland and Rheinland-Pfalz (Germany). At the European scale, Luxembourg is a middle-sized European city-region with a very pronounced international profile, mainly based on specialised financial activities and the presence of EU institutions. The proximity of national borders seems to have advantaged the Grand Duchy in its economic development, insofar that it allows Luxembourg to recruit skilled workers from surrounding regions without having to bear the cost of their social reproduction. Furthermore, Luxembourg is experiencing strong demographic growth, with a high proportion of foreigners and an increasing number of cross-border commuters. The concentration of knowledge-intensive activities in Luxembourg is accompanied by strong functional integration of the German, Belgian and French bordering areas.

The long-standing national peripherality has resulted in some limitations concerning intra and inter-regional accessibility, especially for inter-regional railways connections. With the opening of borders and the rise of strong functional interdependencies between the urban centres and their cross-border periphery, such an historical legacy might also be interpreted as a stimulus for local and regional actors to cooperate. Another locational historic legacy is the scarcity of land. The presence of brownfields along the French border has strong consequences on structural development, as it results in fierce competition for land use and high real estate prices.

From a social and economic point of view, the Grand Duchy of Luxembourg and its neighbouring countries have all been part of the Common Market and of the Schengen Area since their establishment. This allows workers to freely cross the borders and work in a neighbouring country. However, differentials in income wages (pull factor) and unemployment rates (push factor) are driving forces for the polarization of labour flows, resulting in strong cross-border economic interdependencies between the metropolitan core and its borderland peripheries.

Strong disparities can be observed with regard to the level and distribution of services to the residents, leading to an important functional division of space, with the urban centre being well-equipped and with the periphery offering mainly residential services but few jobs. Due to the strong difference in real estate prices between the Grand Duchy (high) and its neighbouring countries (low), a significant number of households have chosen to leave the urban agglomeration both for the domestic

periphery and for the neighbouring countries.¹⁴² However, despite the high differentials in real estate prices, the Grand Duchy remains an attractive place for workers who can afford it. Good access to urban amenities specific to a metropolitan centre and the proximity to the place of work are also strong incentives.

The Grand Duchy has experienced strong demographic growth over the last decades, mainly because of the combination of financial activities and employment in European institutions. The knowledge-intensive economy of the CBMR attracts an increasing number of highly-qualified and innovative individuals from around the world, creating a multilingual and multicultural environment. In addition to wealthy and creative expatriates, cross-border workers also contribute to the cultural diversity of the CBMR. Such a multicultural and multilingual society can be an asset for stimulating cross-border projects between local, regional and international actors across borders and contributing to greater social cohesion.

¹⁴² This phenomenon is known as 'residential escape', which in the case of Luxembourg is also coupled to the emergence of a growing flow of "in-commuting nationals" (i.e. former Luxembourg residents who now live on the other side of the border but still work in Luxembourg).

Figure 48 Geneva: nexus model

Importance of intra-urban firm linkages data for the analysis of economic regional integration

European integration and the abolition of the Iron Curtain have opened many national political borders, resulting in the urbanization of borderlands and the emergence of cross-border metropolitan regions (ESPON 2010, Sohn, Reitel and Walther 2009). In a world being transformed from a '*space of places*' into a '*space of flows*' (Castells 1996), a border region can thus be seen as peripheral from a territorial point of view, but central from a network point of view. The nature and extent of economic relations "such as communication between two office locations or business relations with customers, suppliers or technology producers" substantially determines the position of border city-regions in the global city network (Goebel and Thierstein 2006).

The ORBIS database (Bureau Van Dijck 2010) provides information on economic relationships between the headquarters of companies and their subsidiaries. Such data enable different types of firm networks to be distinguished. Economic linkages between firms within a nation state illustrate the existence of domestic or local networks, while linkages across a border reflect the existence of transnational networks.

With regard to a border region, the examination of intra-firms linkages can contribute to understanding its economic embeddedness from a multi-level perspective. On one hand, the number and nature of links between firms located within the cross-border region reflect the level of cross-border regional economic integration. On the other hand, the number and nature of links between firms located within the border region and other regions illustrate the level of national, European or global economic integration depending on the scale considered. Comparison between these two measures allows the economic profile of a border region to be assessed from a relational point of view.

We believe that the organizational and spatial patterns of intra-firm networks have important implications for the territories in which they are located, and vice versa. According to agglomeration theory, the existence of regionally integrated ties/networks is important if regions are intended to attract and embed exogenous investments (originating from supra-regional networks). In concrete terms, insight into the spatial organization of firm networks enables policy makers and entrepreneurs to have a better understanding on how networks of cross-border firms' function, and the conditions under which these networks foster cross-border regional integration.

Cross-border firm networks in the Greater Region (the case of Luxembourg)

The ORBIS dataset enabled us to investigate the number of ownership linkages and their spatial pattern in the Greater Region. This showed that the firms are concentrated in a number of cities, reflecting the existence of multiple centres. However, while nodes (firms and cities) displayed a polycentric spatial pattern, ownership linkages displayed a monocentric pattern.

The overlay of the city networks with the border areas based on 45-minute travel distance to the borders, showed that most of the ownership links concern cities located in border areas. Only a few ownership linkages go beyond the border areas (e.g. Nancy- Luxembourg, Koblenz-Luxembourg, Mainz-Luxembourg). Given the presence of four state borders within the Greater Region, it was necessary to distinguish between linkages within a single cross-border area (two adjacent border areas separated by one border) from linkages between different border areas (related to different borders). On this basis, we found that, of 189 cross-border ownership links, 92 have a regionally integrated character and are located within the functional cross-border area of Luxembourg.

The asymmetric pattern of regionally integrated and supra-regional linkages reveals the level of integration and connectivity between border regions of the Greater Region. On one hand, the frequency of *regionally integrated linkages* between Luxembourg and the regions of Lorraine (especially with Thionville) and Saarland (Saarbrücken) shows a high level of economic integration and connectivity. On the other hand, the frequency of regionally integrated linkages between neighbouring regions of Luxembourg shows a low level of economic integration and connectivity. Considering the overall spatial pattern of firm networks in the Greater Region, we can conclude that most follow a hierarchical spatial pattern and form a star-shaped structure, with Luxembourg at the centre of most networks. Luxembourg polarizes most of the connections of other cities, due to its central position in the Greater Region, its level of economic development, and its position in global networks. This situation points to the need to encourage and create better conditions for the creation of cross-border firm networks between neighbouring regions of Luxembourg in order to achieve a higher level of integration.

The frequency of *supra-regional linkages* in the Greater Region also shows the central position of Luxembourg in these networks. For instance, there are significantly more linkages between Luxembourg and Wallonia (with Liege and Charleroi) than with Lorraine, Saarland and Rheinland-Pfalz. In terms of spatial pattern, the supra-regional networks are hierarchical and star-shaped. There is also evidence of a few heterarchical networks (e.g. network of Luxembourg-Liege-Manhein-Thionville) connecting more than two regions. These networks reflect positive change in the evolution of

networks and strengthen the economic integration of the different components of the Greater Region.

Conclusion

To distinguish positive and negative effects of each type of border, we used the GEOSPECS delineation based on the 45-minute travel distance to a border. In the case of the Greater Region, our results confirm that the majority of cross-border links occur within this travel distance, reflecting positive border effects. The highest number of connections within this range is across the Luxembourgish-French border, with the strongest tie between Luxembourg City and Liege. Strong links are also observed between Luxembourg and Charleroi, and between Luxembourg and Thionville.

Further research is required to deepen the meaning of these results. Interviews with locally-involved firms could first help to understand firm location-strategies and identify possible shortcomings. This could lead to analysis of the variables considered by entrepreneurs when they decide to settle beyond state borders, to determine whether the benefits of cross-border linkages are really superior to the legal and administrative obstacles that they generate, and the share of the benefits of cross-border economic differentials in comparison with so called "untradable interdependencies" (Storper 1995) that influence economic actors under conditions of uncertainty.

Interviews with state or regional representatives would also allow evaluation of institutional responses to the development of cross-border linkages in the Greater Region. This would lead to analysis of whether cross-border business is encouraged by public policy or is the result of opportunistic entrepreneurs, and also test Scott's (1999 : 613) interesting argument, that, in contrast to North America, "border regions policies in Europe "have maintained an administrative, bureaucratic character that appears to have inhibited private-sector participation"

A more detailed elaboration can be found in Annex 36.

Evidence from other cases also covering border areas

A number of complementary findings are revealed by the cases which addressed other geographic specificities of GEOSPECS and also covered different internal and external EU borders. A summary presentation of

these findings is now realised alongside the individual aspects of the “multi-dimensional reality” of European borders (see also section 3.2.5).

The status of the political border still plays a significant role especially along the external EU border between France and Switzerland. The case of the *Jura Massif* shows, for example, that the cross-border commercialisation of French wood processed in the Jura still encounters multiple problems. This is due to the limited number of customs posts and to existing customs formalities or the Swiss rules for tonnage limits and for the maximum height of vehicles, but is also a consequence of the high value of the Swiss Franc. For cross-border provision of services of general interest, it seems that the most influential factors with a negative impact are the different administrative and regulatory settings or proceedings on either side of the border (i.e. limiting border-crossing access to services especially in the *Jura Massif*). However, equally important for this particular aspect is a lack of “critical mass” in terms of population (i.e. infrastructure and services only available in the urban centres, often far from the border especially in the *Jura Massif* and *Torne Valley*): an influential factor that is not directly associated to the status of the border.

The “barrier effect” represented by natural obstacles plays a prominent but also ambivalent role in most of the cases. These obstacles, on one hand, hamper transport and/or communication and lower the intensity of all types of exchange relationships (e.g. *Irish Sea*, *Sicily*, *French Guiana*, *Tatra Region*, *West Stara Planina*), but they also induce unbalanced flows (e.g. *Belgium Coast*¹⁴³; *Irish Sea*¹⁴⁴) or can even generate specific behavioural patterns (e.g. self-referential attitudes of Sicilians due to insularity). On the other hand, however, mountains or larger maritime separations also establish *per se* spaces with a significant natural value (i.e. unique and fragile landscapes or ecosystems, high biodiversity) and can even help to preserve such spaces due to difficult or non-existent accessibility (e.g., high mountain zones). While these spaces constitute a general challenge for border-regional and cross-border environmental management (e.g. trans-border protected areas in mountain areas, integrated coastal zone management), they are also important assets for the development of eco-tourism and the production of region-specific goods or of specific high-quality food. However, the extent to which such opportunities are realised in practice for promoting a sustainable territorial development of border and cross-border areas is highly variable. While awareness may be weakly developed (e.g. *Tatra Region*, *West Stara*

¹⁴³ Due to the non-existence of terrestrial accessibility obstacles, substantial tourism flows into Flanders coming from the neighbouring countries (i.e. the Netherlands & France). The tourism coming from the opposite side of the Channel (i.e. the UK) is considerably lower.

¹⁴⁴ Ireland imports and exports the large majority of its goods by sea (90% in 2006).

Planina) or other less sustainable development options may predominate (e.g. mass tourism¹⁴⁵), there are also some visible successes such as in the *Jura Massif*¹⁴⁶ and some parts of the *Belgium Coast*.¹⁴⁷

Although it appears that there are no significant overall economic discontinuities at the borders of the cases examined, such discontinuities exist for specific aspects and for more complex constellations. Significantly different levels of taxation, for example, exist along the Swiss-French border (e.g. *Jura Massif*) and a lack of cross-border fiscal integration hampers cross-border economic integration in the *Torne Valley*. There are also strongly diverse standards of living, generally resulting from wage differences and different purchasing power (i.e. being even reinforced by exchange rate differences between Euro zone and non-Euro zone countries). Although the latter factors stimulate cross-border commuting, especially in the *Jura Massif*, they also tend to generate clearly one-sided effects which negatively influence the territorial development of individual border areas (e.g. out-commuting of young and/or highly qualified labour force and workforce shortages on one side of the border; strong cross-border consumer flows towards one side).

The primary socio-cultural settings prevailing in the border/cross-border areas examined are highly variable,¹⁴⁸ which suggests that, especially in cases of a marked heterogeneity also strong socio-cultural lines of division tend to exist. However, the evidence also shows that an apparent homogeneity does not automatically result in a complete absence of socio-cultural lines of division. The existence of a shared history and of socio-ethnic cohesiveness (e.g. *Torne Valley*)¹⁴⁹ or of common traditions (e.g. *Jura Massif*)¹⁵⁰ and especially of the same language spoken on both sides

¹⁴⁵ This is the case for the planned winter sports development in the Tatra Region & in West Stara Planina, but also for the massive seaside tourism along the Belgian coast.

¹⁴⁶ e.g. high quality cheese production of strong added value; destination for cultural tourism & family-based tourism; existence of regional nature parks & planned establishment of a cross-border nature park.

¹⁴⁷ e.g. the joint management of the ZWIN inlet between Belgium & the Netherlands, the joint management of the Schelde estuary, the initial application of ICZM principles and coastal protection measures in Flanders.

¹⁴⁸ In some, there is (ethno-)linguistic overlapping across the political border (e.g. Jura massif, Irish Sea, Torne Valley, to some extent also the Belgian coast & West Stara Planina), while in others there is a hard linguistic line of division which closely follows the political border (e.g. French Guiana, Tatra Region and to some extent also Sicily, especially regarding Malta).

¹⁴⁹ Although the Torne Valley is a multicultural cross-border area, the existing ethno-linguistic minorities – also linked through many cross-border family ties – are formally recognised in all three countries (i.e. Sámi people, Finnish-speaking minorities in Sweden & Norway) and their respective cultures/languages are also pro-actively furthered (e.g. through cultural self-governance and own regional representative assemblies).

¹⁵⁰ e.g. mountain society based on dairy farming & cheese production; watch-making tradition in the valleys

of a border (e.g. *Jura Massif*, *Torne Valley*, *Irish Sea*) considerably facilitates all sorts of day-to-day cross-border exchange relationships and constitutes an important asset which furthers the territorial development of border areas and the integration of cross-border areas (e.g. easier cross-border job-seeking and commuting, easier contact/relationships among local and regional businesses; easier inter-administrative communication). However, the presence of a solid “cross-border social capital” still seems to be more the exception (e.g. *Torne Valley*) rather than the rule because, in some areas, it appears that the existing elements of a common historical or cultural legacy have not (yet) been strong enough to also establish a broadly shared cross-border identity (e.g. *Jura Massif*¹⁵¹, *Irish Sea*¹⁵²).

¹⁵¹ i.e. persisting prejudices which were formerly fuelled by religious differences (Catholics-Protestants), nowadays more so by the considerable differences in purchasing power.

¹⁵² The case of the UK-Ireland relations is certainly particular, because of the legacy of long-lasting political and religious conflicts which do not facilitate progress towards a real cross-border identity.

5.2.6. Outermost regions: Case study reports

Canary Islands

Spain's Canary Islands form an archipelago of 13 islands, located 100 kilometres off the Moroccan coast and close to the Equator. They share volcanic origins and a generally subtropical climate. Mount Teide on Tenerife (3,718 m) is Spain's highest summit and the third tallest volcano in the world. The Canary Islands are a Spanish Autonomous Community led by an independent regional government (Gobierno de Canarias). Each of the seven major islands is ruled by an island council (Cabildo Insular). With a population of 2,117,519 in 2011, the Canary Islands are the eighth most populous of Spain's autonomous communities, with a theoretical density of 282.6 inhabitants per km². Effective density is, however, much higher since the two islands of Tenerife and Gran Canaria alone host over 80% of the total Canarian population and, due to the mountainous nature of both islands, inhabitants are concentrated in coastal areas.

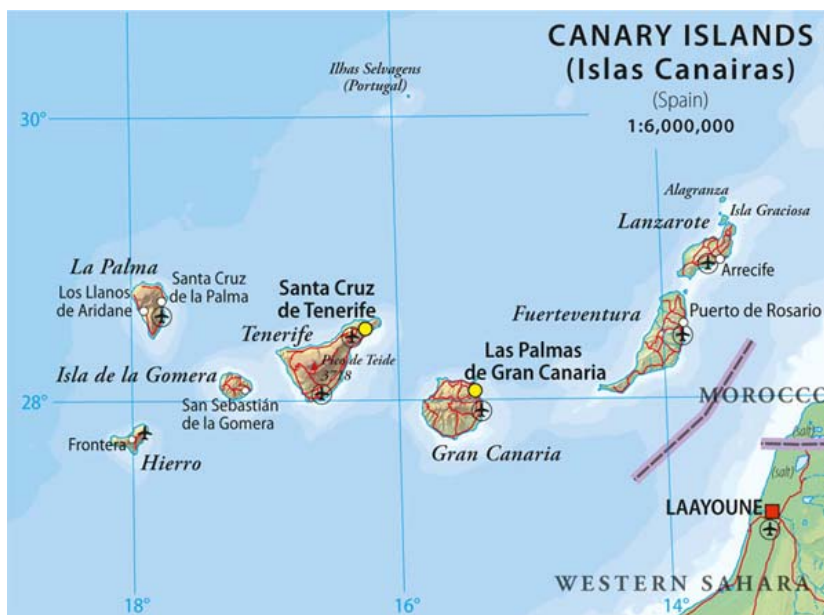


Figure 49 Map of the Canary Islands

Tourism: The islands' great natural attractions (Teide National Park is Spain's most visited national park), climate and beaches make the islands a major tourist destination, visited each year by about 10 million people. The economy is based primarily on tourism, which makes up 32% of the GDP, and more generally on services. As a result, the Canary Islands are the most developed Outermost Region.

However, the extensive development of tourism, by increasing the land pressure already exerted by long-term residents, has generated various problems in terms of land planning and environmental protection. To address the difficulties caused by excessive numbers of tourists, the Canary Islands Government has taken the first step by laying down a tourism moratorium



limiting the construction of new accommodation units. However, given the illegal construction of hotels and other development projects in protected areas, it appears that such problems are not yet solved.

These elements have, over time, downgraded the very image of tourism in the Canary Islands: the destination is increasingly perceived as a mass tourism destination that attracts more and more “low-cost” type clients, thereby not encouraging a reorientation towards a higher quality type of tourism.

Production costs (industry): The small size of the market and its fragmentation hamper economies of scale: infrastructures and teams are necessarily limited in size, if not dispersed throughout the archipelago, and can barely reach the minimal scale needed for efficiency. As a consequence, productive equipment is generally oversized, contributing to very high average production costs and limiting strategic options in terms of diversification, specialisation, etc.

Market characteristics (limited size and fragmentation again) are also a challenge in terms of human resources. Wages are much lower on average than in continental Spain, but qualified workers are rare; employers can hire well-trained workers from continental Spain (but at higher wages) or themselves launch training programmes (which is costly and reduces productivity). Mobility issues between islands further increase this problem of access to qualified workers.

Other production costs are also impacted by the region’s characteristics. Companies need to stock more than their continental counterparts in order to face potential supply problems, but free space is rare and expensive. Water and energy generation and distribution are major issues in the archipelago, as is waste management.

Finally, remoteness from economic and political centres such as Madrid and Barcelona necessitate frequent trips to continental Spain for Canarians, etc. (LL&A and ULB, 2006).

As a consequence, industry plays only a limited role, and the Canary Islands strongly depend on imported goods.

Transport: The remoteness and fragmentation of the archipelago create particular challenges for transport. There are six international airports, mainly serving EU destinations. *Inter*-insular connections are mostly maritime for merchandise, mostly aerial for passengers. The only existing means of *inner*-island transportation are highways and roads. Apart from Fuerteventura and Lanzarote, 80% of the Canarian territory is steeply sloping (in average, the gradient exceeds 20%). This requires winding roads, which in turn imply higher fuel consumption, pollution, and maintenance costs.

Services of general interest: health: Most infrastructure (health centres, practices, emergency services) is concentrated on Gran Canaria and Tenerife, where most inhabitants (and visitors) are concentrated. There are no emergency services on the islands of El Hierro, Fuerteventura and La Gomera, where the proportion of the population that has needed hospitalisation has dramatically increased over the past five years. In absolute numbers, this represents a limited number of persons, but it means that specialised transportation services, including emergency transportation services, are needed to transfer inhabitants from these isolated areas to the two main islands. This has a cost, in addition to that of maintaining numerous health centres across the islands. Telemedicine solutions are being tested for some health issues, to reduce the need for patients to travel to another island for specialist care.

Demography: All islands show a positive migration balance. The age of migrating cohorts, depending on their origin, is an excellent indicator of the reasons why the Canary Islands gain or lose inhabitants. Most emigrants are young adults (between 25 and 39 years old) or older adults (40-59), but clearly from the economically active cohorts, probably in search of jobs. Immigrants belong to all age cohorts, especially the 25-39 cohort, which compensates departures in the population of that age. There is a clear difference in profile between migrants coming from EU and non-EU countries: the former are essentially mature or retired adults who either buy secondary homes in the Canary Islands or choose the archipelago as their main residence; the latter are, on average, much younger (less than 30 years old) and come for employment.

Figure 50 Migration balance in the Canary Islands

Most irregular migrants arrive in the Canary Islands with tourist visas, and then stay beyond the permitted residence period. Migrants arriving by boat from the West African coasts represent a very small proportion of the population illegally residing in the archipelago (Godenau, 2008). This is estimated at a maximum of 5%, but the phenomenon has gained specific attention in the media and among political authorities at various levels, and has led to the Operation Hera II under the umbrella of the European Frontex agency.

Generally, relations with African neighbours are increasing, with growing exports, and the formation of linkages between institutions and universities.

Biodiversity and protected areas: The location of the Canary Islands, less than 100 km from Africa, their multiple climatic influences and thus micro-climates, as well as the territory's fragmentation make it a place of invaluable interest in terms of biodiversity (fauna and flora). The island of Gran Canaria, for example, hosts half of the species that are unique to Spain. The Canary Islands are extensively protected: 42% of the total land area is designated for conservation.

The protection of biodiversity is sometimes linked to conflicts with projects for economic development. In 2009, for instance, a major economic project worth 380M€ (the construction of a giant industrial port in Granadilla, Tenerife) was stopped by a regional court because it endangered beds of protected seaweed located nearby. In this context, the fact that UNESCO declared the entirety of the islands of El Hierro, La Palma and Fuerteventura as "Biosphere Reserves" under its 'Man and Biosphere' programme in 2000 is notable, as such sites should be key locations for balancing conservation and development.

Access to resources: Energy is of key interest in the Canary Islands, which relies on six large autonomous electrical grids. Except for a submarine cable of limited capacity between Lanzarote and Fuerteventura, there are no connections between islands or with the continent. Since there are no conventional energy sources on the islands, all electricity must be generated on the archipelago. Given these characteristics and the high energy demand deriving from tourism, the local government has adopted a policy of energy self-sufficiency. Renewable energy resources must hence be developed, particularly wind and solar.

Desalination plants supply most water. As this requires large amounts of energy, which is difficult to produce and distribute, water prices are very high.

Overall: The Canary Islands show some of the typical characteristics, such as remoteness from the European continent and small market size, of the Outermost Regions of the EU. These characteristics create handicaps of several types for the territory, particularly additional costs for entrepreneurs as well as in the provision of public services.

However, when one looks in more detail into the Canarian situation, it appears that the territory's main characteristics stem from the fact that it is (i) an ecologically rich seven-island archipelago and (ii) a Spanish Autonomous Community that has followed the country's major development trends.

Figure 51 Canary Islands nexus model

French Guiana

French Guiana is an Outermost Region of France, located on the northern Atlantic coast of South America. With an area of 83,846 km² and 232,223 inhabitants (but a dynamic average annual demographic growth of +4% over the last decade), the territory's population density is very low (2.8 people/km²). The region consists of two main geographical areas: a coastal strip where the majority of the people live, and a dense, nearly inaccessible rainforest which covers 96% of the territory. French Guiana became a "département" of France in 1946; it was given a regional status in 1974.

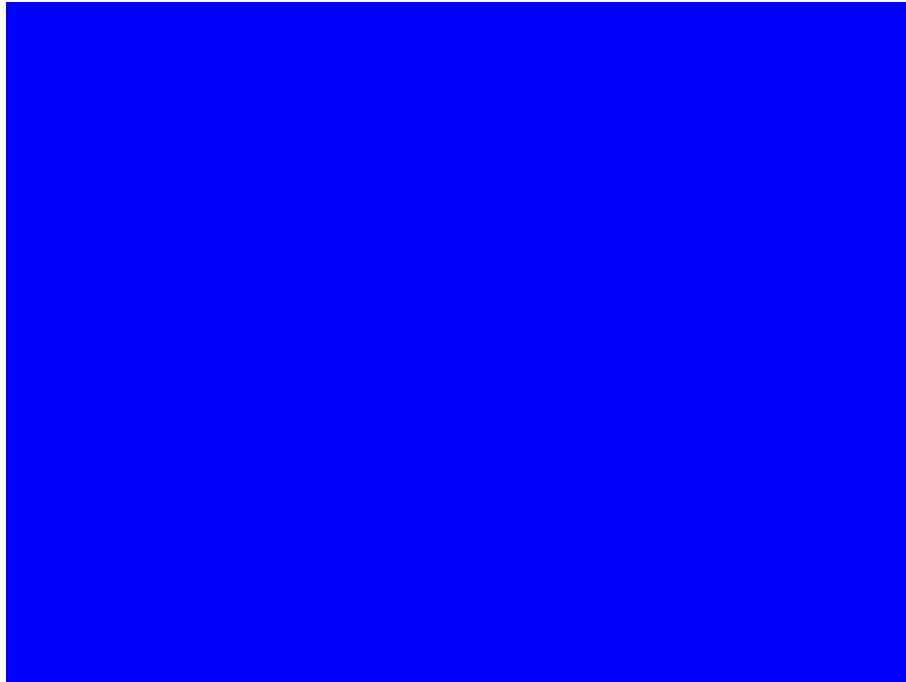


Figure 52 Map of French Guyana

Economic structure: The region's GDP per capita (€14,100 PPP in 2008) is the lowest of the French regions and also of the Outermost Regions. The economy is closely tied to that of France through subsidies and imports. Besides the French space centre at Kourou, construction and services (public and private) are the most important economic activities. The cultivation of crops is limited to the coastal area, where the population is largely concentrated; rice and manioc are the major crops. French Guiana is heavily dependent on imports of food and energy. Unemployment is a serious problem (over 20%), particularly among younger people.

Particularities of the economic structure are the strong weight of the public sector (44% of the total employees), and the strong relative weight of the construction and agriculture sectors. Industry appears to be quite strong in French Guiana in comparison to other French Outermost Regions, but it essentially relies on the aerospace sector.

The French space agency CNES set up a base in French Guiana in the 1960s, due to its position (open to the Atlantic and to the North, proximity to the Equator, large surface area, sheltered from cyclones and not vulnerable to earthquakes). Following the success of Ariane, space activity became very important in this region. In the 1990s, the sector accounted for more than 25% of the GDP (but has decreased since).

With regard to the rest of the economy, it appears that many sectors, such as agriculture, fisheries, gold mining, and forestry and wood

processing, have reached development limits because of a lack of modernization and illegal practices.

The specificities of French Guiana's economic and geographical patterns have a great impact on the spatial distribution of economic activity. The urban area around Cayenne, the main city, concentrates three-quarters of the salaried jobs – half of which are related to the public sector.

Unemployment and illegal immigration have contributed to the development of an informal economy and of moonlight work. In 2006, 4,000 Guianese declared having an informal job (people called "les jobeurs"), which represents 9% of total employment and 14% of employment in the private sector.

There is a recurrent debate concerning involvement in regional activities and cooperation with neighbouring countries, but both are still ineffective. Involvement in regional activities faces barriers at different levels:

- Legal: as an Outermost Region of the EU, French Guiana is also part of the Common Market, and shares EU standards and rules for the circulation of people, goods and services. No such thing exists at the Amazonian scale (Guyana Shield¹⁵³). French Guiana is equally subject to European trade agreements and tariffs;
- Economic: The Guyana Shield cannot be considered as an economic area as regards flows of goods and services. Several economic barriers can be identified for French Guiana, such as the lack of competitiveness of French Guiana's companies (mostly microenterprises) and low income and solvency problems on the other side (Para and Amapa are among the Brazil's poorest States) ;
- Political: Because of institutional arrangements (French Guiana is a region), local policy-makers have limited power in terms of international relations. No agreements can be signed without the supervision and approval from the national government. The national authorities often liaise directly with Brazilian authorities without any form of consultation with regional stakeholders.

Tourism: In contrast to other Outermost Regions, tourism in French Guiana is not a traditional sector. Given the geographic features (climate, limited number of beaches, etc.) and the high prices (transport, food, etc.), French Guiana cannot compete with other Outermost Regions or neighbouring areas in terms of seaside tourism. The few cultural and

¹⁵³ The Guiana Shield is a 1.7 billion year old Precambrian geological formation in northeast South America that forms a portion of the northern coast. It underlies Guyana, Suriname and French Guiana, as well as parts of Colombia, Venezuela and Brazil.

historic attractions (space centre, penal colony, carnival, etc.) are not sufficient to constitute a major touristic asset.

Transport: Maritime and air transport are the main transport modes for external flows. Maritime freight transportation costs are very high (30 to 50% higher than in other Outermost Regions), as a result of several factors: the low volume of exports (only 10% of the containers leave French Guiana filled with merchandise); the inadequacy of port infrastructure; the level of labour costs; and limited competition between operators. More specifically, the port of Degrad des Cannes, located on the estuary of the river Mahury, is not deep enough to accommodate big ships. Hence, transshipment from container ships to coasters is often required. This operation takes place in Trinidad and Tobago.



Access to the internal areas is difficult because of the separation between the coastal and forest areas. Access to the forest is only possible by air or river. This increases the cost of access to primary resources (wood, plants and fruits, gold, etc.), of transport to the final clients, and delivery costs for basic public services. Travel from Maripasoula

from Saint-Laurent on the Maroni river takes two to three days, depending on the season, but only 1 hour and 10 minutes from Cayenne with a light turboprop aircraft.

A railway track, built by slaves, has been effective in the past but no longer functions. Feasibility and profitability studies argue that such a transport mode could not be viable.

Information and Communication Technologies: Regarding telecommunications, French Guiana is linked to the rest of the world by only one cable, AMERICAS II, which crosses the Atlantic. Thus, an e-mail sent from Guiana to Guiana passes through the French mainland. This leads to severe congestion. In addition, due to the topography of the region, it is difficult and costly to provide the forest area with Internet access. As a result, the broadband penetration rate is very low, with striking disparities between different areas.

The penetration rate of mobile communications is very high. Since the standard phone network underdeveloped until the 1990s, telecom companies have invested directly in cellular networks. Also, a significant

part of the population lives in illegal constructions and therefore, does not ask for a landline but uses cell phones.

French Guiana is a leader in the field of ICT applied to public health. These techniques were initially developed to meet astronauts' health needs. They now make it possible for doctors to diagnose and care for patients at a distance thanks to satellite communications, using the CNES portable telemedicine station. Over 34,000 teleconsultations have been carried out since 2001. In addition to ensuring rapidity and reliability of diagnosis, this can avoid costly and stressful medical evacuation for isolated patients.

Demography: Dynamic demographic growth is French Guiana's main feature: it had only 27,000 inhabitants in 1950 and now has over 230,000. Demographic growth is mainly due to a high birth rate, the second reason being immigration. This situation is rather unusual among Outermost Regions and in Europe in general (except for Mayotte which shows similar characteristics). The high fertility rate (3.49) can be explained at least partially by cultural and sociological factors. A considerable proportion of the Guianese population is composed of foreigners or children of immigrants, mainly from Suriname and Haiti. In addition, given the sanitary, healthcare, and welfare situations on both sides of the border, many Surinamese women come to French Guiana to give birth.

As a result of this demographic dynamic, the proportion of young people (under 20) is very high. Unemployment and education are therefore pressing issues. Massive investments in human capital have been undertaken in recent years to improve education, training and qualification levels. However, only 36% of the population aged 15 to 29 are registered in the education system. This means that a significant part of the youth is very difficult to reach through standard policy actions.

Immigration is an important phenomenon, partly due to political turmoil in some of the neighbouring countries, but also because of gold. It is estimated that over 10,000 immigrants are working in illegal gold mining camps. Other informal exchanges include drug and gun traffic. Border control is very active, with ten to twelve thousand people in irregular situations arrested each year. Lack of cooperation with the authorities of neighbouring states has been underlined by several observers.

Identity: French Guiana's population is characterised by the presence of native Amerindians, as well as by a succession of immigration waves (mainly on voluntary grounds). These factors shaped a diverse and complex social structure. Today, about 7,000 Amerindians live in French

Guiana, most of them in the National Park. Although they are authorized to live, hunt, fish and build houses in the protected areas, they have no property rights. This makes them dependent on decisions taken by public authorities. They have the status of French citizens but cannot always enjoy access to services considered as basic in other areas



(drinkable water, healthcare, polling station, etc.).

The Creole culture is by far the most prominent feature of Guiana's society. It is a mix between Caribbean identity and Latin American influence, but with French cultural influences (although it historically developed in opposition to the French / white culture). History also shapes society in other ways. For instance, labour unions, as in the French Antilles, are very strong and pugnacious, and regularly use a rhetoric based on these regions' colonial past.

Biodiversity: The level of biodiversity is among world's highest, in terms of both flora and fauna, particularly because of the presence of primary forests. 5,500 plant species have been recorded, including more than 1,000 tree species, along with 700 species of birds, 177 species of mammals, over 500 fish species, of which 45% are endemic, and 109 species of amphibians. French Guiana hosts some famous endangered species as black caimans, pumas and jaguars, leatherback sea turtles, aras, red-faced spider monkeys.

The Guiana Amazonian Park is one of France's nine national parks. It is the largest national park in France and the European Union, and one of the largest in the world.

The high biodiversity attracts researchers, and issues of genetic patenting have been raised by some stakeholders. For example, whereas it is now impossible to collect natural species samples in Brazil without permission (and without paying a set fee), no such ban exists in French Guiana. As a consequence, numerous researchers come to the region in search of new natural extracts, and leave with samples without even informing local scientists and authorities. In terms of both control and valorisation, this situation is deemed problematic.

Renewable energies: The geographical position and characteristics of French Guiana mean that it cannot be connected to European energy markets or neighbouring countries' energy networks (which in any case do

not even cover their own needs). Due to geographical constraints, especially the inaccessibility of the forest area, one cannot even speak of a single energy market at the 'regional' level. Indeed, 12 communal areas out of 22 are not connected to the Guianese network and are consequently heavily dependent on fossil fuels.

A total of 60% of the electricity comes from hydro-electric plants (115 MW) and there is still potential to produce more hydro-electricity. In addition, solar energy (photovoltaic) could be developed to meet the needs of the population in isolated areas. A third promising source of energy is biomass, as a result of forest exploitation. Currently, about 2 MW per year is produced from biomass derived from sawmill waste; although extensive fuelwood resources exist, their value is not being fully realised.

All these projects are however threatened by the very recent prospects of oil resources. The company "Tullow Oil" claims to have made an "important new oil find" in an untapped region off the coast of French Guiana.

Nexus model: French Guyana

Figure 53 French Guyana nexus model

5.3 Synthesis of findings from case studies

When characterizing the case study areas, it becomes obvious that all are searching for the right path to development – and this almost exclusively refers to economic development, i.e. the generation of (economic) value. However, the discourse varies. For many areas, discussions centre strongly on the area's handicaps or challenges, which should be *compensated for* by policies, in order for the area to be able to exploit its full potential. In other areas, the focus is more on assets or opportunities, which should be *promoted*. A third perspective – although less frequently voiced in ongoing discussions about Structural Funds, regional competitiveness and “headline goals” – is that of overarching values which are less easily quantifiable.

The common question is of course: What can policy do – which levers can be applied – to aid these areas in their path towards development?

The tables in the Annex attempt to give an overview of these elements for each case study area. The case studies were prepared to evaluate how geographic specificities influence development paths. The table should be read with this in mind: it focuses on development challenges and opportunities *deriving from geographic specificity* and is thus not a complete SWOT analysis. In addition, as the case studies focussed on a limited number of transversal themes, not every possible issue is included.

The first two columns present elements of the case study areas where a lever could be applied to *compensate for* challenges or to *promote* assets. As argued in the chapter on policy options, much of the debate so far has concentrated on how GEOSPECS areas can be compensated for their “structural handicaps”, with a view to “levelling the playing field” for these areas. However, when arguing for a level playing field, the underlying assumption is that all regions in Europe should be moving towards the same objective, namely *competitiveness* (in any way, shape or form). On the one hand, this raises the question whether the concept of competitiveness can be applied to regions *at all*,¹⁵⁴ and on the other hand if it is a useful approach. GEOSPECS argues that this is the wrong approach. Policy-makers should be reluctant to imitate a successful model that has

¹⁵⁴ see, for instance: Boschma, R. A. (2004). Competitiveness of Regions from an Evolutionary Perspective. *Regional Studies*, 38(9), pp. 1001-1014.

its origin in a different environment without accounting for region-specific contexts. A successful model relies on a number of interdependencies between different factors. Instead of proclaiming common objectives for every region (and accordingly benchmark everyone against the common average), it would be necessary to seek to identify how regional resources can help generate a more robust internal economy, and on this basis increase the sustainability of local communities. Instead of generally compensating for any perceived disadvantage, it would then be necessary to counteract only those disadvantages that prevent the region from exploiting its full potential.

The third column is here entitled “non-commodified values”. The phrasing stems from an attempt to expand the concept of “ecosystem services”. Ecosystem services are the benefits people obtain from ecosystems, which are quite frequently not quantified in economic terms, as very few are traded on the market. In this context, the concept shall refer to something broader than only services from ecosystems, as ecosystems are usually associated with ecology or the *natural* environment (although this is not strictly speaking true¹⁵⁵). Here, “non-commodified values” is deemed to mean *any value that does not normally receive market-pricing*. The column could equally have been termed “positive externalities”, “public goods” or even “global commons”.

Nevertheless, attempts have been made to quantify such non-market values in economic terms, and there is a growing literature concerned with the pricing of ecosystem services. This exercise inevitably runs into moral snares, since the sum of value of all ecosystem services of the planet is necessarily infinite (as all humans are part of ecosystems, we would not exist without them).

This column intends to broaden the debate, with view to a more long-term perspective. While ongoing political discussions are typically reduced to the immediate generation of monetary value (growth), many elements (assets) of an area have an intrinsic value, which deserves to be maintained for future generations, even if it does not generate immediate added value. These resources (in the widest sense of the word) will be the basis for life for future generations, but also enrich people’s lives today (by creating culture, recreation, health and other values). A region with a comparatively low GDP can thus create a wide range of other values. If the true value of natural capital were taken into account (an approach

¹⁵⁵ The Oxford Dictionary defines “ecosystem” as “a biological community of interacting organisms and their physical environment” – it can thus easily include humans, man-made structures, cultural interactions, etc

that is referred to as "ecological economics"), many GEOSPECS areas might be able to offer much more than agglomerations, which are the classical nodes of competitiveness. In an ever more densely populated world, putting ever more pressure on the natural environment, these aspects deserve consideration, and are being gradually factored into political debates.

It should be noted that the column deliberately leaves out (ecosystem) services that would be common to *all* of these areas. For instance, photosynthesis, air purification, carbon sequestration, soil stabilization, nutrient cycling and pollination can be expected of *any* terrestrial ecosystem, hence a listing for each case study area would be redundant. A ranking of the *extent* to which each case study area provides these services could be created; however, this exercise would require a quantification and go far beyond the scope of this project. Hence the focus is on values/services that are specific to that case study area. More generally, there are some ecosystem services that are exclusive to geographically specific areas. Examples are mountains which play a key role in the water cycle for Europe as a whole, or coasts which provide particular food resources like fish. A more detailed analysis of these specific services can be found in the chapter on transversal themes, more specifically "Biodiversity and protected areas as factors of development".

The Annex contains a summary of all case studies according to this model. For reasons of space, only one example (of the Highland Council area) is reproduced here. Typically, the model would contain elements such as:

Compensation of constraints:

- Low diversification of economy / dependence on public sector (Outer Hebrides)
- Access to island time-consuming & costly (Sicily)
- Services of general interest are provided at lower levels (higher costs per head due to low population densities and long distances) (Tornedalen)
- Small size does not attract investment (sparsely populated areas in Spain)
- Environmental degradation due to overdevelopment of the coast by tourist structures (Belgian coast)
- Ageing society / high share of elderly (Irish Sea)
- Dependency on imported products / higher costs (Canary Islands)

Promotion of assets:

- High living quality (natural capital, strong sense of identity, close-knit communities, particular traditions) (Outer Hebrides)
- Attractive area for tourists, brand as "sea and sun" destination (Sicily)
- Availability of natural resources (Tornedalen)
- Potential for renewable energy exploitation (Belgian coast)
- Multicultural society (Geneva CBMR)
- Building relations with African neighbours: trade increasing (Canary Islands)
- Permeable border makes daily commuting easy (Jura massif)

Non-commodified values:

- Ecological richness (French Guyana)
- Potential for exploiting renewable energy sources: direct use value + option value (Outer Hebrides)
- Recreation value hinging on activities particular to coasts (swimming, boating...) and unique landscape (Irish Sea)
- Interface (melting pot) for many cultures (Sicily)
- Living area of the only indigenous people of the EU (Tornedalen)
- Resources of worldwide importance (forests, iron, construction materials) (sparsely populated areas of Spain)
- Regeneration of a resource: Belgian North Sea as an important spawning and nursery ground for some commercial fish species (Belgian coast)
- Gateway between EU and non-EU countries (Polish-Ukrainian border)

Table 31 Example: Highland Council area

	Levelling the playing field (Compensation of constraints)	Enhancing endogenous development (Promotion of assets)	Non-commodified values
Economic structure	<p>Low diversification of economy / dependence on tourism & public sector</p> <p>Long travel times (due to dispersed settlements and terrain) - deters new enterprises makes some goods more expensive</p> <p>Services of general interest are provided at lower levels (higher costs per head due to low population densities and long distances)</p>	<p>Attractive area for tourists (unique landscapes + outdoor activity opportunities + Highland image)</p>	<p>Recreation value hinging on</p> <ul style="list-style-type: none"> - unique landscape + outdoor activities - cultural elements
Society	<p>Ageing society (due to immigration of old & outmigration of young)</p> <p>High house prices (due to influx of older people) are sometimes unaffordable for younger</p>	<p>Attractive area for residents (living quality due to quality of environment and close-knit communities)</p>	<p>Unique cultural heritage including specific products (e.g. whisky), garments (e.g. kilts), traditions (e.g. Highland dances), Gaelic language + strong sense of identity: <i>cultural value + heritage value</i></p>
Environment	<p>Lack of grid capacity may hinder efficient exploitation of renewable energies</p>	<p>Potential for renewable energy: wave & tidal, wind (offshore & onshore), hydro</p>	<p>High levels of biodiversity supported by Highland landscape: <i>preservation value / intrinsic value</i></p> <p>Potential for exploiting renewable energy sources: <i>direct use value + option value</i></p>

When looking at the tables, it becomes obvious that this approach works better for some geographic specificities than for others. When discussing the compensation of natural handicaps (or constraints), the promotion of assets and non-commodified values makes sense particularly for islands, in mountains, sparsely populated areas and Outermost Regions. A discourse of compensation has for a long time surrounded these areas, and elements of this discourse have been evoked throughout this report. Particularly typical examples are difficulties of access, low levels of public services in sparsely populated areas, the dependence of Outermost Regions on imports due to their remoteness and small market size, or the difficulties that mountain farmers face as compared to lowland farmers. In order to achieve territorial justice, many have claimed that these areas should receive compensation of some form (monetary or exemption from particular regulations). To counterbalance this “negative” discourse, the assets of these areas are then sometimes evoked (as an opportunity for development and GDP growth), or, perhaps more abstractly, the vital contributions that these areas make to the general well-being of humanity as a whole (the non-market values that are often related to the preservation of natural capital).

However, this type of discourse is less pertinent for other GEOSPECS categories, namely border areas and coasts. The underlying assumption of the logic of “compensation” is that all – or at least most – of the respective areas face the same challenges, because the challenges are *structural*: in the case of islands, mountains and Outermost Regions they derive from geographic preconditions, whereas in the case of sparsely populated areas the challenges are inherent in the definition of “sparsely populated”, as the logic of a market economy makes it inevitable that levels of service provision will be lower.

This is not true for borders or coasts. As the case studies prove, both of these GEOSPECS categories are very diverse, and some of the richest and most attractive areas of Europe are borders or coasts. The Luxembourg cross-border metropolitan region features the highest GDP per capita levels of the entire EU, and the Belgian coast is a successful node for transport and logistics, as well as an attractive and thus densely populated living space.

Even though these areas certainly face *challenges*, which policymakers need to address, these challenges do not follow the logic of *compensation for a structural handicap*. For instance, the Belgian coast faces severe environmental degradation due to the impacts of intense anthropogenic activity. Fish stocks in the Irish Sea are depleting. Soaring house prices in Luxembourg and Geneva lead to exclusion of those unable to afford them. The challenges of the border area between Germany, Poland and the

Czech Republic are those of an economy in transition. While all of these issues call for political solutions, they are only indirectly linked to the respective area's position at a border or at a coast, and thus the logic of compensation is hard to apply.

Table 32 Example: Geneva CBMR

	Levelling the playing field (Compensation of constraints)	Enhancing endogenous development (Promotion of assets)	Non-commodified values
Economic structure	<p>Competition for space leads to high land/real estate prices</p> <p>Public transport network across border insufficient</p>	<p>International finance centre Concentration of international organizations Research cluster</p> <p>Many opportunities for (well-paid) employment in the canton Geneva (also for residents of surrounding areas) Image of natural charms in combination with historic & architectural assets</p> <p>Projects to improve public transport network</p>	<p>Recreation value hinging on: - landscape - cultural elements</p>
Society	<p>Border as a limit for spatial planning: in Geneva city development of housing does not keep up with rapidly increasing population</p> <p>High number of internationals / commuters creates slight exclusionary sentiments among some parts of Genevan population</p>	<p>Strong links between both sides of border via commuters: French areas function as "suburbs" for Geneva city without border being an obstacle</p> <p>International & multilingual environment: creativity</p>	<p>Multicultural society: learning process: <i>cultural value</i></p>
Environment	<p>Urban sprawl (consumption of natural areas) + high resource use and waste production</p>		

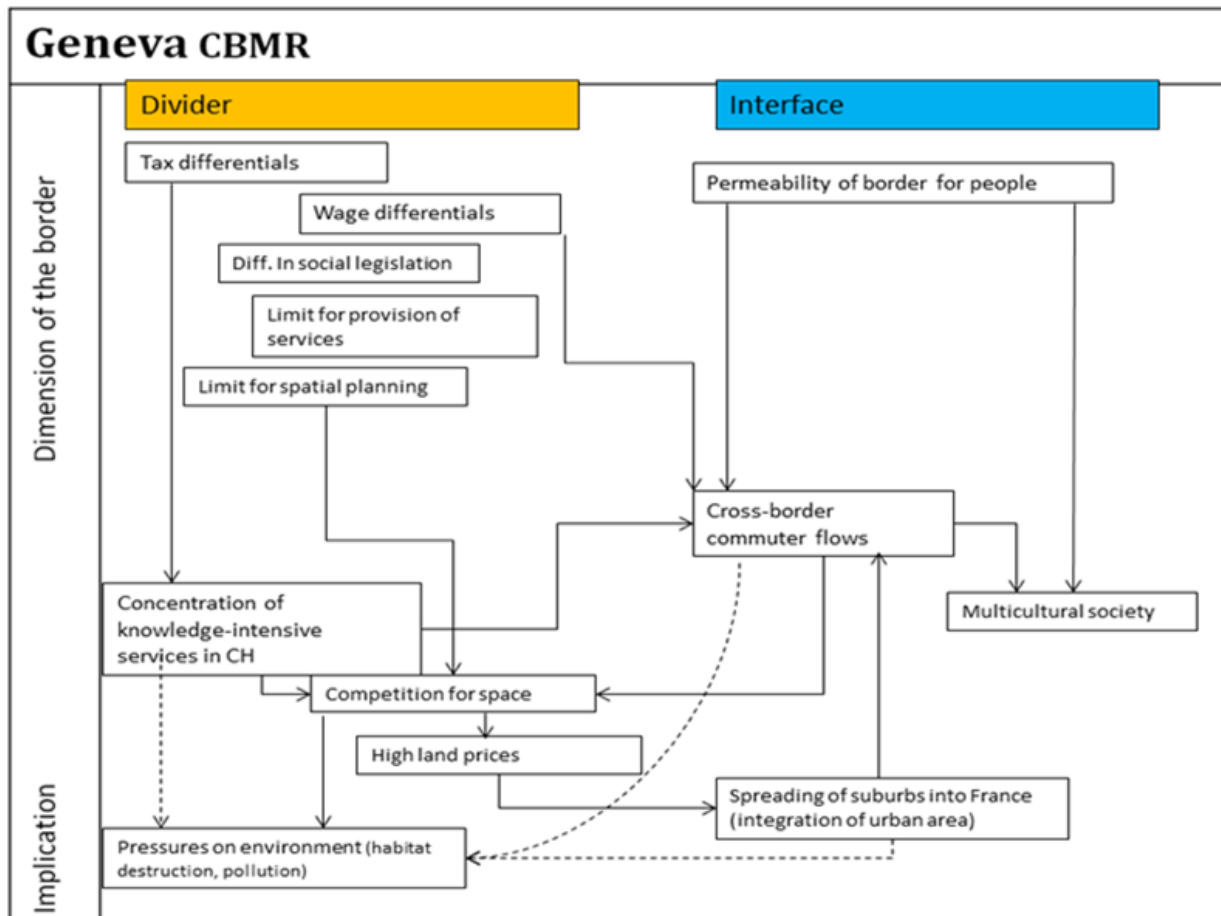


Figure 54 Model of socio-economic processes in areas with a 'linear' geographic specificity: example of the Geneva CBMR

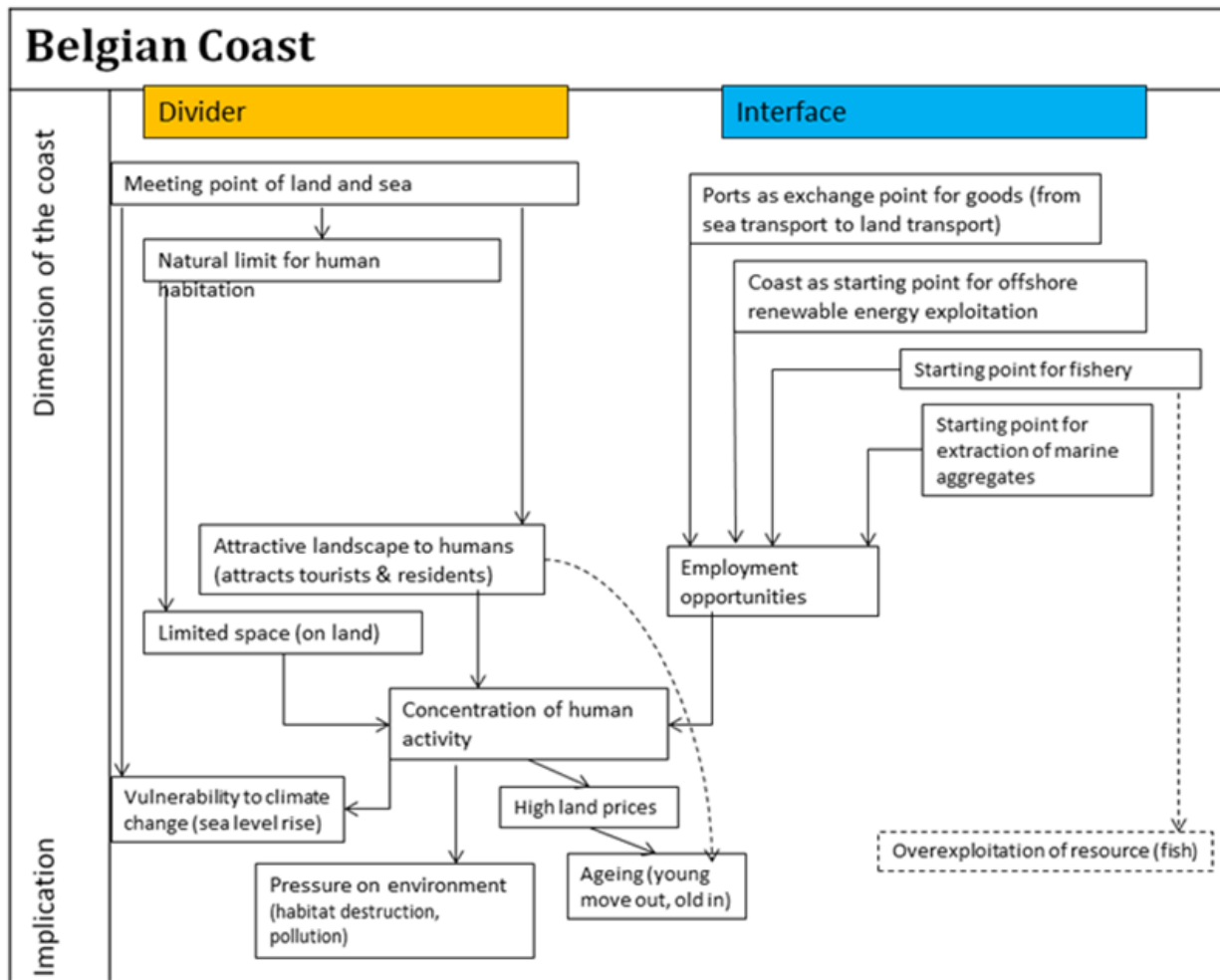


Figure 55 Model of socio-economic processes in areas with a 'linear' geographic specificity: example of the Belgian coast

Instead, a different characteristic appears to unite borders and coasts: conceptually, both can be regarded as *lines* that function as *separators*. The coast obviously separates land from the sea. Borders separate different political administrations with respective rules, different economic spheres with different levels of development, different cultures with different languages, etc. At the same time, these lines have an important role as *interfaces*: economic and cultural exchange takes place across borders; ports on coasts are a focal point for transport, the exchange of goods, and logistics.

GEOSPECS does not regard borders or coasts exclusively as lines, as indicated in the chapter on conceptual understandings and delineations. A coastal *zone* is a strip of variable width measured from the coastline (depending on the type of use for which it is being defined), whereas a border *area* is often characterized as a "buffer zone" where different cultures meet (seeing that lines between different cultures can very rarely be traced sharply). However, both coastal zones and border areas *refer to* a conceptual line.

Overall, it may be more logical to look at borders and coasts in terms of being separators and interfaces. The following are examples for a border region and a coastal region.

6. Transversal themes

6.1 Overview of transversal themes

The cross-analysis of geographic specificities according to transversal themes contributes to a more coherent discourse on geographic specificities, by showing similarities and differences in the ways that regions concerned by each theme experience obstacles to balanced and harmonious development and overcome these challenges.

The TPG has defined transversal themes for the analysis of all types of GEOSPECS areas. The choice of transversal theme makes it possible to cover the strategic ambitions of the European Union of most relevance in the context of GEOSPECS. The purpose of these themes is to establish the basis of a transversal discourse on the relevance of "territorial diversity" in sectoral and territorial policies. The project seeks to identify situations where the adaptation of strategies and measures to the diversity of territorial contexts can improve their efficiency, increase their positive side-effects and/or reduce their negative externalities. It also assesses whether certain GEOSPECS categories are more relevant than others within specific policy fields.

Type of development approach	Transversal theme	Partner name
Economic	Economic vulnerability / robustness facing globalisation	Nordregio, SE
	Accessibility and access to services of general interest	Alterra, NL
	Role of Information and Communication Technologies	Louis Lengrand & associés, FR
Social	Residential attractiveness	E-cubed consultants, MT
	Regional identity and cultural heritage as factors of development	University of Geneva, CH
Environmental	Protected areas and biodiversity as factors of development	Perth College UHI, UK
	Natural resource exploitation	Coastal and Marine Resources Centre, IE
	Vulnerability of human-environment systems to climate change	Umweltbundesamt Österreich, AT

All transversal themes are analysed with the priorities of “Europe 2020” in mind. Within each theme, the TPG therefore seeks to determine how the characteristics of each GEOSPECS category may be of use when formulating and implementing strategies for “smart growth”, “sustainable growth”, and “inclusive growth”. The analysis therefore focuses on the core research question: ‘how may the diversity of geographic specificities across Europe be taken into account for multiple development models and ambitions?’

6.2 Transversal theme reports

6.2.1 Economic vulnerability and resilience – Strategies of territories in the face of globalization

Unpacking globalisation

One of the main spatial effects of globalization is what Harvey (1990) identified as the compression of time and space. Globalisation has had a fundamental impact on the perception that distance is not only a fundamental feature of space (physical distance), but also a result of human interactions: i.e., distance is a fundamentally relational notion, which brings in geographical, technological and social aspects (Young, 2010). The major technological advancements have greatly affected the economics of space (Ward and Hite, 1998), by opening up to new opportunities for local economic actors.

The implications for areas with geographic specificities

As explained by Ward and Hite (1998), “rurality and remoteness from markets has generally been defined with respect to a single, central market”. Consequently, globalization processes give the opportunity, at least in theory, for non-urban economies to reach out to multiple markets, instead of being ‘tied’ to a single core market (either regional or national). As local and regional economies in areas with one or more geographic specificities are often remote and marginalised in the national context, globalisation gives them the opportunity to re-connect to other economic spaces beyond the national borders.

Malecki (2007) highlighted this new situation of competition between territories: "Cities and regions compete for investment by companies and by governments, for skilled workers, and for tourists; in all of these competitive situations, one place or a few places are chosen and others are not." He continues by advocating that "the scale of competition may be global (...). Competition is perhaps keenest within the set of 'peers' – places considered similar in size and scope and likely to be attracting investment, skilled workers, and tourists from one another."

Economic Vulnerability and Resilience of territories

Economic vulnerability refers not solely to a structural weakness of a regional or local economy as such, but also to its compatibility with other regional and local economies. Economic vulnerability suggests that the economic characteristic of a territory needs to be contextualised.

Consequently, vulnerability (or robustness by the same token) cannot be considered as an intrinsic characteristic of an economy. Simmie and Martin (2010), proponents of an evolutionary perspective on regional growth, argue that "A local economy with a successful specialisation can become more conservative and thus less resilient in the long term (...) the important attribute of regional economic resilience is the adaptative capacity of a local economy". Thus, regional resilience is tightly related to the capacity of the local economy to engender an 'evolving economic specialisation', meaning that the sector activity in which the local economy is specialised may change over time in order to adapt to the new patterns in global demand.

Local economies embedded in multiple economic spaces

Local economies are included in economic spaces that take multiple forms. The most obvious of these spaces are the national and global ones. These levels are easily identified as they represent the main units of economic policies, rules and regulations. Recent work has highlighted the relevance of the sub-national or regional as an important economic space of belonging for local economies and for understanding growth mechanisms. For instance, Huggins and Williams (2011) state that "the regional dimension is especially interesting as a way to organize initiatives for local economic development, and not the least in the context of a globalized economy".

Yet, more often than not, the 'regional' level is reduced to sub-national administrative units (e.g. NUTS II or III). In the GEOSPECS project, we argue that the notion of geographic specificity facilitates bringing more

territorial coherence to the idea of regional economic spaces that are not based entirely on administrative divisions, but rather on common challenges and development opportunities experienced by a collection of local communities. On this basis, local economies belong to certain territorial ensembles (or 'massifs' if taking a metaphor from mountain areas). We argue that these economic spaces often overlap: an individual local economy can be embedded into, or integrated in, a number of these territorial ensembles. For local economies, an integrated development strategy thus needs to take into account this multiple territorial anchoring.

Recent literature (Audretsch and Keilbach, 2004; Huggins and Williams, 2011) has emphasized the role of geographic spaces in shaping the conditions for economic development, as competitiveness varies across geographic space and as regions develop at different rates, depending on drivers of growth. Consequently, taken as a whole, different territorial ensembles shape different possibilities for development opportunities because they have different economic preconditions and profiles. For local economies, belonging to a number of such territorial ensembles brings a greater variety of development opportunities than if regional economic spaces are only considered as mono-dimensional (i.e. based on administrative units).

Networking and Social Capital

Social capital has been identified as one of the main comparative advantages of non-urban places in the context of globalisation. As expressed by Ward and Hite (1998), "rural areas and small towns tend to pride themselves upon traditional family values and reliance upon informal institutions in interpersonal relations". Social capital represents the internal relational capital of a territory, i.e. the capacity of economic actors to develop and maintain interactions (e.g. kinship or trust). Yet, this strength of local relations is not enough for economic actors to take advantage of development opportunities. As acknowledged by Lowe et al. (1995) and later by Fløysand and Sjøholt (2007) in the context of peripheral regions, the development of extra-local linkages is necessary for local communities, as they will not be able to generate development purely from within. Consequently, for small, isolated communities, tight social capital ought to be combined with openness towards extra-local actors. In the same vein, based on a study of globalization processes in peripheral parts of Canada, Young (2010) summarizes that 'although rural areas may have high levels of strong-tie or 'bonding' social capital. Recent research suggests that these types of connections are less useful than outside ties in generating new economic and entrepreneurial opportunities".

For small, isolated local communities, doing business has often meant a “strong reliance upon the local market due to the rural firms’ remoteness from extended markets and limited numbers and density of business networks” (Galloway, Sanders and Deakins, 2011). We advocate that these local economies also need to develop new forms of relational capital that extends outside the traditional local economic territory. We furthermore argue that GEOSPECS areas may form coherent economic spaces within which extra-local economic relations may prosper and develop.

Review of relevant findings from the case studies

In relation to the discussion above, the issue of economic vulnerability and resilience will be explored in the GEOSPECS project according to two main aspects, Specialisation and Diversity, and Networking and Social Capital. The empirical discussion will be structured essentially around the qualitative data gathered in the case study reports. This section highlights notable similarities and differences encountered in those case study reports according to these two aspects.

Specialisation and diversity

Traditionally and historically, economic activities directly related to the geographic specificity of a region have been the engine for regional growth and employment: for coastal areas and islands, fishing and maritime transportation; for mountain areas, summer and winter tourism and energy; for sparsely populated areas, mining, energy and forestry. More specifically, the availability of specific natural resources, either above- or underground, was the founding element that led to early economic specialisation in many GEOSPECS areas.

However, in many cases, the dominance of these traditional activities has been significantly reduced in the recent years. Second, the traditional activities need to reinvent themselves and become more competitive and ‘niched’, in order to develop a specific market aiming at developing a competitive advantage based on quality rather than low price. Consequently, the traditional specialisation needs to move from a large-scale, mass activity to a small-scale, ‘niched’ one. Due to rationalisation, traditional activities have become less demanding in terms of workforce. This has been the case, for instance, in the fishing industry in the Irish Sea, or mining activities in the Torne Valley and Central Spain. In order to regenerate the traditional activities, more niched productions had to be developed: for instance, the development of aquaculture and the extraction of marine aggregate on the Belgian coast, aquaculture

specialised in seed mussels along the Irish Sea coast, or the development of organic farming in Sicily and Central Spain.

In some cases, the adaptation to international competition has led to a radical change in the economic specialisation. The most obvious case is the one of Luxembourg: from being a steel-manufacturing region, the Grand Duchy has developed into a centre for financial and high-service industrial activities.

However, some traditional activities have successfully adapted to the global shift, for example mining activities in Northern Norden, whisky-production in the Scottish Highlands, and watchmaking industries in the Jura. These activities not only prosper, but also have expanded, so that they have not only become a growth engine for immediate region, by boosting direct and indirect employment, but also strongly impact the image of the region outward. For instance, in the case of activities such as mining and watchmaking and micro-technologies, the local know-how and experience have been translated into business services that can be exported outside the regional borders.

Finally, in most of the GEOSPECS areas investigated, quite a high share of the workforce is employed in the public sector. Consequently, from a labour-market point of view, public administration has become a specialisation by default, often compensating for a relatively low level of development of industrial activities. From an economic vulnerability standpoint, this characteristic brings some stability to the local and regional labour-market, as public employment is less sensitive to economic downturns. However, it also perpetuates the strong dependency of such areas towards the respective national capital, and thus keeps the region anchored in a core-periphery pattern. Finally, this reliance on public investments can prove to enhance the regional vulnerability in the long run: in the case of Central Spain, the disengagement of the state through cuts in public subsidies to the regional mining activities has had strong impacts on the regional economy.

Networking and social capital

The importance of traditional activities for the regional economies of GEOSPECS areas, discussed above, is much more 'palpable' in terms of cultural and social aspects of local and regional identities rather than in strict economic terms. Consequently, we argue that the traditional activities have an impact that goes well beyond the 'sectoral borders' of a GEOSPECS area. Indeed, they have been instrumental in maintaining tight social relations, based on trust, acquaintance and kinship, within the region that can spill over to other economic activities, e.g. in business

services and manufacturing. In that respect, the perpetuation of traditional activities, although not necessarily economically profitable in itself, can become an important precondition for the development of a diversified range of other activities. Thus, traditional activities have an indirect important role for fostering the establishment and maintenance of local business relations in GEOSPECS areas, in the form of strong interpersonal and social relations.

One of the main aspects of globalisation identified by the literature concerns the increase in interdependencies between territories. From the case studies, we can identify two main aspects of such territorial interdependencies: one concerning the flows of persons (i.e. commuting); and one concerning market exchanges (i.e. transactions). One notable observation is that most of these flows are strongly asymmetrical, thus presenting a core-periphery pattern.

When it comes to interdependencies related to the labour force (i.e. commuting), and when a strong economic centre is in geographic proximity, there is a clear pattern in terms of centre-hinterland. This is obvious in the cross-border regions of Geneva and Grande-Région, as the highly internationalised cities of Geneva and Luxembourg attract skilled workers from their surrounding regions. To a certain extent, this is also the case in the Jura and Central Spain for which, respectively, the Swiss-side and the surrounding metropolises (Madrid, Zaragoza, Valencia) act as magnets for the work force. A consequence of this asymmetrical situation in terms of labour-force supply-demand is that the employment structure in the 'hinterland' is often dominated by the public sector.

'Global specialisation' and the establishment of 'niche-markets' that can give a competitive edge to local and regional economies entail export- or at least outward-oriented activities, and often the necessity to obtain specialised supplies. Consequently, the adaptation of the economic specialisation of local and regional economies often leads to the development of economic exchanges outside their traditional market-zones (i.e. beyond the local/regional centre). In the case of the Jura and the Torne Valley, for instance, the main customers for the regional products (respectively micro-technologies and minerals) need to be found internationally. Nevertheless, this 'global production' is dependent on the availability of specialised and highly-skilled suppliers and subcontractors within the region. In the Jura, it appears that there is a territorial division of labour between both sides of the cross-border area: enterprises on the French side mostly work as subcontractors for enterprises on the Swiss side; these Swiss enterprises are the ones with international customers. For the Torne Valley, the mining operations themselves are undertaken by multinational companies, either Nordic or foreign-owned; however, these

operations necessitate the involvement of many specialised service-subcontractors, often located in the wider Northern Nordic area. The Irish Sea case also shows an interesting example of asymmetrical relations, as the UK is the main trading partner of Ireland, and thus its ports are the main international gateways for Irish production.

Quantitative evidence

The employment data gathered, in the framework of the GEOSPECS project, at the municipal level provides an interesting basis for investigating the aspects of economic vulnerability/robustness related to economic specialisation and diversity.

To identify significant differences in terms of employment profiles, a Factorial Analysis was performed on the subdivisions of each specificity. This led to the following conclusions.

Within each specificity, there is a broad diversity of labour-market profiles. Consequently, it is not possible to identify ONE economic profile for all mountain areas, for example.

Yet, some mountain areas do share, to a certain extent, some similarities in terms of labour-market profile. For instance, in Figure 56, one can identify a grouping of mountain areas that have a strong profile towards Agricultural and Fishing activities (Top-right corner). This is also the case for mountain areas with a profile towards manufacturing (bottom-middle) or mining activities (bottom-right).

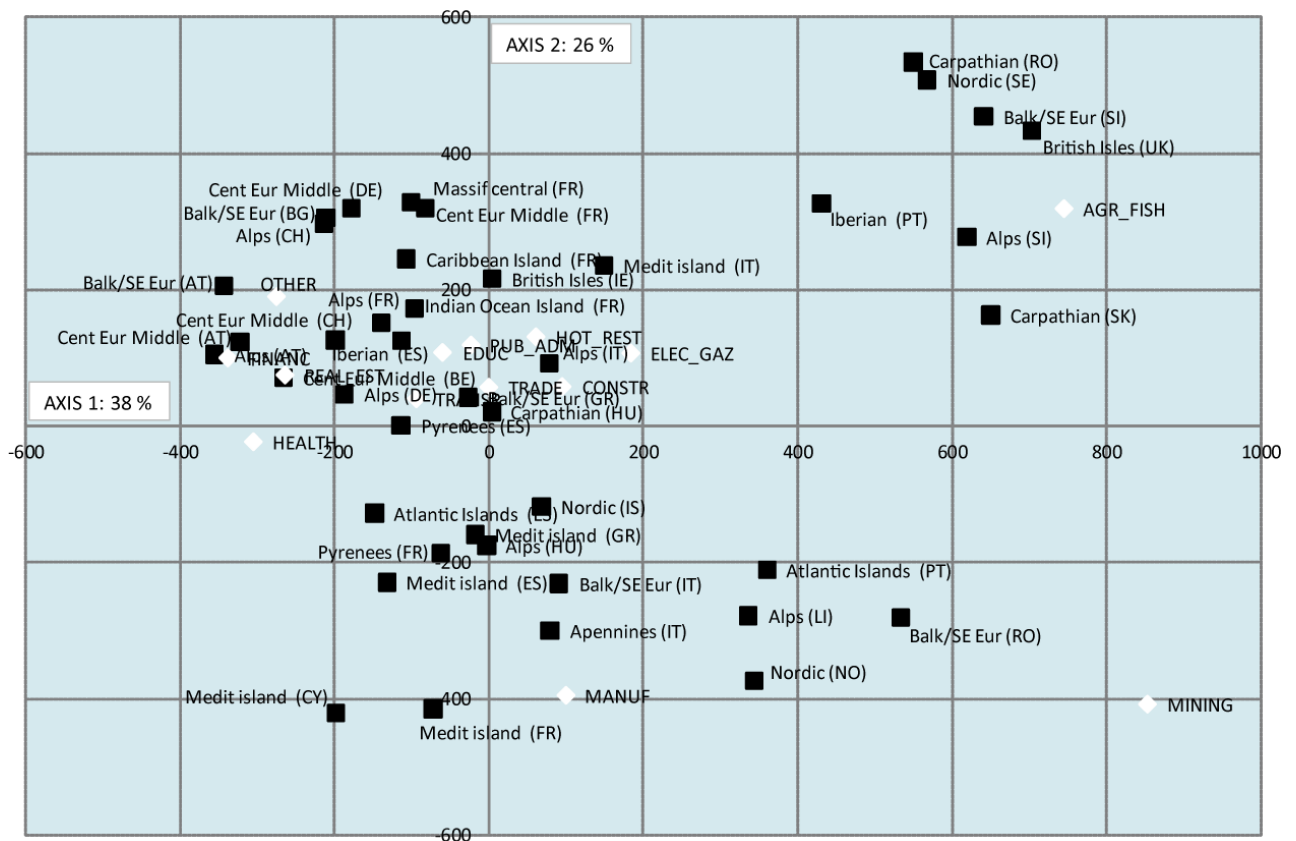


Figure 56 Labour-market profiles in mountain areas

Summary and conclusions

This section proposed conceptual and empirical approaches for understanding issues relating to regional economic vulnerability and resilience. Processes of contemporary globalization have opened up the local and regional economies to the possibility of being included in several economic spaces at the same time. For local economies, traditional economic spaces were structured around the spaces of the nation-state or the regional core-periphery (i.e. urban core and rural hinterland). Globalization (and Europeanisation) processes have, to a certain extent, enabled local economies to participate in other types of economic spaces, the most obvious one being the cross-border one. Furthermore, we argued that the prospects for local and regional economic growth were tightly related to their capacity of retaining or reinventing their competitive advantage across these multiple economic spaces. In that frame of reference, economic specialisation needs to be understood as multi-form, as economic specialisation depends not only on the assets and strengths of the local economy itself, but also on how it 'fits' into the economic landscape of the wider economic spaces in which local and regional economies are embedded.

The notion of geographic specificity, as developed throughout the GEOSPECS project, proposes an interesting vantage point for local and regional authorities to understand the issues relating to economic vulnerability and robustness. We advocate that globalisation implies increased competition between regional and local economies that share the same characteristics and comparative territorial potentials. In that respect, local and regional economies need to understand how what their competitive edge is in their wider 'mountain', 'island' or 'sparsely populated' economic spaces and how existing social capital can be used to support this. By doing so, we argue that local economies would be more able to develop economic specialisations leading to 'sustainable' and robust economic growth.

This understanding acknowledges the need for a more pragmatic, territorial approach to local economic development: for areas with geographic specificity, 'smart growth' is about matching the need for delivering growth on a short- and long-term basis by benchmarking its development opportunities with those of its territorial 'peers'.

As shown through the examples of our case study regions, amenity-based development, i.e. the exploitation of natural and traditional assets, is a key element on which the development of local economies in areas with geographic specificity ought to be based upon in a short-term perspective. However, as suggested by Simmie and Martin (2010), in the long-term perspective, such local economies need to "move up the value chain, by focusing development on the knowledge economy". Yet, we argue that this move "up the value chain" needs to be incremental and grounded in the development path of the region, so that it can draw on the advantages linked to social capital, which, as we have seen in our case study regions, is often founded on an socio-cultural identity originating in traditional activities.

6.2.2 Accessibility and services of general interest

Relevance of these transversal themes for the socio-economic development of regions and localities

Accessibility and Services of General Interest (SGI) are strongly linked concepts. This is the reason why GEOSPECS considers them together in one transversal theme.

- Accessibility is defined in GEOSPECS as the distance in time to urban areas considering all modes of transport (rail, road, flight, ferry); not as the Euclidian distance. Accessibility is frequently used as a proxy for the access from rural areas to SGI located in large cities (e.g. markets, facilities and employment) (Carver et al., 2002; ESPON, 2004, 2006). In rural land-use change studies, accessibility is often described by simple measures of the distance to a location of interest (Verburg et al., 2004). Alternatively, EU-wide methods have been developed to determine accessibility for all combinations of transportation modes – roads, rail, air and navigable water – with a wide variety of applications (ESPON, 2004; Uchida and Nelson, 2009).
- Following the Europa glossary, Services of General Interest (SGI) are “services considered to be in the general interest by the public authorities and accordingly subjected to specific public-service obligations. They include non-market services (e.g. compulsory education, social protection), obligations of the State (e.g. security and justice) and services of general economic interest (e.g. energy and communications). Article 86 of the Treaty (former Article 90) does not apply to the first two categories (non-market services and state obligations)”. There is a current trend of privatisation of public responsibilities, and therefore privately managed services are considered as SGI in GEOSPECS.

Accessibility and SGI are associated with the availability and development of an **efficient infrastructure**, which is a prerequisite for people to be able to perform essential functions such as living, working and mobility, and for the economy, to facilitate the production and sale of goods and services. Having accessible SGI is an important precondition for ensuring equal living conditions and opportunities for development in all regions. Therefore the two concepts are closely connected with the development of population and the economy of regions and localities.

What are the specific roles of accessibility and SGI in socio-economic development?

1) Accessibility

This concept is directly related to the availability and development of infrastructures. Moving people and goods quickly, efficiently and cheaply is a central tenet of the EU's goal for a dynamic economy and cohesive society. Development and planning policies are concerned with equity and a better distribution of people and activities in the territory. We cannot promote the development of the whole without knowledge of all territories and the relationships between them.

In general, territories with geographic specificities have a lower potential to develop economies of agglomeration. The small size and relative isolation of their local economies imply that they are more open (i.e. less circular) and more specialised than other areas. The approach to this issue in GEOSPECS is based on the analysis of small island state economies by Read and Staines (2004), who observe that "economic vulnerability arises primarily because of the high structural openness" of these economies, which make them more dependent on external forces, fluctuations in the demand on the global commodity market and seasonality of activities (e.g. tourism). A further cause of economic vulnerability, in the light of globalisation processes, is the lower capacity of these territories to access information (connectivity to ICT networks), capital (proximity to financiers and capacity to attract FDI), and customers and clients (transport networks to main European and global markets).

2) Services of General Interest

With regard to territorial cohesion, SGI policy issues tend to be associated with two contrasting geographical contexts: (i) rural areas, especially those that are sparsely populated and/or distant from centres of population, and (ii) metropolitan areas or agglomerations that are typically the location for specialised high-order SGI. In the rural areas, the policy issues concern adequacy of provision where the public sector is reducing or withdrawing provision, and declining viability of private service enterprises, when rising demands for SGI occur due to changes in demographic structures. In metropolitan areas, the policy issues relate to the effectiveness of higher-order services to support the global economic competitiveness of the city and its surrounding functional region.

Current European policy processes of importance for the transversal theme

1) Accessibility and connectivity

Transport infrastructure is one of the most visible examples of what can be achieved with aid from the EU Structural and Cohesion Funds. Enhancing accessibility is of key importance to strengthening regional economies and achieving cohesion and competitiveness. The EU's transport policy promotes sustainable mobility for people and goods, ensuring efficiency, safety and minimising negative effects on the environment. Investments cover transport strategies at EU-, national and regional levels that strike a balance between road, rail and sustainable transport modes. In urban areas, clean transport is promoted. Cohesion Policy investments in transport between 2007 and 2013 will be concentrated in the Convergence regions, as follows:

- Trans-European Network (TEN)-T projects across all transport modes will receive €38 billion (11% of the total of Cohesion policy investments). About half of this will be allocated to road infrastructure and the remainder to rail.
- Overall, almost €41 billion (12% of the total) will be available for road infrastructure, including TEN-T and national, regional and local roads.
- For rail infrastructure, a total of €23.6 billion (6.8%) will be spent, including TEN-T projects.
 - Other allocations include: urban transport: €8.1 billion (2.3%), ports and inland waterways: €4.1 billion (1.2%), multimodal transport and intelligent transport systems: €3.3 billion (1%); airports: €1.9 billion (0.5%).

Although many aspects of transport policy come under national governments, it makes sense for the European single market to have a single transport infrastructure. This is why the EU has opened national transport markets across the Union to competition, particularly in the road and air sectors and, to a lesser extent, for rail. Liberalised air travel has brought more competition and lower fares as well as more connections between Member States. The EU also promotes major transport infrastructure projects, the TENs. However, connecting territories means more than ensuring good intermodal transport connections. It also requires **adequate access to services** such as health care, education, sustainable energy, broadband internet access, reliable connections to energy networks, and strong links between business and research centres. This is also essential to address the special needs of disadvantaged groups (Green Paper on Territorial Cohesion {SEC(2008) 2550}).

- **Access to integrated transport systems** involves building roads or rail links between cities, inland waterways, and developing inter-modal transport chains and advanced traffic management systems. In the new Member States, good road links are scarce and driving between cities takes much longer than in the EU15. Good rail links are also unevenly distributed, and railway lines in most Member States cannot handle high speeds and are often in need of repair. The uneven quality of secondary road networks and public transport means that airports often take time to reach, while transport by sea, which can take pressure off congested roads and reduce CO₂ emissions, remains under-developed.
- **Reliable access to energy** is equally important, and the particular situation of networks isolated from the EU market for geographical (rural and remote regions, islands) or historical reasons (e.g. the Baltic States) needs to be further addressed to ensure a robust and efficient supply. Renewable energy and energy efficiency measures can offer opportunities for diversification and sustainable development.
- **Access to services of general economic interest such as health care or education** is often a problem in rural areas where, for example in remote regions, 40% of people on average live more than a 30-minute drive from a hospital and 43% live more than an hour's drive from a university. In remote areas especially, the potential of ICT to provide access to health care and education through telemedicine and remote learning remains to be fully developed.

Many European rural areas are in areas with geographic specificities. These rural areas face significant challenges. Some of their farming and forestry businesses still need to build their competitiveness. More generally, average income per head is lower in rural regions than in towns and cities (van Eupen et al., 2012), while the skills base is narrower and the service sector is less developed. Also, caring for the rural environment often carries a financial cost. One of the main areas of the Rural Development Policy deals with the development of access and connections between cities and rural areas, especially in the context of the information society.

A related topic to accessibility is **employment and social inclusion**. Promoting the integration of all people in society, in particular those on the margins, is a fundamental goal of the EU. The social welfare and support systems in place across Europe reflect this shared value of social cohesion. Yet many groups of people in the Union are socially excluded, because of a disability, because they are low-skilled, because they live in deprived areas with limited access to services, or because of health problems.

The historical review of major initiatives to support local development presented in the 'Cohesion policy support for local development: best practice and future policy options' report shows that one policy priority concerned accessibility of the region and improvement or modernisation of the network infrastructures (e.g. public service utilities such as energy, transport, water and waste) and amply justified the high appropriations of the Cohesion Fund.

2) Services of General Interest

SGI are an important component of what has been described as "the European Model of Society" (EC 2003). They are referred to twice in the EC Treaty (Article 16 and Article 86), and also in the Charter of Fundamental Rights of the European Union (Ibid). More specifically, they are considered to play a very important role in achieving territorial cohesion (EC 2008). Their importance derives from the fact that, on one hand, they address the essential needs of citizens in order to ensure an acceptable level of quality of life and, on the other hand, they deliver key elements of the preconditions for economic competitiveness, innovation and growth.

In May 2003, the European Commission adopted a Green Paper on SGI in Europe. This opened a debate on the role of the EU in promoting the supply of general interest services, in defining their general-interest objectives, and the ways they are organised, financed and evaluated. In May 2004, the Commission issued a White Paper on SGI, setting out the approach taken by the EU to promote the development of quality general-interest services. It presents the elements of a strategy to ensure that all citizens and firms in the Union have access to quality general-interest services at affordable prices. The Commission has decided to develop its sectoral approach without issuing a general directive for the moment.

SGI can contribute to achieving the objectives of the Lisbon Agenda (competitiveness), the Territorial Agenda (2007), and the Territorial Cohesion Green Paper (EC 2008), which are given added urgency by the inclusion of Territorial Cohesion in the Lisbon Treaty. Looking ahead, SGI are at the heart of EU2020, with its aspiration for "smart, sustainable and inclusive growth". More specifically "smart growth" is to be achieved by "fostering knowledge, innovation, education and digital society" and "inclusive growth" is to be achieved by "fostering a high-employment economy delivering social and territorial cohesion".

Quantitative characterisation of areas with geographic specificities based on their accessibility and SGI

An attempt has been made to provide a quantitative characterisation of the accessibility and provision of SGI in areas with geographic specificities, based on the limited set of indicators available at pan-European level (Table 33). The indicators used are average accessibility to cities, number of air destinations, jobs and age distribution in urban areas and GEOSPECS areas with geographic specificities, i.e. Coastal areas, Border regions, Islands, Mountains, Sparsely Populated Areas (SPA), Outermost Regions. The proxy variables used to characterise SGI are (i) number of air destinations; and (ii) total jobs, jobs in the education and the health sectors (as % of the total amount of people in the area). The distribution of the population in three age categories (as average proportion of the total amount of people in the area) is used as additional indicator to characterise these areas.

This analysis shows that these areas do not follow the same patterns but, on the contrary, show the following disparities:

- On average, coastal and border areas have good accessibility to cities; mountain areas have an intermediate accessibility; and Islands, SPA and Outermost Regions have a very low accessibility – on average, it takes more than 2.5 hours for their inhabitants to reach cities with at least 25,000 inhabitants.
- The number of air destinations (as a proportion of the total number in Europe) provides additional information on accessibility by plane since the accessibility travel times were calculated for different road types, railways and frequently used ferry-connections, but not for airports. It appears that 97% of the air destinations are in urban areas. The number of air destinations confirms the relatively good accessibility of coastal areas mentioned before. However, border regions and mountain areas are poorly accessible by air as they have, respectively, 68% and 86% fewer air destinations than urban areas. Islands, SPA, Outermost Regions and IP are barely accessible by air.
- In coastal areas, 69% of the population have a job, which indicates a quite high employment rate, being 50% higher than the European average. The population with a job in Outermost Regions is similar to the European average, whereas in islands, mountains and SPA it is about 30% lower than the European average. Border regions and

IP have the lowest proportion of jobs respectively, 35 and 38% lower than the European average.

- The number of jobs in health and education are used as a proxy for the potential access to health and education services. Coastal areas are the only geographic specificity with a very high proportion of these jobs, being 70% above the European average. In contrast, the other geographic specificities are below the European average. In Outermost Regions, the number of jobs in education is only 3% below the average; in islands, 17% below the average; in mountains, SPA and border regions 0% below the average; and lowest in IP (50% below the average). Strikingly, the number of jobs in health is far below the average for all geographic specificities except the coastal areas. The values for the IP case studies do not provide a consistent trend.
- The age distribution is considered as indicator of potential demand of accessibility and SGI. For example, a high proportion of children will require good provision of education services to keep families in the region. On the other hand, a high proportion of older people requires good provision of health services. The proportion of children in coastal and border areas is similar to the European average, in Outermost Regions it is 26% higher, whereas in islands and mountains it is about 10% lower, and even lower in SPA and IP, at about 30%. For all specificities, the average population aged 15-65 is quite similar to the European average, being SPA having the lowest proportion (14% lower than the European average). Finally, the proportion of the population aged over 65 shows a reverse trend to the proportion of children, being lowest in Outermost Regions (27% lower than the European average) and the highest in SPA (53% higher than the European average).

This analysis shows that differences between geographic specificities exist in accessibility and provision of health and education services. Coastal areas are by far the best accessible and best provided with health and education services. The lower accessibility in mountain regions shows the impact of topography on travel times. In island regions and Outermost Regions, accessibility is more dependent on transportation by freight and passengers by plane or ship. However, it is important to consider that, for SPAs and Outermost Regions, reasonable thresholds for remoteness are probably different in the perception of local people than for those living in highly populated areas.

In Outermost Regions, the potential higher demand for education is in balance with the number of jobs in this sector. In contrast, the high proportion of older people in SPA is not in balance with the low number of

jobs in the health sector. Consequently, these regions, characterised by sparse settlement structures and declining demand as result of demographic changes, have a high chance of facing problems with carrying capacity, i.e., the rate of the utilisation of infrastructure for the provision of SGI (BBR, 2006). The tipping point is reached when the demand potential needed for the efficient operation of such infrastructure no longer exists.

These findings help the understanding of the role of accessibility and SGI in supporting the EU2020 “smart and inclusive growth” in different geographical contexts. Since EU2020 proposes that each Member State develops its own strategy and targets, it is anticipated that there will be substantial interest in these findings regarding better methodologies and indicators to facilitate the assessment of the current situation, and to allow wider dissemination of good practice and innovation in accessibility and SGI provision.

Table 33 Characterisation of the accessibility and provision of SGI in areas with geographic specificities

Type of areas	Area (% total EU27)	Accessibility to cities ¹⁵⁶ (min)	Number of air destinations	Total Jobs	Jobs in Education	Jobs in Health	Age < 15 years	Age 15-59 years	Age > 60 years
Europe	100%	121	100%	44%	3.0%	4.4%	16%	59%	25%
Urban	46%	107	97%	48%	3.3%	5.0%	17%	60%	23%
Coastal	37%	114	62%	69%	5.3%	7.5%	17%	59%	24%
Border	39%	120	32%	29%	1.7%	2.4%	17%	60%	23%
Islands	3%	152	1%	32%	2.4%	2.1%	15%	55%	27%
Mountains	29%	135	14%	32%	1.9%	2.3%	15%	57%	28%
SPA	17%	169	0.05%	33%	1.9%	1.9%	12%	51%	38%
Outer-most Regions	2%	174	0.32%	44%	2.9%	2.6%	21%	61%	18%

¹⁵⁶ Calculated according to van Eupen et al. (2012), who constructed a new accessibility dataset with a 1 km² resolution, based on the ArcInfo cost-distance algorithms (ESRI, 2006; Verburg et al., 2010). This approach calculates the travel time to the nearest destination of interest for each 1 km² in Europe, given the defined transportation network. Travel times were calculated based on a friction surface and average travel speed for different road types, railways and frequently used ferry-connections. In regions with steep slopes, the speed was decreased. Since urban areas of varying sizes offer different services and facilities, the final measure of accessibility was based on the average time-cost to different city sizes (to cities of more than 25,000, 60,000, 100,000, 250,000, 500,000 and 750,000 inhabitants). By including the larger cities, the weight of urban agglomerations that provide the most services is larger than small towns.

6.2.3 Role of Information and Communications Technologies (ICT)

Defining ICT and the Information Society

ICT can be understood as a collection of technologies and applications, which enable electronic processing, storing, retrieval, and transfer of data by a wide variety of users or clients. ICT are characterised by very dynamic technological changes and convergence, decreasing costs for new equipment and features, and a rapidly increasing range of applications and penetration in an increasing number of realms of professional and personal life (Cohen et al., 2002).

ICT comprise enabling technologies but also constitute a sector. As ICT progressively spread to more and more sectors, they could be classified as ICT sectors (for example media, publishing, etc.). The OECD defines the ICT sector as a combination of manufacturing and services industries that electronically capture, transmit and display data and information. Thus, ICT providers can be classified in terms i) manufacturing of ICT, ii) wholesale and retail trade of ICT, iii) ICT network services, iv) other ICT services. Similarly, investments in ICT can address hardware, software, network infrastructure (communications equipment) and, in principle, training of personnel.

Geographical impacts of ICT

If experts eventually agreed on the positive impact of ICT on productivity and growth, the geographical impacts of these developments in general and of the ICT revolution in particular are still disputed. Can the IS contribute to the reduction of territorial imbalances? Can it help compensate for disadvantages partly caused by certain territorial specificities? In which ways can it help turn such disadvantages into growth factors?

Some cyber prophets and technological optimists claimed that the emergence of the digital economy would kill distance, make urban regions superfluous and, at the same time, eliminate the scale disadvantages of smaller and more peripheral regions (e.g., Negroponte, 1995, Friedman, 2005). Their basic idea was that the spread of the use of ICT has the potential to replace face-to-face activities, i.e. to substitute physical movements that formerly occurred in central locations, which would strongly reduce or even eliminate agglomeration economies and hence make all economic activities totally "footloose". This concept, sometimes labelled "substitution theory", has been largely challenged, both in theory and in fact, as simplistic and determinist.

New Economic Geography (NEG) theory, which has developed since the early 1990s, provides economic theoretical tools to understand the factors driving spatial transformations and how these transformations affect regional economic growth (Krugman, 1991). As noted above, the increased use of ICT enables major reductions in geographical transaction costs by reducing spatial information frictions. When these costs are reduced, producers in large markets have good opportunities to exploit economies of scale and to lower production costs by also delivering to other regions. This leads to cumulative causation or positive feedbacks initiated by the effects of ICT on geographical transaction costs. Thus, as a first conclusion, we may assume that investments in ICT, particularly in communications equipment, stimulate further agglomeration. The original version of NEG theory said nothing about the role of knowledge in regional economic growth except for increasing returns (economies of scale). However, since the development and exploitation of ICT is intimately associated with the development, diffusion, appropriation and use of knowledge, it is necessary to integrate knowledge and knowledge externalities in this framework.

During the last decades, the internationalisation of production and globalisation of markets have created the preconditions for geographical location choices based upon global rather than national considerations. Company units and plants are located where the environment is the most attractive (in terms of labour force, R&D, etc.). Two technological conditions, production decomposition and network control, have made these new scenarios possible. Improved monitoring using ICT can, in principle, lead to better, faster, and more timely flows of goods and persons from origin to destination. ICT is, in this sense, first and foremost a complementary technology, rather than a substitute, to existing distribution and transportation networks. ICT is likely to increase the efficiency of the distribution and transport delivery systems through reducing transport costs and better use of transport infrastructure (Soete in Karlsson & Stough, 2006). Thus, in addition to more traditional determinants of industrial location, such as transportation networks, low costs, etc., location choice is increasingly driven by access to particular skills, technology, and knowledge, as well as entrepreneurial talent and venture capital. The high concentration of people and firms in large urban regions creates an environment that answers these needs. These areas offer substantial advantages in terms of knowledge flows and spillovers of knowledge both within and between sectors (as opposed to conventional industrial districts).

This suggests a reformulated NEG model based upon knowledge externalities (Fujita, et al., 1999). When a (large) functional region has

achieved an initial advantage in knowledge production, due to a large pool of well educated labour and a rich supply of ICT capital assets, it will attract additional knowledge-creating and knowledge-utilising firms and subsequently a highly qualified labour force, which wants to take advantage of the increasing demand for its skills.

Even if, in principle, improvements in ICT could eliminate the demand for face-to-face interactions and make cities obsolete in this respect, empirical results suggest that the use of mediated contacts is mainly a complement to face-to-face interactions. The conclusion is that, as ICT is spreading, the demand for interactions of all varieties, including face-to-face interactions rises (Veltz, 1996). Confidence is a key element in human relationship and cannot be stimulated through ICT. Thus, it should be no surprise that most firms in the Internet industry are concentrated in key metropolitan regions. People working in the information society businesses also want to live in urban areas, for reasons related to consumption and tastes, conjugal and other social relationships. In terms of data evidence, emails or phone calls in cities are for largely local and not long-distance (Imagawa, 2002).

Nevertheless, negative externalities, such as congestion or high costs, can hinder the expansion of large metropolitan areas (Fujita et al., 1999). In Europe, studies show that, except for cultural aspirations, big cities with more than 1.5 million inhabitants can lose attractiveness (Lorenzen and Anderson, 2007). In this context, ICT can play an important role in the relocation of economic activities and the mobility of a high-skilled labour force who may want to find a quieter and greener living environment.

In addition, as ICT penetrate every sector, development opportunities are created in more and more conventional activities (agriculture, tourism, craftwork, etc.). In addition, the natural resource base of rural areas allows them to be players in global markets, linking directly and quickly to distant clients (fisheries, natural medicines, etc.). In this sense, ICT are a significant driver for shortening distribution channels. Furthermore, certain innovative rural regions profit from their global connectivity. Innovative high-tech companies with worldwide trading and links can be found in rural areas in Finland, Norway, southern Germany and other parts of Europe. Regions in the Nordic Countries seem to overcome their peripheral location by capitalising on strengths in relation to ICT, research, educational and environmental opportunities.

Last but not least, ICT is becoming widely used in public administrations and services. The development of e-government, telehealth and e-learning represents an important complement to public services where these are limited.

Effects of ICT in territories with geographic specificities: general assumptions

A first concern is that, even in the EU, access to Internet is an important issue that is still not satisfactorily addressed. ICT operators basically follow market rules and tend to invest in heavy and costly infrastructure only in densely populated and wealthy areas, where they are sure to find a sufficient number of clients. Remote, sparsely populated areas or zones where the installation of this infrastructure is particularly costly (e.g., mountain areas or archipelagos) tend not to be attractive to these private operators – unless public policies are enforced to compensate. In areas with no or very little permanent population, telecoms coverage is particularly difficult. Such areas can be found, for example, in northern Scandinavia and other sparsely-populated areas, in isolated communities located in mountain areas, or French Guyana (Outermost Regions). Such areas have a clear problem originating from their remoteness: the technologies in common use are simply out of their reach. A further constraint is in nature conservation areas, especially at high latitudes, where environmental considerations rule out the erection of the 3G-masts needed for mobile telephony. In addition, satellite coverage is often inadequate or too expensive.

Second, ICTs comprise technological solutions whose socioeconomic impacts are likely to be very limited in areas where the human environment does not allow their efficient use. In addition to the inadequacy or absence of local infrastructure, factors which impede demand for ICT in GEOSPECS territories might be characterised by:

- Demography: some areas have an ageing population less inclined to use ICT;
- Education – some areas may have a higher proportion of ICT illiteracy;
- A lack of relevant applications – ICT applications need to focus on the specific needs of the territory / population;
- Low awareness and cooperation – among individuals and businesses: advanced methods of cooperation and innovation in the usage of ICT remain largely unused, with the potential of ICT for economic growth and competitiveness used only at a very basic level;
- The cost of ICT services – the lack of flexible and creative sales packages inhibits profitable take-up by rural businesses. These small markets (in terms of customers but in large geographical

areas) can deter the implementation and development of ICT *support services companies*.

In terms of public services, there are a great number of opportunities in health, education and training, administrative processes, public procurement and institutional communication, access to logistic and postal services, etc. However, these should not substitute for existing physical local services and administrative agencies; ICT should be promoted where no physical solution is viable (e.g., archipelagos). Amongst other specific opportunities, it is also worth mentioning:

- Border regions and Outermost Regions: the maturation of the standards used to connect disparate communications networks, permitting address assignment, roaming, email messaging and file transfers;
- Mountain and coastal areas: improvement of rescue services (beacon and GPS device);
- Sparsely populated areas: community networks, citizen empowerment.

Key questions

Key questions can be classified within three categories:

- Prerequisites and general awareness: What are the mobile phone and high-speed internet coverage rates in these areas? Are there technical and / or environmental constraints? What about awareness and ICT abilities?
- Territorial continuity and access to public services: Are ICT solutions used to provide better public services for isolated people? Are there observable impacts in terms of health / education / migration flows / etc.? Does ICT enable better information sharing and reduced bureaucracy? Has ICT increased access to knowledge flows between metropolitan areas (university networks, etc.) and their visibility?
- New opportunities and socio-economic impact: Has the development of ICT facilitated the creation of new sectors? Has it increased competition within the territory or with neighbouring areas? Are ICT goods and services provided by local suppliers?

Review of relevant findings from the case studies

Prerequisites: supply side

Telecoms connectivity is inherently more commercially attractive in urban areas due to the lower deployment costs per user. Hence, in GEOSPECS territories, it is often more challenging to put forward a convincing case for the private sector to provide widespread connectivity. In addition, neighbours in remote communities are more likely to share internet connections than in cities, sometimes through public access points, further reducing the client base. Alternative technologies, especially mobile solutions such as WiMax and satellite internet access (VSAT), are sometimes required to reach the most remote areas, for example in Greece (archipelagos), Austria (mountainous areas) or French Guiana (sparsely populated area).

For all these reasons, substantial public investments are generally necessary to provide such infrastructures. Thanks to policy support programmes (national and EU), GEOSPECS territories are likely to benefit from adequate telecommunication coverage:

- In Scotland, the Highlands and Islands do not compare unfavourably with the rest of the UK: ADSL coverage is 95%, compared to an average of 99.8%, a better rate than in many major economies (e.g., Japan, Spain, Italy, Germany or the USA);
- In Finland, the Government launched a project in 2008, aiming to provide 99% of the population with fast optical fibre or cable network by the end of 2015. Surveys of the Ministry of Transport and Communications estimate that 95% coverage will be achieved on market terms, and the remaining coverage on sparsely populated areas will be constructed partly with public financial support.

Infrastructure is not the only issue in terms of telecommunication supply. Because of their small size, some operators do not propose services in some GEOSPECS territories even when public authorities partly finance the network. Hence, former monopolists still occupy strong positions in national markets for local access and fixed telephony. This lack of competition, characterised by the absence of local loop unbundling (LLU) and fewer bundled offers, results in higher costs for users. Even though regional/local authorities invest in ICT infrastructures, they do not provide IT services and must ensure that private operators use these grids.

Mobile phone operators' geographical coverage is not always fully effective, especially for new suppliers. Accordingly, people living in GEOSPECS regions tend to opt for the key operators to ensure sufficient

quality services, even if it is more expensive. In addition, people living in border regions have to face additional costs or roaming services. Finally, some figures show that, despite complete broadband coverage, some regions can show limited performance in terms of household connections. In particular, socio-economic characteristics and cultural barriers can hinder broadband penetration (see quantitative section).

Territorial continuity and access to public services

ICT, and the information society in general, can provide effective answers to many of the challenges faced by GEOSPECS territories.

Education is a domain where ICTs can have a positive impact. The implementation of ICT equipment and tools in teaching and learning processes, in particular e-learning applications, reduces (but does not necessarily eliminate) the need for students and teachers to travel to a certain university/school, library, etc. In some Geospecs territories, the education system has put a strong emphasis on on-line approaches complementary to a traditional campus-based university, where face-to-face lectures and seminars are backed up by the use of a virtual learning environment. In Scotland, for example, the use of ICT for further and higher education is particularly well developed through both the **University of the Highlands and Islands** and the Open University (a UK distance-learning institution). The Scottish Government has also been proactive in primary and secondary education.

ICTs now play an important role in the delivery of better and more efficient healthcare services by breaking down barriers, enabling health service providers to work more closely together. E-Health services facilitate access to healthcare, whatever the geographical location, thanks to innovative telemedicine and personal health systems. Telecare generally refers to remote care of older or disabled persons in their homes with the help of sensors connected to a monitoring centre. The gains can be assessed in terms of expedited hospital discharges, avoidance of unplanned hospital admissions and avoided care home admissions. Scotland began to develop a Telecare Development Programme (TDP) in 2006. The supporting telecommunications infrastructure and development of innovative telemedicine have been particularly well implemented in northern peripheral regions: Scandinavian countries demonstrated early and clear commitment to developing e-health within their remote and sparsely populated areas. The first telemedical pilot project started in 1996 in southern Lapland in Sweden, and today most hospitals in Finland offer remote video consultations between primary and secondary healthcare centers; health record systems have been rapidly implemented

in all hospital districts and healthcare centers. Because local medical records are already electronic, E-health concepts to manage chronic diseases have been easily developed in Finland. Finnish healthcare services have also tested a range of e-health solutions, including mobile phone systems.

In French Guiana, the French National Space Center and Cayenne hospital (CHC) have been working together since 2000 on the contribution of space systems to public health matters. Initially developed to meet astronauts' health needs, telemedicine wallets allow doctors to diagnose diverse pathologies, and to care for patients at a distance, even in the most remote areas. Over 34,000 teleconsultations have been carried out since December 2001. In addition to ensuring rapidity and diagnosis reliability, this method can avoid costly and stressful medical evacuation for isolated patients.

Remote sensing and geographical information systems are also ICT tools of particular relevance in GEOSPECS areas and related social and environmental challenges, for instance in tackling issues such as maritime affairs (safety, fishing, etc.); natural resource monitoring (forests, water, etc.); land use; illegal construction, immigration.

ICT are also used to support local democracy and facilitate citizens' empowerment. E-democracy is particularly relevant for reaching isolated communities that cannot always contribute to local governance and public life. Living Labs are a new way of interacting without geographical constraints consists of creating a local community of users/citizens by using new ICT tools in order to share needs and co-create and experiment with solutions. This is an interesting way of fostering local democracy and innovative public services: examples include Aboland living-lab¹⁵⁷ in Finland and Territorial Living Lab (TLL)¹⁵⁸ for the Sicilian region. Nevertheless, excessive and uncontrolled use of such e-democracy practices can result in the polarization of opinions, as well as populism and demagoguery. As regards ICT in public services in general, other concerns are often also emphasized, notably in terms of data protection and identity theft. Using ICT as an alternative to physical services rather than as a complement is also likely to accentuate the exclusion of those without a good broadband connection, as well as those who are less comfortable with computers or, indeed, form filling.

¹⁵⁷ <http://www.openlivinglabs.eu/livinglab/turku-archipelago-l>

¹⁵⁸ <http://www.openlivinglabs.eu/livinglab/tll-territorial-living-lab-sicilian-region>

New opportunities and socio-economic impact

Until recently, rural businesses have been slower to adopt ICT than their urban counterparts. This can be surprising for those who have theorised that rural firms had more to gain from the benefits of the internet in terms of reaching new markets and accessing information flows. However, levels of adoption in rural areas are now higher throughout social and business life, and more rural firms are using ICT for business use.

A key issue about ICT adoption in territories that are rural or have difficult accessibility is that many businesses have been established to provide services to the local population or traditional sectors. Compared to core/urban areas, a greater proportion of the population is self-employed in trades and other activities that are not easily transferred beyond the local economy. In this respect, enhancement of local trading may have been a more important driver of internet adoption than potential access to external markets. A further issue is that of language, with firms in non-English speaking regions likely to encounter greater obstacles in dealing with international markets, particularly if they try to use websites which are not translated into English. Nonetheless, homeworking is still believed to compensate for a lack of jobs and local market opportunities. Scottish regions have actively tried to make use of these prospects, such as the concept of 'Live Local-Work Global' in the Outer Hebrides.

At the individual level, homeworking is generally viewed as positive for those who adopt telework solutions. It is likely to provide significant lifestyle gains in terms of reduced commuting, balancing work with other demands such as caring, and operating from a peaceful and preferred working environment. In terms of socio-economic impact, the benefits are however less obvious. Teleworking is generally available to those who move from cities to certain GEOSPECS regions and retain a previous job, rather than being available to existing residents. The immigrants, generally highly-skilled (IT managers, editors, artists, etc.) are looking for a better quality of life and can do most of their work at home, via Internet. However, they still want physical access to core regions or big cities. Consequently, the regions likely to benefit from this trend are attractive (in terms of weather, natural & cultural assets, etc.) with effective transport infrastructure (high-speed train, airport, etc.). Eventually, the development of teleworking in a specific sector can lead to the installation of companies which are likely to find clients/suppliers, available labour force and low-priced premises.

While employment and added-value in the ICT sector tends to be rather concentrated geographically around Europe's 'blue banana', some GEOSPECS territories are also likely to develop ICT sector. The Highlands, Malta, and some Irish or Polish regions, for example, have successfully

developed competitive ICT sectors. Reasons for ICT service companies to establish in these areas are labour availability and qualification as well as costs. The public sector can also be a significant driver for the development of ICT sectors. Public organisations are major clients for ICT companies (health, fiscal affairs, etc) and specific demand-driven policies can have a substantial impact on local businesses. To this respect, the institutional context is important. In decentralised countries, regional authorities have greater responsibilities and thus are likely to solicit local suppliers. In contrast, in more centralised countries, IT projects and contracts are managed at the national level. Similar issues can be found when considering big companies and multinational firms (e.g., banks, tourism, car industry) where strategic choices are made in headquarters located outside GEOSPECS regions, notably in terms of information systems and other aspects of ICT.

Quantitative evidence

There is a serious lack of relevant data at a regional (and even more at a local) level: this issue that is not adequately addressed by national statistical organisations. According to the last Digital Competitiveness report (2010), the average national coverage of DSL networks in the EU increased from 87% of the population in 2005 to 94% in 2009. The gap between Member States has narrowed substantially as coverage rates have risen in countries where they were lowest, notably Greece and Slovenia. Broadband coverage in sparsely populated areas generally lags behind that in densely populated ones. In three countries, Bulgaria, Romania and Cyprus, broadband still covers less than 50% of population in these areas. Statistics in terms of household connections confirm these national differences, showing that broadband coverage is not sufficient to ensure full take-up of internet for the population. In 2009, around 55% of households in the EU had broadband. In Sweden, the Netherlands and Denmark, the proportion was around 77–79%. At the other extreme, only a quarter or less of households had broadband in Romania and Bulgaria, and in Greece 34%, Italy 39%, and Portugal 46%.

Figure 57 demonstrates a correlation between the general level of ICT accessibility and territorial disparities. In countries such as Sweden or the UK, there is nearly no difference in terms of share of population with access to broadband between densely and sparsely populated area. This is the result of early proactive policy and investments, mainly at national level, and favourable socio-cultural factors.

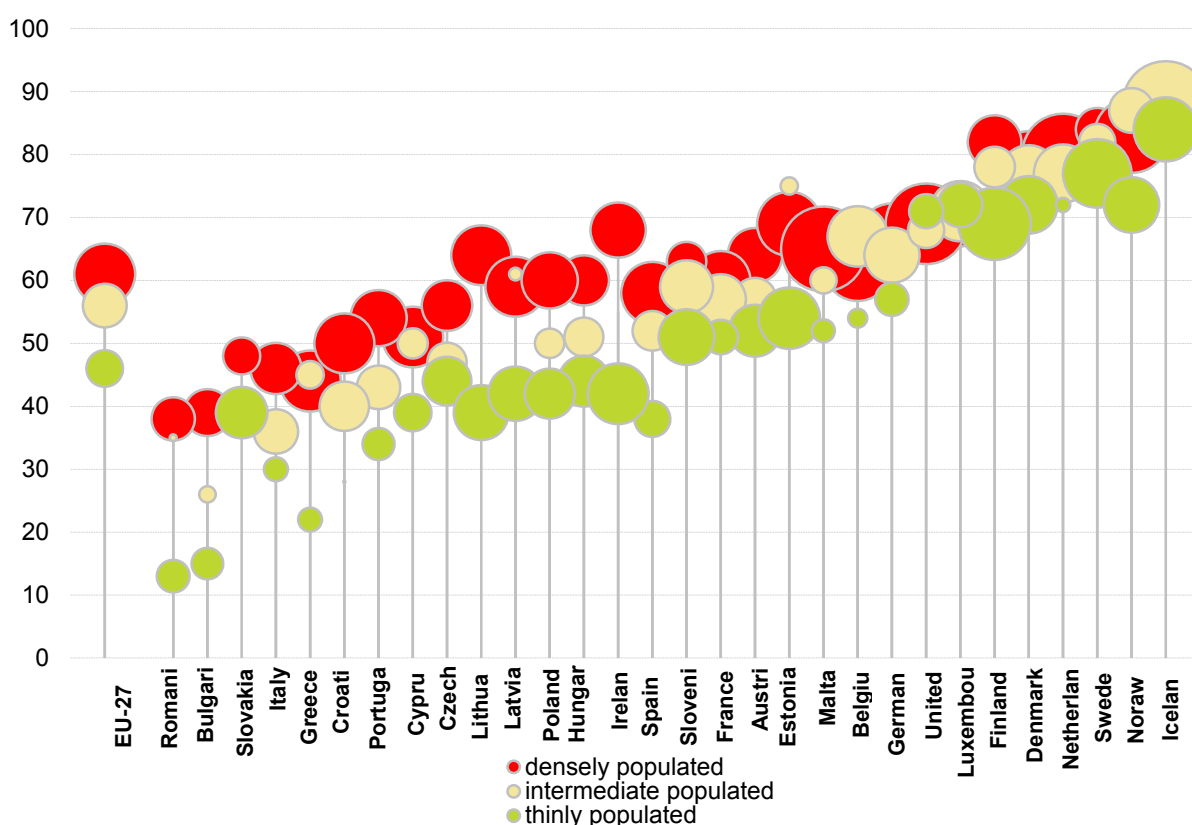


Figure 57 Households with broadband access by degree of urbanisation, 2009

Source: Eurostat regional yearbook 2011

Territorial socio-economic characteristics, especially in terms of living standards, are closely linked to ICT development. Results from an ESPON project¹⁵⁹ show that, in general, territorial differences in terms of IS performance (broadband access, penetration rates for households and firms, employment in ICT intensive sectors and patents) do exist. Although IS differences are less strongly pronounced than territorial differences regarding economic performance (GDP per capita), they partly follow a similar pattern.

Demographic characteristics are also decisive: statistics show that 'digital natives', i.e. people from 16 and 34, especially from 16 to 24, mostly students, are the most regular, intensive users of advanced internet services. There is an evident, profound break with previous generations in the attitude towards the use of internet services. In the UK, 62% of the adults who had never accessed the internet (6.4 million) were over 65.

¹⁵⁹ ESPON project 1.2.3 Identification of Spatially Relevant Aspects of the Information Society (Final Report March 2007)

Also, the presence of children is an important factor for access to a computer and to the Internet: on average, a household with one or more children in Europe is 3.9 times more likely to have such access than a household without children.

Summary and conclusions

Because of geographical constraints (distance, mountains, low population density, etc.) the adoption of ICT and diffusion of the knowledge economy have been more complex in some GEOSPECS regions. Political willingness and substantial public investments have been necessary to reach acceptable IT penetration rates. However, the disparities remain. As central and more advanced regions in the EU invest in Next Generation Networks (NGN), there is an increased risk that more peripheral and thinly populated areas will be left behind. The lack of private investment in NGN outside large urban areas could lead to a renewed digital divide which could particularly affect many GEOSPECS territories.

In addition, demographic and social patterns are likely to influence people's awareness and to influence the adoption process. While the IS provides many opportunities in terms of territorial cohesion, these opportunities require not only connectivity, but that people are adequately informed about the possibilities of ICT and acquire specific skills. Supporting access to broadband without ensuring sufficient development of competences and relevant applications within administrations, companies and households may facilitate non-productive utilisation and increase competition with larger neighbouring regions. The use of ICT for small business and entrepreneurship is probably less about the dramatic gains of individual firms that have used it to re-orientate to the global market and more about its use to improve the function, process and quality of the business and consumer experiences in the local rural economy. This is particularly in traditional sectors such as agriculture, tourism, proximity services or arts and crafts.

While internet use in firms based in GEOSPECS territories has become increasingly necessary in order to stay digitally included and therefore competitive, ICT cannot in itself constitute a sufficient condition for socioeconomic growth. As in the USA during the 1990s, the benefits of ICT may not yet be observable because of the relatively slow take-up process in some GEOSPECS territories and the indirect returns of the IS. Nevertheless, as shown by some examples, particularly in Sparsely Populated Areas in northern Europe and some islands (Malta, Outer Hebrides, etc.), combined with other assets and drivers (human capital development, territorial attractiveness, smart specialisation, etc.), ICT are

likely to enhance structural adjustments and create new development perspectives in a longer-term.

The Information Society also provides many opportunities in terms of territorial cohesion and improvement of polycentricism at regional level. Some public services can be improved thanks to ICT, as long as these technologies are not used as substitutes to other forms of services in order to obtain short-term cost reductions. The ongoing demographic change and adoption of ICT will enable the full implementation of current pilot initiatives which contribute to increases in accessibility, inclusiveness and quality of life.

6.2.4 Residential attractiveness

Introduction

“The quality of life that a region offers can attract and retain the highly skilled people needed for regional competitiveness within today’s knowledge economy” (ESPON, 2006). This implies potential opportunities for territories in exploiting and enhancing residential attractiveness to overcome development challenges.

Definition of Residential Attractiveness: ‘Territorial attractiveness’ can be conceptualised as a quality of regions and cities that in many ways is a precondition for sustainable local development. It can be defined both as the capacity to attract new residents (or migrants), visitors, footloose entrepreneurial activity and investment as well as the ability to retain (and potentially develop) these mobile communities and assets.¹⁶⁰ Attractiveness is portrayed as a characteristic of regions that varies spatially according to its component natural and environmental, social, cultural and economic (endowment) factors¹⁶¹. Territorial attractiveness can be seen as a composite term that encompasses the attractiveness of a region for both residents and visitors. While the concept of Residential Attractiveness focuses on the relationship between residents in a region and the assets of that region, the attractiveness to visitors is an element that also needs to form part of the analysis albeit in an indirect manner. Assets that may form the base of attraction for visitors may also be attractive to residents; however the fact that a region might attract a significant number of visitors might in itself serve as an inconvenience to residents.

Attractiveness can thus be conceived as the complex result of interactions between geographical attributes and a set of factors (themselves, possibly, the result of dynamic processes) that are set in a historic (path dependent) trajectory.

The principal categories of endowments are as follows:

- *Environmental Capital (EnC)*. Includes ‘given’ characteristics of the physical landscape as well as the result of environmental protection/regional planning actions.
- *Antropic Capital (AC)*. This would include man-made landscape elements, partly inherited from the past, partly the result of planning and conservation policies, which enhance the

¹⁶⁰ The Attractiveness of European regions and cities for residents and visitors ESPON ATTREG. The ATTREG Interim report submitted in 2010 has not been superseded by any new version at the time of drafting.

¹⁶¹ The Attractiveness of European regions and cities for residents and visitors ESPON ATTREG

attractiveness and functionality of places for environmental and residential or tourist functions.

- *Economic Capital (EcC)*. This relates to conditions of the economic environment that induce a good business and productive climate.
- *Social & Cultural Capital (SCC)*. This includes assets and relational structures in the social / economic / cultural sphere that contribute to place quality and vitality.
- *Human Capital (HC)*. This reflects the characteristics of the workforce and labour market, and it is separated from social capital so as to distinguish problematic new geography concerns with 'soft' social structures from the 'hard' issues of human resources and skills.
- *Institutional Capital (IC)*. This refers to governance conditions that contribute to the effectiveness and justice of social and economic processes.

Thus, the capital stock of a region is a dynamic organism that follows developments in a number of interconnected elements. These elements, as well as the bi-directional influences between the capital stock of a region and its attractiveness can be strongly affected by governance.

Relevance of Residential Attractiveness to Territorial Development: The view inherent in many studies is that the larger the endowments of a region, the easier it is for that region to develop. However, while natural endowments are innate, their preservation and the proliferation of other types of endowments and assets are subject to influence by regional policy. Development has its own momentum, but policies can make a difference.¹⁶² Numerous studies focus on the necessity of improving the 'economic environment' in regions that are considered as lagging, which is central to development policies. The concept of the 'economic environment', however, has changed over the years. Emphasis is being shifted from the quality of places as economic hubs to the concept of these also being people hubs and therefore need to be attractive to individuals as well as companies – whose decisions on the spatial location of enterprise goes hand-in-hand.¹⁶³ Attractiveness and competitiveness go hand in hand, as attractive regions draw talented individuals and businesses which increase the competitiveness of the region.

Although it is possible to identify stocks of territorial capital, there is no absolute relationship between the presence of territorial capital and positive outcomes. This requires what has been termed a 'mobilisation process' to realise the potential of existing assets.¹⁶⁴

Review of relevant findings from the case studies

¹⁶² Scenarios on the Territorial Future of Europe

¹⁶³ The Attractiveness of European regions and cities for residents and visitors ESPON ATTREG

¹⁶⁴ The Attractiveness of European regions and cities for residents and visitors ESPON ATTREG

Residential Attractiveness as a result of Geographic Specificity

The case studies brought to light a number of commonalities concerning the residential attractiveness of a number of particular geographical regions, most specifically sparsely populated areas, coastal areas, mountainous regions, islands, as well as border areas. A number of these attractions and deterrents can clearly be attributed to the region's characteristics and are therefore those aspects that policy makers need to consider when ensuring the viability and sustainability of these areas.

Excluding border areas, the most prominent heritage possessed by these regional specificities is considered to be their environmental capital. The beauty of their landscape and unique wildlife is a source of pride and is considered to be one of the main advantages of living in these areas. The preservation of these territories is even facilitated in areas that are sparsely populated. As a result, people who consider the environmental capital to be the most determining factor in choosing one's place of residence would opt to live in areas with low population density. Environmental capital is considered to be of even greater value for those regions that can boast of more than one type of landscape. The presence of mountains, coasts and islands as in the case of the Highlands and Sicily are an example of such locations.

Some of these regions can boast a rich history and culture that can be directly linked to their geographical specificity and whose heritage adds to the beauty of the locality. In the case of coastal areas, including islands, the presence of this cultural heritage partly came about due to the great importance attached to ports for trade purposes, in the absence of airfreight, making them much sought after by explorers, traders and invaders. In addition, the geographical location of some of these coastal regions and islands, such as Sicily and other Mediterranean islands, adds to the attractiveness of these locations. The better preservation of this heritage may also be linked to the peripherality of these regions from the main centre of activity and development.

The same argument is true of these regions' identity. More generally, a rich social capital in the form of preserved traditions, tight-knit communities and courteousness is considered an important factor for residential attractiveness. From the case studies it emerged that this characteristic is more predominant among the more insular regions, namely islands, mountainous regions and sparsely populated areas. On the other hand, border regions are more exposed to a variety of cultures. While some people view this as a rich cultural heritage in the form of diversity and multiculturalism that adds to the uniqueness and charm of these regions, others feel that the cultural differences of border regions create an obstacle to integration as a result of an identity-based behaviour that emerges.

However, their attractiveness can even cause new problems for some regions. With incomers, house prices rise. For instance the mountainous and island regions of Scotland, particularly areas close to commuting towns and cities, are experiencing exorbitant increases in house prices. This, as well as the lack of job and educational opportunities and the

relatively low per capita incomes, is often cited as one of the main causes of outmigration particularly amongst the younger age cohorts.

In fact, in a number of cases, these geographical specificities appear to be more residentially attractive to a specific group of older age cohorts. Apart from the lack of job opportunities and high costs of housing in some areas, the peripherality associated with a number of these regions may lead to perceived isolation, boredom and solitude that drives out youths. On the other hand, elderly people are more attracted to the beauty and tranquillity often associated with these areas and have less concerns about employment and educational opportunities. This has negative implications on economic activity, since businesses experience difficulties in finding the necessary human capital for recruitment, and puts pressure on the welfare system of the region since the dependency ratio may become unsustainable. As a result, a paradox appears to emerge whereby youths leave their hometowns in order to invest further in their human capital with this very migration being one of the causes of restrained economic activity.

Residential attractiveness is also impaired in regions where antropic capital is weak, such as in cases where transportation is either inadequate or expensive. Often these result from one another since the lack of infrastructural development leading to the inadequacy of transportation may be due to the high cost of servicing peripheral communities. As a result, goods and services tend to be costlier for these residents. This was particularly cited in the case of islands and sparsely populated areas. In addition, climatic conditions may raise the difficulties to travel or commute for work or pleasure for some regional specificities, particularly in the case of islands. The importance of reducing one's peripherality from a centre of economic and social activity has also emerged as a factor determining residential attractiveness as is cited in the Celtic sea (coastal area) and the Luxembourg border case studies. Research has shown that residents are more attracted to living in areas within their geographic specificity that are better connected to an urban centre. The importance of efficient transport systems is, therefore, vital.

A region may also be residentially unattractive as a result of its poor institutional capital, often reflected in an inefficient judicial process and the emergence of unofficial governance structures due to the region's insularity. Although this may be true, it was only cited in one case study which could imply that regional differences in governance are not a central determining factor in one's residential choice.

Links between Economic Growth and Residential Attractiveness

The beautiful natural landscape of a number of these geographical specificities is perceived as one of the main attractions for tourism and, as a result, can lead to an economic advantage and avenue for further development and job opportunities. Individuals residing in different regions within the country are also attracted to purchasing holiday homes in these areas for recreational and relaxation purposes. This is particularly important in the current economic climate where tourism has been hit hard by the downturn and where domestic tourism, which is often cheaper, can cushion this decline.

Although there are economic advantages associated with this, the resultant environmental pressures due to the large population increase during the holiday periods may outweigh these benefits. This often takes the form of significant problems related to the provision of a number of services including water supply and sewage treatment, as well as landscape intrusion such as the proliferation of septic tanks and groundwater pollution, increased car traffic and urban sprawl. In addition, these touristic areas, such as coastal regions, end up being characterised by an overabundance of “ghost” estates in the winter months.

Due to the insularity, remoteness and often small population size of some of these regions, investors are frequently faced with difficulties – both logistic and cost-related – in setting up shop in these areas. The limitations pertaining to the size and diversity of the labour market in these regions are often cited as among the most problematic. This arises from the difficulties encountered in the pursuit of furthering one’s education and bettering one’s skills. As a result, economic diversification is often limited with seasonality characterising some of the most popular sectors, particularly tourism and agriculture. In addition, the peripherality of a number of these regions makes commuting for work very difficult.

Therefore, although these geographically specific areas may have a comparative advantage in some types of capital, for instance environmental, the sustainability of these regions would be achieved through a greater balance whereby this is supplemented with economic, human and institutional capital development in order to maintain living standards and the well-being of its residents.

Quantitative evidence

The following paragraphs use the datasets collated in this project to analyse the concept of residential attractiveness. Using data on population, weather and employment, inferences about the different classes of assets described above and consequently on the potential of areas with geographic specificities to exploit residential attractiveness as a means to development are derived.

The map below displays the levels of population density in the ESPON area. Coasts in Europe are densely populated compared to the rest of the mainland. The effect of population density on residential attractiveness can be both positive and negative. In general, places with a lower population density convey a greater sense of peace and space that is often sought by individuals in their residential choices. On the other hand, locations with substantial population density act as hubs and have the advantage of offering a greater variety of a number of important factors such as employment, lifestyle, entertainment and links to the rest of Europe. The areas that fare the best in this trade-off are those that have enough of a population density to offer the benefits of such an agglomeration of choices but are also able to afford residents the separation, peacefulness and other benefits that accrue from lower population densities.

Map 58 Population Density

The climatic conditions of areas are a strong contributor to enhancing the environmental capital of that area and therefore increasing its residential attractiveness. The map below outlines the mean sunshine duration per annum of the ESPON area. Warmer climates are generally perceived to be more attractive than colder ones, however, many locations have successfully exploited their climates, both warm and cool to increase their attractiveness. A firm comprehension of how a territorially diverse area may integrate the opportunities presented by climatic conditions, whether for the improvement of recreation, employment or housing capital is necessary for the optimal progress and development of these areas.

Map 59 Yearly Sunshine Duration

Areas with special geographic features, such as coasts, mountains and islands, often find that their environmental and cultural capital lend themselves well to the tourism industry. The map below presents the percentage of people employed in hotels and restaurants in the municipalities. This data is often used as a proxy for the employment in the tourism industry. This figure is visibly higher in the mountainous areas in Europe as well as the coastal areas and islands. The benefits of a strong tourism industry should not be pursued without regard to the impacts this has on residents of the areas. Policy designed to develop an area's residential attractiveness needs to find the balance between these sometimes conflicting needs.

Map 60 Employment in the Tourism Sector

The connectivity between an area and the rest of the continent is a central consideration when individuals make their residential location choices. The ability to access airports is a key variable in the analysis of connectivity. The importance of airports is particularly highlighted for geographically specific areas such as border areas, islands and mountains, which may have limited access to other modes of transport. The map below displays the

number of airlines¹⁶⁵ accessible within a 45 minute travel time of each locality. While islands and coasts appear to be well serviced by air, a number of geographically specific areas such as border areas and some mountainous areas are not serviced by any large airline, and have to rely on smaller air providers or on the use of rail and ferry transport in order to reach larger hubs that are serviced by such airlines. This highlights the importance of antropic capital in the form of infrastructural links. The investment in road networks, airports and other transport hubs are vital for an area to develop its residential attractiveness. Remote areas without such links may overcome these difficulties, however, if the remoteness is exploited to target industries and individuals for which it is an asset. This is the case in sports tourism and in the creative arts.

Map 61 Air Connectivity

¹⁶⁵ With over 15,000 passengers per year

The paragraphs above have looked at different elements of attractiveness through the use of different proxy variables. The capital type that contributes to the attractiveness of a region is spread across the ESPON area, with different regions having different elements of attractiveness, no region is strong in all capital types. This results in differences in the potentials in different regions.

Summary and conclusions

The concept of residential attractiveness presents policy makers with an opportunity to comprehend the different composite parts that come together to make different areas a draw for people to reside in. This is especially vital for areas which have inherent characteristics that make traditional routes to development more challenging. Areas with geographic specificities are often richer in different types of capital than central urban areas. Their strengths typically lie within the environmental capital, and the cultural and social capital fields. The paragraphs above highlight that the particular potentials of an area will vary, not only depending on the geographic specificity at play, but also on the location within Europe, the country and other important determinants of residential capital.

The focus of development plans and policies for these areas should recognise these assets and the potential for using them as a path to growth. Territorial cohesion is not about turning Europe into one big city, but rather about allowing the diversity within territories to flourish and support the development of these territories. Levelling out different spatial characteristics between regions would in fact result in a European territory without distinctiveness, without attractiveness, losing regional identities.¹⁶⁶

Current European policies do not explicitly refer to the concept of using residential attractiveness to stimulate development. There is the potential for the introduction of this concept, on a number of policy levels. The existence of the range of variety of assets in territorially diverse areas suggests that the specific targets for the development of these assets rests on a local level, and therefore policy that aims to exploit these assets should pursue a bottom up approach to development based on residential attractiveness. The presence of top-down coordination and support needs to exist concurrently with such bottom-up approaches.

Development policy for GEOSPECS areas within the EU territory could be suggested by an overarching body, such as the European Commission, that could provide guidance as to how GEOSPECS areas can contribute, through their competitive residential advantages, to the EU as a whole. A top-down approach results in a better understanding of those activities which have proven to be more successful in enhancing attractiveness of GEOSPECS areas. The coordination of the top-down approach could be carried out by DG Regio in order to identify synergies and bring in other expert knowledge. The European market left to its own devices is not likely to bring this to happen autonomously due to market failure in

¹⁶⁶ Territorial Cohesion and Spatial Planning, Bussadori, V.

undertaking such activities and therefore there is strong justification for policy intervention. However, due to the diversity of the areas in question, and their different potentials, a bottom-up individual or cluster basis approach is also needed. These should be encouraged to prepare development plans that incorporate strategies on how best to exploit their residential assets and develop this potential more fully.

This approach to developing policy can be neatly summarised in the diagram below, where the two approaches come together and bring together funding instruments, regulatory instruments, evaluation activities and monitoring activities.

Figure 58 Policy Approach

The potential for a number of GEOSPECS areas to develop through their residential attractiveness should be kept at the centre of EU regional policy. The changing paradigm of GEOSPECS areas as places that can find their place within Europe as contributors to development is overcoming the past belief that such areas were to be considered as permanently problematic and can only be supported financially to compensate for such inherent territorial disadvantages. The future for GEOSPECS areas, and for the preservation of their capital and population is the transformation into areas that tap into this potential and flourish on the very base that makes them territorially unique.

6.2.5 Biodiversity and protected areas as factors of development

Many GEOSPECS areas are hotspots of biodiversity and/or host a comparatively high number of protected areas.

Mountain areas: Most 'hotspots' of biodiversity in Europe are in mountain areas (European Environment Agency, 2010). A number of factors interact to cause these high levels of biodiversity, including the compression of thermal and climatic zones over relatively short distances, steep slopes, variations in geology and soils, and the fragmentation of mountain terrain. In addition, many mountain areas are isolated from one another so that species have evolved separately - a major reason for the high levels of endemism in many mountains, including those on islands. Millennia or centuries of human intervention have also been important for maintaining populations of many species and particular habitats in spatially diverse cultural landscapes.

Mountains also host a particularly high proportion of protected areas. For instance, of the total area designated as Natura 2000 sites in the EU, 43 % is in mountain areas, compared to 29 % for the EU as a whole. These sites cover 14 % of the mountain area of the EU (European Environment Agency, 2010).

Islands: More than any other type of territory, islands are isolated. Over time, this isolation permits unique evolutionary forces that result in the development of a distinct genetic reservoir and the emergence of highly specialized species. As a legacy of this history, many island species are endemic. Islands harbour higher concentrations of endemic species than continents, and the number and proportion of endemics rise with increasing isolation, island size and topographic variety. However, island species are therefore also particularly vulnerable: of the 724 recorded animal extinctions in the last 400 years, about half were of island species. In the same period, at least 90% of the bird species that became extinct were island-dwellers (CBD, 2009). Within Europe, islands (which are often mountainous) have particularly high levels of endemic species (European Environment Agency, 2010).

Some islands are too small for human habitation and therefore host a number of species which have been able, and continue, to evolve undisturbed; often, such islands have been designated as protected areas. In contrast, species and habitats on some touristic islands (particularly in the Mediterranean and other popular tourist destinations) face high pressure from the expansion of infrastructure.

Sparsely Populated Areas: By definition, sparsely populated areas are well suited for the establishment of large-scale protected areas, as the

potential for conflict with other land uses is less. For example, the largest national park (and also biosphere reserve) in the world is situated in Greenland.

Establishing protected areas in regions where human activity is generally low is often a question of convenience, and not necessarily because of high levels of biodiversity. As Dudley (2008) points out: "although the rate of growth [of protected area systems] has been impressive, many protected areas have been set up in remote, unpopulated or only sparsely populated areas such as mountains, ice-fields and tundra...".

Coastal zones: Coastal ecosystems face high pressures. As a transition area between land and the sea, they host homes and workplaces, industries, holiday destinations and recreation areas. In EU countries with a sea border, almost half of the population lives in coastal areas. Coastal habitats are being destroyed to make way for housing, industry, agricultural land, and infrastructure for tourism and transport. They are also affected by a wide range of pollution sources, and sea level rise makes them particularly vulnerable to climate change (European Environment Agency, 2010a).

Coastal areas are very important habitats. In particular, their wetlands provide key feeding areas for species of migratory birds. About 50 coastal habitat types and 150 species that prefer coastal ecosystems (other than birds) are listed in the annexes of the EU Habitats Directive. However, two-thirds of coastal habitat types and more than half of coastal species have an unfavourable conservation status (European Environment Agency, 2010a).

Progress in extending the Natura 2000 network has been significantly slower in the marine environment than on land (European Environment Agency, 2010d). Most of the designated marine Natura 2000 sites — approximately 75 % of the designated area — are located within 12 nautical miles of the coast, but a coherent network of offshore areas is lacking. In addition, the marine network is much less comprehensive than the terrestrial one: in 2010, marine sites accounted for only 20 % of the total designated area in Europe (European Environment Agency, 2010d).

Outermost regions:

Outermost regions are rich in biodiversity and have more endemic species than the whole of continental Europe (European Commission, 2010). As they are situated in other biogeographic zones than continental Europe, their habitats and species are markedly different.

A report for the Commission's DG MARE points out: "The outermost regions are concerned about the consequences of the loss of biodiversity as this is an economic growth factor, tourist attraction and an important

element for human well-being. Coral reefs for example have a huge influence on the life of people in some of the outermost regions. They function as natural breakwaters along the coasts and represent one of the most important natural resources for food, beach sand and building materials. These corals are being threatened by sea level rise, a rise in sea surface temperature and an increase in extreme weather events. Martinique for example, has lost in specific sites about 30% of its coral reefs within one year (2005-2006). Furthermore, due to the increase in sea surface temperature many species of Martinique will likely have to migrate to the north where the sea surface temperature is more moderate." (Policy Research Corporation, 2009).

Border areas: Border areas are often favoured in terms of biodiversity, partly as a result of their peripheral location and/or political factors in the past banning the development of these areas. "Borders run traditionally along rivers, mountain and maritime ranges, the most suitable places for the evolution of the ecosystems. In addition, many borders were forbidden areas for tourism, travel and economic activity for several decades. Ecosystems were able to develop undisturbed and untouched during that time" (Ministry of National development of Hungary, 2011). For example, the former Iron Curtain is now covered by an ecological network called the "European Green Belt", 8,500 km long. Within this zone, economic development was interrupted by forced land abandonment and restructuring of landscapes for military infrastructure. The network provides a cross section of Europe's major ecosystems, and includes national parks, nature parks, and biosphere reserves (TERRY et al., 2006).

As many (comparatively) untouched areas are situated along borders, these areas lend themselves to designations of "transboundary protected areas" (see WORBOYS et al., 2010); the International Union for the Conservation of Nature has a task force on this topic, and the "Europarc" Federation has certified 15 European transboundary parks (www.euoparc.org).

Questions:

Are GEOSPECS areas associated with higher levels of biodiversity (or indeed with a high number of protected areas, as these should be indicative of the presence of important species and habitats)?

Are there examples where a protected area or a particular species has had a key role in either attracting high numbers of tourists or in otherwise creating economic benefit (income) for the area? This does not focus on the exploitation of natural resources, as these are a separate transversal theme of GEOSPECS.

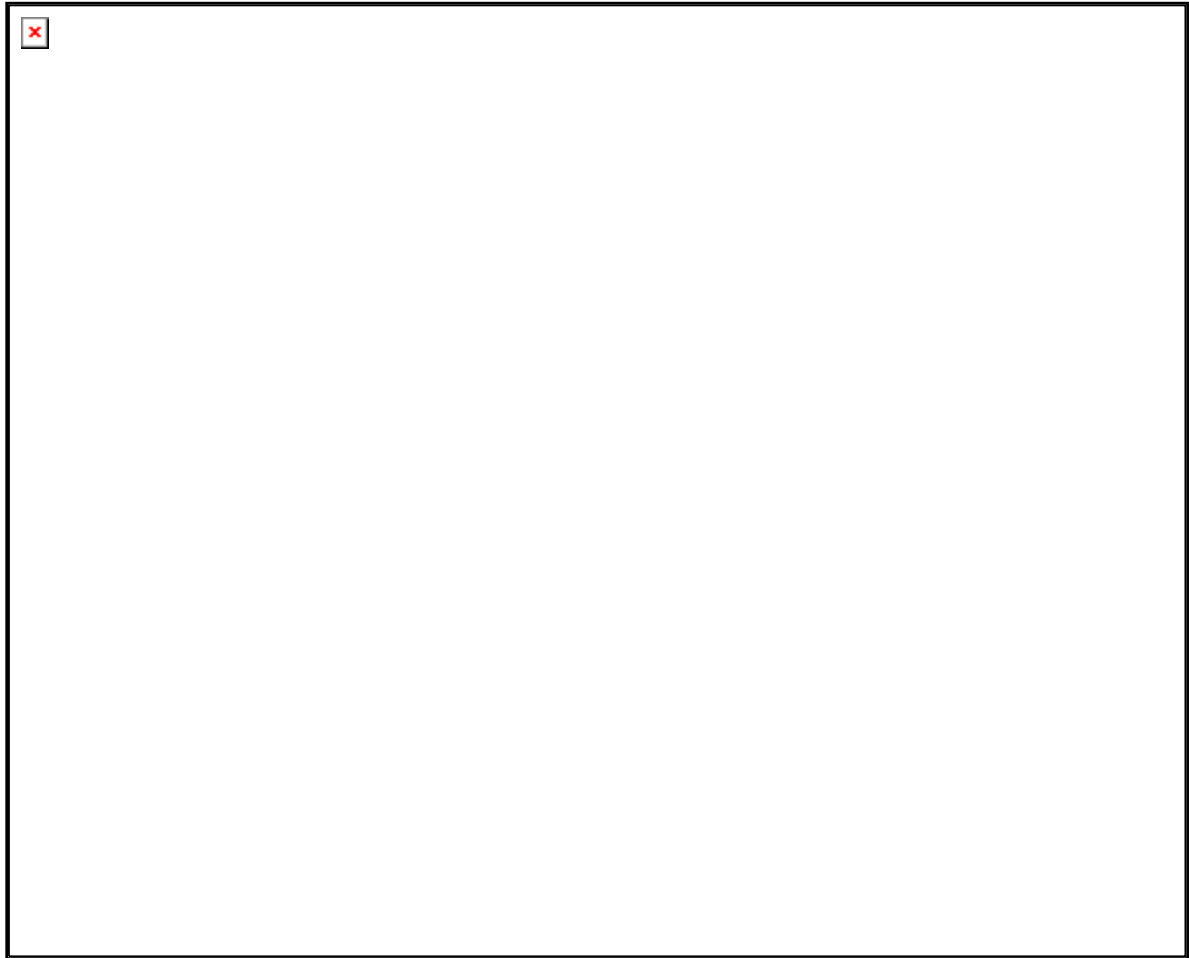
Review of relevant findings from the case studies

Biodiversity and protected areas in GEOSPECS areas

A number of the case studies show that that levels of biodiversity (and numbers of protected areas) are higher in GEOSPECS areas. The location of the Canary Islands, less than 100 km off the African coasts, their multiple climatic influences and thus micro-climates, as well as the territory's fragmentation, make them a place of invaluable interest in terms of biodiversity. The island of Gran Canaria alone, for example, hosts half of the species that are unique to Spain. The Canary Islands are extensively protected, with 42% of the area designated as "park" or "reserve". Four of the 14 Spanish national parks are located in the archipelago.

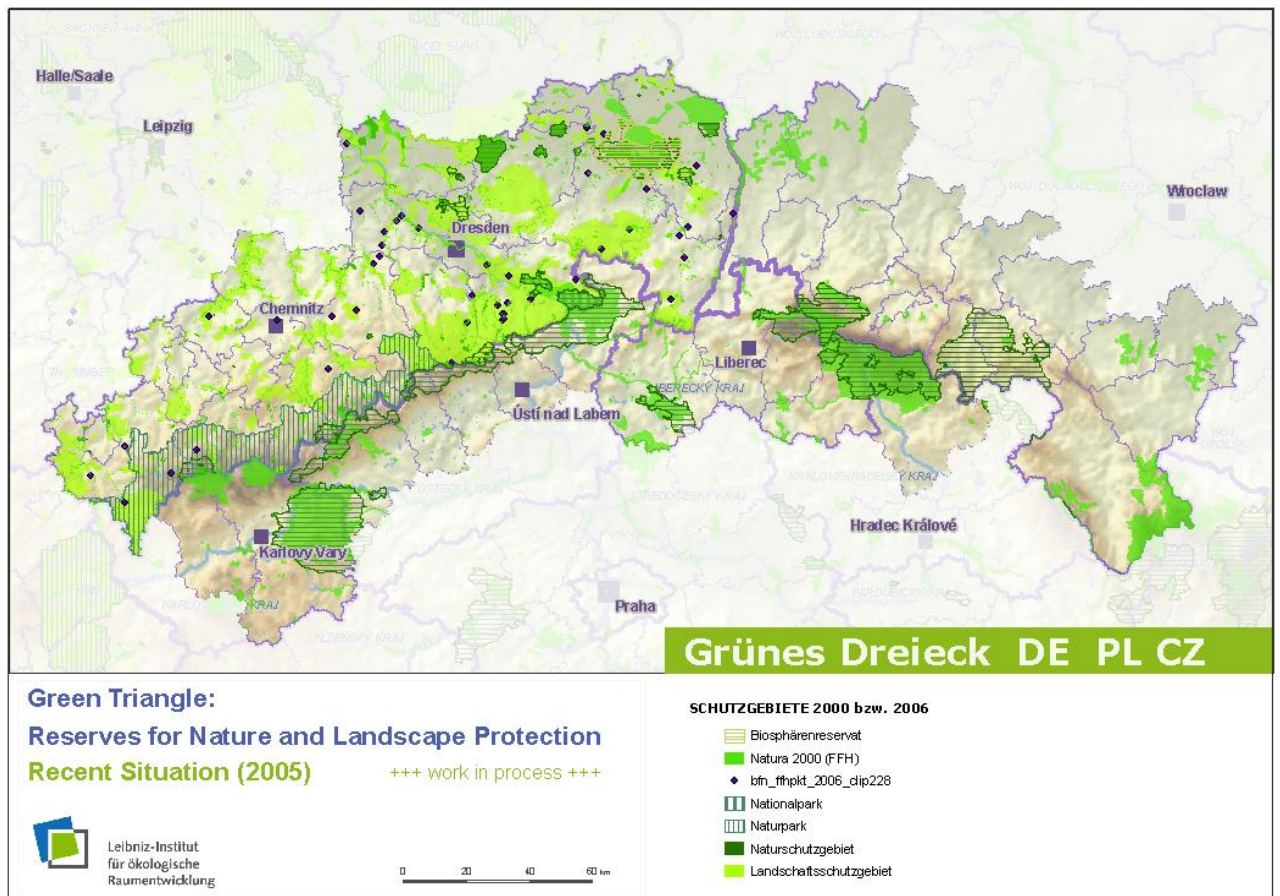
Both the Tatra mountains and the West Stara Planina feature a high number of diverse habitats, due to the compression of different thermal and climatic zones over relatively short distances. Both are home to many endemic and relict species. Particularly in the case of the West Stara Planina, the presence of the state border (between Bulgaria and Serbia) also plays an important role in explaining this high biodiversity. The border areas have been only slightly affected by human activities because of the guarded regime in the border zones that existed until recently (YORDANOVA & MATEEVA, 2011).

In the Greater Region (the area around Luxembourg), 15 out of the 22 Nature Parks are adjacent to a border (Portail de la Grande Région 2011):



Map 62 Nature parks in the “Grande Région”

Similarly, in the “Black Triangle”, the border between Germany and the Czech Republic is almost covered entirely by a protected area at least on one side of the border (sometimes on both). Nevertheless, this border coincides almost entirely with a mountain range (Erzgebirge and Elbsandsteingebirge), so that this long stretch of protected areas cannot be exclusively attributed to the presence of the border.



Map 63 Reserves for Nature and Landscape Protection in the border triangle between Germany, Poland and the Czech Republic

In both coastal case study areas, levels of biodiversity are high, but the pressure from human activities somewhat limited the drive to extend protected areas in the past (see also below). The Belgian coast comprises a diverse range of geological features that form important habitats. The offshore environment contains a sequence of sandbanks in the shallow sea; onshore, the coast mainly comprises sandy beaches, mudflats, salt marshes, sand dunes and polders (HERRIER et al., 2005). In the Irish Sea, the marine environment provides habitats for many fish, seabirds and marine mammals. The coastal areas contain a diversity of habitats such as dunes, machair, salt marches, lagoons, mudflats to tidal and sub-tidal areas that support unique plant and animal communities.

In both Tornedalen and the sparsely populated areas of Spain, the low presence of human activity has contributed to the preservation of an “unspoiled” landscape, even if levels of biodiversity are not particularly high in comparison with other areas in Europe.

Can protected areas / particular species contribute to development in GEOSPECS areas?

The potential economic impact of protected areas (or even particular species) varies. While some play an important role in attracting tourists, others only contribute marginally.

Among the more successful examples, the Zwin tidal inlet at the Belgian Coast is of economic importance as one of the most popular birdwatching areas in Belgium (DEVOS, 2008). In some remote coastal areas of Western Scotland, whale watching is a tourist attraction (PARSONS et al., 2003). "Consumptive" uses of biodiversity attract tourists as well: it has been estimated that shooting activities in Scotland (grouse shooting, deer stalking, etc) contribute £240 million pounds to the Scottish economy (THE ROYAL SOCIETY OF EDINBURGH, 2008), while anglers are said to spend £42 million in the Highlands per year (SCOTTISH EXECUTIVE, 2004).

In most cases, however, it is not a single species that attracts visitors, nor will a protected area profit from tourism purely because of its designation. Rather, a number of factors interact to create a particular image of an area. The Tatra Mountains, for instance, are an extremely popular tourist destination, with 3 million visitors annually on the Polish side and 4 million annually on the Slovakian side (and tourism being by far the most important economic activity in the area) (DUDLEY, 2011). The image of the area as an attractive natural mountainous landscape, with opportunities for hiking and skiing, is certainly *underscored* by its designation as national parks and by its unique fauna, but these factors are only two out of many that create this image. Similarly, the Elbsandsteingebirge along the German-Czech border (better known as *Saxon Switzerland* and *Bohemian Switzerland*) has been traditionally a popular hiking and climbing area, and derives much of its fame from its distinctive sandstone rock formations – even if the designation as a national park in 1990 has doubtlessly contributed to the area's visibility and image.

One study has tried to determine the importance that designation as a national park plays in attracting visitors to an area. The Cairngorms National Park (situated in the Scottish Highlands) receives more than a third of its Gross Value Added from tourism. Income from tourism is said to have grown "perceptibly" around the time of designation as a national park in 2003 (Cairngorms National Park Authority, 2010). According to a survey, 52% of visitors to the park claim that National Park status was "very" or "quite" important in their decision to visit the area (Cairngorms National Park Authority, 2010a). A similar survey among enterprises in the park confirms this, with two-thirds of business owners stating that national park status was quite or very important in attracting their visitors (Cairngorms National Park Authority, 2011a). Nonetheless, tourism in the area had existed previous to designation as a national park.

In the Outer Hebrides, designation as a national park is seen as an opportunity to “reverse depopulation”. The people of Harris have asked the Scottish government to designate their island as Scotland’s third national park. A local hotel owner is quoted as saying: "The national park would offer new opportunities. It would increase tourism and related employment. It would persuade people to have more pride in the island environment and encourage their children to come back to Harris in the future" (Herald Scotland, 2009).

While the attraction of tourists is the most important measurable economic impact of a protected area, it is not their only role. In the Torne valley region, protected areas play a part in the continuous growth of forests, one of the most important natural resources of the area. In the Irish Sea, Marine Protected Areas are deemed necessary to allow for the recovery of severely diminished fish stocks. Both of these are good examples of ecosystem services. Nevertheless, the number of studies trying to quantify the monetary value of ecosystem services is still limited. For example, it has been estimated that the service of water provision from the Polish Tatra National Park is equal to an annual value of €3.7million (GETZNER, 2009).

Conflicts

Unsurprisingly, the most conflicts arise in areas where there are the most human activities. This finding is certainly not exclusive to areas with geographic specificities, but it *also* applies to them.

The case studies offer a number of illustrations. Sicily is an island with a high population density, and population tends to gravitate towards the coasts (where the tourism sector promises employment). Around 10% of the area is protected as parks or nature reserves. People do not seem to look favourably upon protected areas, which are deemed to hinder development (particularly the spreading of touristic and other infrastructure). For instance, in Isola Bella – an island that is entirely designated as a nature reserve – there is a continuous spread of unauthorized construction, such as pools around private residences, fences and signs marking the protected area are removed, and the use of motor boats in shallow areas damages marine fauna, as does aggressive fishing. Different regional bodies (mainly the Regional Department of Land and Environment and the Department of Cultural and Public Education) have been known to clash over these issues in Sicily.

In the Cross-Border Metropolitan Regions Luxembourg and Geneva, urban sprawl covers a large proportion of the land and, at the same time, leads to fragmentation of natural areas. The widespread use of private cars for commuting results in air and noise pollution. In Geneva, it is not just the expansion of urban areas that is seen to affect natural areas, but also vice

versa: the presence of a large area of agricultural land protected by Swiss federal law has been seen as a constraint to urban development, resulting in urban growth being “displaced” to the French side of the border.

In Tenerife, a major economic project - the construction of an industrial port in Granadilla, worth 380M€ - was stopped by a regional court in 2009, because it impinged on beds of protected seaweed located nearby.

The Belgian Coast is particularly densely populated, due to not only numerous employment opportunities in the logistics/transport sector, but also its attractiveness as a living space. The many important habitats along the coast are often interrupted by artificial coastal protection structures such as dikes and seawalls, and other structures such as buildings and roads (HERRIER et al., 2005). Activities such as fishing, shipping and exploitation of mineral resources also put pressure on the coastal habitats. Of the terrestrial systems, salt marshes and sand dunes are most vulnerable. Only two salt marsh regions remain on the coast. One is the *Zwin* tidal inlet, itself in danger of complete siltation due to past beach replenishments at Knokke-Heist in the 1970s and 1980s, and the construction of new container terminals in the adjacent harbour of Zeebrugge (DEVOS, 2008).

In the Irish Sea, industrial fisheries have reduced the stocks of a number of fish species to a fraction of their previous volumes. Some models suggest that the Irish Sea cod stocks, for example, may disappear by 2100 (ROBERTS et al., 2003). Habitats in the Irish Sea are rapidly being transformed and even destroyed by fishing gear such as trawls and dredges. Coastal habitats are suffering from nutrient runoff caused by farming practices.

This is not to say that other areas do not face conflicts. For instance, in the very sparsely populated Scottish Highlands, the intention to expand wind turbines and wind parks is regularly limited by protected areas. In the Slovakian Tatra National Park, the proposal to extend ski slopes and ski resorts into highly sensitive habitats has caused strong opposition from environmental organizations (WWF, 2008).

Nevertheless, the emerging picture is that areas that face the most demands from different interests (as a living space for endangered species, or for humans; as sites of industrial production or exchange of goods; as sites for the generation of energy; as spaces for tourism and recreation, etc.) are the most prone to conflicts.

Quantitative evidence

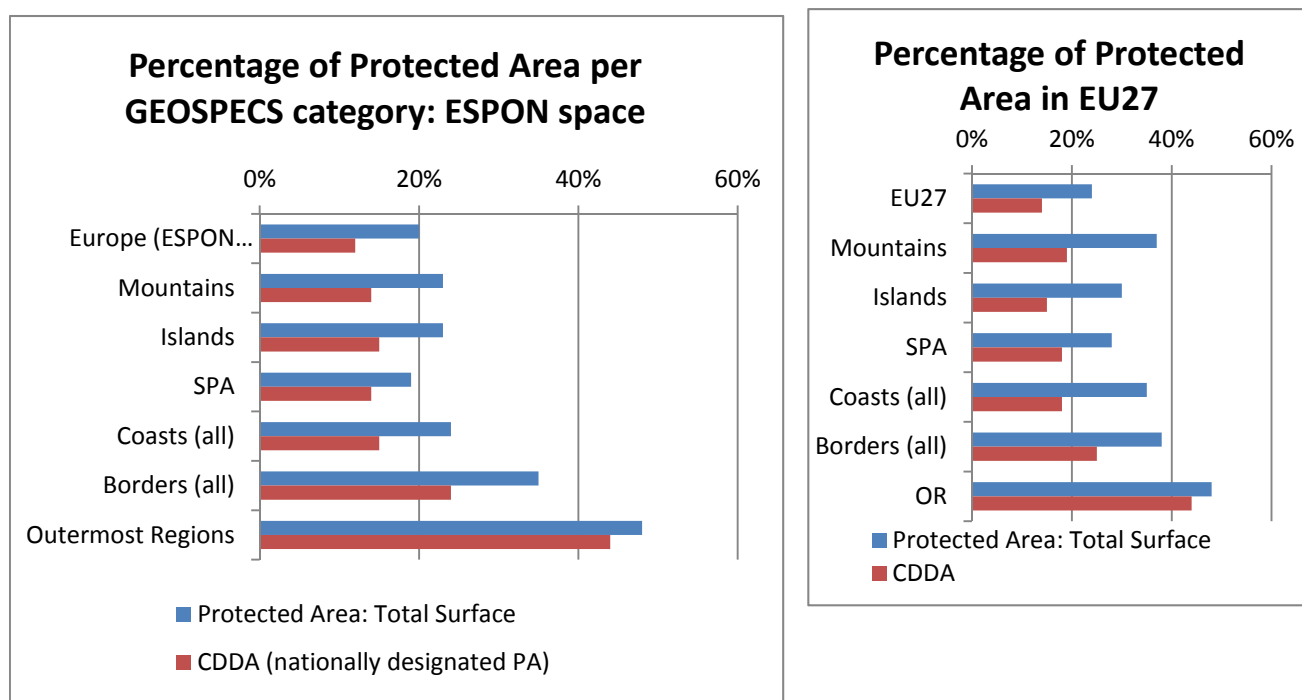


Figure 59 Protected Areas per GEOSPECS category: percentage

The quantitative evidence confirms the conclusions above: the total percentage of the surface covered by Protected Areas (designated under both national and European legislation) is higher in GEOSPECS areas than on the European average – except for SPAs. However, for all GEOSPECS categories, the proportion of nationally-designated areas is higher than the European average. When only the EU27 is considered, the percentage of Protected Area is generally higher.

The likelihood that an area will be protected for nature conservation purposes can rise where geographic specificities overlap (but this is not the case everywhere). For instance, mountainous parts of Outermost Regions have an even higher propensity to be protected than Outermost Regions overall.

Summary and conclusions

Overall, the GEOSPECS case studies show that many GEOSPECS areas are associated with a diverse flora and fauna. Accordingly, many (but not all) of the areas investigated by the project feature a number of protected areas.

How can this particular characteristic of GEOSPECS areas be valued? To some extent, the approach of ecosystem services is useful, and the

particular ecosystems in mountains and coastal areas (and also other GEOSPECS areas) provide specific services that are vital for the entire European population. However, most of these services do not generate an immediate revenue for the concerned areas.

In addition, tourism can generate income in an area. As many GEOSPECS categories show characteristics that are perceived as “attractive” (particularly mountainous landscapes, coasts, and islands), many are already well-placed to attract visitors. When unique vegetation, some flagship species and/or national park designation is added, the overall image of a particular area can be enhanced to profit even better from tourism opportunities.

Conflicts between natural habitats and anthropogenic demands for land use occur most frequently in areas with high population density. This is true for all of Europe, not only for GEOSPECS areas.

6.2.6 Ecosystem Services

Ecosystem services are the benefits people obtain from ecosystems (MA, 2005). The different categories of services and values are well-summarized in the figure below (WATTAGE, 2011):

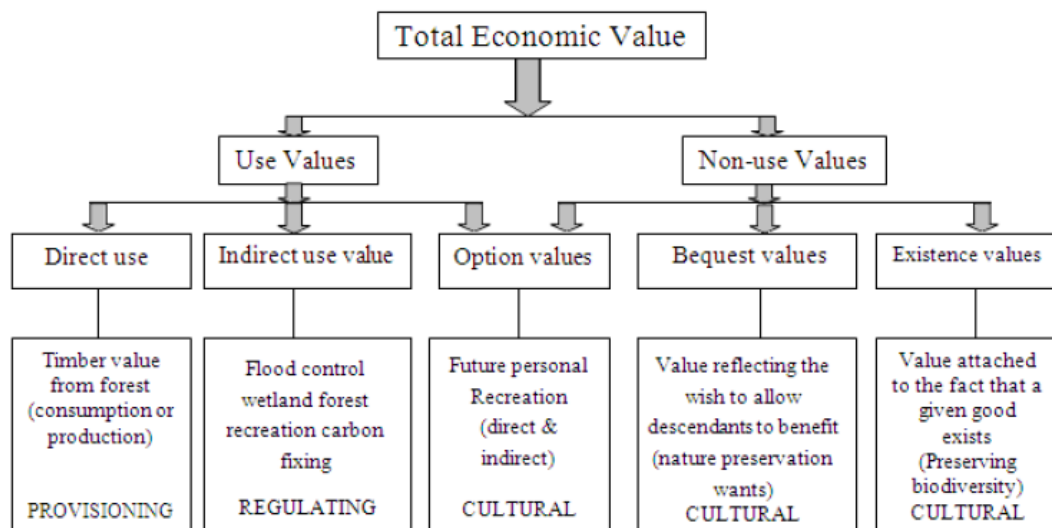


Figure 60 Ecosystem services: categories and values

However, even with such a categorization, the methods of actually putting a price tag on these services are controversial, particularly so for the more abstract values (e.g., existence values, option values). Assigning pecuniary values is obviously easiest for interactions with nature that create a measurable cashflow. One aspect of this relates to direct use

values (e.g. the extraction of timber from a forest which obtains a price at the market). As the *exploitation of natural resources* is the focus of another transversal theme of GEOSPECS, these are not addressed further in this section. In addition, measurable cashflows are created by *tourism*. Even though the recreation value that an individual personally derives from visiting a "beautiful" landscape (or indeed the health value s/he obtains from walking/skiing/swimming) is almost impossible to quantify, the money that is spent for access to, accommodation in, and recreational activities undertaken in an area can be measured. This is the principal way in which the assets of many "natural" areas have been valued; while the values of other important ecosystem services – such as flood control, carbon sequestration or nutrient cycling – have been rarely quantified, and even less have such measures been used as the basis for policy-making or transfer payments.

As noted above, many GEOSPECS categories support high levels of biodiversity. As such, they also play important roles in the supply of ecosystem services. This is especially so given that the concept of ecosystem is broader than only living organisms, as it also comprises (abiotic) physical components of the environment with which the organisms interact.

Natural resources can be biotic or abiotic and refer to products derived from biological, ecological or geological processes to satisfy human needs. They also include ecosystem services, which are not directly consumed, but essential for economic production and/or the maintenance of life (e.g. flood attenuation or maintenance of biodiversity) (Bridge, 2009). Natural resources are often characterised by being either non renewable, referring to finite resources, where their removal reduces the supply available for future use or renewable resources, which have a capacity for regeneration. Non-renewable resources can be further sub divided into those extracted from the environment (e.g. fossil fuel) or those that once extracted may be recycled (e.g. products of metals). Renewable resources can be classified into exhaustible resources (e.g. fish stock) or non exhaustible resources, where the use of the resources has no impact on amount or quality of this resource (e.g. solar, wind and wave) (Bridge, 2009).

In recent years, a debate has emerged about the payment for – or at least proper valuation of - ecosystem services. Different terms arise in the discussion, with some organizations referring to "environmental services", others to "positive externalities" or "public goods". GEOSPECS uses the term ecosystem services, as these include all the mentioned services. Ecosystem services are the benefits people obtain from ecosystems (MA, 2005). The Oxford Dictionary defines "ecosystem" as "a biological community of interacting organisms and their physical environment". It

therefore includes both biotic and abiotic elements, both natural processes and human-induced processes; the term ecosystem service is thus sufficiently broad to include both values that normally receive market pricing and those that do not.

The Millennium Ecosystem Assessment defined four major categories of services (MA, 2005):

- Provisioning services are products obtained from ecosystems such as food, water and timber;
- Regulating services are benefits obtained from regulation of ecosystem processes, such as water purification and pollination,
- Cultural services are non-material benefits obtained from ecosystems, such as recreation and aesthetic experiences; and
- Supporting services are services necessary for the provision of all other ecosystem services (such as soil formation and nutrient cycling). This category is controversial, as some scientists include supporting services in regulating services.

A number of ecosystem services are provided by any terrestrial ecosystem. These fall into the category of regulating services; they include nutrient cycling, water cycling, soil formation, pollination, pollutant deposition, climate regulation, and others. While the magnitude of these services will differ depending on the particular ecosystem and its status, they are all provided at least to some extent. The level of many of these services will tend to be higher in areas that are more "natural" (i.e. less influenced by human activities), and therefore arguably GEOSPECS areas contribute more of these services to the European continent (as most correspond to areas where there is comparatively less human activity, the main exceptions being coasts and, to some extent, borders). However, since it is impossible to quantify the exact impact of any GEOSPECS area in terms of regulating services, it is futile to enumerate them again and again for each category.

It is unrealistic to try to quantify the economic impact of ecosystem services in Europe – be it in GEOSPECS areas or otherwise. However, it is important to note that some GEOSPECS areas provide particular – vital – services to the entire European territory that can *only* be "produced" there. This is perhaps most intuitively clear for mountains and coasts.

Mountain areas

In terms of provisioning services, the most important contribution of mountain areas is the provision of fresh water. They generally have low agricultural productivity: for example, the FAO estimated that 78% of the

world's mountain area is unsuitable or only marginally suitable for growing crops (Huddleston et al. 2003).

Mountains play a key role in the water cycle. They extract moisture from the atmosphere through the orographic uplift of air masses that pass over mountain ranges. They influence temperature and precipitation patterns, and modulate the runoff regime. In addition, they act as "water towers" by storing water in glaciers, permafrost, snowpacks, soil, groundwater and mountain vegetation. Mountain areas typically produce about twice the discharge that could be expected from the land area they cover (MA, 2005). Its rivers transport sediments downstream, providing nutrients for lowland areas, replacing fluvial and coastal sediments, and contributes to groundwater recharge in lowland areas (EEA, 2010b). This is crucial for accessing freshwater for human consumption, but other values are also associated: the economic value of hydropower depends largely on mountain water, for instance. Due to their steep gradients and natural potential for dam sites, mountain valleys are well suited for generating energy through hydropower and storage of water in reservoirs (EEA, 2010). Approximately 84 % of the electricity generated from renewable energy sources in the EU15 and 19 % of total electricity production in Europe is generated by hydropower, with small hydropower plants (up to 10 MW) contributing about 2 % of the total electricity generated (ESHA, 2005). The benefits of hydropower – in terms of access to electricity and profits – accrue mostly to the lowlands (MA, 2005).

In addition, considerable amounts of minerals, stone, coal and timber are still being extracted from mountain areas.

Within mountain areas, one can also identify ecosystem services delivered by biodiversity. One example is the role played by a biologically diverse ecosystem which stabilizes a steep slope (SPEHN et al, 2010).

A typical regulating service is carbon storage. Within the terrestrial biosphere, peatlands are the most important carbon store (in global comparison, they bind even more carbon than forests). A good proportion of peatland is found in upland areas (IUCN UK, 2011)

Cultural services are particularly important in mountain areas. Many consider mountain landscapes as attractive; among the aesthetic features that people value are dramatic scenery, remoteness, tranquillity, open space and unusual plant and animal life. They can provide a setting for spiritual and religious reflection, as travelling through wild and beautiful terrain can invoke a sense of meaning (Bernbaum, 1998). Specific recreational activities can be pursued in mountain areas, such as climbing, mountaineering, walking, skiing, orienteering and mountain biking.

Irrespective of the economic gain for the local population who are involved in the tourism industry, these activities provide health benefits to the visitors, and more “passive” benefits for mental and emotional health (UKNEA, 2011).

Historically, many mountain communities were ethnically or culturally distinct from lowland populations. Even though ease of access increased with the rise of modern means of transport, some distinct traditions, practices, beliefs, dialects and even languages have survived in different mountain valleys across Europe. These often contribute directly to the tourism industry.

Coastal areas

Provisioning services: Coastal ecosystems generate a variety of seafood products such as fish, shellfish, and seaweeds. Many commercially important marine species (such as salmon, snapper, striped bass, shrimp, lobster, crabs, and oysters) use coastal areas as nursery habitats. All fishing activities have to start from a coast. Given the rapid decline in fish stocks, aquaculture is becoming increasingly important; globally, this is the fastest-growing food-producing sector (MA, 2005).

The most important regulating service is coastal defence: protection from erosion, storm and wave damage and coastal flooding. All coastal habitats contribute to this, either by attenuating wave energy or by regulating sediment (UKNEA, 2011).

Cultural services: Open space, proximity to the water, and scenic views are often cited as a primary attractor of residents who live within the coastal fringe. Similar factors attract tourists, along with recreational opportunities such as boating, fishing, swimming, walking, diving and sunbathing (MA, 2005). The seas and coasts are also of spiritual value to many people; in some countries, remote coastlines and islands have been a focus for shrines, monastic settlements and holy sites for Christianity and earlier religions (UKNEA, 2011). In addition, spending time by the sea has long been recognized for its benefits for health and well-being.

Other services include shoreline stabilization, bioremediation of waste and pollutants, and a variety of aesthetic and cultural values (European Commission, 2011).

Sparsely populated areas

A sparsely populated area does not, in itself, generate any particular ecosystem services. However, some ecosystems occur mainly where there are no or few people. Forests shall serve as an example: large expanses of forests are principally found where there is little human settlement. Forests protect soils from erosion and regulate watersheds and local hydrological systems. They regulate the local, regional and global climate, store carbon, and purify air. They produce wood and non-wood products, and are also part of our cultural and historical heritage, and represent key locations for outdoor recreation and leisure (EEA, 2010c).

Other GEOSPECS categories

All ecosystem services that could be called particular to islands are related to their position within the sea, and have therefore already been enumerated in the section on coasts.

For border areas, it is not possible to speak of “particular” ecosystem services, as borders are not a particular ecosystem but can be found in any ecosystem.

As already mentioned, Outermost regions feature a richness of biodiversity that surpasses any other type of area in Europe. For this reason, they offer ecosystem services at a much higher level – however, none of these services are exclusive to Outermost Regions.

Value of ecosystem services

It is thus clear that GEOSPECS areas have an important role in providing ecosystem services and improving the well-being of the entire European continent – on the one hand by providing specific services (mainly true for coastal areas, mountains and some SPAs), and on the other hand by being reservoirs of “green” spaces in which regulating services are provided to a much larger extent than, for instance, by urban areas .

Values of ecosystems can be divided into four categories (World Bank, 2004):

- Direct use values (they are most often enjoyed by people visiting or residing in the ecosystem; they include the value of consumptive uses such as harvesting of food products or timber and the value of non-consumptive uses such as recreational and cultural activities)

- Indirect use values (they provide benefits outside the ecosystem itself, such as natural water filtration, storm protection and carbon sequestration)
- Option values (the option to use ecosystem goods and services in the future, even if they are not used now)
- Non-use (or existence) value (refer to the enjoyment people may experience simply by knowing a resource exists, even if they never expect to use that resource directly themselves).

Pricing the services that create a measurable cashflow is simple: either the price paid on the market for a particular extracted resource, or the price paid for a tourism service such as a hotel night. These fall into the category of direct use values. In contrast, assigning pecuniary values to services that do not create a measurable cashflow is highly complex. This is the case for indirect use values, option values and non-use values, but even some direct use values, such as the health benefit that a tourist derives from hiking in an attractive landscape. Despite the abundance of literature trying to estimate the price tag of particular services within particular areas of the world (using a wide range of methods), any overall aggregation of these values must remain a futile exercise, seeing that the sum of value of all ecosystem services of the planet is necessarily infinite: all humans are part of ecosystems and we simply would not exist without them. However, this does not mean that these values should not be important for policymaking.

There are different methods which address the question of how to internalize the externalities (or, in other words, to valorize the non-market values). One is Payment for Ecosystem Services (PES). The debate centres around offering remuneration (or other benefits) to farmers or landowners in exchange for managing their land to provide particular services (the second pillar of the CAP, Rural Development Policy, contains some elements based on this idea). An overview of different PES schemes can be found in: UNEP, Forest Trends and The Katoomba Group (2008).

Other measures can be equally appropriate to preserve these services, from government regulation to taxes (not the least interesting of which is the idea to tax "bads" instead of "goods", an approach defended for instance by Joseph Stiglitz). GEOSPECS recognises that no single solution exists, and that different methods will be appropriate in different regions. However, a fundamental rethinking is essential. At present, most ecosystem services are either undervalued or have no financial value at all. In a world in which day-to-day decisions habitually focus on immediate financial returns, many ecosystems are deteriorating: the Millennium Ecosystem Assessment found that over 60% of the environmental

services studied are being degraded faster than they can recover. Not only is this economically questionable, since the prevention of damage is often cheaper than the reparation of damage, but this trend does not bode well for future generations. A more strategic thinking has to find its way into the debate. GEOSPECS areas would particularly profit from this more strategic approach, since they provide a significant amount of vital ecosystem services to the European continent. This vital role for the well-being of the people of Europe should be acknowledged.

6.2.7 Natural Resource Exploitation

Natural resources can be biotic or abiotic and refer to products derived from biological, ecological or geological processes to satisfy human needs. They also include ecosystem services, which are not directly consumed, but essential for economic production and/or the maintenance of life (e.g. flood attenuation or maintenance of biodiversity) (Bridge, 2009). Natural resources are often characterised by being either non renewable, referring to finite resources, where their removal reduces the supply available for future use or renewable resources, which have a capacity for regeneration. Non renewable resources can be further sub divided into those extracted from the environment (e.g. fossil fuel) or those that once extracted may be recycled (e.g. products of metals). Renewable resources can be classified into exhaustible resources (e.g. fish stock) or non exhaustible resources, where the use of the resources has no impact on amount or quality of this resource (e.g. solar, wind and wave) (Bridge, 2009).

According to Jacques Lévy (2003), the use of the term "productivist" explains why some consider the solution to abandon the most productive forms of exploitation of natural resources. In order to move away from "predatory" types of exploitation, he argues that one on the contrary needs to increase the overall productivity of human action. This is supposed to be the only viable strategy to reduce the waste, so that one can satisfy the needs without impacting nature in an unsustainable way. Jacques Lévy's argument however presupposes that the development of production is driven by needs, while one could also argue that market mechanisms lead to increases in production and consumption, and that the notion of "needs" to be "satisfied" is only of relative analytical value.

Concerns in terms of natural resource utilisation and management and related policy requirement can be broadly categorised according to exploitation, conservation, sustainability and adaptive management. However issues linked to these categories are not mutual exclusive but in

many cases have to be dealt with simultaneously (Bridge, 2009). Many of the natural resources our society depends on to keep our economy operational are overexploited, limited in supply and some are non-renewable (EUROPEAN UNION, 2011). The European society by and large has been affluent for many decades, benefitting from the intensive use of natural resources but is now faced with a dual challenge of addressing overexploitation and limited supply of natural resources on the one hand, while trying to stimulate economic growth and prosperity on the other (EUROPEAN COMMISSION (2011b)). To tackle issues such as the limited supply and subsequent rising prices of natural resources in Europe, the Europe 2020 strategy, which aims to deliver smart, sustainable and inclusive growth, has focused on a resource efficient Europe as one of its seven flagship initiatives (EUROPEAN COMMISSION, 2011c).

Furthermore, EU regions enjoy some of the highest standards of living in the world, yet at the same time the continent is one of the poorest as far as conventional energy reserves are concerned (ARMAROLI & BALZANI, 2007). It is estimated that more than a third of generation capacity of some EU Member States could be lost by 2020 if alternatives to fossil fuels are not utilised (EUROPEAN COMMISSION, 2010c). Given the scarcity of conventional energy resources, energy conservation is mandatory for Europe (ARMAROLI & BALZANI, 2007). The flagship initiative focuses strongly on exploitation of non-fossil fuel and renewable energy, which should greatly reduce the EU's dependence on limited fossil fuels in future and enhance resilience of the EU's economy towards future increases in global energy prices (EUROPEAN COMMISSION, 2011c; b).

Against this backdrop, GEOSPECS asks:

- Are GEOSPECS areas endowed with any particular resources?
- Is the socio-economic context for natural resource exploitation different in GEOSPECS areas compared to other areas?
- As far as renewable energies are concerned: are the preconditions for renewable energy generation particularly good (or particularly bad) in any of the GEOSPECS categories, and if so why?

Some natural resources are causally linked to different forms of geographic specificities:

- Mountain areas play an important role in supplying the European continent with water, e.g. contributing to regulate rates of flow throughout the year. Water management policies in mountain areas are therefore as important for lowland areas as for the mountain areas themselves. Energy generation from hydropower installations is concentrated in mountain areas and historically been important

been important in the development of manufacturing activities, chemistry and high technology in mountain areas. At the same time good timber resources can often be found in mountain areas, but may often be underexploited in areas where steep slopes make mechanisation difficult.

- Most islands have access to wind, wave and tidal resources for the generation of renewable energies. However, limited accessibility can make the exploitation of certain natural resources unprofitable.
- Sparsely Populated Areas (SPA) have a range of unexploited natural resources of global importance such as minerals and forests. An often encountered challenge is to create a social and economic context making it possible to attract qualified workers that would contribute to their exploitation.
- Coasts host the “landing points” through which the output from the exploitation of marine resources is brought to manufacturing industries and to final consumers. These marine resources range from fossil fuels to fish, from renewable energies (offshore wind, wave energy) to marine aggregates. The extent to which the transit of these resources through coastal “landing points” actually benefits coastal communities is an open question. One can for example presume that small scale coastal fisheries have a different regional impact than fleets of industrial trawlers; however, only limited concrete empirical evidence has been compiled in this respect. The combined effects of changing technical and commercial framework conditions for fisheries and of variations in fish stocks have been dramatic in a number of coastal areas.

Coasts areas also host some specifically coastal forms of resource exploitation, e.g. aquaculture and wind farms. These also pose specific challenges, e.g. in environmental terms, but do improve the perspectives of socially and economically sustainable development for many coastal communities.

- Border areas are not intrinsically linked to any form of natural resource exploitation. However, the exploitation of cross-border resources requires sound cross border management. Existing challenges include the lack of cooperation, different languages and limited access due to lack of infrastructure.
- Outermost regions (OR) face major challenges in terms of access. The Spanish and Portuguese ORs face isolation as remote island territories. The French ORs are territories with European type of regulatory frameworks, with neighbouring countries with different legislations, labour costs and standards of living.

Issues related to natural resource exploitation identified in GEOSPECS areas

Resource exploitation in GEOSPECS areas can be approached:

- from a European and national perspective, identifying critically important inputs to general economic development;
- from the perspective of individual GEOSPECS areas, seeking to identify how natural resources exploitation can contribute to their own ambition of achieving balanced and sustainable development.

The potential adverse long term effects of discoveries of large natural resources on national and regional economies are well known. The term "Dutch disease" was coined by journalists of *The Economist* observing how the exploitation of the Groningen Gas Field had a negative impact on growth and productivity in the manufacturing sector while at the same time generating inflationary pressures (Ebrahim-zadeh, 2003). This does not imply that natural resources need to have a negative economic and social impact. However, careful planning is needed to avoid bringing the revenues generated by this activity into regional and national economies too quickly. As it may be politically difficult to resist the temptation of spending available incomes on improved public services and higher wages, a solid institutional framework is needed to ensure that natural resources actual become economically beneficial on the long term for local and regional economies. The lack of such solid institutions in many parts of the world, and especially in developing countries, is one of the reasons which scholars refer to the notion of "resource curse" (Mehlum, Moene & Torvik, 2006).

The institutional contexts of the GEOSPECS areas analysed in the present report are quite different from those of developing countries. However, these territories tend to be more isolated, more peripheral and have a more limited institutional capacity than "mainstream regions". Another factor that may contribute to limit the socio-economic benefits of natural resource exploitation is the limited size of local labour markets. On the one hand, it may be difficult to recruit workers with the required professional profile locally. On the other, natural resource exploitation endeavours in small, local communities to extract natural resources may create an imbalance on the labour market by attracting a large proportion of skilled workers from pre-existing companies and from providers of public services. Another solution is to recruit external workers that work on the exploitation of the natural resource for limited periods of time. The so-called "fly-in fly-out" model disconnects a large part of the economic benefits of the natural resource exploitation from the region in which it occurs (Storey, 2001).

Within the GEOSPECS areas there are some case studies where the exploitation of natural resources has been to the benefit of regional and national economic growth and security of energy supply e.g. wind in the coastal region of the Irish Sea, minerals in the Sparsely Populated Area (SPA) and cross-border region of the Torne Valley (see Figure 62) and hydro and bio-energy in the mountain regions of the Scottish Highlands and the Jura Massif.

In many others cases e.g. the island regions of Sicily and the Outer Hebrides, and the SPA of Central Spain, the optimisation of exploiting natural resources, while forming an integral part of regional and national strategies, remains to some extent an aspiration and requires extra support to utilise the resources to their full potential. Constrains that may have to be addressed in these areas are not linked to a physical limit of the resource but an economical constrain connected to for example access from within the specificity, lack of labour force and price. Policy support may improve capacity in the areas of technological innovation, behaviour change and collective action as well as increase access to decision making process (Bridge, 2009) to incorporate local needs as well as knowledge.

Particular Resources

A better understanding of the geography and history of specific resources is the first step in order to develop existing underutilised and emerging opportunities in natural resource exploitation. Particular to coastal areas is the possibility of extracting marine aggregates. This type of resource exploitation is growing in the waters of the Belgium coast (VAN DEN EYNDE & NORRO, 2009; LANCKER et al., 2007), where the aggregates are utilised in the construction industry and as materials for land reclamation and the re-nourishment of eroding beaches (VAN LANCKER et al., 2007).

Opportunities in terms of exploiting this resource in the Irish Sea have been identified in the Irish Sea Marine Aggregates Initiative (IMAGIN), a collaborative project between Ireland and Wales, which focused on the sustainable management of marine aggregate resources while posing the minimum risk of impact on marine and coastal environments (SUTTON et al., 2008). However the actual exploitation of the resource is relatively low in the current economic climate as the biggest potential user of the resource, the construction industry is in decline. On the other hand other avenues should be explored as these aggregates provide excellent beach nourishment and coastal defence material. This is especially important in the context of climate change induced sea level rise and a critical demand for aggregates may arise for the coastal areas around the Irish Sea.

In both coastal case study areas and for the islands of the Outer Hebrides fish are cited as an important natural resources, however fishermen are faced with several challenges such as resource depletion due to overfishing, restrictive quota regulations and the effects of climate change (ROBERTS et al., 2003). In the coastal case study areas expansion of the aquaculture sector is noted as an opportunity to partly compensate for the declining fishing industry.

Both case studies on sparsely populated areas show that these areas offer important natural resources. The Fennoscandian Shield (of which Torne Valley is part) is one of the most potential areas for new mining now and in the future (Damsgaard et al. 2009). At the moment almost 90 % of the European need of iron ore comes from Northern Sweden. Northern Sweden and Finland contribute also to significant parts of the EU's production of gold, silver, zinc and copper. Furthermore, chrome production in Kemi in northern Finland has great significance for the production of stainless steel. In the Torne Valley, a SPA and cross-border region (see Figure 62), which is located between Finland and Sweden, existing mining projects are expanding and new projects are underway. Challenges that have to be resolved in order to maximise the local and regional economic and social benefits are the lack of existing infrastructure, limited cross border labour force and environmental impacts.

In Teruel and Soria, SPAs in Central Spain, the extraction of ornamental rocks such as alabaster and of construction materials such as clay is under-utilised despite a local abundance of the resource (BAULUZ & SUBIAS, 2007). However, it is the exploitation of coal that has had the largest economic and physical effect on the region. Around 65% of the total coal production in Spain originates in Teruel and its exploitation is integral to the national energy supply of Spain as well as Teruel being an important contributor to the local and regional economies (see Figure 63).

Forests are another important resource, particularly in the sparsely populated areas. There are vast forest resources in northern Europe. Sweden and Finland together account for 34% of the EU27 countries' forest land and 33% of the forest available for wood supply. The cultivation and harvesting of forests have provided a significant contribution to the regional economy in the Torne Valley (see Figure 62), providing many jobs for past and current generations. The region contains some of the vastest coverings of woodland in Europe, though much of the commercial potential of logging is limited by unfavourable climatic conditions.

In the Jura Mountains, forests comprise much of the landscape – an estimated 48% of the region is forested (OFEV, 2010). The forest

landscape is viewed not only as economically important, but also in a cultural sense as it is immediately associated with the Jura region and therefore important for regional tourism. Timber from the Jura is maybe less of an opportunity in quantitative terms than in qualitative terms. The cool and humid climate, good geological characteristics but only moderate altitudes of the Jura massif lead to solid and homogenous timber. An initiative even tries to attain an AOC label for coniferous wood from the Jura – it claims that this wood deserves a quality label due to its extraordinary robustness.

Renewable Energy Resources

Evidence from the case studies suggests that in many GEOSPECS areas renewable energy resources are seen as opportunities for future development. The Outer Hebrides is perhaps the best example, where wind, although identified as an opportunity to be exploited, is under-utilised as a resource. The islands – because of their location at the North-Western fringe of Europe - are surrounded by some of the most consistent and powerful winds in Europe, but energy production from wind and other renewable sources remain disproportionately low. In 2009 electricity generated from renewable sources in the Outer Hebrides is estimated at less than 6 MW. The proposed future generation is around 300 MW. It is widely believed that onshore wind has the greatest capacity to maximise economic and community benefit in the Outer Hebrides. On top of that, the potential for marine energy exploitation is significant in the Outer Hebrides. As the prevailing wind direction in Europe and the area of greatest fetch are westerly, west-facing sites generally have the greatest wave energy resource. The most attractive sites are where deep water can be found close to the shore, as seabed friction progressively removes energy from ocean waves (Scottish Executive, 2007). The best potential exists around the Scottish islands. In Europe, Scotland is among the top locations for marine energy, with around 25% of Europe's tidal stream resource and 10% of its wave resource (Forum for Renewable Energy Development in Scotland, 2009). This high potential is obviously mainly due to the area's geographical *location*, but it is only from the coast that marine renewable energies can be exploited, and thus this potential is linked to the coast. Recording the most suitable locations on maps is the first step in order to progress on such potential, which will need to be furthered through Marine Spatial Planning and Integrated Coastal Zone Management to be sustainable and avoid future conflict with other existing and potential uses of the area.

Islands such as the Outer Hebrides and Sicily experience high energy prices because of high cost of transporting electricity from generation

sources to the islands. Insularity in that context may provide an extra incentive to develop endogenous electricity generation from the abundant local wind and marine resources (i.e. wave and tide).

In recent years there has been a large increase in the developments of onshore and offshore wind farms in both the Belgian coast and the Irish Sea coasts (TOLON-BECERRA et al., 2011; SEAI, 2010). In the eastern Irish Sea alone, it is estimated that by 2020 wind farms will occupy an area of 254km². The coast of Belgium (see Figure 61) has one of the most conducive environments for wind energy production in that some of the highest wind speeds in Europe exist in the Belgian part of the North Sea. It has been shown that significant obstacles in developing the industry is the reluctance of the public to accept new wind turbines on land, which makes the offshore environment a more attractive location for future wind turbine development (VAN ROMPAEY et al., 2011.) (see Figure 61). A similar situation exists in mountain regions. The wind resource in the Highlands of Scotland is considered one of the best in the world, yet due to the proximity of potential sites to protected areas and residential zones, the resource is largely under-developed (HIGHLAND COUNCIL, 2006). Hydropower is predominately used for renewable energy in the Highlands, while other renewable resources are explored for future development or are utilised but not to the same extent as hydropower e.g. biomass, wave and tidal energy.

Wind resources have been highlighted as being under-utilised in the sparsely populated regions of Central Spain as a result of the regional topography in combination with a lack of adequate infrastructure.

Another renewable energy source, the sun, is viewed as being a potential great resource to the Central Spanish province of Teruel. At present, eight 50 MW solar plants are planned for the wider region, with four planned for the province of Teruel. The region's potential in forestry areas including herbaceous and woody crops has led to serious investigation into biomass production to generate energy as a future opportunity (GOBIERNO DE ESPANA, 2005). Regional forestry cooperatives and energy agencies are collaborating with regional authorities investigating the benefits of such undertaking to rural communities and regional development in terms of employment and landscape management.

In the SPA and cross-border area of the Torne Valley hydropower accounts for almost all electricity generation in the region. Opportunities to develop renewable energy from other sources have been identified for wind and bio-energy. Current wind energy production continues to be very low, while bio-energy is the existing primary form of renewable energy because it is used for heating in Finland, Norway and Sweden (LINDBLOM & RASMUSSEN, 2008).

Outermost Regions are obviously not connected to the European energy grid and thus have to rely on themselves (or neighbouring countries, if possible) for their energy provision. In French Guiana 60% of the electricity comes from hydro-electric plants (115 MW) and there is still a potential to produce more by hydro-electric generation. In addition, solar energy (photovoltaic) is likely to address the need of the population in the isolated areas, but it is still insufficiently developed (projects are ongoing). A third promising source is biomass energy from the exploitation of forests. French Guiana produces about 2 MW per year from biomass derived from sawmill waste. Although French Guiana has extensive fuel wood resources, their value is not being fully realised at present.

Access to resources

Resource access can be viewed from several spatial scales taking into account for example access and control on a local, national or EU level. Furthermore issues are often related to resource security and geopolitical power. Two main issues emerge from the geographic specificities examined where natural resources are considered less accessible because of their distance to the main European markets while other natural resources are difficult to access within the specificity. As shown, many important resources are located in relatively remote or inaccessible areas (sparsely populated areas, islands), which may hinder their efficient exploitation. In the Torne Valley a reason for the under-utilisation of mining resources is a lack of infrastructure capacity (i.e. road, rail). Additionally, access via ports is frequently hampered by frozen seas. In a similar way, renewable energy resources in the Highlands and Islands (including the Outer Hebrides) have been said to be underexploited because of a lack of grid capacity – this in turn being due to the remoteness and low population density of the area, where the construction of large-scale power cables has so far not been profitable and would in future be a major investment.

Conversely, the lack of a particular resource may also be an issue in geographically specific areas and relates to resource security. In Sicily access to fresh water is a major issue. Water scarcity is a persistent problem in the island due to the very low (on average 400 mm of rain per year) and the lack of underground aquifer capacity. Water shortages have profound effects on the agriculture sector especially livestock farming on the island but affect any new business development as water is one of the natural resources we depend on for survival and many daily operations.

Lastly, it must be kept in mind that – while constituting an opportunity – large-scale exploitation of resources is not always greeted with joy by the

local population. This is certainly not only true for areas with geographic specificities, but *also* for them. As mentioned, mining is an important activity in both SPA case study areas. This entails significant environmental impacts. At the same time, it may effect on tourism, as visitors expect unspoiled nature, and it can conflict with other natural resource exploitation such as the forestry industry. In the Torne valley, another interest that must be balanced against the interest of mining operators is that of the Sami people, who have particular rights of way and land. Similar issues have been identified in the TeDI project, where for example in the Romanian county of Alba the interest of the Roşia Montană Gold mining company conflicted starkly with concerns of some locals and NGOs. On the one hand the gold mining company promised to reinvigorate the local economy, while on the other the NGOs challenged this claim and warned that jobs and opportunities will be lost as environmental and historical assets suffer from the gold mining operation and subsequent impacts (Gløersen et.al., 2010)

In coastal regions, environmental impacts can pose a challenge in accessing marine renewable energy resources such as tidal, wave and wind energy. Noise pollution as a result of drilling, dredging and pile-driving during the construction has had noticeable effects on bird and marine mammal populations. Offshore wind turbines also impact on benthic animal communities and migrating bird species (WILSON et al., 2010). However, much of the impacts are now carefully assessed and monitored through Environmental Impact Assessments.

Quantitative evidence

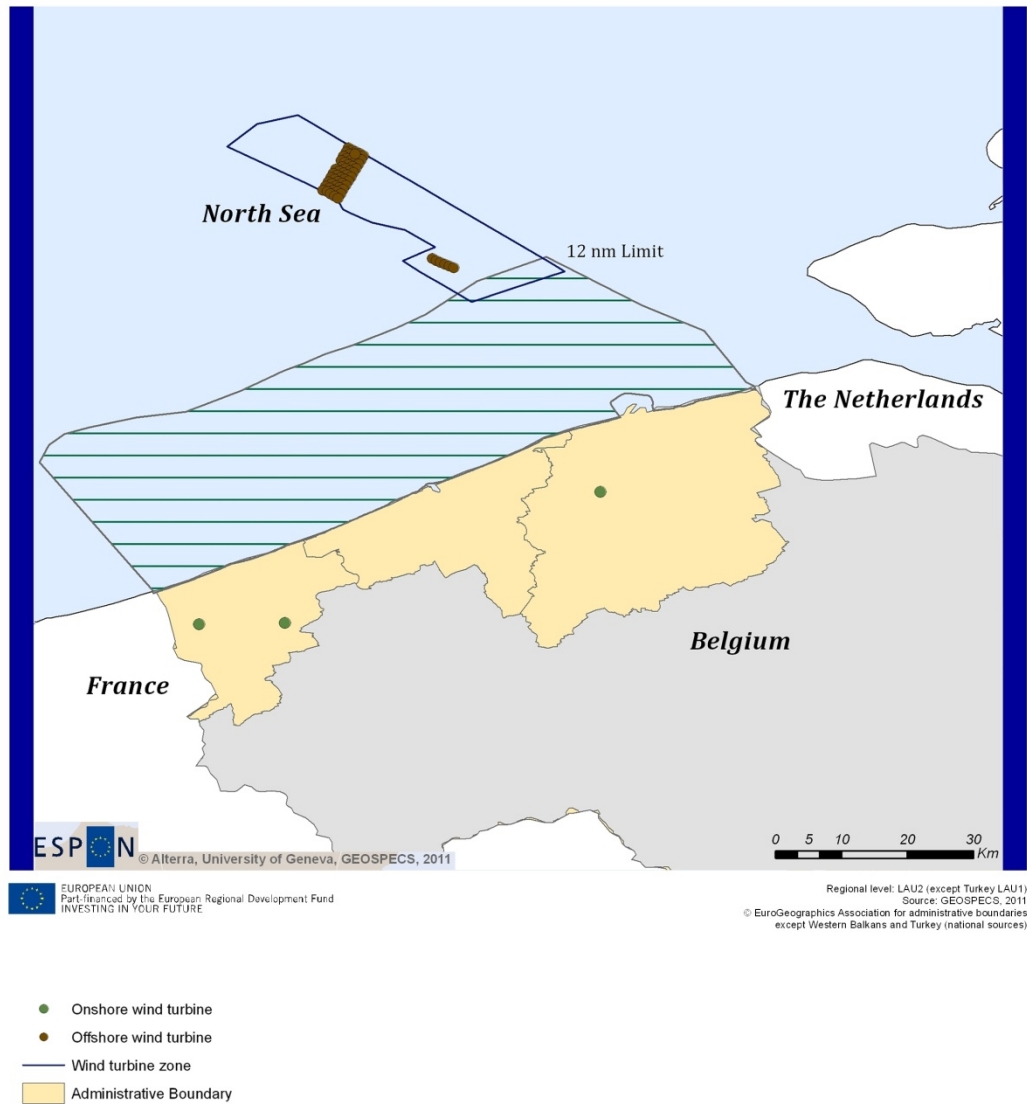
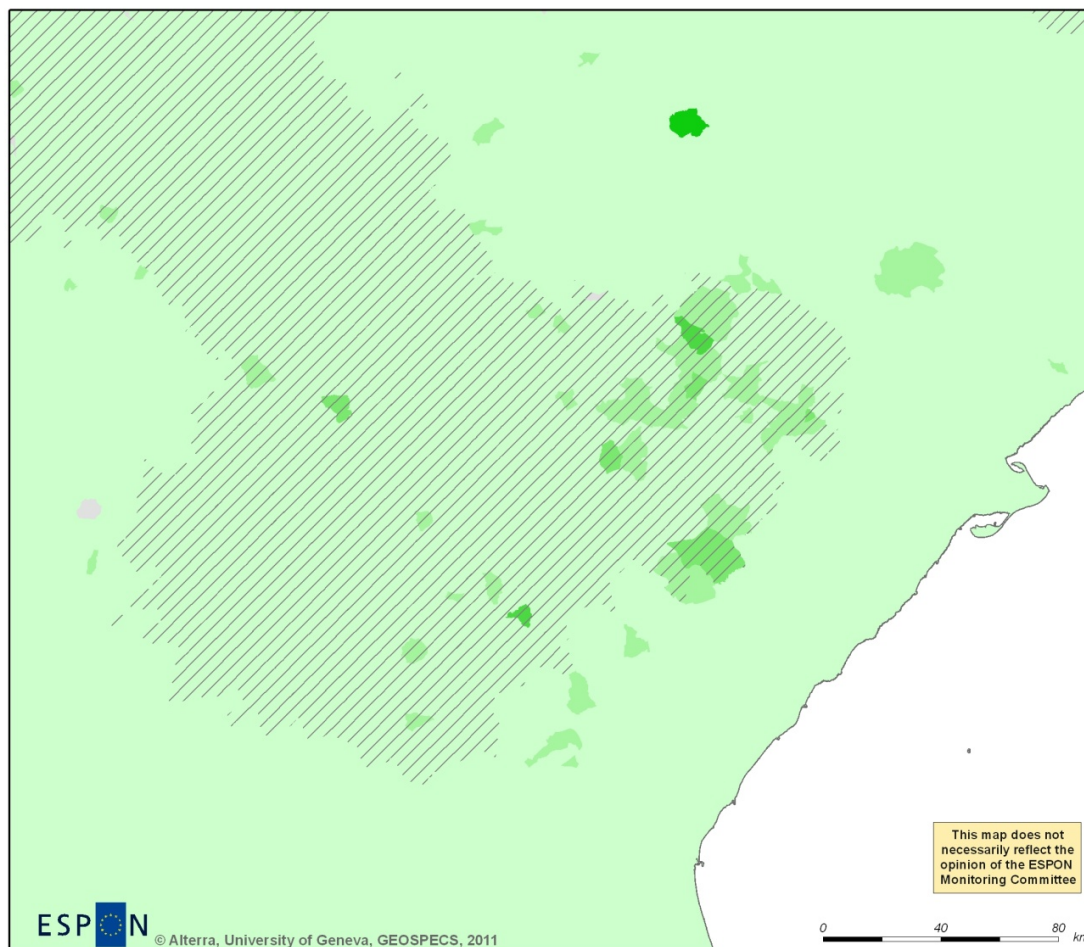


Figure 61 Onshore and offshore wind energy project on the Belgium Coast.

These projects demonstrate the increasing development of offshore projects compared to onshore more localised occurrence

Figure 62 Natural Resource management in SPA and cross- border region of Torne Valley

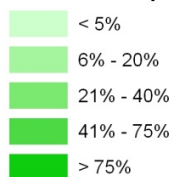
Mining in Spanish Sparsely Populated Areas




 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
 Source: GEOSPECS, 2011
 © EuroGeographics Association for administrative boundaries
 except Western Balkans and Turkey (national sources)

Mining Employment % of total employment



 GEOSPECS Sparsely Populated Area

Figure 63 Hotspots of employment in the mining industry in an SPA of Central Spain

Summary and conclusions

Considerable transformation related to scale, rate and type of natural resource exploitation have taken place in recent history and while EU policy is addressing some emerging issues it is important to identify particular resources and social, economic and political issues related to the specific resource as well as specific place to optimise resource exploitation in a sustainable manner. The case studies highlight, that it is essential to gather certain information on a case by case basis in order to identify resources and issues that are particular to a local area, which may not apply to other areas of that same specificity.

The most important natural resources can be found in the sparsely populated areas. There is evidently no direct link to the geographic specificity (the resources are not there *because* the area is sparsely populated). However the limited population of these areas has limited the exploitation of these resources but require knowledge on how to use them, which could be supported by policy that facilitates such development.

As for renewable energies: The case studies confirm the hypothesis that some of the geographic specificities are linked to a particularly high potential for the generation of renewable energies. Hydropower in mountains, and wave, tidal and offshore wind energy along coasts are the best examples (the latter of course extends to islands). In addition, Outermost Regions are well-placed to generate solar energy (due to their position closer to the equator than the European mainland). In sparsely populated areas, there might not *per se* be a potential for a particular renewable energy source, but the long stretches of uninhabited land make the installation of large-scale wind parks easier than in densely populated areas, where inhabitants often raise protests against these installations. Besides, biomass is often an opportunity in SPAs, simply because wood (and other sources of biomass) have more space to grow undisturbed from human activity. For instance, biomass represents the main renewable resource for heating in Finland, Norway and Sweden.

The presence of an abundant natural resource does not necessarily translate into successful exploitation of that resource. In this sense the geographical specificity of the region may be counter-productive to the capitalisation of resources, i.e. geographic distance, cost to population ratio or limited available workforce. In many instances the resource is available, yet it is difficult and expensive to harvest the resource effectively (e.g. wind, sun), while in other cases the resource is inaccessible due to infrastructural or environmental barriers. Resource availability is also mediated by wealth and power. Inventorying resource availability is essential but the next step is to examine the social

mechanism that facilitates or hinders the ability to benefit from a resource on a national, local as well as individual level.

Optimising natural resources on offer in geographic specificities in the context of Europe 2020 strategy and its flagship initiative "resource efficient Europe" requires understanding of the resources and challenges. However these have to be seen in the context of geographic specificities as well; as those that maybe local and particular to just one area. Therefore initiatives and policy support require not only European level input but regional and local considerations. Exploiting existing resource can be detrimental to an area as the operations and environmental impacts of such undertakings may be in conflict with other local interest and activities. Policies promoting any exploitation of a natural resource have to consider social and ecological impacts and GEOSPECS areas are especially fragile in terms of such changes. Local stakeholder involvement is not only beneficial but essential in the policy making process as the extensive local knowledge base on the natural resource, the geography and the social workings of the specificity have to be incorporated and such involvement also provides access of the stakeholders to the decision making process furthering support of the local community to future changes.

6.2.8 Vulnerability of human-environment systems to climate change

Findings from the case studies generally confirm that climate change impacts and vulnerabilities are distributed unevenly across the regions of Europe. Roughly speaking, regions that are less advantaged in terms of economic development and growth potentials and facing serious development constraints already today appear to be more vulnerable in the future in comparison to the European average. The case study regions appear to blend in the larger picture of a prevailing core-periphery pattern and of a North-South and West-East gradient in vulnerability levels, as it has been ascertained in previous assessments (e.g., ESPON & IRPUD, 2011; European Environment Agency 2010f; European Environment Agency. Joint Research Centre. World Health Organization, 2008; DG REGIO, 2009; Alcamo et al., 2007). That large-scale distribution of vulnerability is to a considerable extent caused by factors that are not directly related to geographical specificities. These factors include: different strength and, sometimes, different direction of climate change signals due to different exposure, which depends mostly on geographic position within Europe; a traditionally higher importance of climate-sensitive sectors, in particular the primary production sector (agriculture), in the Mediterranean and Eastern and South-Eastern Europe, which is influenced by the predominating

Figure 64 Overall potential vulnerability to climate change according to the ESPON CLIMATE project (ESPON & IRPUD, 2011)

economic structure and the current transition state of the respective national economies; and by large-scale differences in adaptive capacity, which are to a large extent related also to the general development status of national economies, causing a North-South gradient similar to that of overall vulnerability. In many respects, the large-scale differences in these factors across Europe appear to act as a generic pattern driving differences in vulnerability across different categories of territories, causing different climate change sensitivities, impacts and vulnerabilities also across and within areas with geographic specificities. There is thus a considerable diversity of impacts and vulnerabilities also within the same GEOSPECS categories.

However, there also appear to be strong interrelations between the constituting geographic specificities of a number of GEOSPECS areas and their vulnerability to climate change. In particular, there are climate change impacts and vulnerabilities that are either rather specific to certain areas with geographic specificities or are more relevant to them than to other types of regions:

Coastal areas, including the coastal zones of islands and outermost regions, are particularly sensitive to effects caused by gradual sea level rise and by extreme sea events, such as coastal storm surges, coastal erosion, and local salinization of coastal aquifers, as well as to inundations of coastal zones caused by river floods. Combined with high concentrations of populations, infrastructure, economic activities and material assets in many parts of the European coastline, in particular along the British, German, French, Dutch, Belgian, North Italian and Norwegian coasts, this accounts for a high vulnerability of coastal areas, despite an often rather high adaptive capacity. In general, sea level rise adjusted extreme events will impact on all economic sectors and activities within coastal areas. Occurrence of damage events is expected to significantly impact on the entire economies of coastal regions, including knock-on social effects. Beach erosion and salinization of estuaries are expected to cause progressing loss of coastal habitats and their biodiversity. These impacts are a consequence of physical exposure to climate-driven hazards that are specifically linked to coastal areas and do not occur in any other geographical type of region. In addition, often high densities of population and physical structures make many coastal areas also vulnerable to a range of other climate change impacts, e.g. related to seasonal water scarcity and urban heat stress. As the case studies demonstrate, the impacts of climate change are often likely to exacerbate other existing stresses that are characteristic to coastal zone with intense human utilisation, such as land pressure, environmental pollution, and dependency of water supply on transfer from other regions, causing multiple-stress vulnerability situations. Although not all coastal areas

within Europe are equally vulnerable, the factor constellation described above makes many coastal areas vulnerability hot spots within Europe. The case study of the Belgian coast is a good example of an area at risk, with dense population and significant infrastructure in close proximity to the coastline.

Mountain areas are particularly vulnerable to specific impacts of climate change. Mountain areas have stronger exposure to climatic changes because temperature increase has been observed to be stronger in higher elevations. Meeting upon specific mountainous terrain features, many projected changes in climatic stimuli, including more winter precipitation in Northern and Central Europe, earlier beginning of snow melt, more frequent extreme weather events, permafrost thawing, and glacier ablation, will contribute to increase significantly natural hazard potentials. Besides higher flood risk in mountain valleys, settlements, infrastructure and populations in mountain areas will become increasingly vulnerable to mass movements triggered by climate change, such as debris flows, landslides, torrential processes, and rockfall. Expanding hazard zones are expected to restrict future spatial and economic development options. Against the background of a constantly increasing damage potential due to on-going land development for settlement and business purposes, an increasing frequency of hazard events is expected to cause a growth in damage costs and economic losses on an annual basis. Damage events could also negatively affect perceptions of safety and accessibility, thus reducing residential attractiveness and attractiveness for investors. While not being restricted to mountain areas as defined in the GEOSPECS project, these gravitational hazard processes are much more relevant in mountain areas than elsewhere. Obviously, a range of consequences related to glacier ablation and permafrost thawing, which include alteration of hydrological and run-off regimes in glacier-fed catchment areas, detrimental effects on hydropower generation, and increasing risk to settlements and infrastructure from destabilisation of mountain slopes due to permafrost degradation, are exclusively linked to high-elevation mountain areas.

The economy of many mountain areas, especially of the Alps, is strongly reliant on winter tourism. Decreasing snow reliability causes high vulnerability of the winter tourism sector, and in many locations its economic viability is severely threatened even in the short to medium term. As is demonstrated by some of the cases studies (e.g. the Tatra mountains and the West Stara Planina), this could cause the loss of development ambitions related to investments planned in the winter tourism industry.

Due to lack of other land use possibilities in rough mountainous terrain, forests tend to be the dominating land cover, and forestry an important economic sector, in many European mountain areas. This makes the

entire forest-wood production chain in mountain areas particularly vulnerable to adverse climate change impacts on ecological stability of forest ecosystems and on forest productivity, which are projected to occur throughout Central, Eastern and South Europe. Via impairment of the protective function of forests, destabilisation of forest ecosystems could have reinforcing feedback effects with natural hazard potentials.

Due to a higher natural hydropower production potential, hydropower generation is, in principle, more important in mountain areas than in other types of territories. Decreasing summer precipitation, more frequent and more extreme low water levels during summer and more frequent high run-off volumes after heavy precipitation events are projected to significantly decrease the hydropower production potential in European mountain regions, except in North Europe. Combined with increased sedimentation in high-alpine hydropower reservoirs and higher risks to energy supply infrastructure from natural hazards, this threatens continuity and reliability of energy supply in some mountain regions, in particular during summer, when energy demand for cooling purposes is expected to increase.

Mountains are among the regions richest in biodiversity in Europe. Due to a lack of re-dispersion opportunities, biodiversity in mountains is at the same time more vulnerable to climate change than in most other types of regions. Species communities in the highest elevation zones are most vulnerable.

In consequence of the range of mountain-specific impacts and their potential consequences on territorial development, it can be concluded that mountain areas in fact represent vulnerability hotspots within Europe.

A common characteristic of sparsely populated areas is the strong dependency of their economies on the primary sector and on the economic use of natural resources. Since agriculture and forestry are highly climate-sensitive sectors, as are the ecosystem services they capitalize on, this makes the economies of sparsely populated areas highly sensitive to climate change. However, it must be noted that this overall higher sensitivity does not automatically translate into higher economic vulnerability, because due to large-scale differences in exposure to climate change the agriculture and forestry sectors in Northern Europe could potentially benefit from climate change, while in the Mediterranean and in South-East Europe impacts will be strongly negative.

Almost all GEOSPECS areas have higher levels of biodiversity and, correspondingly, a higher share of protected areas than in the European average (cf. the transversal theme "biodiversity" in this report). Since it is assumed that any climatic change alters habitat conditions and affects their biotic communities (although they are not equally sensitive to climate change), it follows that biodiversity as such is highly vulnerable to

climate change, and that the biodiversity within GEOSPECS areas is more vulnerable than in other areas. At the same time, also the conservation objectives of the respective protected areas are at threat. In addition, a general lack of effective adaptation options available to mitigate the effects of climate change on species communities and ecosystems further increases their vulnerability.

Evidence provided by the case studies support the judgment that in sparsely populated areas, including the sparsely populated parts of mountains, islands, and outermost areas, the transport infrastructure and their functions for providing access to services of general interest are particularly vulnerable to damages and disruptions triggered by extreme weather events. While the usually sparse transport network in sparsely populated areas may not represent high material values in itself, what matters here is their vital importance as “life-links” for the rural population, i.e. for delivering essential goods and services to populations in scattered settlements, as well as their logistical function in regional economies that are often highly dependent on continuous export of natural resources. The greater the lack of redundancy in the transport infrastructure network, the potentially stronger the effects of service interruptions and loss of access are for the population affected. More frequent disruptions of accessibility hold the potential to decrease residential attractiveness, resulting in acceleration of existing depopulation trends. Climate-induced damages to the transport network can also have severe knock-on effects on businesses and regional economies, impacting also on perceptions of accessibility, reliability and safety of transport connectivity on the part of business investors, and thus on their willingness to invest in areas that are perceived as inaccessible. In disaster situations, even temporary loss of access to health, emergency, and disaster relief services can pose serious problems to remote settlements. Increasing maintenance and repair costs for damaged infrastructure can put an additional financial burden on economies that already have to face higher transport costs and higher costs for supplying services of general interest.

The increase in vulnerability of the transport infrastructure and the socio-economic functions it fulfils within sparsely populated areas illustrates that in many cases existing development constraints that are characteristic of GEOSPECS areas are exacerbated by climate change. Moreover, it emerges from the case studies that different kinds of climate change impacts can cause similar consequences in terms of reinforcing existing development challenges within and across GEOSPECS areas. For instance, on the one hand an increase in winter precipitation and heavy rainfall events is likely to increase the risk of damage to transport connections in the Scandinavian sparsely populated areas, reinforcing existing problems related to poor accessibility, high transport costs, and lower residential

attractiveness. On the other hand, the sparsely populated areas in the Mediterranean and the island areas of the Canary Islands and Sicily will be affected by severe drying trends and increasing water scarcity, causing bottlenecks in water supply to households and raising the need for desalination, which is likely to result in higher water prices, higher energy demand from external sources, and higher production costs for businesses. Though the climate-triggered causes are different between abovementioned types of territories, the effects may be comparable in so far as they tend to exacerbate existing socio-economic development constraints that are closely associated to their constituting geographic specificities.

Findings emerging from the case studies also demonstrate that climate change vulnerabilities may sometimes contest existing development ambitions. This is obvious for planned investments in the development of winter tourism infrastructure and regarding hydropower development schemes in mountain regions, whose feasibility and sustainability is threatened in the face of climate change. Also in rural areas prone to decreasing water availability, realisation of development opportunities related to natural assets such as development of renewable biomass energy sources or of eco-farming appears difficult to achieve against projected climate trends. In such cases, adaptation to climate change may require developing alternative and more sustainable future development paths.

Climate change can, on the other hand, also bring about new development opportunities. This is most evidently illustrated by summer tourism, which could in many European regions benefit from an extended tourist season, with mountain areas and more northerly regions gaining in touristic attractiveness in general, and with more traditional summer destinations in the Mediterranean potentially benefitting from a better balancing of touristic capacity utilisation over the year. However, these opportunities need to be exploited by developing alternative tourism offers, and within Europe there will be regions with a net gain and such with a net loss in overall touristic demand.

The levels of adaptive capacity show some marked commonalities and differences between the GEOSPECS categories. Although there is considerable diversity within the same categories, overall there is evidence that generic adaptive capacities of islands, outermost areas, sparsely populated areas, some mountain areas, and peripheral border regions tend to be lower than on the European average. Comparatively low generic adaptive capacity in these area types appears to reflect existing socio-economic difficulties and development constraints that are specific to these often less advantaged territories, such as isolation, distance to economic and governance centres, smallness of markets, and strong external dependencies in the case of outermost regions and

islands. On the contrary, the cross-border metropolitan regions are among the regions of Europe with the highest adaptive capacity, which is closely related to these areas being high income, knowledge-intensive, innovation-oriented economies. Coastal areas, in particular those densely inhabited, appear to also have high adaptive capacity, but due to strong climate change impacts they are still vulnerable. The examples of islands and sparsely populated areas show that some characteristics that are closely connected to their geographic specificities, such as a strong social capital arising from tight-knit communities, can actually increase some determinants of adaptive capacity. Interestingly, borders can both increase and decrease adaptive capacity, depending on whether the cross-border setting is being utilized as a stimulus for trans-boundary socio-economic development or rather acts as a constraint for cross-border cooperation, which may be due to historical, cultural and language barriers or to the EU external border security regime. A lack of trans-boundary cooperation can be particularly problematic for adaptation to climate change in cross-border regions if vulnerabilities vary largely on both sides of a cross-border corridor (ESPON & IRPUD, 2011).

Generally speaking, it becomes obvious that all policies that have a positive effect on regional economic growth and territorial and social cohesion should be beneficial also to improvement of adaptive capacity. However, since a high adaptive capacity does not automatically translate into effective adaptation to climate change, there is still a need to effectuate adaptive capacity via targeted adaptation strategies.

The full analysis of this transversal theme can be found in Annex 44.

References

- ABEGG, B. (2006). *Climate Change and Winter Tourism. OECD Report on Adaptation*. Presentation at the OECD Wengen 2006 Workshop 'Adaptation to the Impacts of Climate Change in the European Alps', 4th-6th October 2006, Wengen.
- ABS (2011). *Todos los mineros de Castilla y León están parados tras el ultimo ERE*.
URL : <http://www.abc.es/20110120/local-castilla-leon/abci-mineros-201101200946.html>
- ADE (2011). Study on the relevance and the effectiveness of ERDF and Cohesion Fund support to Regions with Specific Geographical Features – Islands, Mountainous and Sparsely Populated areas. Second Intermediate Report. Study coordinated by ADE.
URL: http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/eval2007/geographical_2nd_int_rep_castilla_la_mancha.pdf
- ADE (2012). *Study on the relevance and the effectiveness of ERDF and Cohesion Fund support to Regions with Specific Geographical Features – Islands, Mountainous and Sparsely Populated areas*. Final Report: Volume 1. Report prepared by ADE at the request of the European Commission. URL:
http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/eval2007/geographical_final1.pdf
- ADGER, W.N., AGRAWALA, S., MIRZA, M.M.Q., CONDE, C., O'BRIEN, K., PULHIN, J., PULWARTY, R., SMIT, B. & TAKAHASHI, K. (2007). *Assessment of adaptation practices, options, constraints and capacity. Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, pp. 717-743.
- ADGER, W.N., ARNELL, N.W., TOMPKINS, E.L. (2005). *Successful adaptation to climate change across scales*. In: *Global Environmental Change Part A*, vol. 15, no. 2, pp. 77-86.
- ADGER, W.N., KELLY, P.M. & NINH, N.H. (eds.) (2001). *Living with Environmental Change: Social Resilience. Adaptation and Vulnerability in Vietnam*. London, Routledge.
- AEM - EUROPEAN ASSOCIATION OF ELECTED REPRESENTATIVES FROM MOUNTAIN REGIONS (2009). *Position of the Executive Board on the Green Paper on Territorial Cohesion*. URL:
http://ec.europa.eu/regional_policy/archive/consultation/terco/pdf/4_organisation/86_aem_en.pdf
- AEMA - AGRUPACIÓN DE EMPRESAS MINERAS DE ARAGÓN - (2011). *Minería en Aragón*. URL: <http://www.aema-aragon.com/mineria.asp>
- ÅF-INFRASTRUCTURE AB (2010). *Supply of Raw Materials, Transport Needs and Economic Potential in Northern Europe*. Final Report. ÅF-Infrastructure AB/Infraplan. Report produced for the Swedish Ministry

- of Enterprise, Energy and Communicatians. URL:
<http://89.233.236.127/Barents/BARENTS100526.pdf>
- AGECAM - AGENCIA DE LA ENERGIA DE CASTILLA-LA MANCHA (2011).
Anuario Estadístico de Espana 2010. Capítulo 3. Educación. INE. URL :
<http://www.agecam.es/>
- AGECAM - AGENCIA DE GESTION DE LA ENERGIA DE CASTILLA-LA
 MANCHA (2002). *La biomasa en Castilla-La Mancha*. Junta de
 Comunidades de Castilla-La Mancha.
- AGHION, P. & HOWITT, P. (1998). *Endogenous Growth Theory*. MIT Press,
 Cambridge.
- AGRAWALA, S. & FANKHAUSER, S. (eds.) (2008). *Economic Aspects of
 Adaptation to Climate Change Costs, benefits and policy instruments*.
 OECD - Organisation for Economic Co-Operation and Development.
- AIROLDI, L. & BECK, M.W. (2007). Loss, Status and Trends for Coastal Marine Habitats of
 Europe. In: *Oceanography and Marine Biology: An Annual Review*, 45, pp. 345-405.
- AKADEMIE FÜR RAUMFORSCHUNG UND LANDESPLANUNG - ARL (1996).
*Planerische Zusammenarbeit und Raumentwicklung in tschechischen,
 slowakischen und deutschen Grenzregionen* (Planning cooperation
 and spatial development in Czech, Slovak and German border
 regions). ARL, Hannover.
- ALBERTO MORALEJO, S. & ROYO LASARTE, J. (coord.) (2007). *Comarca
 de las Cuencas mineras*. Colección Territorio 24. Comarcalización de
 Aragon Gobierno de Aragon.
- ALBRECHT, C. (2008). *Umweltindikatoren und Umweltqualitätsziele in
 Sachsen*. Vortrag auf der Projektwerkstatt „Umwelt- und
 Lebensqualitäten im Dreiländereck“, al. Lecture. Nov. 6, 2008 in
 IOER, Dresden.
- ALCAMO, J., MORENO, J.M., NOVÁKY, B., BINDI, M., COROBOV, R.,
 DEVOY, R.J.N., GIANNAKOPOULOS, C., MARTIN, E., OLESEN, J.E., &
 SHVIDENKO, A. (2007). *Europe. Climate Change 2007: Impacts,
 Adaptation and Vulnerability*. Contribution of Working Group II to the
 Fourth Assessment Report of the Intergovernmental Panel on Climate
 Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden
 and C.E. Hanson, Eds., Cambridge University Press, Cambridge, pp.
 541-580.
- ALLISON, I., BINDOFF, N.L., BINDSCHADLER, R.A., COX, P.M., de
 NOBLET, N., ENGLAND, M.H., FRANCIS, J.E., GRUBER, N., HAYWOOD,
 A.M., KAROLY, D.J., KASER, G., Le QUERE, C., LENTON, T.M., MANN,
 M.E., MCNEIL, B.I., PITMAN, A.J., RAHMSTORF, S., RIGNOT, E.,
 SCHELLNHUBER, A.J., SCHNEIDER, S.H., SHERWOOD, S.C.,
 SOMERVILLE, R.C.J., STEFFEN, K., STEIG, E.J., VISBECK, M.,
 WEAVER, A.J. (2009). *The Copenhagen Diagnosis, 2009: Updating the
 World on the Latest Climate Science*. Sydney, The University of New
 South Wales Climate Change Research Centre (CCRC), pp. 60.
- ALMEIDA, A. (2008). *ICT and sustainable development in an outermost
 region*. Thesis, Newcastle University.

- ALSTON, M. (2000). *Rural Policy in Australia- Time for a Rethink*. Presented at 'European Rural Policy at the Crossroads', 3 -7 July 2000, University of Aberdeen, Aberdeen.
- AMELUNG, B. & MORENO, A. (2009). *Impacts of climate change in tourism in Europe. PESETA-Tourism study JRC*, Scientific and Technical Reports. European Commission – Joint Research Centre Institute for Prospective Technological Studies.
- AMOS, W. & MANICA, A. (2006). Global genetic positioning: evidence for early human population centers in coastal habitats. In: PNAS, 103, 3, pp. 820–824.
- ANELLO, L. (2010). *Sicily, gobbler of EU funds*. Article on presseurop of 8 October 2010. URL: <http://www.presseurop.eu/en/content/article/356171-sicily-gobbler-eu-funds>
- ANGUS, S., HANSOM, J. & RENNIE, A. (2011). *Habitat change on Scotland's coasts*. In: Marrs, S.J., Foster, S., Hendrie, C., Mackey, E.C., & Thompson, D.B.A. (eds.) *The Changing Nature of Scotland*. TSO Scotland, Edinburgh, pp. 183-198.
- ANNETT, J.A., MACNULTY, D. & O'DRISCOLL, E. (2007). *The potential for growing marine leisure: A study establishing the scope & opportunities for expansion on the east coast of Ireland*. Irish Sea Marine Sector Marketing & Business Development Programme.
- ARBIA, G., BATTISTI, M. & DI VAIO, G. (2007). *Do Institutions Matter More Than Geography? Empirical Test of Spatial Growth Regressions for the Regions of Europe*. LLEE Working Document No. 57. URL: <http://ricerca.economiaefinanza.luiss.it/dptea/files/llwp57.pdf>
- ARMAROLI, N. & BALZANI, V. (2007). *The future of energy supply: challenges and opportunities*. In: *Angewandte Chemie International*, 46, pp. 52-56.
- ASENSIO, S. (2008). *La energía en la Comunidad Autónoma de Aragón: el Plan Energético 2005-2012*. URL : <http://www.camarazaragoza.com/medioambiente/docs/bibliocamara/documentobibliocamara276.pdf>
- ATTERTON, J. (2007). *The 'Strength of Weak Ties': Social Networking by Business Owners in the Highlands and Islands of Scotland*. *Sociologia Ruralis* 47, pp. 228-245.
- AUDRETSCH, D.B & KEILBACH, M. (2004). *Entrepreneurship and regional growth: an evolutionary interpretation*. In: *Journal of Evolutionary Economics*, 14 (5), pp. 605-616.
- AURROCOECHEA, I. & PETHICK, J.S. (1986). *The Coastline - Its Physical and Legal Definition*. In: *International Journal of Estuarine and Coastal Law*, 1(1), pp. 29-42.
- AZZOPARDI, R.M. (2011). *Lipari and the Impact of the European Social Fund*. Regional Studies Association Conference. URL: <http://www.regional-studies-assoc.ac.uk/events/2011/mar-slovenia/papers/Azzopardi.pdf>
- BACHEV, H. (2010). *State and Efficiency of Management of Agroecosystem Services - The Case of Bulgaria*. In: *Annals of the University of Petroşani, Economics*, 10(1) , pp. 5-28.

- BAILLY, A. (2000). *Geneva: Does Wealth Ensure Social Sustainability?* In: Polèse M., Stren R. (ed) *The social sustainability of cities: Diversity and the Management of Change*. University of Toronto Press, Scholarly Publishing Division, pp. 157-172.
- BALMASEDA, M., CADENAS, G., CUBERO, J., NIETO, E., PEREIRA, E. (2005). *Situacion Canarias*. BBVA, Service for Economic Studies. Bilbao, Spain.
- BALTZER, M., STROBEL, D. & VANCURA, V. (2009). *The Carpathian Mountains - The Wild Heart of Europe*. In: *International Journal of Wilderness*, Volume 15 number 1. URL: <http://ijw.org/wp-content/uploads/2009/12/Apr09-IJW-vol-15-no-1small.pdf#page=38>
- BANCA D'ITALIA (2010). *Economic Development in the Italian Regions*. Rome.
URL: http://www.bancaditalia.it/pubblicazioni/econo/ecore/2010/analisi_m/1085_economieregionali_2010/Economic-development-italian-regions-2009.pdf
- BANKS, M. (2011). *Regions 'crucial' to success of EU 2020 strategy*.
Online article of 13 December 2011 on TheParliament.com.
URL: <http://www.theparliament.com/latest-news/article/newsarticle/regions-crucial-to-success-of-eu-2020-strategy/>
- BANSE, J. & BIELAWSKA-ROEPKE, P. (2010). *Rozwój demograficzny i struktura gospodarcza w saksonsko-polskiej czesci "Zielonego Trójkąta Przygranicznego*. (Population development and economic structure in the Saxon Polish part of the Green triangle). In: ROCH, I. & KOBIELSKA, K. (eds.) *Trójkąt pogranicza niemiecko-polsko-czeskiego. Aspekty demograficzne, srodowiskowe i przestrzenne*. Wroclaw: Dolnoslaskie Centrum Rozwoju Lokalnego (DCRL), pp. 22-37.
- BANSE, J. & JERÁBEK, M. (2009). *Sozioökonomische Entwicklungsverläufe unter Berücksichtigung der Bevölkerungsentwicklung und des Arbeitsmarktes im sächsisch-böhmischen Teil des Grünen Dreiländerecks und der Euroregion Elbe-Labe* (Socio-economic development progress, taking into account population development and the labour market in the Saxon-Bohemian part of the Green Triangle and the Elbe Euroregion). In: *GEOSCAPE* vol. 4, Suppl., pp. 37-51.
- BANSE, J. & ROCH, I. (2010). *Sanierung und Entwicklung im deutsch-polnisch-tschechischen Dreiländereck - ein grenzübergreifendes Projekt* (Rehabilitation and development in the German-Polish-Czech Three Corners Area – A cross-border project). In: *GEOSCAPE* vol. 5, Suppl., pp. 67-76.
- BANSE, J. (2012a). *Wirtschaft im Dreiländereck*. In: LEIBNIZ INSTITUTE OF ECOLOGICAL URBAN AND REGIONAL DEVELOPMENT (IOER) Project 'Begrüntes Dreiländereck – Evaluation umweltschonender Sanierungs- und Entwicklungsprozesse im deutsch-polnisch-tschechischen Dreiländereck' (english title: Green Border Triangle – An Evaluation of Environmentally Benign Rehabilitation and Development Processes in the German-Polish-Czech Border Triangle), unpublished manuscript.

- BANSE, J. (2012b). *Bevölkerung und Wohnen*. In: LEIBNIZ INSTITUTE OF ECOLOGICAL URBAN AND REGIONAL DEVELOPMENT (IOER) Project 'Begrüntes Dreiländereck – Evaluation umweltschonender Sanierungs- und Entwicklungsprozesse im deutsch-polnisch-tschechischen Dreiländereck' (english title: Green Border Triangle – An Evaluation of Environmentally Benign Rehabilitation and Development Processes in the German-Polish-Czech Border Triangle), unpublished manuscript.
- BARBIER, E.B., HACKER, S.D., KENNEDY, C., KOCH, E.W., STIER, A.C. & SILLIMAN, B.R. (2011). *The value of estuarine and coastal ecosystem services*. In: Ecological Monographs 81, pp. 169–193.
- BARCA, F. (2009). *An Agenda for a Reformed Cohesion Policy. A place-based approach to meeting European Union challenges and expectations*. Independent Report prepared at the request of Danuta Hübner, Commissioner for Regional Policy. URL: http://www.eurada.org/site/files/Regional%20development/Barca_report.pdf
- BARILARO, C. (1992). *Problemi ambientali e sviluppo nell'area costiera megarese*. In: Atti del XXVI Congresso Geografico Italiano, Genoa.
- BARREDO, J.I. (2009). *Normalised flood losses in Europe: 1970–2006*. In: Natural Hazards and Earth System Sciences 9, pp. 97–104. European Commission – Joint Research Centre, Institute for Environment and Sustainability.
- BARRIOS et al. (2007). *Mapping the ICT in EU Regions*. IPTS, JRC scientific and technical reports.
- BASSO, C. & MATERA, F.V. *Development of Renewable Energy in Sicily*. Regione Sicilia. URL: http://www.regione.sicilia.it/industria/use/Documenti%20ufficiali%20energia/Internazionali/Development_renewable_energy_Sicily.pdf
- BAULUZ LAZARO, B. & SUBIAS PEREZ, I. (2007). *Los recursos minerales y energéticos*.
- BAULUZ, L.B. & SUBIAS PEREZ, I. (2007). *Los recursos minerales y energéticos*.
- BAUMOL, W.J. (2002). *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*. Princeton UP, Princeton NJ.
- BBC NEWS (2009). *Italy revives Sicily bridge plan*. Article on BBC online of 6 March 2009. URL: <http://news.bbc.co.uk/1/hi/7928949.stm>
- BBC NEWS (2009b). *MP's anger over Inverness's 'slowest' broadband*. BBC website on 25 November 2009. URL: http://news.bbc.co.uk/1/hi/scotland/highlands_and_islands/8378119.stm
- BCGE (2007). *Différences entre places financières genevoise et luxembourgeoise*. In: Les prévisions conjoncturelles 2008 de la BCGE. Geneva, BCGE.
- BEATTY, C., FOTHERGILL, S. & WILSON, I. (2008). *England's Seaside Towns: A 'Benchmarking' Study*. Centre for Regional Economic and Social Research, Sheffield Hallam University.

- BEČVÁR, J. (2008). *Darstellung des Verständnisses von Umweltqualität und relevanter Entwicklungsziele in Tschechien* (Presentation of an understanding of environment quality and relevant development goals in the Czech Republic), al. Lecture. Nov. 6, 2008 in IOER, Dresden.
- BEHRENS, K., GAIGNE, C., OTTAVIANO, G.I.P. & THISSE, J.F. (2006). *Is remoteness a locational disadvantage?* In: *Journal of Economic Geography* 6, pp. 347–368.
- BELFAST HARBOUR (2009). *Belfast harbour Annual Report and Accounts 2009*. Belfast Harbour.
- BELPAEME, K., KONINGS, P. & VANHOOREN, S. (2011). *The Coastal Atlas Flanders-Belgium*. The Coordination Centre for Integrated Coastal Zone Management, Oostende.
- BENISTON, M., KELLER, F. & GOYETTE, S. (2003). *Snow pack in the Swiss Alps under changing climatic conditions: an empirical approach for climate impact studies*. In: *Theor. Appl. Climatol.*, 74, pp. 19-31.
- BERNBAUM, E. (1998) *Sacred Mountains of the World*. University of California Press.
- BERNARDI, G., BUNEMAN, P., & MARINA, M. (2009). *Broadband for Rural Scotland: a white paper*. Edinburgh, Outcomes of the Tegola project.
- BERNDT, E.R. & MORRISON, C.J. (1995). *High-Tech Capital Formation and Economic Performance in U.S. Manufacturing Industries: An Exploratory Analysis*. In: *Journal of Econometrics* 65, pp. 9-53.
- BEVAN, M. & RHODES, D. (2005). *The Impact of Second and Holiday Homes on Rural Communities in Scotland*. Communities Scotland, Edinburgh.
- BEYER, E. (2005). *Chronology*. In: P. Oswalt (ed.), *Shrinking cities; volume 1: international research*. Ostfildern, Hatje Cantz Verlag, pp. 404 – 406.
- BIEL IBAÑEZ, P. (2009). *El paisaje minero en España como elemento de Desarrollo territorial*. In : APUNTES, vol 22 num1. 6-19.Enero-Junio. Bogotá, Colombia.
- BIELAWSKA-ROEPKE, P. (2007). *Informationen zur Umweltsituation in Polen*. Internal materials for the LEIBNIZ INSTITUTE OF ECOLOGICAL URBAN AND REGIONAL DEVELOPMENT (IOER) project 'Begrüntes Dreiländereck' (english title: Green Border Triangle), unpublished manuscript.
- BILGILI, M., YASAR, A. & SIMSEK, E. (2011). *Offshore wind power development in Europe and its comparison with onshore counterpart*. In: *Renewable and Sustainable Energy Reviews*, Vol. 15, Issue 2, pp. 905-915.
- BLACKPOOL COUNCIL (2006). *A Strategy for Blackpool's Visitor Economy*.
- BŁASZKÓW, P. (2008). *Darstellung des Verständnisses von Umweltqualität und relevanter Entwicklungsziele in Polen* (Presentation of an understanding of environment quality and

- relevant development goals in Poland), al. Lecture. Nov. 6, 2008 in IOER, Dresden.
- BNA (2008). *Verslag slotbijeenkomst Ontwerplab Krimp Parkstad Limburg*. KEI V-reeks, V48. Rotterdam / Amsterdam, KEI / BNA.
- BOGAERT, D., CLIQUET, A. & MAES, F. (2009). *Designation of marine protected areas in Belgium: A legal and ecological success?* In: *Marine Policy*, vol. 33, pp. 878-886.
- BÖHME, K., DOUCET, P., KOMORNICKI, T., ZAUCHA, J. & ŚWIĄTEK, D. (2011). *How to strengthen the territorial dimension of 'Europe 2020' and the EU Cohesion Policy*. Report based on the Territorial Agenda 2020, prepared at the request of the Polish Presidency of the Council of the European Union. Warsaw. URL: http://www.mrr.gov.pl/rozwoj_regionalny/Prezydencja/Documents/Background_report_territorial_dimension_of_EU2020_CP.pdf
- BÖHME, K., HANELL, T., PFLANZ, K., ZILLMER, S. & NIEMI, P. (2009). *ESPO Typology Compilation. Scientific Platform and Tools 2013/3/022*. ESPON Interim Report. European Union Publications, Brussels.
- BOKO, M., I. NIANG, A. NYONG, C. VOGEL, A. GITHEKO, M. MEDANY, B. OSMAN-ELASHA, R. TABO & P. YANDA (2007). *Africa. Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, pp. 433-467.
- BORDER MONITORING PROJECT UKRAINE (2010). *Access to Protection Denied: Refoulement of Refugees and Minors on the Eastern Borders of the EU – the case of Hungary, Slovakia and Ukraine*. Munich, BMPU.
- BORDERMONITORING UKRAINE (2009). *Go East! "European Neighbourhood Policy" and Frontex in Ukraine*. URL: <http://bordermonitoring-ukraine.eu/2009/12/12/go-east-european-neighbourhood-policy-and-frontex-in-the-ukraine/#more-22>
- BORJA, A. (2005). *The European water framework directive: A challenge for nearshore, coastal and continental shelf research*. In: *Continental Shelf Research*, 25 (14), pp. 1919–1923.
- BOSWORTH, B. & TRIPLETT, J. (2000). *What's New About the New Economy? IT, Economic Growth and Productivity*. Brookings Institution.
- BOTTIN, M. (1996). *La frontière de l'Etat. Approche historique et juridique*. In: *Sciences de la Société*, no. 37.
- BOUDOUX D'HAUTEFEUILLE, M. (2010). *La frontière et ses échelles : les enjeux d'un pont transfrontalier entre la Guyane française et le Brésil*. In : *Cybergeo : revue européenne de géographie* URL : <http://cybergeo.revues.org/23405>
- BRABANT, R., DEGRAER, S. & RUMES, B. (2011). *Offshore wind energy development in the Belgian part of the North Sea & anticipated*

- impacts: an update*. In: BRABANT, R., DEGRAER, S. & RUMES, B. (Eds.) Offshore wind farms in the Belgian part of the North Sea: Selected findings from the baseline and targeted monitoring. Royal Belgian Institute of Natural Sciences, Management Unit of the North Sea Mathematical Models. Marine ecosystem management unit. pp. 9-16.
- BRASEY-DUTHE, K. (2011). Interview with Karine Brasey-Duthé, Déléguée aux affaires extérieures, Service de l'économie, Neuchâtel, on 17 October 2011.
- BRATANOVA, S., & STOYANOV, N. (2009). *Republic of Bulgaria*. In: I. Willoughby, P. Balandier, N. S. Bentsen, N. McCarthy, & J. Claridge, Forest vegetation management in Europe: current practice and future requirements. Brussels, COST Office.
- BRECKMANN, O. (2007). *Hope in the North Atlantic - How the Faeroe Islands could inspire economic and cultural renewal in the Highlands and Islands*. Policy Institute Series: Rural No 3.
- BREITENMOSER, U., BREITENMOSER-WÜRSTEN, C., CAPT, S., MOLINARI-JOBIN, A., MOLINARI, P. & ZIMMERMANN, F. (2007). *Conservation of the lynx *Lynx lynx* in the Swiss Jura Mountains*. In: Wildlife Biology 13:4. URL: <http://www.wildlifebiology.com/Downloads/Article/680/En/breitenmoser%20et%20al.pdf>
- BRIDGE, G. (2009). *Natural Resources*. Elsevier Ltd.
- BRIDGEPROS (n.d.). *Strait of Messina Bridge Project*. Article on website Bridgepros.com. URL: http://bridgepros.com/projects/Strait_of_Messina_Bridge/
- BRIGHT, J.A., LANGSTON, R.H.W., PEARCE-HIGGINS, J.W., BULLMAN, R., EVANS, R. & GARDNER, S. (2008). *Spatial overlap of wind farms on peatland with sensitive areas for birds*. In: Mires and Peat, Volume 4, Article 07.
- BRIGUGLIO, L., CORDINA, G., FARRUGIA, N. & VELLA, S. (2008). *Economic Vulnerability and Resilience – Concepts and Measurements*. UNU-WIDER Research Paper No. 2008/55.
- BRIGUGLIO, L., CORDINA, G., FARRUGIA, N. & VELLA, S. (2009). *Economic Vulnerability and Resilience Concepts and Measurements*. Oxford Development Studies vol. 37 issue 3, pp. 229-249. URL: <http://www.tandfonline.com/doi/abs/10.1080/13600810903089893>
- BROGGIO, C. (1992). *Les enjeux d'une politique montagne pour l'Europe*. In : Revue de Géographie Alpine, 80, 4, pp. 26-39.
- BROGGIO, C. (2002). *La politique de la montagne en France*. In: *Hérodote*, 107, pp. 147-158.
- BROOKS, N. (2003). *Vulnerability, risk and adaptation: A conceptual framework*. Tyndall Centre Working Paper, no. 38.
- BROOKS, N., ADGER, W.N. & KELLY, M.P. (2005). *The determinants of vulnerability and adaptive capacity at the national level and the implications for adaptation*. Global Environmental Change Part A, vol. 15, no. 2, pp. 151-163.

- BROWN, P. (2011). Interview with Peter Brown, Outer Hebrides Tourism Industry Association.
- BRYDEN, D., WESTBROOK, S., BURNS, B., TAYLOR, W., & ANDERSON, S. (2010). *Assessing the economic impacts of nature based tourism in Scotland*. Scottish Natural Heritage Commissioned Report No. 398.
- BRYDEN, J. (2000). *Decline? What decline? A demographic revival is being observed in a number of rural areas*. LEADER Magazine nr.22. European Union Publications, Brussels.
- BUCCA, M. (2011). Interview with Marcella Bucca, Assistente dell'On.le Giovanni LA VIA; Deputato al Parlamento Europeo.
- BUEKER.NET (2011). *Railways through Europe. Map of Polish network*. Website maintained by Thorsten Bükler. URL: http://www.bueker.net/trainspotting/maps_poland.php
- BURNETT, K. A., & DANSON, M. (2004). *Adding or subtracting value? Constructions of rurality and Scottish quality food promotion*. In: International Journal of Entrepreneurial Behaviour & Research 10, pp. 384-403.
- BUSSADORI, V. (2005). *Territorial Cohesion and Spatial Planning*. AESOP, Vienna. URL: <http://aesop2005.scix.net/data/papers/att/291.fullTextPrint.pdf>
- BYROM, J., MEDWAY, D. & WARNABY, G. (2001). *Strategic Alternatives for Small Retail Businesses in Rural Areas: Evidence from the Southern Western Isles of Scotland*. Manchester Metropolitan University Business School Working Paper Series. URL: <http://www.ribm.mmu.ac.uk/wps/papers/01-05.pdf>
- C.P.M.R ISLANDS COMMISSION (2009). *Green Paper on Territorial Cohesion Submission*. URL: http://ec.europa.eu/regional_policy/archive/consultation/terco/pdf/4_organisation/94_cpnr_islands_en.pdf
- CAIRNGORMS NATIONAL PARK AUTHORITY (2010). *The Economic and Social Health of the Cairngorms National Park 2010*. Grantown-on-Spey, Cairngorms National Park Authority.
- CAIRNGORMS NATIONAL PARK AUTHORITY (2010a). *Cairngorms National Park Visitor Survey 2009/2010 – Summary*. Grantown-on-Spey, Cairngorms National Park Authority.
- CAIRNGORMS NATIONAL PARK AUTHORITY (2011). *Draft Cairngorms National Park Plan 2012-2017 - Strategic Environmental Assessment - Environmental Report*. Grantown-on-Spey, Cairngorms National Park Authority.
- CAIRNGORMS NATIONAL PARK AUTHORITY (2011a). *A Strategy and Action Plan for Sustainable Tourism 2011-2016*. Grantown-on-Spey, Cairngorms National Park Authority.
- CALLACI, G. (2007). *Sicily's rich heritage*. URL: <http://www.interreligiousinsight.org/April2007/April07Callaci.pdf>
- CAMARERO, L. & SAMPEDRO, R. (2008). *Porqué se van las mujeres? El continuum de movilidad como hipótesis explicativa de la*

- masculinización rural*. In : Revista Española de Investigaciones Sociológicas. nº124, 2008. pp. 73-105.
- CAMARERO, L., et al. (2009). *The rural population in Spain. From disequilibrium to social sustainability*. Social Studies Collection.Vol27. Fundació La Caixa. Barcelona, Spain.
- CAMILLONI, S. (2006). *Viminale: il 60% dei clandestini resta con il visto scaduto*. Article on Stranieri in Italia of 14 August 2006.
URL:<http://www.stranieriinitalia.it/news/viminale14ago2006.htm>
- CAMPBELL, N. (2011). Interview with Neil Campbell, Outer Hebrides Councillor.
- CAÑIZARES RUIZ, M.C. (2004). *Algunas iniciativas de turismo minero en Castilla-La Mancha*. In: Cuadernos Geográficos, 34 (2004-1), pp. 129-143.
- CARLISLE, M.A., GREEN, D.R. & RITCHIE, W. (Eds.) (2008). *Corepoint Expert Couplets & case studies: Descriptions of physical, ecological and socio-economic context and of area-specific Corepoint activities*. University of Aberdeen & COREPOINT.
- CARPENTIER, S. & GERBER, P. (2009). *Les déplacements domicile-travail: en voiture, en train ou à pied?* Luxembourg, CEPS/INSTEAD Vivre au Luxembourg 53.
- CARPENTIER, S. & LICHERON, J. (2010). *Des actifs résidents devenus frontaliers. Analyse d'un phénomène émergent*. Luxembourg, La note de l'Observatoire de l'Habitat 14.
- CARPENTIER, S. (ed). (2010). *La mobilité résidentielle transfrontalière entre le Luxembourg et ses régions voisines*. Luxembourg, Saint-Paul.
- CARTENSEN, J., HENRIKSEN, O.D. & TEILMANN, J. (2007). *Impacts on harbour porpoises from offshore wind farm construction: acoustic monitoring of echolocation activity using porpoise detectors (T-PODs)*. In: Marine Ecology Progress Series 321, pp. 295–308.
- CARVER, S., EVANS, A. & FRITZ, S. (2002). *Wilderness attribute mapping in the United Kingdom*. In: International Journal of Wilderness 8, pp. 24–29.
- CASALEGNO, S., AMATULLI, G., BASTRUP-BIRK, A. & DURRANT, T. (2007). *Modelling current and future distribution of European forest categories*. Proceedings of the 6th European Conference on Ecological Modelling: Challenges for ecological modeling in a changing world – global changes, sustainability and ecosystem based management. European Environment Agency.
- CASTELEIN, A., DINH, T.T.V., MEKOUAR, M.A. AND VILLENEUVE, A., (2006). *Mountains and the law: Emerging trends*. Legislative study 75, Revision 1. FAO, Rome.
- CASTELLS, M. (2002). *The Rise of the Network Society*. Blackwell, Oxford.
- CASTELLS, M. (2006). *Globalisation and Identity: A Comparative Perspective*. Barcelona. URL:
http://www.llull.cat/rec_transfer/webt1/transfer01_foc01.pdf

- CATANI, F. & KUKAVICIC, M. (2009). *Remote Sensing Analysis of Desertification trend in Eastern Sicily*.
- CATOVSKY, S., BELLAMY, O., BEYNON, E., DUNKLEY, M., KENNEDY, D., MCNAUGHT, L., THOMPSON, D., TOWERS, E. & WILSON, J. (2011b). *How well is Scotland preparing for Climate Change?* Prepared by the Adaptation Sub-Committee for the Scottish Government.
- CATOVSKY, S., BEYNON, E., DAVIES, S., LIPSON, M., PINDER, C., SURA, K., THOMPSON, D., & WARD, A. (2011a). *Adapting to climate change in the UK: Measuring progress*. United Kingdom, Adaptation Sub-Committee.
- CBD (2009). *Island Biodiversity – What’s the problem?* Text on the website of the Convention on Biological Diversity. URL: <http://www.cbd.int/island/problem/>
- CBS STATLINE (2010). *Regionale kerncijfers Nederland*. Heerlen / The Hague: CBS. URL: <http://statline.cbs.nl/StatWeb/publication>
- CEBRIAN, F. & CEBRIAN, A. (2000). *Los desequilibrios en la estructura urbana de Castilla-La Mancha*. In : Papeles de Geografía, 32. 2000. pp. 45-59.
- CENIA - CZECH ENVIRONMENTAL INFORMATION AGENCY (2007). *Report on the Environment in the Czech Republic*. CENIA, Prague. URL: [http://www.cenia.cz/web/www/web-pub-en.nsf/\\$pid/MZPMSFSP1PHE/\\$FILE/zprava_o_zp_cr_2007_souhrn_eng.pdf](http://www.cenia.cz/web/www/web-pub-en.nsf/$pid/MZPMSFSP1PHE/$FILE/zprava_o_zp_cr_2007_souhrn_eng.pdf)
- CENTRAL STATISTICAL OFFICE (POLAND) (2010). *Monitoring of socio-economic phenomena in border areas. The European Union’s external border in Poland*. URL: www.stat.gov.pl/cps/rde/xbcr/rzesz/ASSETS_informator_ANG.pdf
- CENTRAL STATISTICAL OFFICE (POLAND) (2011). *Border traffic and movement of goods and services at the external border of the European Union in Poland in 2010*. URL: www.stat.gov.pl/cps/rde/xbcr/gus/PUBL_pts_border_traffic_at_the_external_border_EU_2010.pdf
- CENTRO DE ESTUDIOS ECONOMICOS – FOUNDATION TOMILLO (2002). *Los costes de ultraperiferia de la economía canaria*. URL : http://www.gobcan.es/haciendacanaria/downloads/Revista2/RevistaHC_2_6_ULTRAPERIFERIA.pdf?q=jqmodal&go=&form=QBLH&width=100%&height=90%
- CHARLIER, R.H. (2011). *The Zwin: From Golden Inlet to Nature Reserve*. In: Journal of Coastal Research, vol. 27, Issue 4, pp. 746-756.
- CHARNEY, J. I. & ALEXANDER, L.M. (eds.) (1996). *International Maritime Boundaries*. Dordrecht.
- CHÉTELAT, J. & LEY, E. (2002). *Intégration des représentations sociales dans la gestion du paysage jurassien*. In: Cybergeog : European Journal of Geography, Environnement, Nature, Paysage, article 228. URL : <http://cybergeog.revues.org/2048>. Consulté le 29 août 2011
- CHETLEY, A. (Ed.) (2006). *Improving health, Connecting People: The Role of ICTs in the Health Sector of Developing Countries 2006*. infoDev program Grant no. 1254. URL: <http://www.asksourc.info/pdf/framework2.pdf>

- CHIFFELLE, F. (2000). *L'arc jurassien romand à la frontière des langues : faut-il craindre la germanisation?* Lausanne, Payot.
- ČHMÚ (Český hydrometeorologický ústav), WIOŚ (Wojewódzki Inspektorat Ochrony Środowiska), LfUG (Sächsisches Landesamt für Umwelt und Geologie) & UBA (Umweltbundesamt) (2003). *Joint report on air quality in the Tri-border region of the Czech Republic, Poland and Germany in 2002 (former Black Triangle region)*.
- CHRISTENSEN, O.B. & CHRISTENSEN, J.H. (2003). *Severe summertime flooding in Europe*. In: *Nature*, 421, pp. 805-806.
- CIPOLLA, G. (Ed.). *Arba Sicula: Journal of Sicilian Folklore and Literature*. URL: http://www.arbasicula.org/pdf/arba_sicula/30.pdf
- CIRELLI, C., MERCANTANTI, L. & PORTO, C.M. (2003). *Sustainable Development of Sicily East Coast Area*. 43rd Congress of the European Regional Science Association Jyväskylä (Finland). URL: <http://www.jyu.fi/ersa2003/cdrom/papers/346.pdf>
- CISCAR, J.C. (ed.) (2009). *Climate change impacts in Europe. Final report of the PESETA research project*. JRC Scientific and Technical Reports. European Commission – Joint Research Centre Institute for Prospective Technological Studies, Institute for Environment and Sustainability. URL: <http://ftp.jrc.es/EURdoc/JRC55391.pdf>
- CITY OF LONDON (2010). *The Global Financial Centres Index 7*. London, City of London.
- CLAEYS, P. & MANCA, F. (2009). *A Missing Spatial Link in Institutional Quality*. Working Papers 2009/11, Research Institute of Applied Economics. URL: http://www.ub.edu/irea/working_papers/2009/200911.pdf
- CLIQUET, A., KERVAREC, F., BOGAERT, D., MAES, F., QUEFFELEC, B. (2010). *Legitimacy issues in public participation in coastal decision making processes: Case studies from Belgium and France*. In: *Ocean & Coastal Management*, vol. 53, pp. 760-768.
- CLISP & EURAC (2011a). *Vulnerability Assessment*. WP4 Synthesis Report of the ETC Alpine Space project CLISP- Climate Change Adaptation by Spatial Planning in the Alpine Space.
- CLISP & EURAC (2011b). *Climate change scenarios for the Alps*. Annex D.3 of the WP4 Synthesis Report of the ETC Alpine Space project CLISP- Climate Change Adaptation by Spatial Planning in the Alpine Space.
- CLISP & EURAC (2011c). *Model Region Report South Tyrol*. European Academy of Bolzano, ETC Alpine Space project CLISP- Climate Change Adaptation by Spatial Planning in the Alpine Space.
- CLISP (2011a). *Final Results Print Publication of the ETC Alpine Space project CLISP – Climate Change Adaptation by Spatial Planning in the Alpine Space*. The CLISP Partnership. URL: www.clisp.eu
- CLISP (2011b). *Transnational Strategy for Climate Proof Spatial Planning*. The CLISP Partnership. ETC Alpine Space project CLISP- Climate Change Adaptation by Spatial Planning in the Alpine Space.

- COASE, R. (1960). *The Problem of Social Cost*. In: Journal of Law and Economics 3, pp. 1-44.
- COLL, J., GIBB, S. W., PRICE, M. F., MCCLATCHEY, J., & HARRISON, J. (2010). *Developing site scale projections of climate change in the Scottish Highlands*. In: Climate Research 45, pp. 71-85.
- COLLADO CUIRIEL, J.C. & MORENO TORRES, B. (2004). *Los costes de la ultraperiferia en Canarias: el coste público* (Costs of ultraperiphery in the Canary Islands : public costs). In: Hacienda Canaria, N^o. 7, Feb. 2004, pp. 5-45. URL: http://www.gobcan.es/haciendacanaria/downloads/Revista7/RevistaHC_7_1_ULTRAPERIFERIA.pdf?q=jqmodal&go=&form=QBLH&width=100%&height=90%
- COLLANTES, F., PINILLA, V., SAEZ, LA. & SILVESTRE, J. (2010). *El impacto demográfico de la inmigración en la España rural despoblada*. Documento de Trabajo. Real Instituto Elcano, Madrid.
- COLLIER, U., GAULT, A., KHARE-ZODGEKAR, S., MCNAUGHT, L., TOWERS, E. & WILSON, J. (2011). *The appropriateness of a Northern Ireland Climate Change Act*. Report prepared by the Committee on Climate Change.
- COMBES, P.P. (2000). *Economic Structure and Local Growth: France 1984 – 1993*. In: Journal of Urban Economics 47, pp. 329-355. URL: <http://web.cenet.org.cn/upfile/11531.pdf>
- COMHAIRLE NAN EILEAN SIAR (2000). *Western Isles Transitional Programme Strategy 2000-2006*. URL: <http://www.cne-siar.gov.uk/cxdir/strategiespolicies/witps/index.asp>
- COMHAIRLE NAN EILEAN SIAR (2010). *Outer Hebrides Fact Card*. URL: <http://www.cne-siar.gov.uk/factfile/documents/OHFactCards2010.pdf>
- COMHAIRLE NAN EILEAN SIAR (2010b). *Outer Hebrides Local Development Plan: Strategic Environmental Assessment, Environmental Report*. URL: <http://www.cne-siar.gov.uk/planningservice/documents/SEA-%20Env%20Report%20LDP.pdf>
- COMITE DE MASSIF DES PYRENEES (2009). *La Contribution De Politique Interrégionale a la Cohésion Territoriale du Massif des Pyrénées. Contribution au Débat sur le Livre Vert sur la Cohésion Territoriale*. URL : http://ec.europa.eu/regional_policy/archive/consultation/terco/pdf/4_organisation/82_massif_pyrenees_fr.pdf
- COMITE INTERMINISTERIEL DE CONTROLE DE L'IMMIGRATION (2012). *Les orientations de la politique de l'immigration en outre-mer de 2006 à 2011*. URL : <http://www.migrantsoutremer.org/Les-orientations-de-la-politique>
- COMMISSARIAT A L'AMENAGEMENT DU MASSIF DU JURA (2006). *Schéma interregional d'aménagement et de développement du Massif du Jura*. URL: http://territoires.rhonealpes.fr/IMG/pdf_JURA_20sch_C3_A9ma_20massif.pdf
- COMMISSARIO DELEGATO PER L'EMERGENZA BONIFICHE E LA TUTELA DELLE ACQUE IN SICILIA (2006). *Piano di Tutela delle Acque della Sicilia*. URL: http://www.regione.sicilia.it/arra/piano_acque/e/all_eiii.pdf
- CONFÉRENCE TRANSJURASSIENNE (2008). *Gestion intégrée des paysages sylvo-pastoraux de l'Arc Jurassien: MANUEL*. Projet cofinancé par

- Interreg. URL:
http://www.arcjurassien.ch/uploads/media/Manuel_de_gestion_integree.pdf
- CONFERENCE TRANSJURASSIENNE (2010). *Préparer une démarche de co-développement économique à l'échelle de l'Arc jurassien franco-suisse*. Etude réalisée dans le cadre du programme Interreg IV France-Suisse. URL: http://www.conference-transjurassienne.org/fileadmin/Docs_groupes_de_travail/Developpement_economique/150610_rapportfinal_CTJ_Vfinale.pdf
- CONFERENCE TRANSJURASSIENNE (2010a). *Schéma de cohérence des mobilités transfrontalières de l'Arc jurassien - Rapport de consultation*. Projet cofinancé par Interreg IV A France-Suisse 2007-2013. URL: http://www.conference-transjurassienne.org/fileadmin/Docs_groupes_de_travail/Transports/Rapport_consultation_schema_mobilite_221110.pdf
- CONRADT, S. & KUSS, H. (2000). *Die Luftqualität im Schwarzem Dreieck gemessen an den neuen europäischen Minderungsstrategien* (air quality in the black triangle, measured by the new European reduction strategies). In: OMKAS. Optimierung emissionsmindernder Maßnahmen bei gleichzeitiger Kontrolle der Aziditäts- und Luftschadstoffentwicklung für die Grenzregionen des Freistaates Sachsen (Optimizing emission reducing measures with simultaneous monitoring of acidity and air pollution developments in the border regions of the state of Saxony). Dresden, pp. 23-31.
- CONSEIL REGIONAL (2007). *PO FEDER 2007-2013*. URL : http://www.europe-guyane.eu/index.php?option=com_content&task=view&id=14&Itemid=206
- CONSEIL REGIONAL DE GUYANE (2000). *Schema Regional Des Transports*. URL: www.cr-guyane.fr/ressources/File/region_dyn/Etudes/SRT.pdf
- CONSOLI, M.T. (2006). *Migration phenomenon in Sicily*. Department of Sociology University of Catania. URL: http://www.huredepis.eu/assets/mymedia/pdf/Migration_phenomenon.pdf
- COSTANZA, R., D'ARGE, R., DE GROOT, R., FARBERK, S., GRASSO, M., HANNON, B., LIMBURG, K., NAEEM, S., O'NEILL, R., PARUELO, J., RASKIN, R., SUTTON, P., & VAN DEN BELT, M. (1997): The value of the world's ecosystem services and natural capital. In: NATURE, Vol 387. Pp. 253-260.
 URL: http://www.uvm.edu/giee/publications/Nature_Paper.pdf
- COOPER, J.A.G. (2009). *Coastal economies and people review*. In: Marine Climate Change Ecosystem Linkages Report Card 2009. Editors Baxter, J.M., Buckley, P.J. & Frost, M.T. Online science reviews.
- COPUS, A. & HÖRNSTRÖM, L. (eds.) (2011). *The New Rural Europe: Towards Rural Cohesion Policy*. NORDREGIO Report 2011:1. Nordregio, Stockholm.
- CORDINA, G. (2010). *Small Enterprises in Small States: A Case of Double Disadvantage?* Department of Economics, University of Malta. URL: <http://www.eesc.europa.eu/resources/docs/cordina-delivering-sme-policies-in-remote-areas-of-the-eu-07-05-2010.pdf>
- COREPOINT (2007). *EU legislation and policies with implications for coastal management*. Compiled as part of the Corepoint project.

- CORTES DE ARAGON (2000). *Plan Integral de Política Demográfica*. Boletín Oficial de las Cortes de Aragón.
- COSTA, L., TEKKEK, V. & KROPP, J. (2009). *Threat of Sea Level Rise: Costs and Benefits of Adaptation in European Union Coastal Countries*. In: *Journal of Coastal Research*, SI 56 (Proceedings of the 10th International Coastal Symposium). Lisbon. pp. 223-227.
- COUR DES COMPTES (2011). *Les flux migratoires irréguliers en Guyane, à Mayotte et à Saint-Martin. Rapport*.
URL : http://www.ccomptes.fr/fr/CC/documents/RPA/11_flux_migratoires_irreguliers_guyane_mayotte_saint_martin.pdf
- CPCFPU - CENTER FOR PEACE, CONVERSION AND FOREIGN POLICY OF UKRAINE (2008). *Expansion and Modernization of the Schengen: Consequences and perspectives for Ukraine*. Kiev.
- CRABTREE, B., MACDONALD, D., & HANLEY, N. (2002). *Non-market Benefits Associated with Mountain Regions*. Report for Highlands and Islands Enterprise and Scottish Natural Heritage.
- CRAIG, R. H. (2011). *The Value of the Air Bridge to the Islands*. *Scottish Geographical Journal* 127, pp. 61-78.
- CREEL, L. (2003). *Ripple effects: population and coastal regions*. Population Reference Bureau, Washington DC.
- CREVOISIER, O., & KEBIR, L. (2007). *Les ressources culturelles entre réseaux internationaux et développement local*. WORKING PAPER 6/2007-F . Groupe de recherche en économie territoriale (GRET). Institut de Sociologie , Université de Neuchâtel. URL : http://www.migration-population.ch/files/content/sites/socio/files/shared/documents/publications/workingpapers/wp_2007_06_f.pdf
- CREVOISIER, O., & KEBIR, L. (2008). *Cultural resources and regional development: the case of the cultural legacy of watchmaking*. In: Philip Cooke, Luciana Lazzeretti (eds): *Creative Cities, Cultural Clusters and Local Economic Development*. Edward Elgar Publishing, Cheltenham.
- CRISCIONE, L. (2007). *The Sicilian Language*. URL: <http://www.leoluca-criscione.net/HTM-DOCUMENTI/DIALetto-english%20version.htm>
- CROME, E. & FRANZKE, J. (1997). *Die DDR und Polen. Betrachtungen über das Verhältnis der Ostdeutschen zu den Polen* (the German Democratic Republic and Poland: observations on the relationship between East Germans and poles). In: *WeltTrends*, vol. 14, Spring 1997.
- CROSBIE, J. (2009). *Commission questions Italy's immigration policy*. Article on *EuropeanVoice.com* of 23.07.2009. URL: <http://www.europeanvoice.com/article/imported/commission-questions-italy-s-immigration-policy/65570.aspx>
- CROSSBORDER TORNEDALEN (2011). Homepage for Eures Crossborder Tornedalen and employment authorities in the North Calotte area. URL: <http://www.crossbordertornedalen.net/home>
- CROSSLAND, C.J., KREMER, H.H., LINDEBOOM, H.J., MARSHALL CROSSLAND, J.I. & LE TISSIER, M.D.A., (Ed.) (2005). *Coastal Fluxes*

- in the Anthropocene*. The Land–Ocean Interactions in the Coastal Zone Project of the International Geosphere–Biosphere Programme, Springer.
- CUMMINS, V., O'MAHONY, C. & CONNOLLY, N. (2004). *Review of Integrated Coastal Zone Management & Principals of Best Practice*. Prepared for the Heritage Council.
- CURRAN, S. & AGARDY, T. (2004). Considering migration and its effects on coastal ecosystems. In: Unruh, J.D., Krol, M.S. and Kliot, N. Editors , *Environmental Change and Its Implications for Population Migration*, Kluwer, pp. 201–229.
- CZECH STATISTICAL OFFICE (2009). *Population Projection of the CR up to 2065*. URL: www.czso.cz/eng/redakce.nsf/i/czech_demography_2009_vol_3
- DAJIĆ-STEVAŃOVIĆ, Z. (2010). *Biodiversity of Natural Grasslands of Serbia: State and Prospects of Utilization*. In: *Biotechnology in Animal Husbandry 26*, pp. 235-247.
- DAJIĆ-STEVAŃOVIĆ, Z., LAZAREVIĆ, D., PETROVIĆ, M., AĆIĆ, S., & TOMOVIĆ, G. (2010). *Biodiversity of Natural Grasslands of Serbia: State and Prospects of Utilization*. In: *Biotechnology in Animal Husbandry 26* , pp. 235-247.
- DALRADIAN RESOURCES INC. (2012). *Dalradian Acquires Additional Concessions Assembling Largest Exploration Holding in Europe*. News release 2012 – no 2. URL: http://www.dalradian.com/Theme/Dalradian/files/doc_news/DNA_NR_2012_No2_FIN_AL_Jan_25_2012.pdf
- DALTON, G.J. & LEWIS, T. (2011). *Metrics for measuring job creation by renewable energy technologies, using Ireland as a case study*. In: *Renewable and Sustainable Energy Reviews*, Vol.15, Issue 4, pp. 2123-2133.
- DAMSGAARD, O., LINDQVIST, M., ROTO, J. & STERLING, J. (2009). *Territorial potentials in the European Union*. Nordregio Working Paper 2009:6.
- DAS, M. & DE FEIJTER, H. (2009). *Wie komen en wie gaan?* In: J. Latten & S. Musterd (eds.). *De nieuwe groei heet krimp; een perspectief voor Parkstad Limburg*. The Hague, Nicis Institute, pp. 57 – 69.
- DATZIRA-MASIP, J. & JULIA-EGGERT, M. (2008). *Spain and Croatia: Traditional versus new markets for residential tourism*. In: Keller, P. and Bieger, T. (Editors) *Real Estate and Destination Development in Tourism - Successful Strategies and Instruments*. International Association of Scientific Experts in Tourism (AIEST). Berlin.
- DCENR - DEPARTMENT OF COMMUNICATIONS, ENERGY AND NATURAL RESOURCES (2011a). *Fourth Strategic Environmental Assessment for Oil and Gas Activity in Ireland's Offshore Waters: IOSEA4 Irish and Celtic Seas, Environmental Report*. Report prepared by Xodus Group and Aqua-Fact International Services Ltd.
- DCENR - DEPARTMENT OF COMMUNICATIONS, ENERGY AND NATURAL RESOURCES (2011b). *Fourth Strategic Environmental Assessment for Oil and Gas Activity in Ireland's Offshore Waters: IOSEA4 Irish and*

- Celtic Seas, Annex 4*. Report prepared by Xodus Group and Aqua-Fact International Services Ltd.
- DCENR - DEPARTMENT OF COMMUNICATIONS, ENERGY AND NATURAL RESOURCES (2011c). *Appropriate Assessment for IOSEA4: Irish and Celtic Seas*. Report prepared by Xodus Group.
- DE DECKER, P. (2011). *Not for the homeless? Housing policy in Flanders: between selectivity and legitimacy*. In: European Journal of Homelessness, vol. 5, Issue 2.
- DE RIJCK, K., & ERG, B. (2006). *High Nature Value farming in the Western Balkans*. Final report of Workshop on High Nature Value farming in the Western Balkans 2-3 February 2006, Belgrade.
- DE RUYCK, A.M.C., AMPE, C. & LANGOHR, R. (2001). *Management of the Belgian Coast: opinions and solutions*. In: Journal of Coastal Conservation, vol. 7, pp. 129-144.
- DEBARBIEUX, B. & RUDAZ, G. (2010). *Les faiseurs de montagne*. Paris, CNRS Editions.
- DECOVILLE, A., DURAND, F., SOHN, C. & WALTHER, O. (2010). *Spatial integration in European cross-border metropolitan regions: A comparative approach*. Luxembourg, CEPS/INSTEAD Working Papers 40.
- DECOVILLE, A., DURAND, F., SOHN, C. & WALTHER, O. (2010). *Spatial integration in European cross-border metropolitan regions: A comparative approach*. Luxembourg, CEPS/INSTEAD Working Papers 40.
- DEHLG - DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT (2007). *Ireland National Climate Change Strategy 2007 – 2012*. PRN: A7/0397.
- DELANEY, A., DE SMET, S. & VERHAEGHE, D. (2010). *Assessment of the status, development and diversification of fisheries-dependent communities: Oostende Case Study Report*.
- DEMOPOLIS (n.d.). *Orgogliosi di essere siciliani ma insoddisfatti dei servizi e della qualità della vita nell'Isola*. Website of Demopolis. URL: http://www.demopolis.it/newsfocussicilia.php?subaction=showfull&id=1257953167&archive=&start_from=&ucat=13,23&template=News&category=23&sortby=5&PHP_SELF=newsfocussicilia.php
- DERKS, W., HOVENS, P. & KLINKERS, L.E.M. (2006). *Structurele bevolkingsdaling; een urgente nieuwe invalshoek voor beleidsmakers*. The Hague, Raad voor Verkeer en Waterstaat & VROMRaad.
- DEVOS, K. (2008). *Numbers and population trends of waders along the Belgian North Sea coast*. In: BURTON, N.H.K., REHFISCH, M.M., STROUD, A. & SPRAY, C.J. (Eds). The European Non-Estuarine Coastal Waterbird Survey. International Wader Studies 18. International Wader Study Group, Thetford. pp. 5–11.
- DEVOY, R.J.N. (2008). *Coastal vulnerability and the implications of sea-level rise for Ireland*. In: Journal of Coastal Research 24(2), pp. 325-341.

- DG ENVIRONMNET (2011). *Analysis of Member States progress reports on Integrated Coastal Zone Management (ICZM). Final Report*. European Commission – DG Environment.
- DG REGIO (2009). *Regions 2020. The Climate Change Challenge for European Regions. Background Document to Comission Staff Working Document SEC(2008)2868 Final Regions 2020: An Assessment of future Challenges for EU Regions*. Brussels, Directorate General for Regional Policy.
- DI CRISTOFALO, A. & BARBA, L. *Sicilia: Verso una Perenne Siccita?* ITCGS Palermo.
- DI GIACINTO, V., NUZZO, G., *The Role of Institutional Factors in Fostering the Development of Industrial Districs in Italy*. Banca D'Italia Research Unit. URL: http://www.bancaditalia.it/studiricerche/convegni/atti/econ_loc/papers/digiacinto-nuzzo.pdf
- DIARIO ARAGONES (2011). *Alcaldes de Cuencas Mineras viajan a Bruselas para defender el sector del carbon*. URL : <http://www.diarioaragones.com/mediodia/19195-alcaldes-de-cuencas-mineras-viajan-a-bruselas-para-defender-el-sector-del-carbon.html>
- DICK, J., SMITH, R. & SCOTT, M. (2011). *Ecosystem services and associated concepts*. In: *Environmetrics 22*, pp. 598-607.
- DIJKSTRA, L. & POELMAN, H. (2011). *Regional typologies: a compilation*. Regional Focus no 01/2011, European Commission, DG REGIO, Brussels.
- DIOP, L. (2011). *Luxembourg : les marchés fonciers et immobiliers transfrontaliers à l'épreuve de la métropolisation*. CEPS /INSTEAD Working Papers 48.
- DIPARTIMENTO TRASPORTI E COMUNICAZIONI NELL'ASSESSORATO DEL TURISMO DELLE COMUNICAZIONI E DEI TRASPORTI (2002). *Piano Regionale dei Trasporti e della Mobilita*. URL: <http://www.regione.sicilia.it/turismo/trasporti/arcdocumenti/2002/pdirettore.pdf>
- DIPUTACION PROVINCIAL DE TERUEL (2007). *Geología y Paleontología*. Teruel, Patronato de Turismo. URL : <https://236ws.dpteruel.es/turismo>
- DOUVERE, F. & EHLER, C. (2008). *New perspectives on sea use management: Initial findings from European experience with marine spatial planning*. In: *Journal of Environmental Management 90(1)*, pp. 77-88.
- DOUVERE, F. (2005). *Socio-economic value of the human activities in the marine environment: The Belgian case*. In: MAES, F. *Marine resource damage assessment: liability and compensation for environmental damage*. Springer.
- DOUVERE, F. (2008). *The importance of marine spatial planning in advancing ecosystem-based sea use management*. In: *Marine Policy*, vol. 32, Issue 5, pp. 762-771.
- DOUVERE, F., MAES, F., VANHULLE, A. & SCHRIJVERS, J. (2007). *The role of marine spatial planning in sea use management: The Belgian case*. In: *Marine Policy*, vol. 31, Issue 2, pp. 182-191.

- DRAKE, R. (2010). Review of Lupo, Salvatore, *History of the Mafia*. H-Italy, H-Net Reviews. URL: <http://www.h-net.org/reviews/showrev.php?id=29352>
- DREWITT, A. L. & LANGSTON, R. H. W. (2006). *Assessing the impacts of wind farms on birds*. *Ibis*, 148, pp. 29–42.
- DRUKER, J. (2011). *The Czech Republic's "Roma Problem" Gets Educational*. Editor's blog on "Transitions online" on the EAST OF CENTER website. URL: <http://eastofcenter.tol.org/2011/01/the-czech-republics-roma-problem-gets-educational>
- DSM (2009a). *DSM; meer dan een eeuw evolutie*. Heerlen, DSM. URL: http://www.dsm.com/nl_NL/html/about/dsm_history.htm
- DSM (2009b). *Bedrijfsprofiel*. Heerlen, DSM. URL: http://www.dsm.com/nl_NL/html/about/dsm_company_profile.htm
- DUBLIN PORT COMPANY (2007). *Response by the Dublin Port Company to the Dublin City Council Dublin Bay Study*. Dublin Port Company.
- DUBOIS, A. & HEDSTRÖM, M. (2011). *Striving for Local Development – Brokering firm networks in the North of Europe*. Paper presented at the Regional Studies Association Annual International Conference, 17th – 20th April 2011, Newcastle upon Tyne, UK.
- DUDLEY, N. (2011). *A Transboundary Biosphere Reserve in the Carpathians*. Case Study prepared for IUCN. URL: <http://www.tbpa.net/page.php?ndx=57>
- DUDLEY, N. (Ed.) (2008). *Guidelines for Applying Protected Area Management Categories*. Gland, IUCN. URL: <http://data.iucn.org/dbtw-wpd/edocs/PAPS-016.pdf>
- DUMAIN, A. (2003). *Voyage ethnographique sur les Routes du Comté, des acteurs réunis pour la « fabrication » d'un fromage*. In : ethnographiques.org, Numéro 3. URL : <http://www.ethnographiques.org/2003/Dumain>
- DURA-GUIMERA, A. (2003). *Population deconcentration and social restructuring in Barcelona, a European Mediterranean city*. In: *Cities*, Vol. 20, No. 6, pp. 387–394.
- DUTHIE, D. (2011). Phone Interview with Dave Duthie, HITRANS, on 4 November 2011.
- DUTTA, K. (2010). *Marine energy projects approved for Scotland*. The Independent, 17 March 2010, London.
- DÜVELL, F. & VOLLMER, B. (2009). *Irregular Migration in and from the Neighbourhood of the EU. A comparison of Morocco, Turkey and Ukraine*. CLANDESTINO report. URL: http://irregular-migration.net/typo3_upload/groups/31/4.Background_Information/4.6.Link_library_InternalDocuments/Transit_report_COMPAS_Sept09.pdf
- EBRAHIM-ZADEH, C. (2003). *Back to Basics – Dutch Disease: Too much wealth managed unwisely*. Finance and Development, A quarterly magazine of the IMF, Volume 40, Number 1.
- ECON PÖYRY (2007). *The Expanding Bio-energy Market in the Nordic Countries – Possibilities and Consequences*. Econ Pöyry-Report no. 2007-091. URL: <http://www.bioenergypromotion.net/bsr/publications/the->

expanding-bio-energy-market-in-the-nordic-countries-2013-possibilities-and-consequences/at_download/document

- ECRE - EUROPEAN COUNCIL ON REFUGEES AND EXILES (2011). *ECRE Recommendations on the Occasion of the Polish Presidency of the EU*. URL: www.ecre.org/component/downloads/downloads/238.html
- EEA (2004). *Impacts of Europe's Changing Climate*. EEA Report no 2/2004, European Environment Agency, Copenhagen.
- EEA (2006). *The changing faces of Europe's coastal areas*. EEA Report No 6/2006. European Environment Agency, Copenhagen.
- EEA (2006b). *Vulnerability and adaptation to climate change*. EEA Technical Report no. 7/2005. European Environment Agency, Copenhagen.
- EEA (2007). *Climate Change: the cost of inaction and the cost of adaptation*, EEA Technical Report 13/2007. European Environment Agency, Copenhagen.
- EEA (2007b). *Marine and Coastal Environment*. In: Europe's environment – The Fourth Assessment. European Environment Agency, Copenhagen. URL: http://www.eea.europa.eu/publications/state_of_environment_report_2007_1/chapter5.pdf
- EEA (2009). *Regional climate change and adaptation – The Alps facing the challenge of changing water resources*. EEA Report No 8/2009. European Environment Agency, Copenhagen.
- EEA (2010). *Europe's ecological backbone: recognising the true value of our mountains*. EEA report No 6/2010. European Environment Agency, Copenhagen. URL: <http://www.eea.europa.eu/publications/europes-ecological-backbone>
- EEA (2010a). *10 messages for 2010: Coastal ecosystems*. European Environment Agency, Copenhagen. URL: <http://www.eea.europa.eu/highlights/europe2010s-coasts-reconciling-development-and-conservation>
- EEA (2010b). *10 messages for 2010: Mountain ecosystems*. European Environment Agency, Copenhagen. URL: <http://www.eea.europa.eu/publications/10-messages-for-2010-mountain-ecosystems>
- EEA (2010c). *10 messages for 2010: Forest ecosystems*. European Environment Agency, Copenhagen. URL: <http://www.eea.europa.eu/publications/10-messages-for-2010-2014-3>
- EEA (2010d). *Marine and coastal environment – SOER 2010 thematic assessment*. The European Environment: State and Outlook 2010. European Environment Agency, Copenhagen. URL: <http://www.eea.europa.eu/soer/europe/marine-and-coastal-environment>
- EEA (2010f). *The European Environment. State and outlook 2010: Adapting to climate change*. European Environment Agency, Copenhagen.
- EEA (2010g). *The European Environment. State and outlook 2010: Understanding climate change*. Copenhagen, European Environment Agency.

- EEA (2010h). *The territorial dimension of environmental sustainability – Potential territorial indicators to support the environmental dimension of territorial cohesion*. Technical report No 9/2010.
- EEA (2012). *National Adaptation Strategies*. URL: <http://www.eea.europa.eu/themes/climate/national-adaptation-strategies>, last accessed on March 19th 2012
- EEA, JRC, WHO (2008). *Impacts of Europe`s changing climate – 2008 indicator-based assessment*. EEA Report, 4/2008, JRC Reference Report JRC47756. Joint EEA-JRC-WHO report. Copenhagen, European Environment Agency.
- EFNCP, E. F. (2011). *Fading glory of the Western Stara Planina`s grasslands*. URL : <http://www.efncp.org/hnv-showcases/bulgaria/western-stara-planina/facts-and-figures/>
- EHLER, C. & DOUVERE, F. (2009). *Marine Spatial Planning: A Step-by-Step Approach Toward Ecosystem-based Management*. Intergovernmental Oceanographic Commission. Manual and Guides No. 53, ICAM Dossier No. 6.
- EJEDEMO, T. & SÖDERHOLM, P. (2011). *Mining investment and regional development: A scenario-based assessment for Northern Sweden*. In: Resources Policy, 36 (2011), pp. 14–21.
- EL MUNDO (2011). *Encierro en todas las cuencas mineras de Castilla y León por el futuro del sector*. 2011-02-02. URL : <http://www.elmundo.es/elmundo/2011/02/02/leon/1296673433.html>
- EL NORTE DE CASTILLA (2011). *Las mineras de Castilla y León no podrán pagar las nóminas en septiembre ni mantener la producción en 2011 "sin ayudas"*. 2010 -07-26. URL : <http://www.elnortedecastilla.es/20100726/economia/mineras-castilla-leon-podran-201007262020.html>
- ELZERMAN, K. (2010). *A future with shrinkage. What is a suitable policy response to shrinkage?* Master Thesis, Faculty of Social and Behavioural Sciences, University of Amsterdam.
- ENAUX, C. & GERBER, P. (2008). *Les déterminants de la représentation transnationale du bassin de vie. Une approche fondée sur l`attachement au lieu des frontaliers luxembourgeois*. In: Revue d`Économie Régionale et Urbaine 5, pp. 725-752.
- ENERGIAS RENOVABLES EN ARAGON (2008). URL : <http://www.crea.es/economia/pdf/Energias%20Renovables%20en%20Aragon.pdf>
- EREN - ENTE REGIONAL DE LA ENERGIA CASTILLA Y LEON (2011). Portal del EREN. URL : <http://www.eren.jcyl.es/>
- ERNST, D. & FAGERBERG, J. & HILDRUM, J. (2002). *Do Global Production Networks and Digital Information Systems Make Knowledge Spatially Fluid?* Economics Study Area Working Papers 43, East-West Center, Economics Study Area.
- ESCALONA-ORCAO, A.I. & DÍEZ-CORNAGO, C., (2007). *Accessibility to basic services in one of the most sparsely populated areas in Europe: the province of Teruel (Spain)*. In: Area, (2007) 39.3, pp. 295–309.

- ESCHMANN, P. & GIRARDIN, F. (2011). Interview with Patrice Eschmann and Francis Girardin, Domaine Forêts, Office de l'environnement, Republique et canton du Jura, on 28 September 2011.
- ESHA (European Small Hydropower Association) (2005): State of the art of small hydropower in EU-25. European Small Hydropower Association, Brussels.
- ESPACE CULTUREL GRANDE RÉGION (2011). *Coopération transfrontalière – l'association espace culturel Grande Région*. URL : <http://www.espaceculturelgr-kulturraumgr.plurio.net>
- ESPERE CLIMATE ENCYCLOPEDIA (2003). *Climate in Cities – Areas endangered by air pollution*. URL: <http://www.atmosphere.mpg.de/enid/3ou.html>
- ESPON & IRPUD (2011). *ESPON Climate – Climate Change and Territorial Effects on Regions and Economies*. Applied Research 2013/1/4. Final Report. Scientific Report. TU Dortmund University.
URL: http://www.espon.eu/export/sites/default/Documents/Projects/AppliedResearch/CLIMATE/ESPON_Climate_Final_Report-Part_C-ScientificReport.pdf
- ESPON (2006). *ESPON Atlas—Mapping the Structure of the European Territory*. Bundesamt für Bauwesen und Raumordnung, Bonn.
- ESPON ATTREG (2010). *The Attractiveness of European Regions and Cities for Residents and Visitors – Interim Report*. ESPON, Luxembourg.
URL: http://www.espon.eu/export/sites/default/Documents/Projects/AppliedResearch/ATTREG/ATTREG_Interim_report_Dec_2010-case_studies.pdf
- ESPON CLIMATE (2010). *Climate Change and Territorial Effects on Regions and Local Economies. Revised Interim Report: Annexes*. GREIVING, S. et al. Dortmund, TU Dortmund University.
- ESPON METROBORDER (2010). *METROBORDER. Cross-border Polycentric Metropolitan Regions. Final Report*. ESPON, Luxembourg.
- ESPON PROJECT 1.2.1. (2004). *Transport services and networks: territorial trends and basic supply of infrastructure for territorial cohesion. Final report for ESPON project 1.2.1*. ESPON, Luxembourg.
- ESPON PROJECT 1.2.2 (2004). *Telecommunication Services and Networks: Territorial Trends and Basic Supply of Infrastructure for Territorial Cohesion. Final Report*. ESPON, Luxembourg.
- ESPON PROJECT 1.2.3 (2007). *Identification of Spatially Relevant Aspects of the Information Society. Final Report*. ESPON, Luxembourg.
- ESPON PROJECT 3.2 (2007). *Scenarios on the territorial future of Europe. ESPON Project 3.2*. ESPON, Luxembourg.
- ESPON TEDI (2010). *Territorial Diversity (TeDi). Final Report*. ESPON, Luxembourg. URL: http://www.espon.eu/export/sites/default/Documents/Projects/TargetedAnalyses/ESPONTEDI/TeDi_Final_Report-14-05-2010.pdf
- ESPON-INTERACT (2007). *Cross-border co-operation – Cross-Thematic Study of INTERREG and ESPON activities*. KTH - Royal Institute of Technology, Stockholm. Esch-sur-Alzette and Viborg: ESPON Coordination Unit and INTERACT Point Qualification & Transfer.

- ESRI (2006). ArcGIS 9.2. Environmental Systems research, Redlands.
- EUDIMENSIONS (2009). *Polish-Ukrainian Case Study*. URL: <http://www.eudimensions.eu/>
- EURAQUA (2008). Euraqua homepage. URL: <http://www.euraqua.org/content/whatiseuraqua.4.4a4d22a41128e56161b800012068.html>
- EURISLES (1996). *Los sistemas de transporte en las islas*. Edition l'Harmattan.
- EUROMARC EUROPEAN MOUNTAIN AGROFOOD PRODUCTS, RETAILING AND CONSUMERS (2007). *Report on theoretical and methodological framework of the retailing surveys*.
- EUROMARC EUROPEAN MOUNTAIN AGROFOOD PRODUCTS, RETAILING AND CONSUMERS. (2009). *Report on the perception of mountain quality-food products by consumers*.
- EUROMONTANA (2009). *The Green Paper on Territorial Cohesion 'Turning territorial diversity into strength' - Response to consultation*. URL: http://ec.europa.eu/regional_policy/archive/consultation/terco/pdf/4_organisation/114_euromontana_en.pdf
- EUROPEAN CENTRE FOR INTEGRATION AND SELF-GOVERNMENT CO-OPERATION (2008). *Polish-Ukrainian cross-border co-operation strategy for year 2007-2015*. Lublin.
- EUROPEAN COMMISSION (2010). *Investing in Europe's future - Fifth report on economic, social and territorial cohesion*. URL: http://ec.europa.eu/regional_policy/sources/docoffic/official/reports/cohesion5/pdf/5cr_en.pdf
- EUROPEAN COMMISSION (1996). *Living and working in the information society: people first, Green Paper*. Luxembourg, Office for Official Publications of the European Communities.
- EUROPEAN COMMISSION (1999). *Lessons from the European Commission's Demonstration Programme on Integrated Coastal Zone Management (ICZM)*. European Union Publications, Brussels.
- EUROPEAN COMMISSION (2000). *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 Establishing a Framework for Community Action in the Field of Water Policy*. Brussels, European Commission.
- EUROPEAN COMMISSION (2003a). *Analysis of the Island Regions and the Outermost Regions of the E.U. Part II: The Outermost Regions*. Report for the Commission (DG-Regional Policy). Planistat Europe and Bradley Dunbar Associates. Brussels. URL: http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/ilesrup/islands_part2_summary_en.pdf
- EUROPEAN COMMISSION (2005a). *i2010 – A European Information Society for Growth and Employment*, COM (2005) 229 final, Brussels.
- EUROPEAN COMMISSION (2006). *Regulation (EC) No 1931/2006 of the European Parliament and of the Council of 20 December 2006 laying down rules on local border traffic at the external land borders of the*

Member States and amending the provisions of the Schengen Convention.

EUROPEAN COMMISSION (2007). *An Integrated Maritime Policy for the European Union*. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2007)575 final.

EUROPEAN COMMISSION (2007b). *Study on Availability of Access to Computer Networks in Rural Areas*. DG for Agriculture & rural development, Contract No: 30-CE-0099278/00-78, Final Report.

EUROPEAN COMMISSION (2008). *Regions 2020. An Assessment of Future Challenges for EU Regions*. Commission Staff Working Document.
URL:
http://ec.europa.eu/regional_policy/sources/docoffic/working/regions2020/pdf/regions2020_en.pdf

EUROPEAN COMMISSION (2008b). *Directive 2008/56/EC of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)*.

EUROPEAN COMMISSION (2009). *Territorial Cohesion: unleashing the territorial potential*. Background Document to the Conference on Cohesion Policy and Territorial Development: Make Use of the Territorial Potential on 10-11 December 2009, Kiruna, Sweden. URL:
http://ec.europa.eu/regional_policy/archive/consultation/terco/kiruna_20091211.pdf

EUROPEAN COMMISSION (2009a). *WHITE PAPER Adapting to climate change: Towards a European framework for action*. COM (2009) 147 final.

EUROPEAN COMMISSION (2009b). *Climate Change and Water, Coasts and Marine Issues*. Commission Staff working document accompanying the WHITE PAPER Adapting to climate change: Towards a European framework for action. COM(2009) 147 final.

EUROPEAN COMMISSION (2009d). *The economics of climate change adaptation in EU coastal areas: Belgium*. European Commission, Brussels. URL:
http://ec.europa.eu/maritimeaffairs/documentation/studies/documents/belgium_climate_change_en.pdf

EUROPEAN COMMISSION (2009g). *Scientific Report on the Mobility of Cross-border Workers within the EU-27/EEA/EFTA Countries*. Final Report, DG Employment and Social Affairs. Munic/Sopron.

EUROPEAN COMMISSION (2010a). *EUROPE 2020: A strategy for smart, sustainable and inclusive growth*. Commission Staff Working Document, COM(2010) 2020. Brussels, European Commission.

EUROPEAN COMMISSION (2010b). *Open call for proposals in the framework of the Preparatory Action 'BEST' (Voluntary scheme for Biodiversity and Ecosystem Services in Territories of the EU Outermost Regions and Overseas Countries and Territories)*. URL:
<http://ec.europa.eu/environment/funding/pdf/best/Call.pdf>

EUROPEAN COMMISSION (2010c). *Energy 2020 – A strategy for competitive, sustainable and secure energy*. Communication from the

- Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels.
- EUROPEAN COMMISSION (2010e). *Europe's Digital Competitiveness Report*, SEC(2010) 627, Brussels.
- EUROPEAN COMMISSION (2011). *Guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones with particular attention to port development and dredging*. URL: http://ec.europa.eu/transport/maritime/doc/guidance_doc.pdf
- EUROPEAN COMMISSION (2011a). *Second report on the implementation and functioning of the local border traffic regime set up by Regulation No 1931/2006*, COM(2011) 47 final, Brussels, 9.2.2011.
- EUROPEAN COMMISSION (2011b). *Roadmap to a resource-efficient Europe*. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels.
- EUROPEAN COMMISSION (2011c). *A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy*. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels.
- EUROPEAN COMMISSION (2011d). *Implementation of the European Neighbourhood Policy in 2010, Country Report on: Ukraine*. Joint Staff Working Paper. Brussels, 25/05/2011.
- EUROPEAN PARLIAMENT (1997). *Les travailleurs frontaliers dans l'Union Européenne*. Série Affaires Sociales W 16 - 5/1997. Luxembourg.
- EUROREGION "STARA PLANINA". (2007). *Strategy for Development of Euroregion Stara Planina 2008 – 2013*.
- EUROREGION KARPACKI (n.d.). *Tatra National Park*. Website of the Carpathian Euroregion. URL: http://www.karpacki.eu/english_tatry.html
- EUROSION (2004). *Living with coastal erosion in Europe: Sediment and Space for Sustainability. PART II – Maps and statistics*. Service contract B4-3301/2001/329175/MAR/B3. "Coastal erosion – Evaluation of the need for action" Directorate General Environment, European Commission.
- EUROSION (2004). *Living with coastal erosion in Europe: Sediment and Space for Sustainability. PART II – Maps and statistics*. Service contract B4-3301/2001/329175/MAR/B3. "Coastal erosion – Evaluation of the need for action", Directorate General Environment, European Commission, Brussels.
- EUROSTAT (2009). *Nearly half of the population of EU countries with a sea border is located in coastal regions, Statistics in Focus: Agriculture and Fisheries*. 47/2009. European Commission.
- EUROSTAT (2010). *Portrait of EU coastal regions, Statistics in Focus: Agriculture and Fisheries*. 38/2010. European Commission.

- EUROSTAT (2011). *Trends in densely and thinly populated areas*. Eurostat regional yearbook 2011.
- EUROSTAT (2011b). *Euro area unemployment rate at 10.0%*. News release 124/2011. URL: http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/3-31082011-BP/EN/3-31082011-BP-EN.PDF
- EUROSTAT (2012). *Database: National air passenger transport by reporting country*. URL: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=avia_panc&lang=e
- EVAN, P.G.H (2007). *Proceedings of the ASCOBANS/ECS Workshop Off shore Windfarms and Marine Mammals: Impacts and Methodologies for Assessing Impacts*. (Editor Evans, P.G.H) ECS Special Publication Series No. 49. Feb 2008.
- EXPEDITIONGREENTHORN.COM (2011). *Border crossings*. URL: http://2011.expeditiongreenthorn.com/Border_crossings
- FÁILTE IRELAND (2007). *Tourism and the Environment. Fáilte Ireland's Environmental Action Plan 2007-2009*. Fáilte Ireland – National Tourism Development Authority.
- FALUDI, A. & PEYRONY, J. (2011). *Cohesion Policy Contributing to Territorial Cohesion – Future Scenarios*. In: European Journal of Spatial Development. Article no. 43.
- FALUDI, A. (2009). *Territorial Cohesion under the Looking Glass: Synthesis paper about the history of the concept and policy background to territorial cohesion*. European Commission - Regional Policy – Inforegio. URL: http://ec.europa.eu/regional_policy/consultation/terco/pdf/lookingglass.pdf
- FALUDI, A. (2011). *Multi-level (Territorial) Governance: Three Criticisms*. Paper published on the online platform CoesioNet. URL: <http://www.sciencespo.fr/coesionet/sites/default/files/Faludi%20-%20Multi-level%20%28Territorial%29%20Governance%20-%20Three%20Criticisms.pdf>
- FARMER, J. (2007). *Connected care in a fragmented world: lessons from rural health care*. In: British Journal of General Practice 57(536), pp. 225–230.
- FARRINGTON, J. & FARRINGTON, C. (2005). *Rural accessibility, social inclusion and social justice. Towards conceptualization*. In: Journal of Transport Geography, 13, pp. 1-12.
- FAZIO, A. (2002). *Culture and the Development of Southern Italy*. University of Catania. URL: http://www.bancaditalia.it/interventi/integov/2002/catania/en_fazio_14_12_02.pdf
- FEYEN, L. & DANKERS, R. (2009). *The impact of global warming on streamflow drought in Europe*. In: Journal of Geophysical Research 114.
- FINDLAY, G. (2011). Interview with Gayle Findlay, Outer Hebrides Community Planning Partnership.
- FINNISH COMMUNICATIONS REGULATORY AUTHORITY (2011). *Broadband project ensures fast network connection also to sparsely-populated areas*. Article on the website of the Finnish Communications Regulatory Authority. URL:

<http://www.viestintavirasto.fi/en/index/internet/laajakaista/laajakaista2015-hanke.html>

- FISHERIES RESEARCH SERVICES (2003). *The Changing Abundance of Spring Salmon*. FRS Freshwater Laboratory, Faskally. URL: <http://www.riverdee.org.uk/FileLibrary/Content/Publications/CS2.pdf>
- FISHERIES SCIENCE SERVICE (2005). *Biologically Sensitive Area. Assessing, researching and advising on the sustainable exploitation of living marine resources in a healthy ecosystem*. Marine Institute.
- FLEMISH GOVERNMENT (2010). *Policy Paper 2009-2014: Tourism*. Flemish Authorities. URL: http://iv.vlaanderen.be/nlapps/data/docattachments/policypaper_tourism_09-14.pdf
- FLØYSAND, A. & SJØHOLT, P. (2007). *Rural development and embeddedness: the importance of human relations for industrial restructuring in rural areas*. In: *Sociologia Ruralis*, Vol. 47:3, pp. 205-227.
- FOCUS MIGRATION (2010). *Länderprofil Tschechien*. (Country profile of the Czech Republic). Online information portal "Migration-info.de" maintained by Netzwerk Migration in Europa and Bundeszentrale für Politische Bildung. URL: http://www.migration-info.de/mub_artikel.php?Id=040203
- FOCUS MIGRATION (2010a). *Länderprofil Polen*. (Country profile of Poland). Online information portal "Migration-info.de" maintained by Netzwerk Migration in Europa and Bundeszentrale für Politische Bildung. URL: http://www.focus-migration.de/Polen_Update_02_200.2810.0.html
- FONTAINE, C.M. & ROUNSEVELL, M.D.A. (2009). *An agent-based approach to model future residential pressure on a regional landscape*. In: *Landscape Ecology*, 24, pp. 1237-1254.
- FORTE, A., ORAM, R.D. & PEDERSEN, F. (2005). *Viking Empires*. Cambridge University Press.
- FORUM FOR RENEWABLE ENERGY DEVELOPMENT IN SCOTLAND (2009). *Marine Energy Road Map*.
- FRASER OF ALLANDER INSTITUTE, UNIVERSITY OF STRATHCLYDE, THE MACAULAY LAND USE RESEARCH INSTITUTE AND THE ARKLETON CENTRE FOR RURAL DEVELOPMENT RESEARCH, UNIVERSITY OF ABERDEEN (2003). *Economic Impact of the 2001 Foot and Mouth Disease Outbreak in Scotland: Final Report*. Fraser of Allander Institute, Glasgow.
- FRENCH, P.W. (1997). *Coastal and Estuarine Management*. Routledge, London.
- FRIEDEWALD, M. (Ed.) (2004). *Benchmarking national and regional policies in support of the competitiveness of the ICT sector in the EU*. Fraunhofer Institute Systems and Innovation Research, Louis Lengrand & Associés, TNO, Paper prepared for European Commission.
- FRIEDMAN, T.L. (2005). *The World is Flat. A Brief History of the Twenty-First Century*. Farrar, Strauss and Giroux, New York.

- FRONTEX (2011). *Annual Risk Analysis 2011*. Warsaw. URL: www.frontex.europa.eu/download/Z2Z4L2Zyb250ZXgvZW4vZGVmYXVsdF9ha3R1YWxub3NjaS8xMDYvMjMvMQ/ara_2011_for_public_release.pdf
- FUJITA, M., KRUGMAN, P. & VENABLES, A. (1999). *The Spatial Economy. Cities, Regions and International Trade*. MIT Press, Cambridge.
- FUNDACIÓN ENCUENTRO (2009). *Indicadores Estadísticos. Evolución del Índice de Dependencia de niños y mayores por provincias.1990-2009*. URL : http://www.fund-encuentro.org/indicadores_php/indicadores.php?t=2&id1=N1-5
- FUNDEAR (2007). *Innovaciones en política territorial. Comarcas y otras experiencias internacionales de cooperación intermunicipal*. FUNDEAR (Fundacion Economía Aragonesa). Libros FUNDEAR. Zaragoza.
- FÜSSEL, H.M. & KLEIN, R.J.T. (2006). *Climate Change Vulnerability Assessments: An Evolution of Conceptual Thinking*. In: *Climatic Change*, 75, pp. 301–329.
- FÜSSEL, H.M. (2005). *Vulnerability in Climate Change Research: A Comprehensive Conceptual Framework*. University of California International and Area Studies, Paper 6.
- FÜSSEL, H.M. (2007). *Vulnerability: A Generally Applicable Conceptual Framework for Climate Change Research*. In: *Global Environmental Change*, 17, pp. 155–167.
- GALLOWAY, L., SANDERS, J. & DEAKINS, D. (2011). *Rural small firms' use of the internet: From global to local*. In: *Journal of Rural Studies*, 27:3, pp. 254-262.
- GAME & WILDLIFE CONSERVATION TRUST SCOTLAND (2010). *An economic study of Scottish grouse moors: An update*. A report by the Fraser of Allander Institute to the Game & Wildlife Conservation Trust Scotland.
- GARMENDIA, M., UREÑA, J.M. & CORONADO, J.M. (2011). *Long-distance trips in a sparsely populated region: The impact of high-speed infrastructures*. In: *Journal of Transport Geography*, Vol 19, pp. 537-551.
- GASPAR, J. & GLAESER, E. (1998). *Information Technology and the Future of Cities*. In: *Journal of Urban Economics*, Elsevier, vol. 43(1), pp. 136-156.
- GASPARINI A. (1999). *Borders dividing and borders uniting Europe*. In: *Isig magazine*, no. 4/99, no. 1/2000.
- GAULT, J. & MCSWEENEY, S. (2006). *Review of the coastal protection at Tramore strand. Final report*. Prepared for Waterford County Council.
- GENEVE PLACE FINANCIERE (2011a). *Liste des banques à Genève*. URL: <http://www.geneve-finance.ch>
- GENEVE PLACE FINANCIERE (2011b). *La place financière de Genève*. URL: <http://www.geneve-finance.ch>
- GENRE-GRANDPIERRE, C. & MOINE, A. (1999). *L'Arc jurassien franco-suisse, une communauté de destin?* In: *Images de Franche-Comté*, n°20, pp. 14-17.

- GEORGE STREET RESEARCH & JONES ECONOMICS (2004a). *Economic Impact And Development Opportunities For Outdoor And Environment Related Recreation In The Highlands And Islands - Research Report - Walking And Mountaineering 2003/2004.*
- GEORGE STREET RESEARCH & JONES ECONOMICS (2004b). *Economic Impact And Development Opportunities For Outdoor And Environment Related Recreation In The Highlands And Islands - Research Report - Snowsports 2003/2004.*
- GEORGE STREET RESEARCH LIMITED (2003). *Highlands Visitor Survey - Full-year Report: May 2002 to April 2003.* Report prepared for Highlands and Islands Enterprise; Highland Council; Highlands of Scotland Tourist Board; VisitScotland; Scottish Natural Heritage; Forest Enterprise.
- GERBER, P., KLEIN, O. & CARPENTIER, S. (2011). *Local mobility and cross-border peri-urbanisation.* In: Sohn C. (ed.) Luxembourg: an emerging cross-border metropolitan region. Brussels, Peter Lang, pp. 141-159.
- GERSHUNY, J.I. & MILES, I.D. (1983). *The New service Economy. The Transformation of Employment in Industrial Societies.* Francis Printer, London.
- GERVAIS-AGUER, M.M. (2006). *Cahiers du GRES - Prospective Analysis : Residential choice and territorial attractiveness.* Groupement de Recherches Economiques et Sociales, France.
- GETZNER, M (2009). *Economic and cultural values related to Protected Areas - Part A: Valuation of Ecosystem Services in Tatra (PL) and Slovensky Raj (SK) national parks- Final report.* Commissioned by WWF World Wide Funds for Nature - Danube Carpathian Programme (DCP), Vienna.
- GETZNER, M. (2010). *Ecosystem services, financing, and the regional economy: A case study from Tatra National Park, Poland.* In: Biodiversity, Vol. 11, Issue 1-2.
- GIBSON, J. (2003). *Integrated Coastal Zone Management Law in the European Union.* In: Coastal Management, 31(2), pp. 127-136.
- GLOBAL DETENTION PROJECT (2009). *Ukraine Detention Profile.* URL: <http://www.globaldetentionproject.org/countries/europe/ukraine/introduction.html>
- GLÖCKNER, R., SLAVIK, J. & ROCH, I. (2010). *Vývoje Procesy Změn v Sasko-Česko-Polském Pohraničí* (Development Processes of Change in the the Saxon-Bohemian-Polish Border Region. In: Urbanismus a Územní Rozvoj, vol. XIII, 2/2010. pp. 45-52.
- GLØERSEN, E. (2009). *Strong, Specific and Promising: Towards a Vision for the Northern Sparsely Populated Areas in 2020.* Nordregio Working Paper 2009:4.
- GLØERSEN, E., DUBOIS, A., ROTO, J., RASMUSSEN, R. & STERLING, J. (2009). *Development perspectives for the NSPA - Opportunities and challenges.* Nordregio Working Paper 2009:5.

- GLOERSEN, E., et al. (2005). *Northern peripheral, Sparsely Populated Regions in the European Union and in Norway*. Nordregio Report 2006:2. Nordic Centre for Spatial Development, Stockholm.
- GOBIERNO DE ARAGON - DEPARTAMENTO DE EDUCACION Y CIENCIA (2001). *Orden de 18 de abril de 2001. que desarrolla la disposición adicional del RD 1004/1991, de Centros y Escuelas de Educación Infantil de primer ciclo en el ámbito de la Comunidad Autónoma de Aragon*.
- GOBIERNO DE ARAGON (2010). *Datos Básicos Aragon, 2010*. Instituto Aragonés de Estadística.
- GOBIERNO DE ARAGON. LEY 6/2002, de 15 de abril, de *Salud de Aragón*.
- GOBIERNO DE CANARIAS (2004). *Plan de salud de Canarias 2004-2008* (Canary Islands Health Plan 2004-2008). Canary Islands.
- GOBIERNO DE CANARIAS (2008). *Informe anual del sistema de salud 2008* (annual report on the health care system, 2008). Canary Islands.
- GOBIERNO DE ESPAÑA (2005). *Plan de Energías Renovables en España 2005.-2012. (PER)*. Instituto para la Diversificación y Ahorro de la Energía. Ministerio de Industria, Turismo y Comercio.
- GOBIERNO DE ESPAÑA (2005b). *Plan Estratégico de Infraestructuras y Transporte 2005-2020*. Ministerio de Fomento, Madrid. URL: http://www.fomento.es/MFOM/LANG_CASTELLANO/_ESPECIALES/PEIT/
- GOBIERNO DE ESPAÑA (2006). *Plan Nacional de Reserva Estratégica del Carbón 2006-2012 y Nuevo modelo de desarrollo integral y sostenible de las Comarcas Mineras*. Instituto para la Reestructuración de la Minería del Carbón. Ministerio de Industria, Turismo y Comercio.
- GOBIERNO DE ESPAÑA. *Ley Orgánica de Educación 2/2006*.
- GODENAU, D. (2008). *Immigration in the Canary Islands*. Speech given in Rabat, Morocco, 4th January 2008.
- GÓMEZ LOSCOS, A. & HORNA JIMENO, G. (2006). *El sector turístico en las comarcas aragonesas*. Fundación Economía Aragonesa. Documentos de Trabajo 25/2006.
- GORDON, R.J. (2000). *Does the 'New Economy' Measure Up to the Great Inventions of the Past?* In: *Journal of Economic Perspectives* 14, pp. 49-74.
- GORZELAK, G. et al. (2011). *EU BORDERREGIONS. Case Studies. Poland-Ukraine*. URL: <http://euborderregions.eu/research-content/case-studies/pol-ukr-przemysl-sambor>
- GRAAF, P. DE (2005). *Met sluiting kolenmijnen knakte Limburgs trots*. De Volkskrant, 19th December 2005.
- GRANT, L. (2005). *Liverpool between stations*. In: P. Oswalt (ed.), *Shrinking cities; volume 1: international research*. Ostfildern, Hatje Cantz Verlag, pp. 421 – 424.
- GR-Atlas (2011). University of Luxembourg. URL: <http://geo.uni.lu/joomla/>

- GRENAND, F. (2011). *Un pont entre la France et le Brésil : l'Observatoire Hommes / Milieux sur le fleuve Oyapock*. In : 'Dossier Brésil', Rayonnement du CNRS, 56, pp. 41-47, Paris. URL : <http://www.rayonnementducnrs.com/bulletin/b56/grenand.pdf>
- GRET - GROUPE DE RECHERCHES EN ECONOMIE TERRITORIALE & THEMA - THEORISER ET MODELISER POUR AMENAGER (2006). *Impact de l'accord bilatéral relatif à la libre circulation des personnes sur la région transfrontalière du canton de Neuchâtel et du département du Doubs*. Etude réalisé dans le cadre de Interreg III. URL: http://www.ostaj.org/fileadmin/user_upload/indicateurs/pages_diveres/Canededo_RapportFinalOctobre06.pdf
- GRIMES (2005). *How well are Europe's Rural Businesses Connected to the Digital Economy?* In: European Planning Studies Vol. 13, No. 7.
- GROGNA, V., MAHY, M., MEURIS, S., TAYMANS, J., VINCKE, J., WEYNS, S., BORN, C.H., MAHY, G., HERMY, M., TYTECA, D., AMELOOT, E., ENDELS, P., NULENS, G. (2009). *How to make natura 2000 work properly? Socio-economic, legal and ecological management - SELNAT. Final Report*. Brussels: Belgian Science Policy 2009 (Research Programme Science for a Sustainable Development).
- GUIDE TO ITALY (2009). *Water in Sicily*. Article on traditional-italy.co.uk. URL: <http://www.traditional-italy.co.uk/water-in-sicily-2/#axzz1WbDtelJQ>
- GUTIERREZ PUEBLA, J., (2004). *El tren de alta velocidad y sus efectos espaciales*. Investigaciones Regionales, otoño.num 005. Asociación Española de Ciencia Regional. Alcalá de Henares. Pp. 199-121.
- HALCROW GROUP LIMITED (2009). *Economic and Community Benefit Study for the Scottish Government*. URL: <http://www.scotland.gov.uk/Resource/Doc/917/0076743.pdf>
- HALL AITKEN (2007). *Outer Hebrides migration study*. for Comhairle nan Eilean Siar, Western Isles Enterprise and Communities Scotland. URL: <http://www.cne-siar.gov.uk/factfile/population/documents/OHMSStudy.pdf>
- HALL AITKEN (2008). *Building capacity for a Sustainable Population in the Outer Hebrides*. for the Outer Hebrides Community Planning Partnership. URL: <http://www.cne-siar.gov.uk/factfile/population/documents/Building%20Capacity%20Study.pdf>
- HANSEN, N. (1981). *The Border Economy*. Austin, University of Texas Press.
- HANTEL, M., EHRENDORFER, M. & HASLINGER, A. (2000). *Climate sensitivity of snow cover duration in Austria*. In: Int. J. Climatol., 20, pp. 615-640.
- HARRIS INTERACTIVE (2008). *The Visitor Experience 2008: Overview Presentation*. A presentation prepared for VisitScotland.
- HARRIS TWEED HEBRIDES (2011). *About Harris Tweed*. Website of Harris Tweed Hebrides. URL: <http://www.harristweedhebrides.com/about-harris-tweed/>
- HARVEY, D. (1990). *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change*. Cambridge, Blackwell.
- HAY, W. A. (2003). *Geopolitics of Europe*. Orbis, vol. 47, Issue 2, pp. 295-310.

- HEBRIDES NEWS TODAY (2011). *Well North Outer Hebrides leads the way in Scotland*. Article of June 30, 2011. URL: <http://hebridestoday.com/2011/06/well-north-outer-hebrides-leads-the-way-in-scotland/>
- HEGEWALD, M. (2008). *Das Verständnis von Lebensqualität in der sächsischen Raumordnung*. Vortrag auf der Projektwerkstatt „Umwelt- und Lebensqualitäten im Dreiländereck“, al. Lecture. Nov. 6, 2008 in IOER, Dresden.
- HELPMAN, E. (ed.) (1998). *General Purpose Technologies and Economic Growth*. MIT Press, Cambridge MA, pp. 55-83.
- HERALD SCOTLAND ONLINE (2009). *Harris votes for national park status to reverse depopulation*. Article of 21 February 2009. URL: <http://www.heraldscotland.com/harris-votes-for-national-park-status-to-reverse-depopulation-1.903277>
- HERNANDEZ, B., JIMÉNEZ, J. & MARTÍN, M.J. (2009). *Key website factors in e-business strategy*. In: International Journal of Information Management, vol. 29, pp. 362-371.
- HERRIER, J.L. & LETEN, M. (2010). *Restoration of the tidal lagoon of the Zwin*. Proceedings of the 7th European Conference on Ecological Restoration Avignon, France, 23-27/08/2010.
- HERRIER, J.L., MEES, J., SALMAN, A., VAN NIEUWENHUYSE, H. & DOBELAERE, I. (Eds.) (2005). Proceedings 'Dunes and Estuaries 2005' – International Conference on Nature Restoration Practices in European Coastal Habitats, Koksijde, Belgium, 19-23 September 2005, VLIZ Special Publication 19.
- HI ENERGY (2010). *Hebridean Hydrogen Park*. Website of HI Energy. URL: <http://www.hi-energy.org.uk/Research-Development/Hebridean-Hydrogen-Park.htm>
- HI ENERGY (n.d.). *Biomass Energy*. URL: <http://www.hi-energy.org.uk/Renewables/Biomass-Energy.htm>
- HI ENERGY (n.d.). *Hydro Energy*. URL: <http://www.hi-energy.org.uk/Renewables/Hydro-Energy.htm>
- HI ENERGY (n.d.). *Onshore Wind*. URL: <http://www.hi-energy.org.uk/Renewables/Wind-On-Shore.htm>
- HIDAIR, I. (2008). *L'immigration étrangère en Guyane : entre stigmatisation et stratégie de récupération*. In : REVUE Asylon(s), N°4, mai 2008, Institutionnalisation de la xénophobie en France. URL: <http://www.reseau-terra.eu/article742.html>
- HIEP - HIGHLANDS AND ISLANDS EUROPEAN PARTNERSHIP (2009). *Response to the Green Paper on Territorial Cohesion*. URL: http://ec.europa.eu/regional_policy/archive/consultation/terco/pdf/4_organisation/91_hiep_en.pdf
- HIGHLAND AREA TOURISM PARTNERSHIP (2006). *Highland Area Tourism Partnership Plan - The Strategy*.
- HIGHLAND COUNCIL (2006). *Highland Renewable Energy Strategy and Planning Guidelines*.

- HIGHLAND COUNCIL (2006a). Deprivation and Fragility. URL: <http://www.highland.gov.uk/yourcouncil/highlandfactsandfigures/deprivationandfragility/>
- HIGHLAND COUNCIL (2009). *Local Transport Strategy for the Highlands*.
- HIGHLAND COUNCIL (2009a). *Highland Wide Local Development Plan - Main Issues Report*.
- HIGHLAND COUNCIL (2010a). *Highland Biodiversity Action Plan 2010-2013*.
- HIGHLAND COUNCIL (2010b). *Climate Change Adaptation Strategy: Highland Context*.
- HIGHLAND COUNCIL AND ARGYLL AND BUTE COUNCIL (2004). *The Cost of Supersparsity*. Report produced by Paula Gilder Consulting with Ralph Leishman and Nicola Rankin.
- HIGHLAND COUNCIL PLANNING ENVIRONMENT AND DEVELOPMENT COMMITTEE (2011). *Update on Fuel Supply Issues in the Highlands. Report by Director of Planning and Development*.
- HIGHLAND CYCLE FORUM (2004). *The Value of Cycling in the Highlands and Islands of Scotland*.
- HIGHLANDS AND ISLANDS ENTERPRISE (2009). *Telecoms connectivity in the Highlands and Islands - Executive Summary*.
- HIGHLANDS AND ISLANDS ENTERPRISE (2009a). *Young people in the Highlands and Islands*. Report developed by Cogent Strategies International on behalf of HIE.
- HIGHLANDS AND ISLANDS ENTERPRISE (2011). *Area profile for Highlands and Islands*.
- HIGHLANDS AND ISLANDS ENTERPRISE (2011a). *Area profile for Caithness and Sutherland*.
- HIGHLANDS AND ISLANDS ENTERPRISE (2011b). *Area profile for Innse Gall*. Website of Highlands and Islands Enterprise. URL: <http://www.hie.co.uk/highlands-and-islands/area-information/outer-hebrides/economic-profile.html>
- HIGHLANDS AND ISLANDS ENTERPRISE (2011b). *Area profile for Lochaber, Skye and Wester Ross*.
- HIGHLANDS AND ISLANDS ENTERPRISE (2011c). *Area profile for Inner Moray Firth*.
- HIGHLANDS AND ISLANDS ENTERPRISE (2011d). *Next generation broadband for the Highlands and Islands*.
- HIGHLANDS AND ISLANDS ENTERPRISE (2011e). *Next generation broadband*. URL: <http://www.hie.co.uk/highlands-and-islands/digital/next-generation-broadband.html>
- HINKEL, J., NICHOLLS, R., VAFEIDIS, A., TOL, R. & AVAGIANOU, T. (2010). *Assessing risk of and adaptation to sea-level rise in the European Union: an application of DIVA*. Mitigation and Adaptation Strategies for Global Change, pp. 1–17.

- HINKEL, J., NICHOLLS, R.J., VAFEIDIS, A.T., TOL, R.S.J., EXNER, L. & AVAGIANOU, T. (2009). *The vulnerability of European coastal areas to sea level rise and storm surge*. Contribution to the EEA SOER 2010 report, Potsdam Institute for Climate Impact Research (PIK).
- HITRANS THE HIGHLANDS AND ISLANDS TRANSPORT PARTNERSHIP (2007). *Regional Transport Strategy for the Highlands & Islands*.
- HN CONSEIL INGENIERIE (2008). *Etat des lieux du tourisme équestre en vue de la mise en place d'une Grande traversée du Jura équestre*. URL: <http://across-jura.com/upload/paragraphes/1233671879.pdf>
- HOLZINGER, K., KNILL, C. & SCHAFFER, A. (2006). *Rhetoric or Reality? 'New Governance' in EU Environmental Policy*. In: *European Law Journal* 12(3), pp. 403–420.
- HOWARD, R. (2011). *Grid connection conundrum*. In: *Renewable Energy Focus* 12 (1), pp. 8-9.
- HSIAO, E. (2010). *Peace Parks for Mountain Forests: The Law and Policy of Transforming Conflict to Stewardship*. LL.M. Thesis. URL: <http://digitalcommons.pace.edu/cgi/viewcontent.cgi?article=1006&context=lawdisserations>
- HUDDLESTON, B., E. ATAMAN, & L. FE D'OSTIANI, (2003): *Towards a GIS-based analysis of mountain environments and populations*. Environment and Natural Resources Working Paper, No. 10. Food and Agriculture Organisation of the United Nations, Rome.
- HUFFINGTON POST (2009). *Italy Illegal Immigration Crackdown Draws Fire*. Article on [Huffingtonpost.com](http://www.huffingtonpost.com) of 08/15/09. URL: http://www.huffingtonpost.com/2009/07/15/italy-illegal-immigration_n_233331.html
- HUGGINS, R. & WILLIAMS, N. (2011). *Entrepreneurship and regional competitiveness: the role and progression of policy*. *Entrepreneurship & Regional Development*, pp. 1-26.
- HUISMAN, O. & ICARE-NOUREL, M. (2009). *Rapport de synthèse des Etats Généraux en Guyane*. Secrétariat d'Etat à l'outre-mer. URL : <http://www.etatsgenerauxdeloutremer.fr/rapport-de-synthese-des-etats-generaux-en-guyane>
- HUMAN RIGHTS WATCH (2010). *Buffeted in the Borderland. The Treatment of Asylum Seekers and Migrants in Ukraine*. Washington, HRW. URL: <http://www.hrw.org/sites/default/files/reports/ukraine1210WebVersion.pdf>
- HYNES, S. & FARRELLY, N. (2012). *Defining standard statistical coastal regions for Ireland*. In: *Marine Policy*, 36(2), pp. 393-404 (in press).
- HYNES, S. & FARRELLY, N. (in press). *Defining standard statistical coastal regions for Ireland*. In: *Marine Policy*, vol. 36, Issue 2, March 2012, pp. 393-404.
- IAEST - INSTITUTO ARAGONES DE ESTADISTICA (2008). *Datos Básicos Aragon 2008*. Gobierno de Aragon.
- IDATE (2000). *Regulatory, infrastructure and tariff aspects of electronic communications and broadband connectivity in the Outermost Regions (OR) - A comparison of the current situation with that in the*

rest of the Community and neighbouring countries. Report for the European Commission

- IDEA - INSTITUTO PARA EL AHORRO Y LA DIVERSIFICACIÓN ENERGÉTICA. *Wind Atlas of Spain*. URL: <http://atlaseolico.idae.es>
- I-ES - INSTITUTO DE ESTADÍSTICA DE CASTILLA Y LA MANCHA (2009). *Anuario Estadístico Castilla-La Mancha*. Junta de Castilla-La Mancha.
- IGLICKA, K., GMAJ, K. & BORODZICZ-SMOLIŃSKI, W. (2011). *Circular Migration Patterns. Migration between Ukraine and Poland*. URL: <http://www.eui.eu/Projects/METOIKOS/Documents/CaseStudies/>
- ILO (1989). *C169 Indigenous and Tribal Peoples Convention*. URL: <http://www.ilo.org/ilolex/cgi-lex/convde.pl?C169>
- IMAGAWA TAKUO (2002). *Economic analysis of telecommunication, technology and cities in Japan*. Taga Shuppan.
- INGLE, R. & DE SUTTER, R. (2009). *Effects of climate change on the Flemish water system*. Presentation at the First IWA BeNeLux Regional Young Water Professionals Conference, Eindhoven, The Netherlands.
- INSEE GUYANE (2006). *L'Atlas des populations immigrées en Guyane*. INSEE. URL : http://www.insee.fr/fr/insee_regions/guyane/themes/etudes_detaillees/atlas_immig/atlas_immigres_gy.pdf
- INSEE GUYANE (2010). *Tableau Economique Régional Enseignement – Formation*. TER 2008, Direction Antille-Guyane INSEE. URL : http://www.insee.fr/fr/insee_regions/guyane/themes/ter/ter2010/ter2010_gy.pdf
- INSEE-OCSTAT (2008). *Synthèse 2008*. Observatoire statistique transfrontalier des accords bilatéraux. Geneva, Lyon: OCSTAT, INSEE.
- INSEE-OCTAT (2010). *Synthèse 2010*. Observatoire statistique transfrontalier des accords bilatéraux. Geneva, Lyon: OCSTAT, INSEE.
- INSTITUTO NACIONAL DE ESTADÍSTICA (2009). *Enuestas de ocupación hotelera*. National Statistic Insitute of Spain. URL: www.ine.es.
- INSTITUTO NACIONAL DE ESTADÍSTICA (2010). *Indicadores Demográficos Básicos*. National Statistics Institute of Spain. URL: www.ine.es
- INSTITUTO NACIONAL DE ESTADÍSTICA. Census (1961, 1971, 1981, 1991, 2001). National Statistics Institute of Spain. URL: www.ine.es
- INSTITUTO NACIONAL DE ESTADÍSTICA. *Estadística de Transporte de Viajeros*. National Statistic Insitute of Spain. URL: www.ine.es.
- INSTITUTO NACIONAL DE ESTADÍSTICA. *Explotación Estadística del .Padrón municipal 2010*. National Statistic Insitute of Spain. URL: www.ine.es.
- INSTITUTO NACIONAL DE ESTADÍSTICA. *Municipal Register (1996-2010)*. National Statistics Institute of Spain. URL: www.ine.es

- INSTITUTO PARA LA DIVERSIFICACION Y AHORRO DE LA ENERGIA (2007). *Energía Solar en España 2007. Estado Actual y Perspectivas*. Ministerio de Industria, Turismo y Comercio.
- INTERNATIONAL CENTRE FOR TOURISM AND HOSPITALITY RESEARCH, BOURNEMOUTH UNIVERSITY (2010). *The Economic Impact of Wildlife Tourism in Scotland*. Scottish Government Social Research.
- INTERREG IV A NORD (2011). *Gränslös vård II – Tornedalen*. URL: <http://www.interregnord.com/fi/hyvaeksytyt-hankkeet/pohjoinen/3-alueellinen-toimivuus-ja-identiteetti/graensloes-vaard-ii-tornedalen.aspx>
- INVERIE PRIMARY SCHOOL (2010). *Inverie Primary School Handbook 2010-2011*. URL: <http://www.highland.gov.uk/NR/rdonlyres/E24C824D-2D6A-40BC-9862-6D184E31A699/0/InveriePrimary2011.pdf>
- IPCC (International Panel for Climate Change) (2007). *Europe: Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Editors, Cambridge University Press, Cambridge, pp. 541-580.
- IPCC (2001). *Impacts, Adaptation and Vulnerability: Contribution of WG II to the 3rd Assessment Report of the Intergovernmental Panel of Climate Change*. Cambridge, Cambridge University Press.
- IPCC (2007a). *Climate change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, Cambridge University Press.
- IPCC (2007b). *Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, Cambridge University Press.
- IPCC (2007c). *Annex I: Glossary*. In: IPCC (ed.) *Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, Cambridge University Press.
- IRISH TOURIST INDUSTRY CONFEDERATION (2009). *ITIC News, Year-end Review 2009 & Outlook 2010*. Irish Tourist Industry Confederation.
- ISTAT (2010). *Regional Statistical Yearbook, Sicily 2010*. URL: http://pti.regione.sicilia.it/portal/pls/portal/!PORTAL.wwpob_page.show?_docname=9572232.PDF
- ITD (2010). *L'intégration régionale des PME-PMI guyanaises*. AFD. URL : http://www.cnccef.org/TPL_CODE/TPL_PUBLICATIONLISTE_INTERNET/ID_PUBLICATION/222/DL/PUB_FICHIER/46-publications.htm
- IUCN UK (2011): IUCN UK Commission of Inquiry on Peatlands. IUCN UK Peatland Programme, Edinburgh. URL: <http://www.iucn-uk-peatlandprogramme.org/sites/all/files/IUCN%20UK%20Commission%20of%20Inquiry%20on%20Peatlands%20Full%20Report%20readerview.pdf>

- IVANKOVIĆ, M. (2009). *Raising Awareness in the Stara Planina mountain of Serbia*. In: Europe's mountain bonus: how communities and land management provide positive externalities for European society and the related policies and opportunities. Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia.
- IVANOV, S. (2008). *Agrobiodiversity in the Stara Planina Mountain Nature Park, Serbia*. In: T. e. Amend, Protected Landscapes and Agrobiodiversity Values. IUCN World Commission on Protected Areas.
- JARVIS, T. (2011). Phone Interview with Tony Jarvis, Senior Development Manager, Transport Policy, Highlands and Islands Enterprise, on 4 November 2011.
- JCYL - JUNTA DE CASTILLA Y LEON (2010). *Anuario Estadístico de Castilla y León*. URL : <http://www.jcyl.es/>
- JEAN, R. (2008). *Guyane : Un développement sous contraintes*. CEROM. URL: http://www.insee.fr/fr/insee_regions/guyane/themes/etudes_detaillees/cerom/cerom_2008_gy.pdf
- JERNSLETTEN, J. & KLOKOV, K. (2002). *Sustainable Reindeer Husbandry*. Centre for Saami Studies, University of Tromsø.
- JILKOVÁ, J. (2008). *Das Verständnis von Lebensqualität in Tschechien und diesbezügliche Entwicklungsziele*. Vortrag auf der Projektwerkstatt „Umwelt- und Lebensqualitäten im Dreiländereck“, al. Lecture. Nov. 6, 2008 in IOER, Dresden.
- JIT - JOINT IMPROVEMENT TEAM (2010). *Summary of Telecare Services in Scotland*.
- JIT - JOINT IMPROVEMENT TEAM (2010a). *An Assessment of the Development of Telecare in Scotland 2006-2010*.
- JOHANSSON, B., KARLSSON, C. & STOUGH, R.R. (Eds.) (2006). *The Emerging Digital Economy. Entrepreneurship, Clusters and Policy*. Springer, Berlin.
- JONES, G. & JAMIESON, L. (1997). *Young People in Rural Scotland: Getting Out and Staying On*. Joseph Rowntree Foundation, York.
- JONES, G. (1999). *The Same People in the Same Places? Socio-spatial identities and migration in youth*. In: *Sociology*, Vol. 33(1), pp. 1-22.
- JONES, R.N. (2001). *An environmental risk assessment/management framework for climate change impact assessments*. In: *Nat. Hazards*, 23, pp. 197-230.
- JONG, A. DE & VAN DUIN, C. (2010). *Regionale prognose 2009-2040: vergrijzing en omslag van groei naar krimp*. The Hague, Netherlands Environmental Assessment Agency.
- JORDAN, A. (2005). *Environmental policy in the European Union*. Earthscan, London.
- JORGENSEN, D.W., HO, M.S. & STIROH, K.J. (2002). *Projecting Productivity Growth: Lesson from the US Growth Resurgence*. Federal Reserve Bank of Atlanta Economic Review, Third Quarter, pp. 1-13.

- JUNTA DE CASTILLA Y LEON (2005). *Ley 9/2005, de 17 de Junio, por la que se establece el programa de actuación en las comarcas mineras durante el período 2004-2007*. Boletín Oficial de Castilla y León. URL : <http://bocyl.jcyl.es>
- JUNTA DE CASTILLA Y LEON (2010). *Agenda para la Población de Castilla y León 2010-2020*.
- JUNTA DE CASTILLA Y LEON (2010). *Plan Regional del Ámbito Sectorial de la Bionenergía de Castilla y León. (PBCyL)*. Ente Regional de la Energía (EREN).
- JUNTA DE CASTILLA Y LEON (2011). *Anuario Estadístico de Castilla y León, 2010*. Dirección General de Estadística.
- JUNTA DE COMUNIDADES DE CASTILLA.- LA MANCHA. *Ley 7/2010 Ley de Educacion de Castilla-La Mancha*.
- JUNTA DE COMUNIDADES DE CASTILLA-LA MANCHA (2002). *Plan Director de Transportes de Castilla-La Mancha*. URL: http://www.jccm.es/contenidos/portal/ccurl/230/914/PLAN_DIRECTOR.pdf
- JUNTA DE COMUNIDADES DE CASTILLA-LA MANCHA (2009). *Anuario Estadístico Castilla-La Mancha 2009*. I-ES (Instituto de Estadística de Castilla y la Mancha).
- KAARLELA, M. (2009). *Crossborder Tornionlaakso -työmarkkinat ja työvoiman liikkuvuus 2009*. Crossborder Tornedalen. URL: <http://www.crossbordertornedalen.net/images/stories/pdf/TutkimusCrossborder.pdf>
- KAMPHUIS, O. (2011). *The eastern external border of the EU. A journey through the borderlands of the EU and its neighbours*. Master thesis Human Geography, Nijmegen.
- KAPOS, V., RHIND, J., EDWARDS, M., PRICE, M.F. & RAVILIOUS, C. (2000). *Developing a Map of the World's Mountain Forests*. In: M.F. Price and M. Butt (eds.), *Forests in Sustainable Mountain Development: A Report for 2000*. Wallingford, CAB International, pp. 4-9.
- KAWKA, R. (2003). *Regional Development along the Former Inner-German Border after Unification (Preliminary Version)*. Institut für Wirtschaftsforschung, Halle. Paper presented at ERSA 2003, 27th-30th August 2003, Jyva skyla , Finland.
- KEAVENEY, K. (2007). *Contested Ruralities: Housing in the Irish Countryside*. Project No: 5164 NUI Maynooth.
- KELLENS, W., NEUTENS, T., DECKERS, P., REYNS, J. & DE MAEYER, P. (2011). *Coastal flood risks and seasonal tourism: analysing the effects of tourism dynamics on casualty calculations*. In: *Natural Hazards* 60 (3), pp. 1211-1229.
- KELLY, P.M. & ADGER, W.N. (2000). *Theory and practice in assessing vulnerability to climate change and facilitating adaptation*. In: *Climate Change*, 47, pp. 325-352.
- KIDD S., MCGOWAN, L., SHAW, D., JANBEN, H., SAPOUNTZAKI, K., WASSENHOVEN, L., KOKKOSSIS, H., GILBERT, A., JANSSEN, R., KVINDE, T., LANGELAND, O., BOSTINA, A., STANÇA, C., LITTKOPF,

- A., ABDUL-MALAK, D., ULIED, A., BIOSCA, O. & FARINOS-DASI, J. (2011). *European Seas and Territorial Development Opportunities and Risks*. ESaTDOR Inception Report 28/02/2011. European Union Publications, Brussels.
- KIDD, A. (2005). *The rise and decline of Manchester*. In: P. Oswalt (ed.), *Shrinking cities; volume 1: international research*. Ostfildern, Hatje Cantz Verlag, pp. 407 – 414.
- KIISKINEN, K. (2009). *Borderless form or bounded substance: media images of cultural cooperation in the Polish-Ukrainian borderland*. In: H Hyvönen, T Räsänen & J Tunturi (eds), *Media, interaction and integration: cross-cultural dialogues in the Baltic sea area*. Publications of The Graduate School on Integration and Interaction in The Baltic Sea Region, no. 10, Working papers / Population Research Institute. E., no. 36/2009, Graduate school on integration and interaction in the Baltic sea region, Turku, pp. 17-44.
- KILKENNY, M. (1998). *Transport costs, the New Economic Geography, and Rural Development*. In: *Growth and Change*, Vol. 29:3, pp. 259-280.
- KNIGHT, F. (2011). *New Build Second Homes Report*. Knight Frank Residential Research, DCLG.
- KNIPPSCHILD, R. (2011). *Cross-border Spatial Planning: Understanding, Designing and Managing Cooperation Processes in the German-Polish-Czech Borderland*. In: *European Planning Studies* vol. 19, no. 4, pp. 629-645.
- KNOBLOCK, E. & PETTERSSON, Ö. (2010). *Restructuring and risk-reduction in mining: employment implications for northern Sweden*. In: *Fennia* 188: 1, pp. 61–75.
- KOCHAN, B. (2012a). *Natur- und Landschaftsschutz*. In: LEIBNIZ INSTITUTE OF ECOLOGICAL URBAN AND REGIONAL DEVELOPMENT (IOER) Project ‚Begrüntes Dreiländereck – Evaluation umweltschonender Sanierungs- und Entwicklungsprozesse im deutsch-polnisch-tschechischen Dreiländereck‘ (english title: Green Border Triangle – An Evaluation of Environmentally Benign Rehabilitation and Development Processes in the German-Polish-Czech Border Triangle), unpublished manuscript.
- KOCHAN, B. (2012b). *Fazit und neue/weiterführende Aufgaben*. In: LEIBNIZ INSTITUTE OF ECOLOGICAL URBAN AND REGIONAL DEVELOPMENT (IOER) Project ‚Begrüntes Dreiländereck – Evaluation umweltschonender Sanierungs- und Entwicklungsprozesse im deutsch-polnisch-tschechischen Dreiländereck‘ (english title: Green Border Triangle – An Evaluation of Environmentally Benign Rehabilitation and Development Processes in the German-Polish-Czech Border Triangle), unpublished manuscript.
- KOPECKÁ, M. & NOVÁÈEK, J. (2009). *Forest fragmentation in the Tatra Region in the period 2000–2006*. In: *Landform Analysis*, Vol. 10. Pp. 58–63. URL: http://geoinfo.amu.edu.pl/sgp/LA/LA10/LA_10_11.pdf

- KOPKE, K. & O'MAHONY, C. (2011). *Preparedness of key coastal and marine sectors in Ireland to adapt to climate change*. In: *Marine Policy* vol. 35, No. 6, pp. 800-809.
- KOSTADINOVA, V. (2010). *Ambiguous Borders: the European Commission and the reconstruction of borders*. Ph.D. thesis, University of Birmingham.
- KOUTI, R. & RAMIREZ, J. (2009). *Mobility habits of the cross-border commuters in Geneva*. Geneva School of Business Administration, University of Applied Sciences of western Switzerland, No HES-SO/HEG-GE/C--09/8/1—CH, Working Paper Series. URL: http://doc.rero.ch/lm.php?url=1000,44,9,20091126084057-MX/8_09_Kouti_Ramirez.pdf
- KOWALCZYK, M. A. (2008). *Mobilisierungspotenziale sozialen Kapitals in der deutsch-polnischen Grenzregion* (Mobilization potentials of social capital in the German-Polish border region). Shaker Verlag, Aachen. Dissertation submitted to the European Viadrina University, Frankfurt (Oder).
- KOWALKE, H. (ed.) (2000). *Sachsen (Saxony) Perthes Länderprofile*. Klett-Perthes, Gotha & Stuttgart.
- KRÄMER, R. (1999). *Zwischen Kooperation und Abgrenzung - Die Ostgrenzen der Europäischen Union* (Cooperation and delimitation - The eastern boundary of the European Union). In: *WeltTrends* vol. 22, pp. 9-26.
- KRAUS, M. & SCHWAGER, R. (2003). *EU Enlargement and Immigration*. *JCMS* 42(2), pp. 165-81.
- KROK, K. (2004). *Polish - Ukrainian transboundary co-operation and policy of the European Union (Polsko - Ukraińska współpraca transgraniczna a polityka Unii Europejskiej) paper for International Conference "EU Membership of Poland and Baltic States as a factor of strengthening transborder co-operation in Northern and Eastern Europe"*. Augustow.
- KROMP-KOLB, H. & FORMAYR, H. (2005). *Schwarzbuch Klimawandel*. Salzburg, ecowin Verlag der TopAkademie GmbH.
- KRUGMAN, P. (1991). *Geography and Trade*. MIT Press, Cambridge.
- KRUPPA, S. (2008). *Die Highlands - Unberührter Naturraum und/Oder Touristisches Potential*. Grin.
- KUBRIN, C.E. & WEITZER, R. (2003). *New Directions in Social Disorganisation Theory*. In: *Journal of Research in Crima and Delinquency*, Vol. 40. URL: http://www.gwu.edu/~soc/docs/Kubrin_new_directions.pdf
- KULONEN, U., SEURUJÄRVI-KARI, I. & PULKKINEN, R. (ed.) (2005). *The Saami - a cultural encyclopaedia*. SKS, Helsinki.
- LACHAT, G. (2011). Interview with Guillaume Lachat, Directeur, Jura Tourisme, on 10 September 2011.

- LAGNEAUX, F. (2005). *Economic importance of the Flemish maritime ports: Report 2003*. Working Paper Document Series. Prepared for the National Bank of Belgium.
- LÄHTEENMÄKI, M. (2006). *Terra ultima – a short history of Finnish Lapland*. Otava, Keuruu.
- LAIRD, J. (2009). *Wider Economic Impacts in Remote Rural Areas of Scotland*. Association for European Transport and contributors.
- LAIZ MONSALVE, A. (2010). *Transporte público a la demanda. Castilla y León*. Catàleg de Bones Pràctiques. Xarxa MOBAL. Diputació de Barcelona. URL : <http://xarxamobal.diba.cat/XGMSV/documents/practiques/61/61.pdf>
- LAMMENS, M., DE BRUYN, R. & GO, F. (2008). *A conceptual design of public measures: The case of the Flemish holiday market*. In: KELLER, P. & BIEGER, T. (Eds.) *Real estate and destination development in tourism: successful strategies and instruments*. Erich Schmidt Verlag GmbH.
- LAPIN ALUEHALLINTOVIRASTO (2011). *Peruspalvelut Lapissa 2010*. Lapin aluehallintoviraston julkaisuja 2/2011. URL: http://www.avi.fi/fi/virastot/lapinavi/Ajankohtaista/julkaisut/Documents/Peruspalvelut_Lapissa_2010.pdf
- LARSON, J. (2007). *Relevance of geographical indications and designations of origin for the sustainable use of genetic resources*. Study commissioned by the Global Facilitation Unit for Underutilized Species. URL: http://www.underutilized-species.org/Documents/PUBLICATIONS/gi_larson_lr.pdf
- LATTEN, J. & MUSTERD, S. (2009). *Parkstad Limburg in een veranderend demografisch tij*. In: J. Latten & S. Musterd (eds.), *De nieuwe groei heet krimp; een perspectief voor Parkstad Limburg*. The Hague, Nicis Institute, pp. 9 – 15.
- LAUDANI, M. *Climate Change Adaptation Action Plan in the Province of Catania and in the Municipality of Biancavilla*. Provincia Regionale di Catania. URL: [http://www.grabs-eu.org/downloads/ETNA%20PPT-AAP%20\[modalit_%20compatibilit_\].pdf](http://www.grabs-eu.org/downloads/ETNA%20PPT-AAP%20[modalit_%20compatibilit_].pdf)
- LE HIR, P. (2011). *El Hierro, an island in the wind*. Article in 'The Guardian', Tuesday 19 April 2011.
- LE ROY, D., VOLCKAERT, A, VERMOOTE, S., DE WACHTER, B., MAES, F., COENE, J. & CALEWAERT, J.B. (2006). *Risk analysis of marine activities in the Belgian Part of the North Sea (RAMA)*. Research in the framework of the BELSPO Global change, ecosystems and biodiversity – SPSDII.
- LEBBE, L. & VAN MEIR, N. (2000). *Implications of Accelerated Sea-Level Rise (ASLR) for Belgium*. In: *Proceeding of SURVAS Expert Workshop on European Vulnerability and Adaptation to impacts of Accelerated Sea-Level Rise (ASLR)*, Hamburg, Germany, 19th-21st June 2000.
- LEBBE, L., VAN MEIR, N. & VIAENE, P. (2008). *Potential implications of sea-level rise for Belgium*. In: *Journal of Coastal Research*, vol. 24, Issue 2, pp. 358–366.

- LEGGE 15 LUGLIO 2009, N. 94 *'Disposizioni in materia di sicurezza pubblica'*, pubblicata nella *Gazzetta Ufficiale* n. 170 del 24 luglio 2009 - Supplemento ordinario n. 128. URL: <http://www.parlamento.it/parlam/leggi/09094l.htm>
- LEHTOLA, V. (1997). *Saamelaiset – historia, yhteiskunta, taide*. Kutannus-Puntsi, Jyväskylä.
- LEICK, B. (2006). *Die Rolle grenzüberschreitender Unternehmenskooperationen im Grenzraum Südwestsachsen-Nordböhmen im Zuge der EU-Osterweiterung* (The role of cross-border business cooperation in the border area between Southwestern Saxony and northern Bohemia in the course of the EU Eastern enlargement). Dissertation submitted to the Department of Economics of the University of Mining, Freiberg.
- LEICK, B. (2006a). *Grenzüberschreitende Verflechtungen sächsischer und tschechischer Unternehmen: Ein Beitrag zur Konvergenz der Grenzräume?* (Connections of Saxon and Czech businesses). In: Ifo Dresden Berichtet, Ifo Institut Dresden /2, pp. 20-25.
- LEUNG, D.Y.C. & YANG, Y. (2012). *Wind energy development and its environmental impact: A review*. In: Renewable and Sustainable Energy Reviews, vol. 16, Issue 1, pp. 1031-1039.
- LEVY, J. & LUSSAULT, M. (2003). *Dictionnaire de la géographie et de l'espace des sociétés*. Paris, Berlin.
- LÉVY, B. & MATOS, R. (2002). *Transforming the Tourist Image of Geneva from a Leisure to a Business Destination and its Cultural Implications*. In: Wöber K. (ed) City Tourism. New York, Springer Verlag, pp. 241-250.
- LEWS CASTLE COLLEGE (2012). *About Lews Castle College*. Website of the University of the Highlands and Islands. URL: <http://www.lews.uhi.ac.uk/about>
- LEXER, W., FELDERER, A., GROTHMANN, T., HOLSTEN, A., KROPP, J., LEXER, M.J., PLESCHBERGER, W., ROITHMEIER, O., SCHERHAUFER, P., SÜSSENBACHER, E. & WALTER, C. (2010). *Concept and process design for participatory regional vulnerability assessments: lessons learnt from analysing model projects*. International conference 'Global Change and the World's Mountains', Perth, Scotland, 26-30 September 2010. URL: <http://mri.scnatweb.ch/webcasts/perth-conference-26-30-september-2010-scotland-parallel-sessions-4>
- LIGIER, J-M. (1999). *L'arc jurassien, région d'Europe: Présent et avenir d'une identité*. Yens-sur-Morges, Editions Cabédita.
- LIMAO, N. & VENABLES, A.J. (2001). *Infrastructure, geographical disadvantage, transport costs, and trade*. The World Bank Economic Review, 15, pp. 451-479.
- LINDBLOM, P. & RASMUSSEN, R. (2008). *Bioenergy and Regional Development in the Nordic Countries*. Nordregio Working Paper 2008:5.
- LINTZ, G. & SCHMUDE, K. (2005). *Germany: Tackling the East-West Divide*. In: MÜLLER, B., FINKA, M. & LINTZ, G. (eds.) Rise and

- Decline of Industry in Central and Eastern Europe. A Comparative Study of Cities and Regions in Eleven Countries. Berlin. (Central and Eastern European Development Studies - CEEDES), pp. 81-110.
- LL&A, UNIVERSITE LIBRE DE BRUXELLES (DULBEA - Département d'économie appliquée) (2006). *Identification and estimation of the quantifiable effects of special handicaps specific to outermost regions and possible measures to reduce these handicaps.*
- LOESENER, P. (2011). Phone Interview with Pierre Loesener, Secrétaire général de la Conférence TransJurassien on 29 September 2011.
- LONG, R. (2011) *Legal aspects of ecosystem-based marine management in Europe.* Ocean Yearbook Vol. 26.
- LONGINO, C.F. & BRADLEY, D.E. (2003). *A First Look at Retirement Migration Trends in 2000.* In: *The Gerontologist*, 43(6), pp. 904-907.
- LOPEZ JIMENEZ, A. (coord.) (2007). *Comarcas, calidad de vida y vertebración del territorio. Logros y retos del proceso de comarcalización.* FUNDEAR (Fundacion Economía Aragonesa). Libros FUNDEAR, Zaragoza.
- LORENZEN, M. & ANDERSEN, K.V. (2007). *The Geography of the European Creative Class: A Rank-Size Analysis.* DRUID Working Paper No. 07-17. Aalborg & Copenhagen, Danish Research Unit for Industrial Dynamics.
- LOTTIERI, C. & STAGNARO, C. (2007). *North and South, the Tragedy of Equalisation in Italy.* Istituto Bruno Leoni Turin. URL: <http://www.fcpp.org/images/publications/FB049ItalianEqualizationMarch07draft.pdf>
- LOUIS LENGRAND & ASSOCIES (2001). *Impact des technologies de l'information et de la communication dans les régions ultrapériphériques de l'Union européenne.* Rapport pour la Commission européenne.
- LOWE, P.J., MURDOCK, J. & WARD, N. (1995). *Networks in rural development beyond endogenous and exogenous models.* In: van der Ploeg, J.D. and van Dijk, G., eds. *Beyond modernisation: the impact of endogenous development.* Assen, Van Gorcum.
- LUERS, A. L. (2005). *The surface of vulnerability: An analytical framework for examining environmental change.* In: *Global Environmental Change*, 15, pp. 214-223.
- LUNDEVALL B.-Å. & ARCHIBUGI, D. (Eds.) (2001). *The Globalizing Learning Economy.* Oxford University Press, Oxford.
- MACLENNAN, J. (2011). Interview with Joyce MacLennan, Head of Financial and Business Services, Highlands and Islands Enterprise, on 16 November 2011.
- MADSEN, P.T., WAHLBERG, M., TOUGAARD, J., LUCKE, K. & TYACK, P. (2006) *Wind turbine underwater noise and marine mammals: implications of current knowledge and data needs.* In: *Mar Ecol Prog Ser.*, 309, pp. 279-295.
- MAES, F. (2008). *The international legal framework for marine spatial planning.* In: *Marine Policy* vol. 32, pp. 797– 810.

- MAGNOLLAY, J. (2011). *Le pâturage boisé , emblème de l'arc jurassien, est en péril*. Article in 24heures on 03.08.2011. URL : <http://www.24heures.ch/actu/serie/paturage-boise-embleme-arc-jurassien-peril-2011-08-03>
- MAGRIN, G., C. GAY GARCÍA, D. CRUZ CHOQUE, J.C. GIMÉNEZ, A.R. MORENO, G.J. NAGY, C. NOBRE AND A. VILLAMIZAR (2007). *Latin America. Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, pp. 581-615.
- MALECKI, E.J. (2007). *Cities and regions competing in the global economy: knowledge and local development policies*. In: Environment and Planning C: Government and Policy 2007, volume 25, pp. 638 - 654.
- MALYNOVSKA, O. (2006). *Trans-border Migration of the Population of the Ukrainian Western Frontier Areas in the Context of EU Enlargement*. In: Iglicka, K. (ed.), Transnational Migration-Dilemmas. Warsaw, Center for International Migrations.
- MANCEBO, F. (2001). *Discontinuités, lisières et territoires. Tentative de généralisation de la notion de frontière et de compréhension des dynamiques frontalières*. Manuscrit auteur, publié dans « Sud-Ouest Européen », 10 (2001) p. 77-87.
- MANDER, L., CUTTS, N.D., ALLEN, J. & MAZIK, K. (2007). *Assessing the development of newly created habitat for wintering estuarine birds*. In: Estuarine, Coastal and Shelf Science 75(3), pp. 163-174.
- MAPA - MINISTERIO DE AGRICULTURA, PESCA Y ALIMENTACION (2004). *Castilla y León*. In: MAPA (ed.) Libro Blanco de la Agricultura y el Desarrollo Rural, MAPA, Madrid, pp. 469-522.
- MAREAN, C.W., BAR-MATTHEWS, M., BERNATCHEZ, J., FISHER, E., GOLDBERG, P., HERRIES, A.I., JACOBS, Z., JERARDINO, A., KARKANAS, P., MINICHILLO, T., NILSSEN, P.J., THOMPSON, E., WATTS, I. & WILLIAMS, H.M. (2007). *Early human use of marine resources and pigment in South Africa during the Middle Pleistocene*. In: Nature, 449 7164, pp. 793-794.
- MARINE INSTITUTE (2004). *A National Survey of Water-Based Leisure Activities in Ireland 2003*. URL: <http://www.marine.ie/NR/rdonlyres/2A571A28-486D-4CA5-B697-7D796AD31AAA/0/SurveyofWaterBasedLeisure.pdf>
- MARMIER, S. (2011). Personal Interview with Sylvain Marmier, Fédération nationale des syndicats d'exploitants agricoles, on 27 September 2011.
- MARTINEZ SANCHEZ-MATEO, H.S. (2010). *La estructura del transporte y sus implicaciones territoriales en Castilla-La Mancha*. Consejo Economico y Social de Castilla-La Mancha. Colección Tesis. N. 9.

- MARTÍNEZ, M.L., INTRALAWAN, A., VÁZQUEZ, G., PÉREZ-MAQUEO, O., SUTTON, P. AND LANDGRAVE, R. (2006). *The coasts of our world: Ecological, economic and social importance*. In: *Ecological Economics* (63)2-3.
- MATHEY, J. & STUTZRIEMER, S. (2010). *Landscape and nature protection in the Czech-German-Polish border region. Successes, deficits, perspectives of a mining and industrial area*. In: *EUROPA XXI*, vol. 20 (European Union external and internal borders – interactions and networks), pp. 145-160.
- MATHEY, J. (2012). *Einleitung zum erreichten Entwicklungsstand in der Umweltqualität*. In: LEIBNIZ INSTITUTE OF ECOLOGICAL URBAN AND REGIONAL DEVELOPMENT (IOER): Project ‚Begrüntes Dreiländereck – Evaluation umweltschonender Sanierungs- und Entwicklungsprozesse im deutsch-polnisch-tschechischen Dreiländereck‘ (english title: Green Border Triangle – An Evaluation of Environmentally Benign Rehabilitation and Development Processes in the German-Polish-Czech Border Triangle), unpublished manuscript.
- MCARTHUR, L. (2011). *Minister's Answer Undermines Justification For The Air Discount Scheme Cut*. Press Release of Liam McArthur, MSP for Orkney, of 15.06.2011. URL: <http://www.liammcarthurmsp.org.uk/press-releases.php?detail=y&id=876>
- MCDOWELL, N. & SHIELDS, Y. (1998). *A Profile of Boating Activity on the Irish Sea*. Marine Resource Series, Marine Institute.
- MEÄNMAA (2011). *Meänmaan yhistys*. URL: <http://www.meanmaa.net/>
- MEE, L. (2010). *Between the Devil and the Deep Blue Sea: The coastal zone in an era of globalisation*. *Estuarine, Coastal and Shelf Science*.
- MEHLUM, H. MOENE, K. & TORVIK, R. (2006). *Institutions and the Resource Curse*. In: *The Economic Journal*, Volume 116, Issue 508, pp. 1–20.
- MEINER, A. (2010). *Integrated maritime policy for the European Union – consolidating coastal and marine information to support maritime spatial planning*. In: *Journal of Coastal Conservation* 14(1).
- MENDELSON, R. (2000). *Efficient adaptation to climate change*. In: *Climatic Change*, 45, pp. 583–600.
- MENDELSON, R., MORRISON, W., SCHLESINGER, M.E. & ANDRONOVA, N.G. (2000) *Countryspecific market impacts of climate change*. In: *Climatic Change*, 45, pp. 553-569.
- MERTENS, T., DEWOLF, P., VERWAEST, T., TROUW, K., DE NOCKER, L., COUDERE, K. (2008a). *An Integrated Master Plan for Flanders Future Coastal Safety*. Proceedings of the 31st International Conference on Coastal Engineering, 31 August – 5 September 2008, Hamburg (Germany), pp. 4017-4028.
- MERTENS, T., TROUW, K., BLEUKENS, K., DE NOCKER, L., COUDERE, K., SAUWER, C., DE SMEDT, P., LEWIS, C. & VERWAEST, T. (2008b). *SAFECoast: An Integrated Master Plan for Flanders Future Coastal Safety*. Coastal Division of the Flemish Community, Belgium.

- MERTENS, T., VERWAEST, T., DELGADO, R., TROUW, K., DE NOCKER, L. (2010). *Coastal management and disaster planning on the basis of flood risk calculations*. In: Proceedings of the 32nd International Conference on Coastal Engineering, 30 June – 5 July 2010, Shanghai (China).
- MIGRANTS AT SEA (2011). *Italy Criticises Malta Regarding Search and Rescue Response*. Blog entry of 8 April 2011. URL: <http://migrantsatsea.wordpress.com/2011/04/08/italy-criticises-malta-regarding-search-and-rescue-response/>
- MILES, L., GRAINGER, A. & PHILLIPS, O. (2004). *The impact of global climate change on tropical forest biodiversity in Amazonia*. In: *Global Ecol. Biogeogr.*, 13, pp. 553-565.
- MILEVA, M. (2007). *Sustainable Agriculture and Rural Development in Mountain Regions (SARD – M) Project - Assessment of the strengths and weaknesses of mountain policies in the SEE Europe (Balkans): National Report for the Republic of Bulgaria*. FAO.
- MILJIĆ, S., MARIĆ, I., & BAKIĆ, O. (2010). *Approach to Identification and Development of Mountain Tourism Regions and Destinations in Serbia with special Reference to the Stara Planina Mountain*. In: *SPATIUM International Review* No. 22, pp. 19-28.
- MILLARD, J. (2005). *Rural Areas in the Digital Economy*. In: D. Schmied (ed.), *Winning and Losing - the Changing Geography of Europe's Rural Areas*. Sage, pp. 90-123.
- MILLENNIUM ECOSYSTEM ASSESSMENT (2005). *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC. URL: <http://www.maweb.org/documents/document.356.aspx.pdf>
- MA: MILLENNIUM ECOSYSTEM ASSESSMENT (2005b): *Current State & Trends Assessment*. Island Press, Washington, DC. URL: <http://www.maweb.org/documents/document.356.aspx.pdf>
- MINISTRY OF AGRICULTURE AND FORESTRY (2003). *Ylä-Lapin metsä- ja porotalouden yhteensovittamista koskeva toimintaohjelma*. programme paper.
- MINISTRY OF EMPLOYMENT AND THE ECONOMY OF FINLAND (2011). *Alueelliset talousnäkömät syksyllä 2011*. URL: http://www.temtoimialapalvelu.fi/files/1304/alueelliset_talousnakymat_2_2011_web.pdf
- MINISTRY OF THE ENVIRONMENT OF THE CZECH REPUBLIC (2006). *State Environmental Policy of the Czech Republic 2004-2010*. Prague.
- MIRWALDT, K. (2009). *The Small Projects Fund and Social Capital Formation in the Polish-German Border Region: An Initial Appraisal*. In: *European Policy Research Papers*, No 68, European Policies Research Centre, University of Strathclyde, Glasgow.
- MISSION PARLEMENTAIRE SUR LA POLITIQUE TRANSFRONTALIERE, REPUBLIQUE FRANÇAISE (2010). *Rapport de mission : Les frontières, territoires de fractures, territoires de coutures*.

- MKW WIRTSCHAFTSFORSCHUNG, EMPIRICA KFT (2009). *Scientific report on the mobility of cross-border workers within the EU-27/EEA/EFTA countries*. Final report.
- MLADENOV, C. (2011). *Demographic Potential and Problems of the Settlements Network in the Mountains of Bulgaria*. In: G. Zhelezov, *Sustainable Development in Mountain Regions: Southeastern Europe*. Springer.
- MOINE, A. (2003). *Evolution d'un Espace de Production Transfrontalier : Un ou des Systèmes ?* 6èmes Rencontres de Théo Quant. URL : <http://hal.archives-ouvertes.fr/docs/00/13/12/39/PDF/Article.pdf>
- MOINE, A. (2003). *Systémogénèse d'un espace de production transfrontalier : le Jura Horloger*. In : *Mappemonde 71* (2003.3). URL: <http://www.mgm.fr/PUB/Mappemonde/M303/Moine.pdf>
- MOINE, A. (2011). Interview with Alexandre Moine, Professeur de Géographie, Laboratoire ThéMA UMR 6046 Université de Franche-Comté, on 30 September 2011.
- MONFORT, P. (2009). *Territories with specific geographical features*. European Commission, Regional Policy Working Papers no. 2009-02.
- MONTAGNES DU JURA (2006). *Ce que les élus doivent savoir : C'est quoi ? Ça sert à quoi ? Ça coûte combien ?* URL: http://www.montagnes-du-jura.fr/pro/var/ezwebin_site/storage/original/application/a9278b145010305a3fdd5b26e192e44a.pdf
- MORITZ, M. (2008). *Spatial Effects of Open Borders on the Czech Labour Market*. (IAB Discussion Paper, 30/2008), Nürnberg.
- MORRISSEY, A.K. & O'DONOGHUE, C. (in press). *The Irish marine economy and regional development*. In: *Marine Policy*, vol 36 (2012), pp 358–364.
- MORRISSEY, A.K., O'DONOGHUE, C. & HYNES, S. (2011). *Quantifying the value of multi-sectoral marine commercial activity in Ireland*. In: *Marine Policy*, vol. 35, Issue 5, pp 721-727.
- MOSS, R.H., BRENKERT, A.L. & MALONE, E.L. (2001). *Vulnerability to Climate Change: A Quantitative Approach*. Pacific Northwest National Laboratory, Richland Washington.
- MOT (2011). *The Longwy European Development Pole*. URL: <http://www.espaces-transfrontaliers.org/en>
- MÜLLER, S., RUSTERHOLZ, H. & BAUR, B. (2006). *Effects of forestry practices on relict plant species on limestone cliffs in the northern Swiss Jura mountains*. In: *Forest Ecology and Management* 237 (2006), pp. 227–236.
- MUNICH RE (2010). *Geo Risks Research*. NatCatSERVICE. URL: <http://www.munichre.com/de/reinsurance/business/non-life/georisks/natcatservice/default.aspx>
- MVA CONSULTANCY (2010). *HITRANS Access to Hospitals*. Report prepared for HITRANS.

- NAESS, L., THORSEN NORLAND, I., LAFFERTY, W. & AALL, C. (2006). *Data and processes linking vulnerability assessment to adaptation decision-making on climate change in Norway*. In: Global Environmental Change 16 (2), pp. 221-233.
- NAESS, O. & HOLMAN, I. (2009). *Vulnerability Assessments in the Developed World: The UK and Norway*. In: Assessing Vulnerability to Global Environmental Change. Making Research Useful for Adaptation, Decision Making and Policy, edited by A. G. Patt, D. Schröter, R. J. T. Klein and A. C. de la Vega-Leindert. London, Earthscan, pp. 41-78.
- NAIRN, V. (2007). *Broadband/ICT and its wider uses*. The Highland Council.
- NAKICENOVIC, N. & SWART, R. (eds.) (2000). *Emissions Scenarios*. Cambridge, Cambridge University Press.
- NEGROPONTE, N. (1995). *Being Digital*. Vintage Books, New York.
- NELISSEN, E. & NEVALA, A.M. (2006). *An exhaustive analysis of employment trends in all sectors related to sea or using sea resources. Country Report – Belgium*. ECOTEC Research and Consulting.
- NELSON, R. et al. (2011). *Border Security in a Time of Transformation. Two International Case Studies—Poland and India*. URL: http://csis.org/files/publication/100715_Nelson_BorderSecurity_web.pdf
- NEWRLY, P. (2002). *Transnationaler Regionalismus: Die grenzüberschreitende Zusammenarbeit am Oberrhein – ein Beispiel für die Fortentwicklung der europäischen Integration?* Münster-Hamburg-London.
- NICHOLLS, R.J., P.P. WONG, V.R. BURKETT, J.O. CODIGNOTTO, J.E. HAY, R.F. MCLEAN, S. RAGOONADEN & C.D. WOODROFFE (2007). *Coastal systems and low-lying areas*. In: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, pp. 315-356.
- NICK FORREST ASSOCIATES LTD, THE SCOTTISH INSTITUTE OF SUSTAINABLE TECHNOLOGY (SISTECH), BLACK & VEATCH LTD. (2008). *Scottish Hydropower Resource Study: Final Report*. Study commissioned by the Scottish Government through the Hydro Sub Group of the Forum for Renewable Energy Development in Scotland (FHSG).
- NILSSON, B. (2010). *Ideology, environment and forced relocation: Kiruna - a town on the move*. In: European Urban and Regional Studies, vol. 17 no. 4, pp. 433-442.
- NORDIC WORKING GROUP ON GLOBALISATION AND CROSS-BORDER COOPERATION (2010). *Nordic Cross-border Cooperation Committees and Cross-border Authority Integration*. Nordregio Electronic Working Paper 2010:3. Stockholm. URL:

<http://www.nordregio.se/en/Publications/Publications-2010/Nordic-Cross-border-Cooperation-Committees-and-Cross-border-Authority-Integration/>

- NORDREGIO (2004). *Analysis of mountain areas in EU Member States, acceding and other European countries*. Report prepared for the European Commission. Stockholm, Nordregio.
- NORRIS, M., PARIS, C. & WINSTON, N. (2010). *Second homes within Irish Housing Booms and Busts: North-South Comparisons, Contrasts and Debates Holiday*. Environment and Planning C: Government and Policy, vol. 28, Issue 4, pp. 666-680, Pion Ltd.
- NORTHLAND (2011). *Development Projects*. URL: <HTTP://WWW.NORTHLAND.EU/S/KAUNISVAARA.ASP>
- NRK (2010). *Millioner til liten nytte*. URL: http://www.nrk.no/kanal/nrk_sapmi/1.7340752.
- NRK (2011). *Drømmen om Ishavsbanen brister*. URL: http://nrk.no/nyheter/distrikt/troms_og_finnmark/1.7808299
- NSD (2012). *Norrbotten behöver inte räddas*. URL: <http://www.nsd.se/nyheter/artikel.aspx?ArticleId=6688448>
- NYTTBREDBÅND.NO (2011). *Bredbånd i kommuner*. URL: <http://www.nyttbredband.no/kommune/bredband-k%C3%A5fjord>
- O'HAGAN, A.M., BALLINGER, R., BALL I. & SCHRIVERS, J. (2005). *Corepoint: European Legislation And Policies With Implications For Coastal Management*.
- OBSERVATOIRE INTERREGIONAL DU MARCHÉ DE L'EMPLOI (2007). *Situation du marché de l'emploi dans la Grande Région*. 5th Report. Saarbrücken, INFO-Institute.
- OBSERVATOIRE INTERREGIONAL DU MARCHÉ DE L'EMPLOI (2010). *Situation du marché de l'emploi dans la Grande Région*. 7th Report. Saarbrücken: INFO-Institute.
- OBSERVATOIRE STATISTIQUE TRANSFRONTALIER (2011). *Carte du territoire observé*. URL: http://www.statregio-francosuisse.net/telechargements/cartes_transfrontalier/territoires.html
- OCSTAT (2008). *Le secteur bancaire à Genève*. In: Coup d'Oeil 36.
- OCSTAT (2010). *Les frontaliers à Genève. 1er semestre 2010*. URL: http://www.ge.ch/statistique/tel/publications/2010/tableaux_bord/trav_frontaliers/tb-tf-s1-2010.pdf
- OCSTAT (2011). *Statistiques cantonales*. URL: http://www.ge.ch/statistique/domaines/03/03_05/tableaux.asp#8
- ODE VLAANDEREN (2008). *Wind Energy in Flanders*. Proceedings of the European Wind Energy Conference (EWEC) 2008 Conference, Brussels.
- ODZIEMCZYK, A. (2006). *Deutsch-tschechische Kooperationsnetzwerke – Eine interkulturelle Betrachtung* (German-Czech cooperation networks: an intercultural perspective). In: HOLEČKOVÁ, R., NEUBERT, A. & STEGER, TH. (eds.) *Sächsisch-tschechische Unternehmenskooperation. Probleme und Chancen* (Saxon-Czech business cooperation: problems and opportunities), Munich & Mering, Rainer Hampp Verlag, pp. 55-65.

- OECD (2002). *Measuring the Information Economy*. Paris, Organisation for Economic Co Operation and Development.
- OECD (2007). *Climate Change in the European Alps - Adapting Winter Tourism and Natural Hazards Management*. Organisation for Economic Cooperation and Development.
- OECD (2007). *OECD Territorial Reviews, Luxembourg*.
- OFEV - OFFICE FÉDÉRAL DE L'ENVIRONNEMENT (2010). *Jahrbuch Wald und Holz 2010 / Annuaire La forêt et le bois 2010*. URL: <http://www.bafu.admin.ch/publikationen/publikation/01578/index.html?lang=fr>
- OFFICE FEDERAL DE L'INDUSTRIE, DES ARTS ET METIERS ET DU TRAVAIL (OFIAMT) (1956). *Mesures de la Confédération en faveur des populations montagnardes*. Berne, Ofiamt.
- OFFICES STATISTIQUES DE LA GRANDE RÉGION (2011). *Structure de la population*. URL: <http://www.grande-region.lu/eportal/pages/HomeTemplate.aspx>
- OFFSHORE WIND INDUSTRY GROUP - OWIG (2010). *Scotland's Offshore Wind Route Map - Developing Scotland's Offshore Wind Industry to 2020*.
- O'HAGAN, A.M. & COOPER, J.A.G. (2001). *Extant Legal and Jurisdictional Constraints on Irish Coastal Management*. In: *Coastal Management*, 29. pp. 73-90.
- OKRASKA, E. (2005). *Poland: Redevelopment Strategies at Different Levels*. In: MÜLLER, B., FINKA, M. & LINTZ, G. (eds.) *Rise and Decline of Industry in Central and Eastern Europe. A Comparative Study of Cities and Regions in Eleven Countries*. Berlin. (Central and Eastern European Development Studies - CEEDES), pp. 155-178.
- OLMA, N. (2010). *The Polish-Ukrainian Special Partnership 1990 - 2010*. Athens.
- Operational Programme Canary Islands 2007-2013, ERDF. Programme for Community assistance from the European Regional Development Fund (ERDF) under the 'Regional competitiveness and employment' objective in the Autonomous Community of the Canary Islands. URL: http://www.gobiernodecanarias.es/hacienda/media/PROGRAMA%20OPERATIVO%20%20FEDER%20CANARIAS%202007-2013_tcm15-4462.pdf
- Operational Programme 'Sicily'. ERDF regional operational programme for Sicily 2007-2013. URL: http://ec.europa.eu/regional_policy/country/prordn/details_new.cfm?gv_PAY=IT&gv_reg=ALL&gv_PGM=1044&gv_defL=7&LAN=7
- ORKNEY ISLANDS COUNCIL (2011). *Councils Team Up On Air Discount Scheme Concerns*. Website of Orkney Islands Council. URL: <http://www.orkney.gov.uk/Default.aspx.LocID-0cznew0ol.RefLocID-0cz00d.Lang-EN.htm>
- OSBERGHAUS, D. & REIF, C. (2010). *Total Costs and Budgetary Effects of Adaptation to Climate Change: An Assessment for the European Union*. Discussion Paper, no. 10-046, Mannheim, Centre for European Economic Research. URL: <ftp://ftp.zew.de/pub/zew-docs/dp/dp10046.pdf>

- OSE - OBSERVATORY ON SUSTAINABILITY IN SPAIN (2009). *Sustainability in Spain 2009: Integrated assessment atlas* (2009). Universidad de Alcalá.
- OSE - OBSERVATORY ON SUSTAINABILITY IN SPAIN (2010). *Sostenibilidad en España 2009*. URL: http://www.sostenibilidad-es.org/sites/default/files/_Informes/anuales/2009/sostenibilidad_2009.pdf
- OSE - OBSERVATORY ON SUSTAINABILITY IN SPAIN (2011). *Sostenibilidad en España 2010*. URL : http://www.sostenibilidad-es.org/sites/default/files/_Informes/anuales/2010/sostenibilidad_2010.pdf
- OSPAR COMMISSION (2000). *Quality Status Report 2000, Region II – Greater North Sea*. OSPAR Commission, London.
- OSTAJ - OBSERVATOIRE STATISTIQUE TRANSFRONTALIER DE L'ARC JURASSIEN (2010). *Population et logement*. URL: http://www.ostaj.org/uploads/media/OSTAJ_PopLogment_2010.06.30.pdf
- OSTAJ - OBSERVATOIRE STATISTIQUE TRANSFRONTALIER DE L'ARC JURASSIEN (2010). *Économie de l'Arc Jurassien: Évolutions récentes*. URL: http://www.ostaj.org/uploads/media/EconomieAJ_01.09.2010.pdf
- OSTAJ- OBSERVATOIRE STATISTIQUE TRANSFRONTALIER DE L'ARC JURASSIEN (2009). *Une comparaison des salaires entre la Franche-Comté et l'Arc jurassien suisse*. URL : http://www.conference-transjurassienne.org/fileadmin/Docs_groupes_de_travail/OSTAJ/OSTAJ_salaires2009_01.pdf
- OSWALT, P. & RIENIETS, T. (2006a). *Atlas of shrinking cities (atlas der schrumpfenden städte)*.
- OSWALT, P. (2006b). *Shrinking cities; volume 2: interventions*. Ostfildern, Hatje Cantz Verlag.
- OUTER HEBRIDES COMMUNITY PLANNING PARTNERSHIP (n.d.). *Community Planning in the Outer Hebrides*. URL: http://www.ohcpp.org.uk/index.php?option=com_content&view=article&id=74&Itemid=199
- PACHAURI, R.K. & REISINGER, A. (Eds.) (2007). *Synthesis Report: Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. IPCC, Geneva.
- Palermo: rientra sciopero selvaggio autisti trasporto pubblico*. Article on Tiscali Sicilia of 10 August 2011. URL: http://notizie.tiscali.it/regioni/sicilia/feeds/11/08/10/t_16_02_ADN20110810194251.html?sicilia
- PANTEIA (2010). *Ex-Post Evaluation of the INTERREG 2000-2006 Community Initiative funded by the Regional Development Fund. Final Report to the European Commission DG Regio*. Zoetermeer.
- PAPAZOVA, N. (2008). *Bulgarian-Serbian Cross-Border Mountain West Stara Planina*. Assignment in the framework of the course "Managing Sustainable Mountain Development" at Perth College, University of the Highlands and Islands.
- PAQUÉ, K.-H. (2010). *Wo stehen Ostdeutschland und Mitteleuropa heute? Bemerkungen zu Messung und Vergleich der Produktivität* (Where are

- East Germany and Central Europe today? observations on the measurement and comparability of productivity). In: INSTITUT FÜR WIRTSCHAFTSFORSCHUNG HALLE (IWH) 20 Jahre Deutsche Einheit. Von der Transformation zur europäischen Integration. (Twenty years of German unification: The transformation to European integration), Conference book. IWH special issue 3/2010. Halle (Saale), pp. 169-182.
- PARKSTAD LIMBURG (2009). *Herstructureringsvisie voor de woningvoorraad Parkstad Limburg*. Heerlen, Parkstad Limburg.
- PARKSTADMONITOR (2010). *Parkstad Limburg in cijfers*. Heerlen, Parkstad Limburg. URL: <http://parkstad-limburg.buurtmonitor.nl>
- PARRENO CASTELLANO, J. M. (2008). *Turismo sostenible y diversificación de la oferta en las islas Canarias (España)* (Sustainable tourism and offer diversification in the Canary Islands, Spain). In: *Études caribéennes*, April-August 2008. URL: <http://etudescaribeennes.revues.org/1343>
- PARRY, M., ARNELL, N., BERRY, P., DODMAN, D., FANKHAUSER, S., HOPE, C., KOVATS, S., NICHOLLS, R., SATTERTHWAITTE, D., TIFFIN, R. & WHEELER, T. (2009). *Assessing the Costs of Adaptation to Climate Change: A Review of the UNFCCC and Other Recent Estimates*. London, International Institute for Environment and Development and Grantham Institute for Climate Change.
- PARRY, M.L., CANZIANI, O.F., PALUTIKOF, J.P. et al. (2007). *Technical Summary*. In: *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, pp. 23-78.
- PARSONS, E., WARBURTON, C., WOODS-BALLARD, A., HUGHES, A., & JOHNSTON, P. (2003). *The value of conserving whales: the impacts of cetacean-related tourism on the economy of rural West Scotland*. In: *Aquatic Conservation: Marine and Freshwater Ecosystems* 13 , pp. 397-415.
- PATT, A., SCHRÖTER, D., DE LA VEGA LEINERT, A.C. & KLEIN, R.J.T. (2009). *Vulnerability Research and Assessment to Support Adaptation and Mitigation: Common Themes from the Diversity of Approaches*. In: PATT, A., SCHRÖTER, D., KLEIN, R.J.T. & DE LA VEGA LEINERT, A.C. (eds.) *Assessing Vulnerability to Global Environmental Change: Making Research Useful for Adaptation Decision Making and Policy*. London, Earthscan.
- PAVIS, S., PLATT, S. & HUBBARD, G. (2000). *Social Exclusion and Young People In Rural Scotland*. Report No 210 produced for The Joseph Rowntree Foundation.
- PEARCE-HIGGINS, J.W. (2011). *How ecological science can help manage the effects of climate change: A case study of upland birds*. In: Marrs, S.J., Foster, S., Hendrie, C., Mackey, E.C., & Thompson, D.B.A. (eds.)

- The Changing Nature of Scotland. TSO Scotland, Edinburgh, pp. 397-414.
- PENCK, M., BROPHY, J. & NASH, R. (2009). *Implications for the natural heritage of Ireland's coast and inland waterways*. In: KELLY, B. & STACK, M. (eds.) *Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways*. The Heritage Council of Ireland Series. An Chomhairle Oidhreachta/ the Heritage Council.
- PICHLER, V. & SOROKOVA, M. (2005). *Viliam and Magdalena: Utilisation of natural forests for ecotourism: matching goals and reality*. In: For. Snow Landsc. Res. 79, ½. Pp. 185-194.
- PINILLA, V. & SAEZ, L.A. (2009). *Tendencias recientes en la evolución de la población de las comarcas aragonesas: el problema de las comarcas demográficamente regresivas. 2000-2007*. Centro de Estudios sobre la Despoblacion y Desarrollo en Areas Rurales (CEDDAR) and Fundacion de Economía Aragonesa (FUNDEAR). Rolde de Estudios Aragoneses. Zaragoza.
- PINILLA, V., AYUDA, M.I. & SAEZ, L.A. (2008). *Rural depopulation and the migration turnaround in Mediterranean Western Europe: A case study of Aragon*. In: *Journal of Rural and Community Development*, 3, 1, 2008, pp. 1-22.
- PINNEGAR, J.K., CHEUNG, W.W.L. & HEATH, M. (2010). *Fisheries*. In: *Annual Report Card 2010-11, Science Review*. Marine Climate Change Impacts Partnership.
- PINOJA, J. & MARULLB, J. (2012). *Ecological networks: Are they enough for connectivity conservation? A case study in the Barcelona Metropolitan Region (NE Spain)*. In: *Land Use Policy* 29, pp. 684-690.
- PKP POLSKIE LINIE KOLEJOWE S.A. (2011). *Interaktywna mapa modernizacji linii kolejowych*. URL: <http://www.plk-inwestycje.pl/index.php?id=9&L=2>
- Plan Eolico de Castilla La Mancha (2010). URL : <http://www.jccm.es/web/es/CastillaLaMancha/index/plan1212700430333pl/1193043192499.html>
- PLAN MINER - Plan de la Minería 2006-2012. URL : http://gobierno.aragon.es/Temas/Minas/Subtemas/PlanMiner/ci.01_Plan_MINER.detaIleTema
- PNR JURA VAUDOIS (2011). *Charte: Section B.: Territoire et stratégies 2013-2022*. PNR Jura vaudois, St-George.
- POLICY RESEARCH CORPORATION (2009). *The economics of climate change adaptation in EU coastal areas. Country overview and assessment: Outermost regions*. Study done on behalf of the European Commission, Directorate General for Maritime Affairs and Fisheries. URL: http://ec.europa.eu/maritimeaffairs/climate_change/outermost_regions_en.pdf
- POLISH-ONLINE.COM (2011). *Grenzübergänge nach Polen*. URL: <http://www.polish-online.com/polen/reisetipps/grenzuebergaenge.php>

- POMMER, C. (2005). *Region Erzgebirge - SWOT-Analyse für den Bereich „Umwelt“ Nutzung von grenzüberschreitenden natürlichen Ressourcen als Entwicklungspotential* (Analysis for the environmental area). In: RESNAFRONT. SWOT-Analyse. pp. 5-39.
- PORTAIL DE LA GRANDE RÉGION (2011). *Carte du réseau des Parcs Naturels de la Grande Région*. URL : http://www.granderegion.net/pictures/photos/shared/autres-cooperations-interregionales/RESEAU_PARCS_NATURELS_CARTE.pdf.
- Portal de las Comarcas de Aragón (2011). URL : <http://www.comarcas.es/index.php/mod.servicios/mem.listado/relcategoria.10/chk.a022f1134edcea05fde0b209371172a.html>
- PRAGUEMONITOR (2010). *Many Romani children fail to go on to higher education*. Online article on Prague Monitor on 30 December 2010. URL: <http://praguemonitor.com/2010/12/30/many-romani-children-fail-go-higher-education>
- PRESIDENCIA DEL GOBIERNO DE ESPAÑA (2005). *Plan de Actuación Específico para Teruel*. Gobierno de España, Madrid.
- PRESIDENCIA DEL GOBIERNO DE ESPAÑA (2005). *Plan de Actuación Específico para Soria*. Gobierno de España, Madrid.
- PRESIDENZA DELLA REGIONE SICILIA, DIPARTIMENTO REGIONALE DELLA PROGRAMMAZIONE. *Documento Unitario di Programmazione della Politica Regionale 2007-2013*. URL: http://194.243.81.173/Portals/0/Altri%20documenti/DUP_Sicilia_2007_2013_Deliber_a_n_206_2010.pdf
- PREUSSCHER, C. (2006). *Euroregionen haben sie sich bewährt? Funktionen, Aufgaben und Perspektiven* (Euroregions proven themselves? Functions, tasks and perspectives). In: JANSSEN, G. (ed.) *Europäische Verbünde für territoriale Zusammenarbeit (EVTZ)*. (European Association for territorial cooperation) Berlin. LIT Verlag, pp. 79-84.
- PRICE, M.F. (1999). *Cooperation in the European mountains 1: The Alps*. Cambridge and Gland, IUCN.
- PRICE, M.F., DIXON, B., WARREN, C.R. & MACPHERSON, A. (2002). *Scotland's Mountains: Key Issues for their Future Management*. Scottish Natural Heritage, Battleby.
- PRICE, M.F., LYSENKO, I. & GLØERSEN, E. (2004). *Delineating Europe's mountains*. In: *Revue de Géographie Alpine*, 92, 2, pp. 61-86.
- PRODES - Promotion of Renewable Energies for Water Production through Desalination. *Example of project development opportunities in Greece, Italy, Spain and Portugal*. URL: http://www.prodes-project.org/fileadmin/Files/D5_2_Developemtn_Opportunities.pdf
- Programa de actuación en las comarcas mineras 2008-2012. URL: http://www.ayudas.net/Programa_actuacion_comarcas_mineras_2008-8471BT1ERP15O2PQ.htm
- PROGRAMME OPERATIONNEL DE COOPERATION TERRITORIALE EUROPEENNE INTERREG IV FRANCE-SUISSE 2007-2013. URL: <http://www.europe-bourgogne.eu/engagement-europe/t-pointerreg-france-suisse.PDF>

- PROJET D'AGGLOMERATION (2007). *Projet d'agglomération franco-valdo-genevois*. Cahier annexe 1. Geneva.
- PRUTSCH, A., GROTHMANN, T., SCHAUSER, I., OTTO, S. & MCCALLUM, S. (2010). *Guiding Principles for Adaptation to Climate Change in Europe*. ETC/ACC Technical Paper 2010/6, November 2010. Copenhagen, European Environment Agency.
- PS PUBLIC SERVICE (2005). *Creating Communities of the Future*. Devolved Government Issue 10. Article on PublicService.co.uk on 13 December 2005. URL: http://m.publicservice.co.uk/article.asp?publication=Devolved%20Government&id=202&content_name=ICT&article=5215
- PUCHALA, P. (2011). *Feasibility check of the Tatra National Park's potential for PAN Parks certification*.
- PYLYNSKYI, Y. (2008). *Undocumented migration, Counting the Uncountable, Country Report – Ukraine*. Athens, ELIAMEP.
- QUINN, B. (2004). *Dwelling through multiple places: a case study of second home ownership in Ireland*. pp. 45 – 59, in, Hall, C.M. and Muller, D.K., *Tourism Mobility and Second Homes. Between Elite Landscapes and Common Ground*, Channel View Publications, Clevedon.
- RAI (2007). *Restaurant Association of Ireland - Annual Report 2007*.
- RASMUSSEN J. *Islands: Centres hubs, spheres and ... - metaphysical islandscapes in social theory*. URL: http://www.keg.lu.se/IGUislands/J_Rasmussen_paper_draft.pdf
- RAUSCHMAYER, F., PAAVOLA, J. & WITTMER, H. (2009). *European Governance of Natural Resources and Participation in a Multi-Level Context: An Editorial*. In: *Environmental Policy and Government*, 19, pp. 141-147.
- REC - THE REGIONAL ENVIRONMENTAL CENTER FOR CENTRAL AND EASTERN EUROPE (2007). *Trans-Boundary Cooperation through the management of shared natural resources - Experience and lessons from six years of work in three pilot areas – the Neretva Delta, Skadar/Shkodra Lake and West Stara Planina*. In: *Second Preparatory Conference to the 15th OSCE Economic and Environmental Forum, Zaragoza, Spain, 12-13 March 2007*.
- REC - THE REGIONAL ENVIRONMENTAL CENTER FOR CENTRAL AND EASTERN EUROPE. (n.d.). *West Stara Planina Activities*. URL : <http://archive.rec.org/REC/Programs/REREP/Biodiversity/planina/PlaninaActivities.html>
- RECAÑO, J. (2004). *Las migraciones internas de retorno en España durante la primera mitad de la década de los noventa; Implicaciones demográficas y territoriales*. *Papers de Demografia*, 243. Centre d'Estudis Demogràfics. Barcelona.
- REDDING, S. & VENABLES, A. J. (2004). *Economic geography and international inequality*. In: *Journal of International Economics* 62, pp. 53–82.

- REGERINGSKANSLIET (2011). *En nationell bredbandsstrategi*. URL: <http://www.sweden.gov.se/sb/d/12313>
- REGIONAL ENVIRONMENTAL RECONSTRUCTION PROGRAM (2003). *Project REReP 4.3.23: "Promotion of networks and exchange of experience between stakeholders in 3 crossborder sites: Neretva Delta, Skadar Lake and West Stara Planina"*. 6th REReP TF Meeting – 7th November 2003, Brussels.
- REGIONE SICILIA (2001). *Primo Rapporto sul Turismo in Sicilia*. URL: http://pti.regione.sicilia.it/portal/page/portal/PIR_PORTALE/PIR_LaStrutturaRegionale/PIR_TurismoSportSpettacolo/PIR_Turismo/PIR_6584964.046479105/sintesi.pdf
- REGIONE SICILIANA. *Analisi della Situazione Economica della Sicilia 1999-2003*. URL: http://194.243.81.173/Portals/0/Altri%20documenti/Analisi_SES.pdf
- REGIONE SICILIANA. *Piano Energetico Ambientale Regione Siciliana (P.E.A.R.S.)*. URL: http://pti.regione.sicilia.it/portal/page/portal/PIR_PORTALE/PIR_LaNuovaStrutturaRegionale/PIR_AssEnergia/PIR_DipEnergia/PIR_PianoEnergeticoAmbientaledellaRegioneSicilianaPEARS
- REICHMAN, S. & RATTI, R. (1993). *Theory and practice of transborder cooperation*. Basel/Frankfurt am Main.
- REITEL, B. & MOINE, A. (2005). *Entre Rhin et Jura, des espaces transfrontaliers où émergent des dissymétries spatiales*. In: *Mappemonde 77* (2005.1). URL: <http://mappemonde.mgm.fr/num5/articles/art05101.pdf>
- RENNIE, F. & MASON, R. (2005). *Bits or Baubles: The opportunities for broadband to add value to education and learning*. Scottish Affairs No. 53, pp. 31-47.
- REPUBLIQUE ET CANTON DE NEUCHÂTEL, DEPARTEMENT DE L'ÉCONOMIE: *Programme de mise en oeuvre de la loi fédérale sur la politique régionale pour la période 2008-2011*. URL: <http://www.regiosuisse.ch/telechargement/docs/grundlagen-fondements-basi/umsetzungsprogramme-programmes-de-mise-en-oeuvre/up-ne-2008-2011>
- REPUBLIQUE ET CANTON DU JURA (2011). *Utilisation du bois*. URL: <http://www.jura.ch/DEE/ENV/Forets/Filiere-Foret-Bois/Utilisation-du-bois.html>
- RIBEIRO, M., LOSENNO, C., DWORAK, T., MASSEY, E., SWART, R., BENZIE, M. & LAASER, C. (2009). *Design of guidelines for the elaboration of Regional Climate Change Adaptation Strategies*. Vienna, Ecologic Institute.
- RICARD, D. (2009). *Qualité des produits et maîtrise des marchés : le cas des fromages et des AOC jurassiennes*. In: *Norois 2009/1 - n° 210*, pp. 91-105. URL: <http://www.cairn.info/revue-norois-2009-1-page-91.htm>
- RICHARDSON, R., & BELT, V. (2001). *Saved by the Bell? Call Centres and Economic Development in Less Favoured Regions*. In: *Economic and Industrial Democracy* 22, pp. 67-98.
- RICO GONZALEZ, M. & GÓMEZ GARCÍA, JM. (2003). *Mujeres y despoblación en el medio rural de Castilla y León*. *AGER*, 3. 2003. *Revista de Estudios sobre Despoblación y Desarrollo Rural*. Pp. 151-184. Centro de Estudios sobre la Despoblación y Desarrollo en Areas Rurales (CEDDAR). Zaragoza, Spain.

- RITCHIE, H. & ELLIS, G. (2010) *A system that works for the sea? Exploring Stakeholder Engagement in Marine Spatial Planning*. In: *Journal of Environmental Management and Planning*, vol. 53, Issue 6, pp. 701-723.
- RKTL (2011). *Game and fisheries research Finland*. URL: <http://www.rktl.fi/>
- ROBERTS, A. et al. (2010). *Transnational comparison: A retrospective study on e-health in sparsely populated areas of the northern periphery*. In: *Telemed J E Health* 16(10), pp. 1053-9.
- ROBERTS, C.M., GELL, F.R. & HAWKINS, J.P. (2003). *Protecting nationally important marine areas in the Irish Sea Pilot Project region*. University of York.
- ROBERTS, C.M., GELL, F.R. & HAWKINS, J.P. (2003). *Protecting nationally important marine areas in the Irish Sea Pilot Project region*. University of York.
- ROBERTS, D. & THOMSON, K.J. (2000). *Sources of Structural Change in Peripheral Rural Areas: The Case of the Western Isles, 1988/89 to 1997*. Taylor and Francis Journals, Regional Studies.
- ROCH, I. (2009). *Entwicklungsphasen im sächsisch-böhmisch-schlesischen Dreiländereck* (Development phases in the Saxon-Bohemian-Silesian three corners area). In: *GEOSCAPE*, vol. 4, Suppl. pp. 9-36.
- ROCH, I. (2012). *Beschreibung des Untersuchungsgebiets*. In: LEIBNIZ INSTITUTE OF ECOLOGICAL URBAN AND REGIONAL DEVELOPMENT (IOER): Project ‚Begrüntes Dreiländereck – Evaluation umweltschonender Sanierungs- und Entwicklungsprozesse im deutsch-polnisch-tschechischen Dreiländereck‘ (english title: Green Border Triangle – An Evaluation of Environmentally Benign Rehabilitation and Development Processes in the German-Polish-Czech Border Triangle), unpublished manuscript.
- RODRIGUEZ M.C., GARCIA E. & POLEO A. (2005). *High Speed crafts in the Canary Islands*. In: *Journal of maritime research*, Vol. II. No. 2, pp. 81-91.
- RODRIGUEZ, J.-P. (2009). *Sustainable Initiatives in Marginal Rural Areas Of Serbia: A Case Study of Dimitrovgrad Municipality*. Budapest, Agroinform Publishing House.
- RODRIGUEZ, V. (2001). *Tourism as a recruiting post for retirement migration*. In: *Tourism Geographies* 3(1), pp. 52–63.
- ROEKAERTS, M. (2002). *The Biogeographical Regions Map of Europe: Basic principles of its creation and overview of its development*. Copenhagen, European Environment Agency.
- ROMANO, M. (2005). *Education in Sicily*. Best of Sicily Magazine. URL: <http://www.bestofsicily.com/mag/art181.htm>
- ROSS, C. & MCKINNON, K. (2011). Phone Interview with Claire Ross and Kateryna McKinnon, Highlands and Islands Enterprise, on 2 November 2011.
- ROSS, I. (2011). Personal Interview with Ian Ross, Councillor, the Highland Council, on 27 September 2011.

- ROYO GRACIA, JF. (2007). *Turismo deportivo en la provincial de Teruel*. STVDIVM. Revista de Humanidades, 13. Pp. 229-255.
- ROYO, G.J.F. (2007). *Turismo deportivo en la provincial de Teruel*. STVDIVM. Revista de Humanidades, 13, pp. 229-255.
- ROZENBLAT, C., & CICILLE, P. (2003). *Les villes européennes. Analyse comparative*. Montpellier, Maison de la Géographie.
- RSPB SCOTLAND, WWF SCOTLAND & FOE SCOTLAND (2006). *The Power of Scotland: Cutting Carbon with Scotland's Renewable Energy*.
- RUBIO TERRADO, P. & SANZ HERNDANDEZ, A. (coord) (2007). *Investigación aplicada al desarrollo de territorios rurales frágiles*. Prensas Universitarias de Zaragoza. FEDER. Diputación Provincial de Teruel. Revital. Universidad de Zaragoza.
- RUDOLF, B. (2011). *Zu wenig Wasser. Tschechien gehört zu den Ländern mit den niedrigsten Grundwasservorkommen Europas* (Too little water: the Czech Republic is one of the countries with the lowest supplies of groundwater in Europe). In: Prager Zeitung, January 27, 2011.
- RUFFINI, F.V., STREIFENEDER, T. & EISELT, B. (eds.) (2006). *Implementing an International Convention: An Approach for the Delimitation of the Carpathian Convention Area*. Bolzano, European Academy.
- RUFFRAY, S. DE & HAMEZ, G. (2009). *La dimension sociale de la cohésion territoriale. L'exemple de l'accessibilité aux maternités dans la Grande Région*. In: L'Espace Géographique 38(4), pp. 328-344.
- SAARI, S. (2006). *Balancing between Inclusion and Exclusion: The EU's Fight against Irregular Migration and Human Trafficking from Ukraine, Moldova and Russia*. Working Paper 'Challenge'. London School of Economics.
- SÄCHSISCHE STAATSKANZLEI (2009). *Sachsen – die Fakten 2009* (Saxony – the facts 2009). SV Saxonia Verlag GmbH, Dresden.
- SAGE, L. (2011). Phone Interview with Laurent Sage, Chambre de Commerce et d'Industrie, on 9 September 2011.
- SALEHI-ISFAHANI, D. & MURPHY JR., R.D. (2007). *Labour Market Flexibility and Investment in Human Capital*. URL: <http://www.filebox.vt.edu/users/salehi/creativity.pdf>
- SALOMON, I. (1998). *Technological Change and Social Forecasting: The Case of Telecommuting as a Travel Substitute*. Transport Research Part C 6, pp. 17-45.
- SANTONOCITO, S.D. *Sustainable Tourism and Carrying Capacity in the Mediterranean Area Focus on Sicily*. 3rd IRT International Scientific Conference Vol.1. URL: http://www.arces.it/public/Pubblicazioni_Ricerche/Turismo_Relazionale/Irt_conferenc/e/Paper%20Book/Vol%201/Paper%20Book_Vol1_8.pdf
- SANZ HERNANDEZ, M.A. (1998). *La explotación minera de Ojos Negros: repercusiones en la estructura social y en la cultura*. Teruel: Revista

- del Instituto de Estudios Turoleses, Vol. 86, Nº 2, 1998, pp. 157-192.
- SASSEN, S. (1991). *The global city: New York, London, Tokyo*. Princeton, Princeton Univ.
- SAXONY STATE STATISTICAL OFFICE (2009). *5. Regionalisierte Bevölkerungsprognose für den Freistaat Sachsen bis 2025, Stichtag 31.12.2008 (Variante 1)*.
- SAXONY STATE STATISTICAL OFFICE (2011). *Cross-border friendship database – Datenbank für grenzüberschreitende statistische Informationen, Tabellen und Zeitreihen zur Bevölkerung und Erwerbstätigkeit*. URL: www.statistik.sachsen.de
- SAYRE, L. (2005). *The EU's organic tiger*. Article on the website of the RODALE INSTITUTE of November 10, 2005. URL: <http://newfarm.rodaleinstitute.org/international/features/2005/1105/italy1/sayre.shtml>
- SCCIP (2010). *Local Climate Impacts Profile: Highland Council*.
- SCHRÖTER, D., ACOSTA-MICHLIK, L., ARNELL, A.W., ARAÚJO, M.B., BADECK, F., BAKKER, M., BONDEAU, A., BUGMANN, H., CARTER, T., DE LA VEGA-LEINERT, A.C., ERHARD, M., ESPÍÑEIRA, G.Z., EWERT, F., FRITSCH, U., FRIEDLINGSTEIN, P., GLENDINING, M., GRACIA, C.A., HICKLER, T., HOUSE, J., HULME, M., KANKAANPÄÄ, S., KLEIN, R.J.T., KRUKENBERG, B., LAVOREL, S., LEEMANS, R., LINDNER, M., LISKI, J., METZGER, M.J., MEYER, J., MITCHELL, T., MOHREN, F., MORALES, P., MORENO, J.M., REGINSTER, I., REIDSMA, P., ROUNSEVELL, M., PLA, E., PLUIMERS, J., PRENTICE, I.C., PUSSINEN, A., SÁNCHEZ, A., SABATÉ, S., SITCH, S., SMITH, B., SMITH, J., SMITH, P., SYKES, M.T., THONICKE, K., THUILLER, W., TUCK, G., VAN DER WERF, G., VAYREDA, I., WATTENBACH, M., WILSON, D.F., WOODWARD, F.I., ZAEHLE, S., ZIERL, R., ZUDIN, S. & CRAMER, W. (2004). *ATEAM Final report. Section 5 and 6 and Annex 1 to 6*. Detailed report, related to overall project duration. Reporting period: 01.01.2001-30.06.2004.
- SCHULER, M., DESSEMONTET, P., JEMELIN, C., JARNE, A., PASCHE, N., HAUG, W. (2007). *Atlas des mutations spatiales de la Suisse*. Zurich, NZZ Libro.
- SCHULTZ, T.W. (1961). *Investment in Human Capital*. In: *The American Economic Review*, Vol.51 No.1. URL: http://www.ciefr.com/download/2009_02/09022516022200.pdf
- SCOTT, J. & MATZEIT, S. (eds.) (2006). *EXLINEA "Lines of Exclusion as Arenas of Co-operation: Reconfiguring the External Boundaries of Europe – Policies, Practices, Perceptions"*, FINAL PROJECT REPORT. URL: http://www.exlinea.comparative-research.net/fileadmin/user_upload/reports_and_publications/exlinea%20final%20report.pdf
- SCOTTISH COUNCIL FOR VOLUNTARY ORGANISATIONS (2011). *Climate Change: How will vulnerable groups weather the storm?* Highlands & Islands Equality Forum.

- SCOTTISH ENTERPRISE (2005). *Marine Renewable (Wave and Tidal) Opportunity Review*.
- SCOTTISH ENTERPRISE (2010). *Innovation in Offshore Wind - support structures*.
- SCOTTISH EXECUTIVE (2004). *The Economic Impact of Game and Coarse Angling in Scotland*.
- SCOTTISH EXECUTIVE (2007). *Scottish Marine Renewable SEA - Environmental Report Section B: Marine Renewables - Resource and Technology*.
- SCOTTISH EXECUTIVE (2007). *Scottish Marine Renewables SEA - Environmental Report Section A: Introduction, Background and Method*.
- SCOTTISH GOVERNMENT (2007). *Energising the Outer Hebrides*. National Planning Framework 2008-12. Outer Hebrides Submission. URL: <http://www.scotland.gov.uk/Resource/Doc/187960/0052049.pdf>
- SCOTTISH GOVERNMENT (2008). *Highlands and Islands Scotland: European Regional Development Fund 2007-2013: Structural Funds Operational Programme: Annex F: Summary of Environmental Situation*.
- SCOTTISH GOVERNMENT (2008). *Highlands and Islands Scotland: European Regional Development Fund 2007-2013: Structural Funds Operational Programme: Socio-Economic Background*.
- SCOTTISH GOVERNMENT (2008). *Review of the Air Discount Scheme*. Scottish Government Social Research.
- SCOTTISH GOVERNMENT (2010). *Lewis wind farm*. News Release of 14/01/2010. URL: <http://www.scotland.gov.uk/News/Releases/2010/01/14095411>
- SCOTTISH GOVERNMENT (2010). *Specification - Council Regulation (EC) No 510/2006 on protected geographical indications and protected designations of origin "Stornoway Black Pudding"*. URL: <http://www.scotland.gov.uk/Publications/2010/12/08144650/2>
- SCOTTISH GOVERNMENT (2010). *Target for renewable energy now 80 per cent*. Press release on 23/09/2010. URL: <http://www.scotland.gov.uk/News/Releases/2010/09/23134359>
- SCOTTISH GOVERNMENT (2011). *Developing High Nature Value Farming and Forestry Indicators for the Scotland Rural Development Programme*. Edinburgh.
- SCOTTISH GOVERNMENT (2011). *Scotland's Digital Future: A Strategy for Scotland*.
- SCOTTISH NATURAL HERITAGE (1995). *The Natural Heritage of Scotland - an Overview*. Mackey, E.C. (ed.). Scottish Natural Heritage, Perth.
- SCOTTISH PARLIAMENT (2002). *Rural Tourism*. SPICe Briefing 02/92. Produced for the Enterprise and Lifelong Learning Committee.
- SEAI – SUSTAINABLE ENERGY AUTHORITY OF IRELAND (2010). *Strategic Environmental Assessment (SEA) of the Offshore Renewable Energy*

- Development Plan (OREDP) in the Republic of Ireland. Environmental Report Volume 2: Main Report.*
- SEAI – SUSTAINABLE ENERGY AUTHORITY OF IRELAND (2011). *Assessment of the Irish Ports and Shipping Requirements for the Marine Renewable Energy Industry*. Prepared on behalf of the SEAI in cooperation with IMDO Ireland.
- SEAI – SUSTAINABLE ENERGY AUTHORITY OF IRELAND (2011). *Assessment of the Irish Ports and Shipping Requirements for the Marine Renewable Energy Industry*. Prepared on behalf of the SEAI in cooperation with IMDO Ireland.
- SEPA SCOTTISH ENVIRONMENT PROTECTION AGENCY (2008). *Changes in river flow variability in snow influenced catchments in Scotland*.
- SERVILLO, L. (2010). *Territorial Cohesion Discourses: Hegemonic Strategic Concepts in European Spatial Planning*. In: Planning Theory & Practice, Vol. 11, No. 3, pp. 397-416.
- SHUCKSMITH, M. & PHILIP, L. (2000). *Social Exclusion in Rural Areas: A Literature Review and Conceptual Framework*. Scottish Executive, Edinburgh.
- SicilianelCuore.net (n.d.): *Aree protette*. Article on SicilianelCuore.net. URL: <http://www.sicilianelcuore.net/aree-protette/>
- SICILIAPARCHI (2009). *Isolabella, esposto Wwf*. Notizia - 09 Ottobre 2009. URL: http://www.siciliaparchi.com/_newsArchivio.asp?idnews=4173
- SIEGRIST, D., AUFDEREGGEN, M., LINTZMEYER, F., & SPIESS, H. (2007). *The Economic Potential of Regional Nature Parks in Switzerland: A Case Study of the Planned Regional Nature Parks in the Canton of Bern*. In: Ingo Mose (ed): Protected Areas and Regional Development in Europe. Ashgate Publishing, Aldershot.
- SIMCO, N. & CAMPBELL, G. (2011). *Developing blended learning in higher education – a case study of the University of the Highlands and Islands*. In: Practitioner Research in Higher Education, Vol 5, No 1.
- SIMMIE, J. & MARTIN, R. (2010). *The economic resilience of regions: towards an evolutionary approach*. In: Cambridge Journal of Regions, Economy and Society, 3, pp. 27-43.
- SIMMONDS, M.P. & DOLMAN, S.J. (2007). *All at Sea: Renewable Energy Production in the Context of Marine Nature Conservation*. Proceedings of the ASCOBANS/ECS Workshop Off shore Windfarms and Marine Mammals: Impacts and Methodologies for Assessing Impacts. (Editor Evans, P.G.H) ECS Special Publication Series No. 49. Feb 2008.
- SIMON FERNANDEZ, B., AIXALA PASTO, J., PEREY Y PEREZ, L. & SANAU VILLARROYA, J. (2009). *Efectos económicos de la energía eólica en Aragón (1996-2012)*. Economía Aragonesa 56.
- SIMON, P. & ACKER, D. (2009). *La place de la télémédecine dans l'organisation des soins*. Direction de l'Hospitalisation et de l'Organisation des Soins, Ministère de la Santé et des Sports. URL: http://www.sante.gouv.fr/IMG/pdf/Rapport_final_Telemedecine.pdf

- SIMPSON, C. (2011). Phone Interview with Colin Simpson, Tourism Co-ordinator, The Highland Council, on 1 November 2011.
- SKERRATT, S. (2010). *Hot Spots and Not Spots: Addressing Infrastructure and Service Provision through Combined Approaches in Rural Scotland*. In: *Sustainability 2*, pp. 1719-1741.
- SKJÆRSETH, J.B. & WETTESTAD, J. (2002). *Understanding the Effectiveness of EU Environmental Policy: How Can Regime Analysis Contribute?* In: *Environmental Politics*, 11(3), pp. 99-120.
- SKOWRONEK, E. & FURTAK, T. (2009). *Determinants of Change in the Landscape of the Polish-Ukrainian Borderland as exemplified by Rawa Roztocze*. In: *Journal of Borderlands Studies*, vol. 24, no. 2, pp. 106-122.
- SLAVIK, J. (2010). *Entwicklungsphasen des deutsch-polnisch-tschechischen Grenzraums aus wirtschaftlicher, sozialer und Umweltsicht* (Development phases of the German-Polish-Czech border area from an economic, social and environmental perspective). In: *GEOSCAPE* vol. 5, Suppl., pp. 14-22.
- SLAVÍK, J., MORAVEC, J., RYBOVÁ, K. & SLÁNSKÁ, V. (2007). *Begrüntes Dreiländereck – Entwicklung von Natur- und Landschaftsschutz* (Stand Anfang der 1990er Jahre bis heute). Internal materials for the IOER project „Begrüntes Dreiländereck“ (english title: Green Border Triangle), unpublished manuscripts.
- SMART CONSULTANCY (2010). *Highland Employer Coalition - Review Of Homeworking Pilot Project*. Report prepared for Highlands and Islands Enterprise, Vertex and Highland Employer Coalition.
- SMEULDERS, E. & LATTEN, J. (2009). *De verborgen aantrekkingskracht van Parkstad Limburg*. In: J. Latten & S. Musterd (eds.), *De nieuwe groei heet krimp; een perspectief voor Parkstad Limburg*. The Hague, Nicis Institute, pp. 71 – 83.
- SMILIES – SMALL MEDITERRANEAN INSULAR LIGHT INDUSTRIES ENHANCEMENT & SUPPORT. *Local Studies Sicily*. Project co-financed by ERDF. URL: http://www.regione.sicilia.it/cooperazione/print/doc/Sicily_Local_study.pdf
- SMIT, B. & PILIFOSOVA, O. (2001). *Adaptation to climate change in the context of sustainable development and equity*. In: IPCC 2001: Climate Change 2001 - Impacts, Adaptation, and Vulnerability- Contribution of the Working Group II to the Third Assessment report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, pp. 877-912.
- SMIT, B. & WANDEL, J. (2006). *Adaptation, adaptive capacity and vulnerability*. In: *Global Environmental Change*, 16, pp. 282-292.
- SMITH, A. D. (1995). *Nations and Nationalism in a Global Era*. Cambridge.
- SMITH, K. (2002). *Assessing the Economic Impacts of ICT*. STEP Report R-01, STEP Group, Oslo.

- SMITH, K. (2006). *The outsiders: the European neighbourhood policy*. In: Balzacq, Thierry and Carrera, Sergio, (eds.) *Security versus freedom? A challenge for Europe's future*. Ashgate, Aldershot.
- SMWA (1994). *Entwicklungs- und Handlungskonzept Euroregion Elbe/Labe* (Development and action concept for the Elbe Euroregion). Kommunalentwicklung Baden-Württemberg GmbH for the Saxon State Ministry for Economics and Labour.
- SOHN, C. & STAMBOLIC, N. (2012). *Typology of border regions according to their urban potential*. CEPS/INSTEAD.
- SOHN, C. & WALTHER, O. (2012). *Building a cross-border metropolitan region: the political stakes of scalar restructuring*. In: Sohn C. (ed.) *Luxembourg: an emerging cross-border metropolitan region*. Brussels, Peter Lang, pp. 265-278.
- SOHN, C., REITEL, B. & WALTHER, O. (2009). *Cross-border metropolitan integration in Europe: the case of Luxembourg, Basel and Geneva*. In: *Environment and Planning C: Government and Policy* 27, pp. 922-939.
- SOJA, W.E. (1999). *Postmetropolis Critical studies of cities and regions*. Blackwell publishers.
- SOLSTEN, E. & MEDITZ, S.W. (1988). *Spain: A Country Study*. Washington, GPO for the Library of Congress. URL: <http://countrystudies.us/spain/>
- SORIA YA! (2011). *La Numantrina*. La voz de Soria Ya! n.4 Primavera 2011. Soria.
- SPEHN, E., RUDMANN-MAURER, K, KÖRNER, C. & MASELLI, D. (2010). *Mountain Biodiversity and Global Change*. GMBA-Diversitas, Basel.
- SQUIRES, N. & MEO, N. (2010). *Mafia cash in on lucrative EU wind farm handouts - especially in Sicily*. Article on the Telegraph on 05 Sep 2010. URL: <http://www.telegraph.co.uk/earth/energy/renewableenergy/7981737/Mafia-cash-in-on-lucrative-EU-wind-farm-handouts-especially-in-Sicily.html>
- STANKOV, U., STOJANOVIĆ, V., DRAGIĆ, V., & ARSENOVIĆ, D. (2011). *Ecotourism - An Alternative to Mass Tourism in Nature Park "Stara Planina"*. In: *Journal of the Geographical Institute "Jovan Cvijic"* 61(1), pp. 43-59.
- STATE STATISTICS COMMITTEE OF UKRAINE (SSCU) (2009). *Ukrainian External Labour Migration*. Ukrainian Center for Social Reforms (UCSR), Kiev.
- STATISTICS FINLAND: <http://www.stat.fi/index.html>
- STATISTICS NORWAY: <http://www.ssb.no/>
- STATISTICS SWEDEN: <http://www.scb.se/>
- STATISTISCHES LANDESAMT DES FREISTAATES SACHSEN (2009). *5. Regionalisierte Bevölkerungsprognose für den Freistaat Sachsen bis 2025* (Fifth regionalized population prognosis for the state of Saxony through 2025).

- STEJSKAL, J. (2005). *Czech Republic: Towards the Reclamation of Derelict Land*. In: MÜLLER, B., FINKA, M. & LINTZ, G. (eds.) *Rise and Decline of Industry in Central and Eastern Europe. A Comparative Study of Cities and Regions in Eleven Countries*. Berlin. (Central and Eastern European Development Studies - CEEDES), pp. 69-80.
- STELZENMÜLLER, V., ROGERS, S. I. & MILLS, C. M. (2008). Spatio-temporal patterns of fishing pressure on UK marine landscapes, and their implications for spatial planning and management. – *ICES Journal of Marine Science*, vol. 65, pp. 1081–1091.
- STERN, N. (2006). *The Economics of Climate Change. Executive Summary*. Cambridge, Cambridge University Press.
- STETTER, S. (2006). *Border Conflicts in Europe*. URL: www.uni-bielefeld.de/Universitaet/Einrichtungen/Pressestelle/dokumente/BI_research/29_2006/Forschungsmagazin_1_06_Grenzkonflikte_76_80.pdf
- STIGLITZ, J.E. (1999). *Public Policy for a Knowledge Economy*. Center for Economic Policy Research, London.
- STIGLITZ, J. (2006): *Making globalization work*. W.W. Norton & Company.
- STOCKDALE, A. & BARKER, A. (2009). *Sustainability and the multifunctional landscape: An assessment of approaches to planning and management in the Cairngorms National Park*. In: *Land Use Policy*, 26, pp. 479-492.
- STOCKDALE, E. (2004). *Rural Out-Migration: Community Consequences and Individual Migrant Experiences*. In: *Sociologia Ruralis*, Vol.44 No.2, Blackwell Publishing, Oxford.
- STOREY, K. (2001). *Fly-in/Fly-out and Fly-over: Mining and regional development in Western Australia*. In: *Australian Geographer*, Volume 32, Issue 2, pp. 133-148.
- STORPER, M. & VENABLES, A. (2004). *Buzz: face-to-face contact and the urban economy*. In: *Journal of Economic Geography*, vol. 4(4), pp. 351-370.
- SURCHAT VIAL, N., BESSAT, F. & ROULET P (eds) (2010). *Genève Agglo 2030. Un projet pour dépasser les frontières*. Marseille, Parenthèses.
- SUSTAINABLE DEVELOPMENT RESEARCH CENTRE (n.d.). *The contribution of the social enterprise sector to the wastes management industry in the Highlands and Islands*.
- SUTTON, G., O'MAHONY, C., MCMAHON, T., Ó'CONNOR, M. & NIXON, E. (2008). *IMAGIN Policy Report - Issues and Recommendations for the Development and Regulation of Marine Aggregate Extraction in the Irish Sea*. In: *Marine Environment & Health Series*, No. 32.
- ŠVAJDA, J. (2008). *Participatory conservation in a post-communist context: The Tatra National Park and Biosphere Reserve, Slovakia*. In: *International Journal of Biodiversity Science & Management*, Vol. 4, Issue 4.
- ŠVAJDA, J. & FENICHEL, E. (2011). *Evaluation of Integrated Protected Area: Management in Slovak National Parks*. In: *Polish J. of Environ.*

- Stud. Vol. 20, No. 4, pp. 1053-1060. URL:
http://cmsdata.iucn.org/downloads/pjoes_svajda_vol_20_no_4_2011__2_.pdf
- ŠVAJDA, J. (2007). *Slovakia: Tatry National Park - Site fact file. Natura 2000 networking programme.* URL:
http://www.natura.org/sites_sk_tatry.html
- SWART, R., BIESBROEK, R., BINNERUP, S., CARTER, T., COWAN, C., HENRICH, T., LOQUEN, S., MELA, H., MORECROFT, M., REESE, M., & REY, D. (2009). *Europe Adapts to climate Change: Comparing National Adaptation Strategies.* PEER Report, no. 1, Helsinki: Partnership for European Environmental Research. URL:
<http://www.peer.eu>
- SWIFT, L.J., DEVOY, R.J.N., WHEELER, A.J., SUTTON, G.D., & GAULT, J. (2004). *Sedimentary dynamics and coastal changes on the south coast of Ireland.* In: *Journal of Coastal Research*, SI 39, pp. 227-232.
- SWISS PARKS NETWORK/NETZWERK SCHWEIZER PÄRKE (Unterstützt vom Bundesamt für Umwelt BAFU) (2011). URL: <http://www.netzwerk-parke.ch/en/index.php>
- TACZANOWSKA, K. (2004). *The Potentials for Developing Cross-border Tourism between Poland and Slovakia in the Tatra Mountains.* Working Papers of the Finnish Forest Research Institute 2. URL:
<http://www.metla.fi/julkaisut/workingpapers/2004/mwp002.htm>
- TÄGIL, S. (ed.) (1999). *Regions in Central Europe. The Legacy of History.* London.
- TALOUSELÄMÄ (2011). *Suomi ja Ruotsi tappelevat kaivosmiehistä.* Talouselämä. URL:
<http://www.talouselama.fi/uutiset/suomi+ja+ruotsi+tappelevat+kaivosmiehista/a713655>
- TAYLOR, P. & ARANYA, R. (2008). *A global 'urban roller coaster'? Connectivity changes in the world city network, 2000-2004.* In: *Regional Studies* 42(1), pp. 1-16.
- TEEB (2010). *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB.* URL: http://www.teebweb.org/LinkClick.aspx?fileticket=bYhDohL_TuM%3d&tabid=924&mid=1813
- TERRY, A., ULLRICH, K. & RIECKEN, U. (2006). *The Green Belt of Europe: From Vision to Reality.* IUCN, Gland and Cambridge.
- THACKRAY, D. (2005). *Safeguarding Coastal Culture in the UK: the experience of The National Trust for England, Wales and Northern Ireland.* Proceedings of the Europa Nostra Forum, Bergen, Norway.
- THE ASSOCIATION OF FINNISH LOCAL AND REGIONAL AUTHORITIES (2011). *Local government reform and the New Municipality 2017 programme.* URL:
<http://www.localfinland.fi/en/authorities/newmunicipality2017/Pages/default.aspx>
- THE MERSEY PARTNERSHIP (2008). *Liverpool Super Port.* The Mersey Partnership.

- THE OUTER HEBRIDES COMMUNITY PLANNING PARTNERSHIP (2009). *Forward Together, Single Outcome Agreement 2009-2010*. URL: http://www.ohcpp.org.uk/Single_Outcome_Agreement.pdf
- THE OUTER HEBRIDES FISHERIES TRUST (2009). *Fisheries Management Plan*. URL: <http://ohft.reefnet.co.uk/wp-content/uploads/2010/02/OHFT-FMP.pdf>
- THE ROYAL SOCIETY OF EDINBURGH (2008). *Committee of Inquiry into the Future of Scotland's Hills and Islands - Report*.
- THISSEN, F. & POELMAN, B. (2009). *Wat hebben grensgebieden gemeen?* In: J. Latten and S. Musterd (eds.), *De nieuwe groei heet krimp; een perspectief voor Parkstad Limburg*. The Hague, Nicis Institute, pp. 47 – 56.
- TISCALI SICILIA (2011).TOL, E.A.J. (2002a). *New Estimates of the Damage Costs of Climate Change, Part I: Benchmark Estimates*. In: *Environmental and Resource Economics*, 21, pp. 47-73.
- TOL, E.A.J. (2002b). *New Estimates of the Damage Costs of Climate Change, PartII: Dynamic Estimates*. In: *Environmental and Resource Economics*, 21, pp. 135-160.
- TOL, R.S.J. & YOHE, G.W. (2007). *The weakest link hypothesis for adaptive capacity: An empirical test*. In: *Global Environ. Chang.*, 17, pp. 218-227.
- TOLON-BECERRA, A., LASTRA-BRAVO, X.B., STEENBERGHEN, T. & DEBECKER, B. (2011). *Current situation, trends and potential of renewable energy in Flanders*. *Renewable and Sustainable Energy Reviews* 15, pp. 4400– 4409.
- TOPALOGLOU, L., KALLIORAS, D. & VENIERIS, S. (2009). *Tracing the Determinants of Economic Cross-Border Interaction in the European Union*. In: *Spatium*, 21 (1).
- TOPALOGLOU, L., KALLIORAS, D., MANETOS, P. & GEORGE PETRAKOS, G. (2005). *A Border Regions Typology in the Enlarged European Union*. In: *Journal of Borderlands Studies*, Volume 20, No. 2.
- TORNEDALS RÅDET (2009). *Ishavsbanen – Mulighetsstudie jernbane Kolari-Skibotn*. SWECO. URL: <http://img9.custompublish.com/getfile.php/953985.1229.urywvaqpcq/Prosjektrappor t+19.06.09.pdf?return=www.storfjord.kommune.no>
- TOURISM FLANDERS (2002). *Strategisch beleidsplan voor Toerisme en Recreatie aan de kust* (Strategic Policy Plan for Tourism and Recreation at the coast). Westtoer.
- TOURISM IRELAND (2009a). *Facts & Figures 2008, Island of Ireland*. Brochure, Tourism Ireland.
- TOURISM IRELAND (2009b). *Quarterly Situation & Outlook July 2009*, Brochure, Tourism Ireland.
- TRANSPORT SCOTLAND (2008). *Scottish Road Network Landslides Study: Implementation*. Transport Scotland, Edinburgh.

- TRAPANI SICILIA (n.d.). *Egadi Islands*. Website of the province of Trapani.
URL: http://www.trapani-sicilia.it/english/isole_egadi.htm
- TRAVIS, A. (2011). *Planning for Tourism, Leisure and Sustainability: International Case Studies*. CABI.
- TSAYEM DEMAZE, M. (2009). *Le parc amazonien de Guyane française : un exemple du difficile compromis entre protection de la nature et développement*. In: *Cybergeo: European Journal of Geography, Environnement, Nature, Paysage*, article 416.
URL : <http://cybergeo.revues.org/17203>
- TSCHECHISCHER HYDROMETEOROLOGISCHER DIENST (ČHMÚ),
WOJEWODSCHAFTSINSPEKTORAT FÜR UMWELTSCHUTZ (WIOŚ),
SÄCHSISCHES LANDESAMT FÜR UMWELT UND GEOLOGIE (LFUG) &
UMWELTBUNDESAMT (UBA) (2003). *Gemeinsamer Bericht zur Luftqualität im Schwarzen Dreieck 2002* (Joint air quality report in the Black Triangle).
- TSP2020 – The Territorial State and Perspectives of the European Union -
2011 update. Background document for the Territorial Agenda of
the European Union 2020. URL : http://www.ums-riate.fr/documents/Territorial_State_and_Perspective_of_the_EU-update_2011.pdf
- TURKU SCHOOL OF ECONOMICS AND BUSINESS ADMINISTRATION
(SAARA LOUKO) (2008). Deliverable 11: Regional Summary Report-
Tornio, Finland, From FP6 project: Challenges and Prospects of Cross
Border Cooperation in the Context of EU Enlargement. URL:
<http://www.crossbordercoop.net/Publications/RSR%20Tornio%20Haparanda.pdf>
- TURNER, B.L., KASPERSON, R.E., MATSON, P.A., MCCARTHY, J.J.,
CORELL, R.W., CHRISTENSEN, L., ECKLEY, N., KASPERSON, J.X.,
LUERS, A., MARTELLO, M.L., POLSKY, C., PULSIPHER, A., & SCHILLER,
A. (2003). *A framework for vulnerability analysis in sustainability science*. In: *PNAS*, vol. 100, no. 14, pp. 8074-8079.
- TUULIVOIMAYHDISTYS (2011). *Tuulivoimalaitokset Suomessa*. URL:
<http://www.tuulivoimayhdistys.fi/tuulivoimalaitokset>
- UBA - UMWELTBUNDESAMT (2011). *Überschreitung der Critical Loads für Stickstoff (Eutrophierung)*. URL: <http://www.umweltbundesamt-daten-zur-umwelt.de/umweltdaten/public/theme.do?nodeIdent=2870>
- UCHIDA, H. & NELSON, A. (2009). *Agglomeration index: towards a new measure of urban concentration*. Background paper for the World Bank's World Development Report 2009.
- UHI MILLENNIUM INSTITUTE (2008). *Strategic Plan 2008-2011*.
Inverness.
- UHLIG, J. (2005). *Region Erzgebirge – SWOT-Analyse für den Bereich „Raumplanung“ – Raumplanung, Flächennutzungsplanung und regionale Entwicklung*. In: RESNAFRONT SWOT-Analyse – Nutzung von grenzüberschreitenden natürlichen Ressourcen als Entwicklungspotential.
- UK NATIONAL ECOSYSTEM ASSESSMENT (2011): The UK National Ecosystem Assessment: Technical Report. UNEP-WCMC, Cambridge.

- UKCP09. (n.d.). *Key Findings for Scotland North*. URL: <http://ukclimateprojections.defra.gov.uk/content/view/2153/499/>
- UKRAINIAN REFUGEE COUNCIL (2010). *The EU-Ukraine readmission agreement – Myths, facts and risks*. Press Statement. URL: http://bordermonitoring-ukraine.eu/files/2010/03/URC_Press_Release.pdf
- UMWELTBUNDESAMT (2007a). *Umweltsituation in Österreich: Achter Umweltkontrollbericht des Umweltbundesamtes*. Wien, Umweltbundesamt GmbH.
- UMWELTBUNDESAMT (2007b). *Wald und Waldnutzung*. In: *Umweltsituation in Österreich: Achter Umweltkontrollbericht des Umweltbundesamtes*. Wien, Umweltbundesamt GmbH, pp. 95-104.
- UNEP, FOREST TRENDS & THE KATOOMBA GROUP (2008): *Payments for Ecosystem Services - Getting Started: A Primer*. Forest Trends, The Katoomba Group, and UNEP.
URL: http://www.unep.org/pdf/PaymentsForEcosystemServices_en.pdf
- UNESCO (2011). *Atlas of the World's Languages in Danger*. UNESCO Publishing, Paris.
- UNFCCC (2009). *Copenhagen Accord. Decision CP.15*. FCCC/CP/2009/L.7, 18 December 2009, UNFCCC COP 15, 7.-18 December 2009.
- UNHCR (2011). *UNHCR's Recommendations to Poland for its EU Presidency*. URL: www.unhcr.org/4df8d00f9.pdf
- UNHCR (2011a). *Ukraine. 2012 Regional Operations Profile - Eastern Europe. Working environment*. URL: <http://www.unhcr.org/pages/49e48d4d6.html>
- UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP) (2007). *Carpathians Environmental Outlook 2007*. Geneva, UNEP.
- URQUHART, J. & ACOTT, T. (2011). *Fishing cultures: marine fisheries and sense of place in coastal communities*. In: "It's Not Just About the Fish": social and cultural perspectives of sustainable marine fisheries, 4-5 Apr 2011, Greenwich, London.
- UTBILDNING NORD (2012). Website Utbildning Nord - Koulutus Nord - Utdanning Nord. URL: <http://www.utbnord.se>
- VAN DEN EYNDE, D. & NORRO, A. (2009). *Modelling the effect of sand extraction on the Kwinte Bank*. Proceedings of the European Marine Sand and Gravel Group (EMSAGG) Conference, 7-8 May 2009 Frentani Conference Centre, Rome, Italy.
- VAN DER BIEST, K., VERWAEST, T. & REYNS, J (2008). *Assessing climate change impacts on flooding risks in the Belgian coastal zone*. LITTORAL 2008. A Changing Coast: Challenge for the Environmental Policies, Venice.
- VAN EUPEN, M., METZGER, M.J., PÉREZ-SOBA, M., VERBURG, P.H., VAN DOORN, A. & BUNCE, R.G.H. (2012). *A rural typology for strategic European policies*. In: *Land Use Policy* 29, pp. 473– 482.
- VAN HOUTUM, H. & GIELIS, R. (2006). *Elastic migration: the case of Dutch short-distance transmigrants in Belgian and German*

- borderlands*. In: Tijdschrift voor Economische en Sociale Geografie 97(2), pp. 195-202.
- VAN HOUTUM, H. & SCOTT, J. (2005). *Policy Considerations of Project Results: "Good Practices" and Situational Ethics of Cross-Border Cooperation*. EXLINEA Policy Paper, Berlin and Nijmegen.
- VAN LANCKER, V., DU FOUR, I., VERFAILLIE, E., DELEU, S., SCHELFAUT, K., FETTWEIS, M., VAN DEN EYNDE, D., FRANCKEN, F., MONBALIU, J., GIARDINO, A., PORTILLA, J., LANCKNEUS, J., MOERKERKE, G. & DEGRAER, S. (2007). *Management, research and budgeting of aggregates in shelf seas related to end-users (Marebasse)*. Final Scientific Report. Belgian Science Policy.
- VAN ROMPAEY, A., SCHMITZ, S., KESTELOOT, C., PEETERS, K., MOENS, B., VAN HEMELRIJCK, H., VANDERHEYDEN, V., LOOPMANS, M., & VANDEN BROUCKE, S. (2011). *Landscape capacity and social attitudes towards wind energy projects in Belgium "LACSAWEP"*. Final Report. Brussels, Belgian Science Policy 2011. (Research Programme Science for a Sustainable Development).
- VANOLO, A. (2010). *European Spatial Planning Between Competitiveness and Territorial Cohesion: Shadows of Neo-liberalism*. In: European Planning Studies Vol. 18, No. 8.
- VELTZ, P. (2005). *Mondialisation, villes et territoires : une économie d'archipel*. PUF.
- VERBURG, P.H., OVERMARS, K.P. & WITTE, N. (2004). *Accessibility and land use patterns at the forest fringe in the Northeastern part of the Philippines*. In: Geographical Journal 170, pp. 238-255.
- VERBURG, P.H., VAN BERKEL, D.B., VAN DOORN, A.M., VAN EUPEN, M. & VAN DEN HEILIGENBERG, H.A.R.M. (2010). *Trajectories of land use change in Europe: a model-based exploration of rural futures*. In: Landscape Ecology 25, pp. 217-232.
- VERWAEST, T., VANNEUVILLE, W., PEETERS, P., MERTENS, T. & DE WOLF, P. (2007). *Uncertainty on coastal flood risk calculations, and how to deal with it in coastal management: case of the Belgian coastal zone*. In: Flood Risk Assessment II: proceedings of a conference held by the Institute of Mathematics and its Applications, September 2007. pp. 151-157.
- VFR (2011). *Region schafft Zukunft , Ergebnisse auf den Masterplan für Werra-Meißner-Kreis*. Verein für Regionalentwicklung Werra-Meißner e.V., Eschwege.
- VILLEGAS, A. (2011). Personal Interview with Ailsa Villegas, Sustainable Development Officer, Highland Council, on 28 September 2011.
- VINCENT, M.A., ATKINS, S.M., LUMB, C.M., GOLDING, N., LIEBERKNECHT, L.M. & WEBSTER, M. (2004). *Marine nature conservation and sustainable development - the Irish Sea Pilot*. Report to Defra by the Joint Nature Conservation Committee, Peterborough.

- VIRTANEN, V. (2011). *Aluebarometri 2012 – Regionbarometern 2012*. Työ- ja elinkeinoministeriön julkaisuja 42/2011. URL: http://www.tem.fi/files/31464/TEMjul_42_2011_web.pdf
- VOLMERT, A. (2008). *The Reinterpretation of Political Tradition: The Catholic Roots of Jurassian Nationalism*. In: Nationalism and Ethnic Politics, 14, pp. 395–427.
- WALTHER, O. (2012). *Metropolitan regions and cross-border demographic integration*. In: Sohn C. (ed) Luxembourg: an emerging cross-border metropolitan region. Brussels, Peter Lang, pp. 185-204.
- WALTHER, O., SCHULZ, C. & DÖRRY, S. (2011). *Specialized international financial centres and their crisis resilience: the case of Luxembourg*. In: Geographische Zeitschrift 99 (in press).
- WARD, W.A. & HITE, J.C. (1998). *Theory in Rural Development: An Introduction and Overview*. In: Growth and Change, Vol. 29:3, pp. 245–258.
- WARREN, C.R. & BIRNIE, R.V. (2009). *Re-powering Scotland: Wind farms and the 'energy or environment' debate*. In: Scottish Geographical Journal, 125, pp. 97-126.
- WARREN, C.R. (2009). *Managing Scotland's Environment*, 2nd edition. Edinburgh University Press.
- WATKISS, P. (2009). *Literature Review for the Scoping Study for a National Climate Change Risk Assessment and Cost-Benefit Analysis*. Defra Contract number GA0208. Metroeconomica, AEA group, and Paul Watkiss Associates. Published by Defra.
- WATTAGE, P. (2011). *Valuation of Ecosystem Services in Coastal Ecosystems: Asian and European Perspective*. Ecosystem Services Economics (ESE), Working Paper Series, Jan. 2011. URL: http://eprints.port.ac.uk/2207/1/WATTAGE__Prem_Wattage_-_Draft.pdf
- WEBSTER, F. (1995). *Theories of Information Society*. London, Routledge.
- WEGENER, M. (2007). *Competitiveness or Cohesion? A Phase Strategy of European Spatial Development*. Paper presented at the Warsaw Regional Forum 2007, published in EUROPA XI 18, pp. 23-38.
- WEINSTEIN, M. P., BAIRD, R.C., O'CONOVER, D., GROSS, M., KEULARTZ, J., LOOMIS, D.K., NAVEH, Z., PETERSON, S.B., REED, D.J., ROE, E., SWANSON, R.L., SWART, J.A.A., TEAL, J.M., TURNER, R.E. AND VAN DER WINDT, H.J. (2007). *Managing Coastal Resources in the 21st Century*. In: Front Ecol Environ 5(1), pp. 43-48.
- WEINSTEIN, M.P. (2009). *The Road Ahead: The Sustainability Transition and Coastal Research*. In: Estuaries and Coasts, 32, pp. 1044–1053.
- WERRA-MEIßNER-KREIS (2011). *Portrait Werra-Meißner-Kreis*. Der Kreisausschuss & mediaprint infoverlag gmbh, Eschwege. URL: http://www.werra-meissner-kreis.net/fileadmin/Downloads_und_Grafiken/R2_Informationsbroschueren/Portrait_WMK_Weka_kom.pdf
- WERRA-MEIßNER-KREIS (n.d.). *Wer, Wo, Was – Zahlen, Daten, Fakten zum Werra-Meißner-Kreis*. Der Kreisausschuss, Eschwege. URL: <http://www.werra-meissner->

kreis.net/fileadmin/Downloads_und_Grafiken/R2_Informationsbroschueren/Wer__Wo__Was_-_Zahlen__Daten__Fakten_zum_Werra-Meissner-Kreis.pdf

- WFG (2009). *Lebensraum Werra-Meißner*. Website of the Wirtschaftsförderungsgesellschaft Werra-Meißner mbH. URL: <http://www.lebensraum-werra-meissner.de/>
- WHO (2008). *Protecting health in Europe from climate change*. WHO Regional Office for Europe, Copenhagen.
- WHO (2009). *Improving public health responses to extreme weather/heat-waves – EuroHEAT. Technical summary*. WHO Regional Office for Europe, Copenhagen.
- WILLET, J. (2011). Interview with Jonathan Willet, Biodiversity Officer, Highland Council, on 14 November 2011.
- WILLIAMS, C.H. (2004). *The geography of language*. In: Sociolinguistics – An international handbook of the science of language and society. Volume 1, Berlin, pp. 130-145.
- WILLIAMS, E. & VAN DER VELDE, M. (2005). *Borders for a New Europe: Between History and New Challenges*. In: Journal of Borderlands Studies, Volume 20, No. 2.
- WILLIAMS, E., FIRN, J. R., KIND, V., ROBERTS, M., & MCGLASHAN, D. (2003). *The Value of Scotland's Ecosystem Services and Natural Capital*. In: European Environment 13, pp. 67-78.
- WILLIAMS, M. (1990). *Understanding wetlands*. In: Williams M. (Editor), Wetlands: A Threatened Landscape. The Institute of British Geographers. Special Publication Series. Blackwell, Oxford.
- WILLIS, D. (2009). *Marine Conservation Zones in the Irish Sea*. Presentation of Irish Sea Conservation Zones downloaded from <http://www.irishseaconservation.org.uk/>
- WILSON, A. (2010). *Homeworking: Supporting the Financial & Business Services Sector in the Highlands and Islands*.
- WILSON, J.C., ELLIOT, M., CUTTS, N.D. MANDER, L., MENDAO, V., PEREZ-DOMINGUEZ, R. & PHELPS, A. (2010). *Coastal and Offshore Wind Energy Generation: Is It Environmentally Benign?* Energies 3, pp.1383-1422.
- WINTERS, S. & ELSINGA, M. (2008). *The future of Flemish social housing*. In: Journal of Housing and the Built Environment, vol. 23, pp. 215-230.
- WINTERS, S. & HETLEN, K. (2011). *Housing quality and affordability in Belgium in an international comparison*. Proceedings of the Enhr Conference 2011 – 5-8 July, Toulouse.
- WNU – WORLDWIDE NEWS UKRAINE (2011). *Two Giant Fish Images Across the Border Become a Symbol of Polish-Ukrainian Unity*. URL: <http://m.wnu-ukraine.com/news/culture-lifestyle/?id=610>
- WOOLCOCK, M. (n.d.). *The Place of Social Capital in Understanding Social and Economic Outcomes*. Development Research Group, The World Bank. URL: <http://www.oecd.org/dataoecd/5/13/1824913.pdf>

- WORBOYS, G.L., FRANCIS, W.L. & LOCKWOOD, M. (Eds.) (2010). *Connectivity Conservation Management: A Global Guide*. Earthscan, London.
- WORK GLOBAL (1999). *An example of ICT from the Outer Hebrides*. Website of the Work Global Project. URL: <http://www.work-global.com/news/index.php?id=11>
- WORLD BANK, IUCN & THE NATURE CONSERVANCY (2004): How much is an ecosystem worth? Assessing the economic value of conservation. The World Bank, Washington.
- WORLD BANK GROUP & PRICEWATERHOUSECOOPERS (2011). *Paying Taxes 2011 – the global picture*. URL: http://pdfmasher.com/download?project_id=9D51F0EE044AC685B151861C2807458F&s%5B%5D=3915FE898A065B015713E59F6337D3B4
- WRIGHT, K. (2009). *Climate Change: The Threat to Species*. SPICE Briefing 09/28.
- WWF & EFNCP (2008). *High Nature Value farmlands: Recognising the importance of South East European landscapes - Case Study Report Western Stara Planina (Bulgaria)*.
- WWF (2008). *Incendio a Torre Salsa*. Notizia inserita in data: set 18, 2008. URL: <http://www.wwftorresalsa.com/index.php?mact=News,cntnt01,detail,0&cntnt01articleid=6&cntnt01origid=62&cntnt01returnid=62>
- WWF (2008). *White Elephants in the Green Mountains - Ski developments in Bulgaria, Romania, Slovakia and Ukraine*. WWF Danube-Carpathian Programme.
- WWF (2010). *Slovakia moves to sacrifice wildlife for ski slopes*. WWF Global News. URL: http://www.panda.org/what_we_do/where_we_work/black_sea_basin/danube_carpathian/news/?193082/Slovakia-moves-to-sacrifice-wildlife-for-ski-slopes
- YLE (2011). *Rautatie Kolarista Kittilän kautta Kemijärvelle?* URL: http://yle.fi/alueet/lappi/2011/03/rautatie_kolarista_kittilan_kautta_kemijarvelle_2473028.html
- YOHE, G. & TOL, R.S.J. (2002). *Indicators for social and economic coping capacity - moving toward a working definition of adaptive capacity*. In: *Global Environ. Chang.*, 12, pp. 25-40.
- YORDANOVA, M. & MATEEVA, Z. (2011). *The Natural Potential of Mountains in Bulgaria and Its Sustainable Use*. In: G. Zhelezov, *Sustainable Development in Mountain Regions: Southeastern Europe*. Springer.
- YOUNG, N. (2010). *Globalization from the edge: A framework for understanding how small and medium-sized firms in the periphery 'go global'*. In: *Environment and Planning A*, vol. 42, pp. 838-855.
- ZEBISCH, M., GROTHMANN, T., SCHRÖTER, D., HASSE, C., FRITSCH, U. & CRAMER, W. (2005). *Climate Change in Germany: Vulnerability and Adaptation of Climate Sensitive Sectors*. Research Report 201 41253, UBA-FB 000844/e. Dessau, Umweltbundesamt.

Annexes

Overview:

1	Analytical matrix
2	Overview of data collection
3	The European nation-building process and its negative effects on border regions
4	The dimensions of the globalisation process & their potential influence on changing the nature of European borders
5	Border concepts and their overall analytical focus
6	“International political borders” in Europe - A map-based representation according to the main forms of existing supranational co-operation & integration
7	Main drivers contributing to a further “tightening” of the external EU-borders
8	A mapping of various other examples for “economic discontinuities” which exist at European borders
9	Ethnic communities in Europe and the revival of ethnic nationalism
10	Languages in Europe
11	Extensive version of the general typology of border effects
12	Efficiency of customs clearance processes along European
13	EU-wide analyses of the situation of cross-border workers & problems associated to data gathering
14	Current scope & focus of cross-border commuting in the EU27
15	Long-term development of the right of EEC & EC nationals / EU citizens to work in other EU Member States
16	Labour market integration within the EEA and between EU Member States and Switzerland
17	The current status of labour market integration between the EU27 and other Third Countries
18	The specific status of cross-border workers
19	Main obstacles to commuting in EU27/EEA/EFTA cross-border areas
20	Obstacles to cross-border mobility existing in the five Nordic countries
21	The EU external border regime
22	Multilingual borderlands in Europe
23	Outermost Regions - related policy documents
24	Case Study Highland Council area, Scotland
25	Case Study Jura massif
26	Case Study Sicily
27	Case Study Outer Hebrides
28	Case Study Torne Valley
29	Case Study SPA in central Spain
30	Case Study Belgian Coast
31	Case Study Irish Sea
32	Case Study border triangle Germany-Poland-Czech Republic
33	Case Study Polish-Ukrainian
34	Case Study Geneva CBMR

35	Case Study Luxembourg CBMR
36	The cross-border intra-firm networks in the Greater Region
37	Case Study Canary Islands
38	Case Study French Guyana
39	"Additional case" Tatra mountains
40	"Additional case" West Stara Planina
41	"Additional case" Saaremaa
42	"Additional case" North-Eastern Turkey
43	Table: Synthesis of case studies
44	Vulnerability of human-environment systems to climate change: synthesis
45	Difference between proportion of employment in selected sectors in coastal areas and national average
46	Core border areas where a border is reached within 45 minutes
47	Core border areas where 45-minutes or more are needed to reach a border
48	The difference between "land cover" & "land use" and approaches to assess the "degree of naturalness" for a given territory
49	Individual mapping of selected land cover categories
50	Weighted distance between border areas belonging to the same border within the matrix of the factor analysis
51	Definition of the urban potential & classification procedure
52	Resident population in core border areas (2006)
53	Population change in core border areas (2001-2006)
54	Sparsely populated areas
55	Mountain areas in Kiruna municipality

Annex 1: Analytical matrix for GEOSPECS areas

	Mountains	Islands	Sparsely populated areas	Coasts	Border areas	Inner Periphery	Outermost Regions
Economic vulnerability / Robustness facing globalisation							
Activity structure (EVR1)	Is mountainousness associated with an over- or under-representation of specific sectors? How open (more dependent on external forces, fluctuations in the demand on the global commodity market and seasonality of activities) and specialised are the economies?	Is insularity associated with an over- or under-representation of specific sectors? How open (more dependent on external forces, fluctuations in the demand on the global commodity market and seasonality of activities) and specialised are the economies?	Is sparsity associated with an over- or under-representation of specific sectors? How open (more dependent on external forces, fluctuations in the demand on the global commodity market and seasonality of activities) and specialised are the economies?	Is proximity to a coast associated with an over- or under-representation of specific sectors? How open (more dependent on external forces, fluctuations in the demand on the global commodity market and seasonality of activities) and specialised are the economies?	Is proximity to a border associated with an over- or under-representation of specific sectors? How open (more dependent on external forces, fluctuations in the demand on the global commodity market and seasonality of activities) and specialised are the economies?	Is the origin of an IP associated with an over- or under-representation of specific sectors? Are IP associated with lack of jobs in the area? How open (more dependent on external forces, fluctuations in the demand on the global commodity market and seasonality of activities) and specialised are the economies?	Is OR status associated with an over- or under-representation of specific sectors? How open (more dependent on external forces, fluctuations in the demand on the global commodity market and seasonality of activities) and specialised are the economies?
Tourism (EVR2)	How / to what extent does tourism contribute to the perspectives of more balanced and sustainable development in mountain areas?	How / to what extent does tourism contribute to the perspectives of more balanced and sustainable development in islands?	How / to what extent does tourism contribute to the perspectives of more balanced and sustainable development in SPAs?	How / to what extent does tourism contribute to the perspectives of more balanced and sustainable development in coastal areas?	What are the key types of tourism generated by "border effects"? What role do these forms of tourism play in the concerned areas?	Do IPs play a role as providers of green areas and leisure services for neighbouring metropolitan areas? Is this the reason for becoming IP?	How / to what extent does tourism contribute to the perspectives of more balanced and sustainable development in ORs?

	Mountains	Islands	SPA	Coasts	Border areas	IP	OR
Economic vulnerability / Robustness facing globalisation (continued)							
Economic specificity related to geographic specificity (EVR3)	<p>Can one identify some main types of "mountain economies"?</p> <p>Can the amenities and resources linked to the mountainous character of the concerned areas help explaining their economic profile?</p>	<p>Can one identify some main types of "island economies"?</p> <p>Can the amenities and resources linked to the insular character of the concerned areas help explaining their economic profile?</p>	<p>Does sparsity lead to specific forms of economic organisation?</p> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - <i>relative weight of SMEs and large corporations,</i> - <i>high dependence on external service providers and public services,</i> - <i>limited circularity of local economies?</i> - <i>difficult balance between the necessity to increase economic interactions outside the region (openness) and within the region (circularity)</i> - <i>What would be the advantages of improved connections between small peripheral economies?</i> 	<p>Economic significance of the coast: What share of the economy is accounted for by coast-specific activities such as tourism (?), fishery and maritime freight?</p> <p>Can the amenities and resources linked to the coastal character of the concerned areas help explaining their economic profile?</p> <p>What is the effect of coasts on the regional economic development ("half circle economy")?</p>	<p>Economic significance of the border as a discontinuity: Can one make a typology of the main types of discontinuities (e.g. income, GDP, language, institutional and administrative systems...), and identify their respective effects? (incl. development of cross-border commuting and other cross-border flows)</p> <p>What is the effect of borders on the regional economic development ("half circle economy") and cross-border economic exchanges?</p>	<p>Can one identify some main types of "inner periphery economies"?</p>	<p>What are main destinations of exports and origins of imports ("core Europe" or neighbouring countries)?</p> <p>Can the amenities and resources linked to the OR status of the concerned areas help explaining their economic profile?</p>

	Mountains	Islands	SPA	Coasts	Border areas	IP	OR
Accessibility, connectivity and SGI							
Specific transport infrastructure issues related to geographic specificity (ACC1)	What are the typical challenges for building, operating and maintaining transport infrastructure related to mountain areas? What strategies can be identified to deal with these challenges?	Overcoming insularity: How does reliance on air and sea transport for external connections affect the perspectives of economic development and social well-being? Do fixed links cancel this specificity, or do some specificities remain?	What are the typical challenges for building, operating and maintaining transport infrastructure related in sparsely populated areas? Climatic conditions? Protected environmental areas? What strategies can be identified to overcome / deal with these challenges?	Do specific challenges exist with regard to building, operating and maintaining transport infrastructure in the immediate proximity of a coast? Does specifically coastal infrastructure (ferry connections, pipelines, submarine phone lines...) create local and regional specific development opportunities?	What are the challenges connected to building, operating and maintaining of infrastructure across national borders? What strategies can be identified to overcome / deal with these challenges? What difficulties of coordination / conflicts / issues arise with the development of cross-border commuting and other cross-border flows?	What are the main factors leading to lower accessibility in IP compared to neighbouring metropolitan areas? Is it distance to hubs and logistics centres mainly, or does the quality of the infrastructure and/or regularity of transport connections also play a role?	What specific arrangements have been established to facilitate connections between OR and the country to which they belong? To what extent can the OR be said to be functionally integrated in their geographic context?
	<i>Hypotheses / questions:</i> - Additional costs linked to topography - Effects of seasonally closed connections - Specific hazards - Ecological constraints on the development of transport in mountain areas - Functioning of mountain areas as the hinterland of densely populated piedmont areas	<i>Hypotheses / questions:</i> - Population and size of islands are critical factors - Double insularity amplifies challenges - what is the role of regulatory framework and commercial context for the operation of air/sea connections	<i>Hypotheses / questions:</i> - Is distance to markets or access to logistic centres / hubs the main factor? - How are cost-benefit ratios used when assessing infrastructure projects in these areas?	<i>Hypotheses / questions:</i> - Do coastal areas concentrate many flows and infrastructures without reaping the same economic benefits from this situation as previously?	<i>Hypotheses / questions:</i> - Border areas can be prosperous interfaces, but may also struggle with challenges linked to a peripheral situation caused by political and cultural factors	<i>Hypotheses / questions:</i> - Some inner peripheries are preserved rural areas, and limited accessibility is part of an assumed strategy, while others are lagging areas in the shadow of metropolitan regions.	<i>Hypotheses / questions:</i> - Some OR function as national outposts, and their disconnection from their geographic context contributes to limit their economic and social autonomy.

	Mountains	Islands	SPA	Coasts	Border areas	IP	OR
Accessibility, connectivity and SGI (continued)							
Services of general interest (ACC2)	<p>Does the production and delivery of services in mountain areas pose specific challenges? (i.e. different from those to be found in equivalent urban and rural areas in the lowland) What strategies can be identified to overcome / deal with these challenges?</p> <p><i>Hypotheses / questions:</i> - Are issues similar to other areas, but territorial patterns of difficulty of access to SGI nonetheless specific? - Specific role of piedmont areas as providers of SGI? -foreseeable challenges due to demographic trends</p>	<p>Does the production and delivery of services in insular areas pose specific challenges? What strategies can be identified to overcome / deal with these challenges?</p> <p><i>Hypotheses / questions:</i> - Population and size of islands are critical factors - Does the isolation of islands from the outside world when there is no ferry or flight create specific demands for local SGI? - Can critical population thresholds for SGI production in island be identified? -foreseeable challenges due to demographic trends</p>	<p>Does the production and delivery of services in sparsely populated areas pose specific challenges? What strategies can be identified to overcome / deal with these challenges?</p> <p><i>Hypotheses / questions:</i> - What SGI are of critical importance to maintain population levels? - How can new forms of PPP help in maintaining access to SGI? - Can critical population thresholds for SGI production in isolated communities be identified? -foreseeable challenges due to demographic trends</p>	<p>In what respects do coastal areas represent a specific situation as far as the production and delivery of services of general interest is concerned?</p>	<p>What strategies can be identified to use the proximity to a border to enable the provision of services to/from another country? What are the main motivations / obstacles to such a strategy?</p> <p><i>Hypotheses / questions:</i> - Border areas are exposed to a number of regulatory, linguistic and cultural obstacles to an effective operation of SGI.</p>	<p>To what extent are IP dependent on neighbouring urban centres for the provision of services of general interest?</p> <p><i>Hypotheses / questions:</i> - The operation of SGI in inner peripheries is increasingly difficult, as these are exposed to a vicious circle in which the higher educated income providers move out, while the elderly and unemployed consumers of SGI remain. -foreseeable challenges due to demographic trends</p>	<p>To what extent are OR dependent on actors / interventions from extra-regional actors of the country to which they belong for the production and delivery of services of general interest?</p> <p><i>Hypotheses / questions:</i> -Historically inherited administrative and economic systems in some OR makes it difficult to adapt SGI production to local conditions. -foreseeable challenges due to demographic trends</p>

	Mountains	Islands	SPA	Coasts	Border areas	IP	OR
Accessibility, connectivity and SGI (continued)							
	<i>Are the challenges for service production and delivery in these three types of TeDi areas similar, or are there any major differences?</i>						
Role of information and Communication Technologies							
Impacts of ICT (ICT1)	What strategies can be identified to compensate for relative isolation and limited population size in mountain areas through the usage of ICT? What are the difficulties such a strategy is facing?	What strategies can be identified to compensate for relative isolation and limited population size of islands through the usage of ICT? What are the difficulties such a strategy is facing?	What strategies can be identified to compensate for relative isolation and limited population size of sparsely populated areas through the usage of ICT? What are the difficulties such a strategy is facing?	Has ICT contributed to the spatial dissociation of coastal landing points and associated commercial and service functions? (e.g. trade, customs, logistics management) or on the	How does ICT contribute to the development of cross-border cooperation and integration? <i>Hypotheses / questions: - do people have access to multilingual public web portal, providing administrative</i>	Do IP have lower broadband and mobile phone coverage levels than neighbouring metropolitan areas? <i>Hypotheses / questions: - Can ICT contribute to facilitate new types of working arrangements for</i>	What strategies can be identified to compensate for relative isolation and limited population size of OR through the usage of ICT? What are the difficulties such a strategy is facing?

	<p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - Does geographic specificity lead to lower mobile / broadband coverage? In what different ways (e.g. technical challenges, limited potential market, limited competition between operators, regulatory frameworks not adapted to local conditions...) - Does geographic specificity favour an abandonment of existing services in favour of online services (or are both used as complements) 			<p>contrary improved the ability of coastal areas to access information and take advantage of opportunities?</p> <p>Is the proximity to transoceanic communication cables an advantage for concerned coastal areas?</p>	<p><i>information on the different national / regional schemes (taxes, health, public transport, etc.)</i></p> <p><i>- Are differences between national systems an obstacle (e.g. IT-standards, usage of mobile phone in cross-border areas (roaming))?</i></p>	<p><i>the inhabitants of these areas, with distance-working most of the time?</i></p>	<p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - Is the historical presence of national ICT providers in OR an asset or an obstacle? - Does ICT contribute to strengthen links between OR and the country they belong to / the rest of Europe? - Is it an instrument for territorial cohesion in OR?
	Mountains	Islands	SPA	Coasts	Border areas	IP	OR
Demographic structures and trends							
Demographic processes (DEM1)	Do mountain areas feature a specific age and gender structure of the population?	Do islands feature a specific age and gender structure of the population?	Do SPAs feature a specific age and gender structure of the population?	Do coastal zones feature a specific age and gender structure of the population?	Do border areas feature a specific age and gender structure of the population?	Do IP feature a specific age and gender structure of the population?	Do OR feature a specific age and gender structure of the population?
	Are birth, in and out- migration rates & overall population trends specific in mountain areas?	Are birth, in and out- migration rates & overall population trends specific in islands?	Are birth, in and out- migration rates & overall population trends specific in SPAs?	Are birth, in and out- migration rates & overall population trends specific in coastal areas?	How do contrasts in birth, in and out- migration rates & overall population trends across borders affect border areas?	How do in- and out- migration trends result in population density trends? Are these population trends specific for IPs?	Are birth, in and out- migration rates & overall population trends specific in ORs?

Settlement patterns (DEM2)	What are the specific settlement patterns and types of demographic change associated with mountainousness?	What are the specific settlement patterns and types of demographic change associated with insularity?	What are the specific settlement patterns and types of demographic change associated with sparsity?	What are the specific settlement patterns and types of demographic change associated with proximity to a coast?	What are the specific settlement patterns and types of demographic change associated with proximity to a border?	What are the specific settlement patterns and types of demographic change associated with Inner Peripherality?	What are the specific settlement patterns and types of demographic change to be found in Outermost Regions?
	<i>Hypotheses / questions: - Polarising trends occur and a particularly narrow scale in many mountain areas - Overall demographic trends vary from massif to massi</i>	<i>Hypotheses / questions: - Depending on their size and attractiveness, islands can be struggling either with over-concentration or depopulation</i>	<i>Hypotheses / questions: -SPA are struggling both with demographic "thinning out" processes in most rural parts, and with intense growth in some cities</i>	<i>Hypotheses / questions: -Many of coastal areas are among Europe's most attractive living environments. What differentiates these from the other coastal areas?</i>	<i>Hypotheses / questions: - Patterns will be different, depending on whether the border primarily functions as an obstacle or an interface</i>	<i>Hypotheses / questions: - Patterns will be different, depending on the degree of polycentricism of the country (linked to the urban-rural divide), and whether border functions as obstacle or interface)</i>	<i>Hypotheses / questions: - Migratory movements between OR and the country they belong to has a major influence on their demographic trends</i>

	Mountains	Islands	SPA	Coasts	Border areas	IP	OR
Demographic dynamics (continued)							
Migratory movements (DEM3)					How are border areas affected by migratory movements (intra-European and extra-European)?		How are OR affected by migratory movements (intra-European and extra-European)?

Residential attractiveness							
Residential attractiveness as a result of geographic specificity (RAT1)	To what extent is the degree of residential attractiveness (positive and negative) dependent on the mountainousness of the area rather than on human intervention? To what extent does the residential attractiveness of mountain areas depend on the social and demographic characteristics which are specific to mountain areas?	To what extent is the degree of residential attractiveness (positive and negative) dependent on the insularity of the area rather than on human intervention? To what extent does the residential attractiveness of islands depend on the social and demographic characteristics which are specific to islands?	To what extent is the degree of residential attractiveness (positive and negative) dependent on the sparse population of the area rather than on human intervention? To what extent does the residential attractiveness of SPA depend on the social and demographic characteristics which are specific to SPA?	To what extent is the degree of residential attractiveness (positive and negative) dependent on the proximity to a coast rather than on human intervention? To what extent does the residential attractiveness of coasts depend on the social and demographic characteristics which are specific to coasts?	To what extent is the degree of residential attractiveness (positive and negative) dependent on the proximity to a border rather than on human intervention? To what extent does the residential attractiveness of border areas depend on the social and demographic characteristics which are specific to border areas?	Do Inner Peripheries offer features making them more or less attractive that are <i>independent</i> from human intervention? To what extent does the residential attractiveness of IP depend on the social and demographic characteristics which are specific to IP?	To what extent is the degree of residential attractiveness (positive and negative) dependent on the situation as an OR, rather than on human intervention? To what extent does the residential attractiveness of OR depend on the social and demographic characteristics which are specific to OR?

	Mountains	Islands	SPA	Coasts	Border areas	IP	OR
Regional identity and cultural heritage as factors of development							
Identity (RID 2)	<p>Is mountainousness associated with specific ways of using territorial identity and cultural heritage for development purposes</p> <p><i>Hypotheses / questions:</i> - Is the mountain/lowland opposition drawn upon by economic actors? If yes, in what ways? - Are the networks of people identifying with specific mountain areas, but not necessarily living there, particularly strong?</p>	<p>Is insularity associated with specific ways of using territorial identity and cultural heritage for development purposes?</p> <p><i>Hypotheses / questions:</i> - Is the island/mainland opposition drawn upon by economic actors? If yes, in what ways? - Are the networks of people identifying with specific mountain areas, but not necessarily living there, particularly strong?</p>	<p>Is sparse population associated with specific ways of using territorial identity and cultural heritage for development purposes? What role do ethnic and cultural minorities play shaping the regional identity?</p> <p><i>Hypotheses / questions:</i> - Is the sparse (peripheral) / dense (central) opposition drawn upon by economic actors? If yes, in what ways? - Are the networks of people identifying with specific sparsely populated regions, but not necessarily living there, particularly strong?</p>	<p>Is proximity to a coast associated with specific ways of using territorial identity and cultural heritage for development purposes?</p> <p><i>Hypotheses / questions:</i> - Is the coastal / inland opposition drawn upon by economic actors? If yes, in what ways?</p>	<p>Is proximity to a border associated with specific ways of using territorial identity for development purposes?</p> <p>Do border communities distancing themselves from the Nation-States they belong to generate specific economic dynamics?</p> <p>Do cross-border linguistic/ cultural/ ethnic differences influence on the development of border areas?</p> <p><i>Questions:</i> - Influence of "resurgent nations" (e.g. Catalonia, Scania...) in border areas on development trends?</p>	<p>In what ways, and by which groups/actors, are the identities of IP constructed? Are these identities and the cultural heritage of IP used as a factor of development?</p> <p><i>Hypotheses / questions:</i> - Are successful Inner peripheries those that are recognised as proposing an alternative lifestyle to neighbouring metropolitan regions?</p>	<p>Are OR associated with specific ways of using territorial identity and cultural heritage for development purposes?</p> <p><i>Hypotheses / questions:</i> - Is the OR / continental Europe opposition drawn upon by economic actors? If yes, in what ways? - Are the networks of people identifying with specific sparsely populated regions, but not necessarily living there, particularly strong?</p>

	Mountains	Islands	Sparsely populated areas	Coasts	Border areas	Inner Periphery	Outermost Regions
Regional identity and cultural heritage as factors of development (Continued)							
Geographic specificity as factor in the Protected Designations of Origin (RID1)	Is mountainousness a factor for the identification and branding of PDO, PGI and TSG designations in mountain areas?	Is insularity a factor for the identification and branding of PDO, PGI and TSG designations in islands?	Is sparsity a factor for the identification and branding of PDO, PGI and TSG designations in SPAs?	Is proximity to the coast a factor for the identification and branding of PDO, PGI and TSG designations in coastal areas?	Is proximity to the border a factor for the identification and branding of PDO, PGI and TSG designations in border regions?	Is IP status a factor for the identification and branding of PDO, PGI and TSG designations in IP?	Is OR status a factor for the identification and branding of PDO, PGI and TSG designations in ORs?

Residential attractiveness							
Links between economic growth and residential attractiveness (RAT1)	Does mountainousness reinforce positive or negative feedback loops between economic growth and residential attractiveness?	Does insularity reinforce positive or negative feedback loops between economic growth and residential attractiveness?	Does sparse population reinforce positive or negative feedback loops between economic growth and residential attractiveness?	Does the proximity to a coast reinforce positive or negative feedback loops between economic growth and residential attractiveness?	Does the proximity to a border reinforce positive or negative feedback loops between economic growth and residential attractiveness?	Do Inner Peripheries reinforce positive or negative feedback loops between economic growth and residential attractiveness?	Do OR reinforce positive or negative feedback loops between economic growth and residential attractiveness?

	Mountains	Islands	Sparsely populated areas	Coasts	Border areas	Inner Periphery	Outermost Regions
Protected areas and biodiversity as factors of development							
Protected Areas (PAB1)	Is mountainousness associated with a particularly high proportion of PA?	Is insularity associated with a particularly high proportion of coverage with PA?	Is sparse population associated with a particularly high proportion of coverage with PA?	Is proximity to a coast associated with a particularly high (or low) proportion of coverage with PA?	Is proximity to a border associated with a particularly high proportion of coverage with PA?	Are IP associated with a particularly high proportion of coverage with PA?	Are OR associated with a particularly high proportion of coverage with PA?
<i>Hypotheses / questions:</i> - How do PA function as a resource and/or constraint for local and regional development? - How does geographic specificity influence the capacity for implementing "successful protected area tourism"?							
Particular plant and animal species as a factor of local development (PAB2)	Are there mountain-specific species that contribute to local economic development? In what way? What could be done to take more advantage of these?	Are there island-specific species that contribute to local economic development? In what way? What could be done to take more advantage of these?	Do some species that mainly occur in sparsely populated areas contribute to local economic development? In what way (e.g. hunting)?	Do some species that occur only along coasts contribute to local economic development? In what way (e.g. recreational fishing)?	Do borders that have functioned as unoccupied buffer zones between neighbouring countries host specific species?	not relevant – could be - as part of the cultural identity or restricted development areas	Are there species that don't exist in continental Europe which of particular economic importance?
<i>Hypotheses / questions:</i> - are specific losses of biodiversity perceived as a threat for economic growth and/or regional perspectives of sustainable development?							

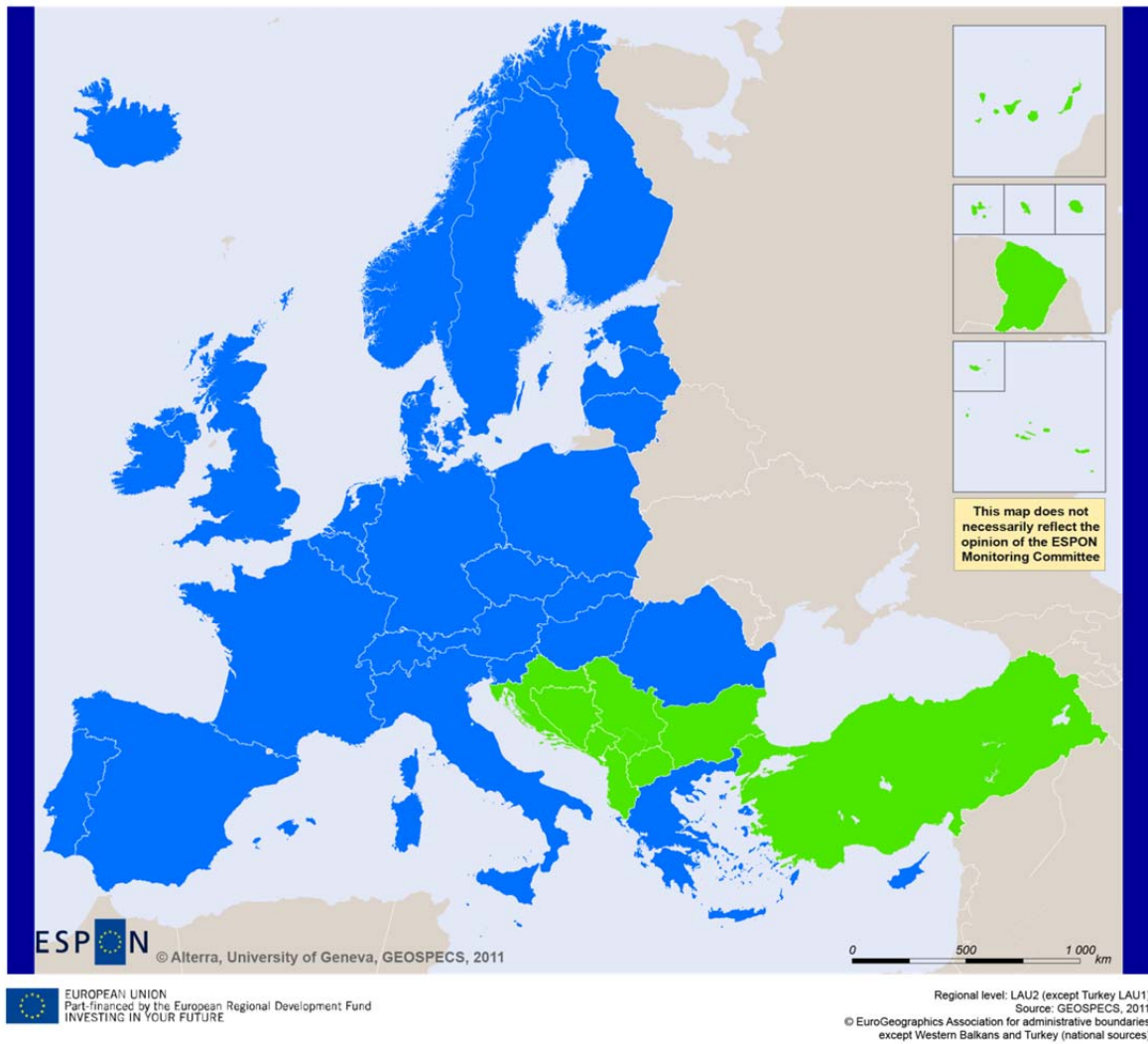
	Mountains	Islands	Sparsely populated areas	Coasts	Border areas	Inner Periphery	Outermost Regions
Natural resource exploitation							
Particular resources (NRE1)	<p>To what extent do the different mountain ranges function as water towers for surrounding regions? What is the relative importance of mountain forestry resources in Europe?</p> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - Contribution of mountains to the regulation of access to water throughout the year (importance of glaciers) <div style="border: 1px solid black; padding: 2px;"> <ul style="list-style-type: none"> - Importance of hydropower production for local / regional / national economy - Are mountain forests under-or over-exploited? </div>	<p>In which islands is the exploitation of marine resources a significant component of the local/regional economy?</p> <div style="border: 1px solid black; padding: 2px;"> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - is it possible to distinguish between coastal and offshore exploitation of marine resources? - How are island communities involved in strategies for the sustainable management of marine resources? </div>	<p>What strategically important natural resources are located in SPA? Can vast unoccupied land areas in itself be a resource?</p> <div style="border: 1px solid black; padding: 2px;"> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - Can one identify resources in SPA that of which the exploitation is limited because of distance to main markets, incapacity to recruit employees with adequate competences and/ or impossibility of adapting to prevailing models exploitation models (e.g. intensive agriculture)? </div>	<p>In which coastal areas is the exploitation of marine resources a significant component of the local/regional economy?</p> <div style="border: 1px solid black; padding: 2px;"> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - is it possible to distinguish between coastal and offshore exploitation of marine resources? - How are coastal communities involved in strategies for the sustainable management of marine resources? </div>		<p>Are IP associated with particular natural resources (e.g. mining)?</p>	<p>How do OR contribute to supply the exploitation of resources of strategic interest for Europe and/or effectively contributing to local wealth and well-being?</p> <div style="border: 1px solid black; padding: 2px;"> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - Can the European regulatory frameworks and international commitments be an obstacle to the sustainable exploitation of OR regions resources (e.g. fisheries)? - Is the geographic location of the OR a resource in itself? </div>

	Mountains	Islands	Sparsely populated areas	Coasts	Border areas	Inner Periphery	Outermost Regions
Natural resource exploitation (continued)							
Clean air and “untouched nature” as a resource (NRE2)	Are mountainous areas associated with better air quality than other areas?	Are islands associated with better air quality than other areas?	Are sparsely populated areas associated with better air quality than other areas?	Are coastal zones associated with better air quality than other areas?	Are border areas associated with better air quality than other areas?	Are IP associated with better air quality than other areas?	Are OR associated with better air quality than other areas?
Renewable energy resources (NRE6)	Does mountainousness entail particular preconditions for the production of renewable energy? (wind, water, solar) If yes, how are these advantages taken advantage of for local and regional development?	Does insularity entail particular preconditions for the production of renewable energy? (wind, water, solar) If yes, how are these advantages taken advantage of for local and regional development?	Do SPA have particular preconditions for the production of renewable energy? (wind, water, solar, bioenergy, peat) If yes, how are these advantages taken advantage of for local and regional development?	Do coasts have particular preconditions for the production of renewable energy? (wind, water, solar, bioenergy, peat) If yes, how are these advantages taken advantage of for local and regional development?		Do IP entail particular conditions for the production of renewable energy? (wind, water, solar) (opportunities)	Do ORs have particular preconditions for the production of renewable energy? (wind, water, solar, bioenergy, peat) If yes, how are these advantages taken advantage of for local and regional development?
Access to key resources (NRE4)		Are enough water resources available on islands? If not, what perspectives are there to adapt the supply of freshwater to the demand?					

Exploitation of natural resources (NRE3)	What barriers/challenges does the mountainousness of the area present to collaborative and communicative practices and policies of natural resource exploitation?	What barriers/challenges does the insularity of the area present to collaborative and communicative practices and policies of natural resource exploitation? What are the environmental issues linked to the exploitation of natural resources?	What barriers/challenges does the sparsity of the area present to collaborative and communicative practices and policies of natural resource exploitation?	What barriers/challenges does the proximity to a coast present to collaborative and communicative practices and policies of natural resource exploitation?	What barriers/challenges does the existence of a border present to collaborative and communicative practices and policies of natural resource exploitation?	Has exploitation of natural resources been a factor in the development of some IP? Why?	What barriers/challenges does the sparsity of the area present to collaborative and communicative practices and policies of natural resource exploitation?
	Mountains	Islands	SPA	Coasts	Border areas	IP	OR
Natural resource exploitation (continued)							
Eco-system services (NRE5)	Are there specific eco-system services rendered by mountain areas?	Are there specific eco-system services rendered by islands?	Are there specific eco-system services rendered by SPAs?	Are there specific eco-system services rendered by coastal areas?		<i>Not relevant</i>	Are there specific eco-system services rendered by ORs?
Vulnerability of human-environment systems to climate change							

<p>Vulnerability of human-environment systems to climate change</p> <p>(VCC1)</p>	<p>Are there climate change related vulnerabilities that are specific to mountains?</p> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - Climate change causes biodiversity loss and threatens ecological balance and delivery of ecosystem services in mountain areas - Mountain areas are particularly vulnerable to increases in natural hazard potentials (floods, gravitational mass movements) and to changes in the hydrological cycle 	<p>Are there climate change related vulnerabilities that are specific to islands?</p> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - Climate change may make islands particular vulnerable to floods and extreme weather events - who/what sectors /systems/social groups would be most vulnerable to such changes? 	<p>Are there climate change related vulnerabilities that are specific to SPAs? (or do vulnerabilities depend on location and not on sparse population)?</p> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - Northern SPA are in significantly different position than other SPAs. The link with sparsity as such may be weak. - who/what sectors /systems/social groups would be most vulnerable to such changes? 	<p>Are there climate change related vulnerabilities that are specific to coasts?</p> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - Climate change may make coasts particular vulnerable to floods and extreme weather events - who/what sectors /systems/social groups would be most vulnerable to such changes? 	<p>Not relevant</p>	<p><i>Not relevant</i></p>	<p>Are there climate change related vulnerabilities that are specific to OR? Is it useful to group OR together in this respect (or does vulnerability depend more on location)?</p> <p><i>Hypotheses / questions:</i></p> <ul style="list-style-type: none"> - OR particularly exposed to extreme weather events and floods - Habitat degradation in OR may follow different patterns than in other parts of Europe. - who/what sectors /systems/social groups would be most vulnerable to such changes?
---	---	---	--	---	---------------------	----------------------------	---

Annex 2: Overview of data collection



Road network coverage used in GEOSPECS

- Open Street Map road network
- Eurogeographics road network
- Non-ESPON space

Map 1 Road model used for GEOSPECS

Global Globcover legend (level 1)		CLC 2006
Post-flooding or irrigated croplands	S-Artif_km	Continuous urban fabric
Rainfed croplands		Discontinuous urban fabric
Mosaic Cropland (50-70%) / Vegetation (grassland, shrubland, forest) (20-50%)		Industrial or commercial units
Mosaic Vegetation (grassland, shrubland, forest) (50-70%) / Cropland (20-50%)		Road and rail networks and associated land
Closed (>15%) broadleaved evergreen and/or semi-deciduous forest (>5m)		Port areas
Closed (>40%) broadleaved deciduous forest (>5m)		Airports
Open (15-40%) broadleaved deciduous forest (>5m)		Mineral extraction sites
Closed (>40%) needleleaved evergreen forest (>5m)		Dump sites
Open (15-40%) needleleaved deciduous or evergreen forest (>5m)		Construction sites
Closed to open (>15%) mixed broadleaved and needleleaved forest (>5m)		Green urban areas
Mosaic Forest/Shrubland (50-70%) / Grassland (20-50%)	S-Agri_km	Sport and leisure facilities
Mosaic Grassland (50-70%) / Forest/Shrubland (20-50%)		Non-irrigated arable land
Closed to open (>15%) shrubland (<5m)		Permanently irrigated land
Closed to open (>15%) grassland		Rice fields
Sparse (>15%) vegetation (woody vegetation, shrubs, grassland)		Vineyards
Closed (>40%) broadleaved forest regularly flooded - Fresh water		Fruit trees and berry plantations
Closed (>40%) broadleaved semi-deciduous and/or evergreen forest regularly flooded - Saline water		Olive groves
Closed to open (>15%) vegetation (grassland, shrubland, woody vegetation) on regularly flooded or waterlogged soil - Fresh, brackish or saline water		Pastures
Artificial surfaces and associated areas (urban areas >50%)		Annual crops associated with permanent crops
Bare areas		Complex cultivation patterns
Water bodies		Land principally occupied by agriculture, with significant areas of natural vegetation
Permanent snow and ice		Agro-forestry areas
	S-Forest_km	Broad-leaved forest
		Coniferous forest
		Mixed forest
	S-Scrub_km	Natural grasslands
		Moors and heathland
		Sclerophyllous vegetation
		Transitional woodland-shrub
	S_NoVeg_km	Beaches, dunes, sands
		Bare rocks
		Sparsely vegetated areas
		Burnt areas
	S_GlacSnow_km	Glaciers and perpetual snow
	S_WetLand_km	Inland marshes
		Peat bogs
		Salt marshes
		Salines
		Intertidal flats
	S_Water_km	Water courses
		Water bodies
		Coastal lagoons
		Estuaries
		Sea and ocean
		UNCLASSIFIED LAND SURFACE

Table 1 Simplification and aggregation of Corine Land Cover 2006 & ESA GlobCover 2009 V2.3

Color Legend			Text Legend		Agriculture, livestock, hunting/forestry	Fishing	Mining and quarrying	Manufacturing	Electricity, natural gas and water	Construction	Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods	Hotels and restaurants	Transport, storage and communications	Financial intermediation	Real estate, renting and business activities	Public administration and defense, compulsory social insurance	Education	Health and social work	Other community, social and personal service activities	Activities of households	Extra-territorial organizations and bodies	Other
Data of quantitative and geographical higher reliability	Data of quantitative lower reliability	Included in another column	Missing	Work																			Residence	Rev1	Rev2	Empl	FTE
Map	Level	Data	Country	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	X	
Ebm08	NUTS5	1999AB;01Rest / Work / Rev1 / A-EPT;Rest-Empl	Austria		Included in A																	
Ebm08	NUTS5	2008/ Work / Rev1/ FTE?	Belgium																			
NSI	NUTS4	2008 / Work / Rev2 / FTE	Bulgaria		Included in A																	
EspN5	NUTS5	A03;B06;C-Q05 / Work / Rev1 / Empl	Cyprus																			
Ebm08	NUTS5	2008 / Work / Rev2 / Empl	Denmark		Included in A																	
Ebm08	NUTS5	2000 / Residence / Rev1 / Empl	Estonia																			
Ebm08	NUTS5	2004 / Work / Rev1 / Empl	Finland																			
Ebm08	NUTS5	2007 / Work-or-Resid/ Rev2/Empl	France (including OR)		Included in A																	
Ebm08	NUTS5	2003 / Work / Rev1 / Empl	Germany																			
Ebm08	NUTS5	2000/Residence / Rev1 / Empl	Greece																			
Ebm08	NUTS5	2008 / Residence / Rev Special / ??????	Hungary		Included in A																	
Ebm08	NUTS3	2005 Special Reg / location Work irrelevant / Rev1 / Empl	Iceland																			
Ebm08	NUTS5	2006 / Residence / Rev 1 / Empl	Ireland		Included in A																	
Ebm08	NUTS5	2001 / Work / Rev 1 / Empl	Italy																			
Ebm10	NUTS4	2010 / Work / Rev2 / Empl	Latvia		Included in A																	
Ebm08	NUTS5	2009 / Work / Rev2 / FTE	Liechtenstein		Included in A																	
Ebm10	NUTS4	2001 / Work / Rev1 / Empl	Lithuania																			
Ebm08	NUTS5	2008 / Work / Rev1 / Empl	Luxembourg (Grand-Duché)																			
Ebm08	NUTS3	2007 / Work / Rev1 / Empl	Malta																			
Ebm08	NUTS5	2008 / Work / Rev1 / Empl	Netherlands		Included in A																	
Ebm08	NUTS5	2006 / Work / Rev1 / Empl	Norway																			
Ebm08	NUTS5	2001 / Residence / Rev1 / Empl	Portugal (including OR)																			
EspN5	NUTS5	2002 / Residence / Rev1 / Empl	Romania																			
Ebm08	NUTS5	2006 / Work / Rev1 / Empl	Sweden																			
Ebm08	NUTS4	2008 / Work / Rev1 / Empl	Slovenia																			
Ebm08	NUTS4	2009 / Work / Rev2 / Empl	Slovakia		Included in A																	
Ebm08	NUTS5	2001 / Work / Rev1 / Empl	Spain (including OR)																			
Ebm08	NUTS5	2008 / Work / Rev2 / FTE	Switzerland		Included in A																	
NSI	NUTS5	2001 / Residence / Rev1 / Empl	England&Wales																			
NSI	NUTS5	2001 / Residence / Rev1 / Empl	Scotland																			
NSI	NUTS5	2001 / Residence / Rev1 / Empl	Northern Ireland																			
NSI	NUTS4	2000 / ??? / Rev special / Empl	Turkey																			
			Czech Republic																			
			Poland																			

Table 2 Overview of NACE collection and contents, country by country

NACE Rev. 1.1		NACE Rev. 2	
Section	Description	Section	Description
A	Agriculture, hunting and forestry	A	Agriculture, forestry and fishing
B	Fishing		
C	Mining and quarrying	B	Mining and quarrying
D	Manufacturing	C	Manufacturing
E	Electricity, gas and water supply	D	Electricity, gas, steam and air conditioning supply
		E	Water supply, sewerage, waste management and remediation activities
F	Construction	F	Construction
G	Wholesale and retail trade: repair of motor vehicles, motorcycles and personal and household goods	G	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	Hotels and restaurants	I	Accommodation and food service activities
I	Transport, storage and communications	H	Transportation and storage
		J	Information and communication
J	Financial intermediation	K	Financial and insurance activities
K	Real estate, renting and business activities	L	Real estate activities
		M	Professional, scientific and technical activities
		N	Administrative and support service activities
L	Public administration and defence; compulsory social security	O	Public administration and defence; compulsory social security
M	Education	P	Education
N	Health and social work	Q	Human health and social work activities
O	Other community, social and personal services activities	R	Arts, entertainment and recreation
		S	Other service activities
P	Activities of private households as employers and undifferentiated production activities of private households	T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
Q	Extraterritorial organisations and bodies	U	Activities of extraterritorial organisations and bodies

Figure 1 Broad correspondence between sections of NACE Rev.1.1 & NACE Rev.2¹

Please note that this table presents only the rough one-to-one correspondence between the sections: further additional details are necessary to establish the complete correspondence.

¹ http://epp.eurostat.ec.europa.eu/portal/page/portal/nace_rev2/publication

Annex 3: The European nation-building process and its negative effects on border regions

Since the 17th century, the modernist nation-building process in Europe penalised border areas in a number of ways:

- Firstly in economic and commercial terms due to the development of national mercantile production systems which interrupted formerly homogenous cross-regional goods markets and because local commercial exchanges were now forced to "cross" new fiscal and monetary borders.
- Secondly in socio-cultural terms as the new borders often separated areas with a population having the same ethnic or socio-cultural origins (i.e. shared traditions/myths and dialect/language etc.) and because the nation-state often "unified" its population under a common national language which was propagated through the national education systems.
- Thirdly in political terms as different national legislations were developed on either side of a border and because the principles of national defence often contributed to the development of a non-communicative infrastructure (i.e. roads or rail tracks running parallel to the border).
- Finally also in socio-demographic terms, because all these obstacles and the permanent fear of military conflicts which normally manifested themselves first along national borders motivated people living in border areas to increasingly migrate towards the more central areas of a state which led - in turn - to the emergence of many sparsely populated zones along national borders.

Annex 4: The dimensions of the globalisation process & their potential influence on changing the nature of European borders

Globalisation is most often only associated to the **economic dimension of this process**, as the emergence of increasingly liberated world-wide markets and of a new and specific international organisation of production generates a new reaction of enterprises which differs significantly from former patterns such as "internationalisation" or "multi-nationalisation". Against this wider background, a broad controversial debate is underway since many years which discusses to what extent trade interdependency and integration between national economies make (or not make) political borders increasingly irrelevant to economic activity.

Some observe that the *de-jure* established state-borders are now more dynamic in nature or in extreme cases are even becoming obsolete, as economic globalisation makes it increasingly difficult for individual nations or regions to manage on their own the development challenges resulting from a world-wide economy and to adapt themselves to the new mode of technological change.²

Other approaches, which are based on a more economics-driven view about the very nature of borders and about the effects of national borders on economic interactions taking place across and around borders, observe that an analysis of the *de-facto* international trade and investment flows (...) *undermine our expectations about the necessary continued expansion of interdependency, integration and international economic interactions as a result of 'globalization'* (...) and that national border continue to have a (...) *'determining' influences on trade, real capital flows and other cross-border interactions*.³

Globalisation has also an evident **socio-cultural dimension** which involves an array of different aspects: The growth of cross-cultural contacts due to greater international travel/tourism and immigration (including illegal immigration), a spread of multiculturalism enhancing peace and understanding or, negatively, the emergence of a new form of monoculture wiping out distinctions between various traditions and lifestyles, the advent of new categories of [consciousness](#) and identities (e.g. due to a better individual access to cultural diversity), the desire to increase one's standard of living or to enjoy foreign products and ideas or to adopt new technology and practices and the possibility of those having Internet or television access to participate in a "world culture".⁴

But also in this case, it seems hard to accept that all these influences will generate a uniform trend which is capable of eliminating the peoples' rootedness in varying elements of individual identity and a wider feeling of "belonging together" (i.e. myths, symbols, traditions, religion, language, belonging to an ethnic group or historically grown homelands etc.).⁵ Instead, we think that these aspects remain an important reference base for establishing a wider local, regional or national collective identity and that they also create "socio-cultural demarcation lines" between peoples (i.e. as a sort of "mental" border) which continue to separate "insiders" from "outsiders" not sharing the common set of values or identity.

² Courlet, C. (1996): *Globalisation et frontière*. In: Sciences de la Société, no. 37 / février 1996.

³ As a good example see: Thompson, G.F. (2000): *The Limits to 'Globalization': Taking Economic Borders Seriously* (Paper based on remarks originally made at the 'Workshop on the Persistence of Boundaries', University of Surrey, England, May 15-16 2000).

⁴ <http://en.wikipedia.org/wiki/Globalization>

⁵ On this more general aspect see in particular: Smith, A. D. (1995): *Nations and Nationalism in a Global Era*. Cambridge, 1995.

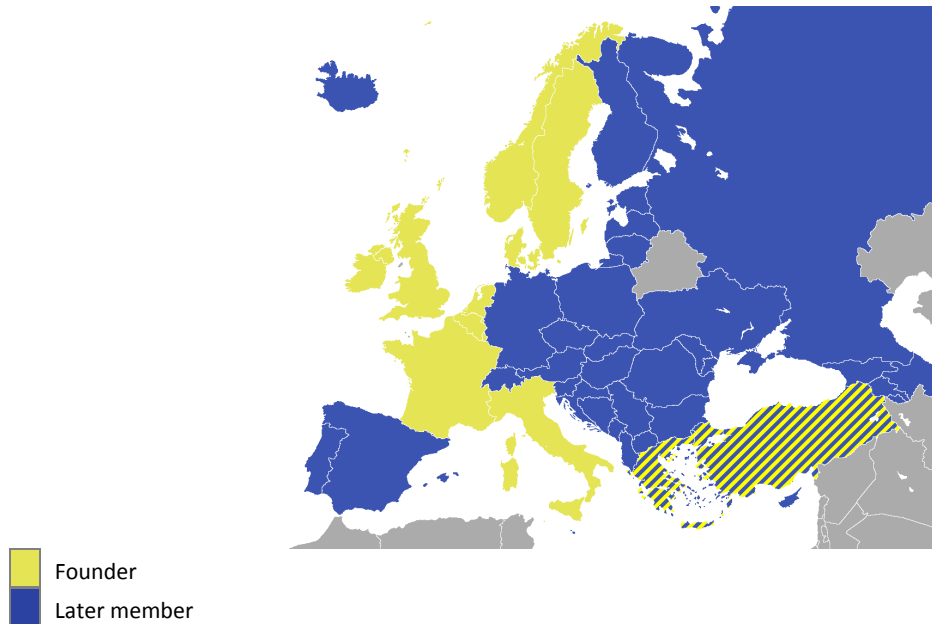
Annex 5: Border concepts and their overall analytical focus

Border concept	Analytical focus
Political borders	<p>Considers the politically defined land borders which separate – as simple lines – a sovereign nation state/federated state and its sub-national entities as well as its legal jurisdiction from another political entity / legal jurisdiction. Political borders also cover lake or river boundaries, because lakes and rivers are considered as “internal waters” over which a state has complete jurisdiction (i.e. thus being different to maritime boundaries, see below).</p> <p>The current political land borders between sovereign states in Europe are the result of many wars and peaceful diplomatic processes (e.g. European-wide congresses, treaties, peaceful secessions & reunifications) which took place over the past four centuries. The location of a political border was and still is an extremely sensitive issue, as it touches the very nature of a nation’s sovereignty, traditions and sense of community. Disputes about the location of a political border therefore continue to exist around the world and also in Europe.</p>
Maritime boundaries (where relevant)	<p>Considers the ocean borders of a maritime nation. The process of boundary delimitation encompasses the natural prolongation of geological features and outlying territory. Maritime boundaries are usually calculated from a declared baseline (e.g. the low water line or a straight line enclosing bays, estuaries, inland waters etc. or a combination of the two), for which the conditions of establishment are described in the “United Nations Convention on the Law of the Sea” (UNCLOS).</p> <p>The limits of maritime boundaries are expressed polylines and polygons, creating concentric areas and zones surrounding coastal and feature baselines on which a nation claims sovereignty and exclusive rights or control over the mineral and biological resources: These are usually the “coastal waters” (extending 3 nm. from the baseline), the “territorial sea” (extending 12 nm. from the baseline), the “contiguous zone” (extending 24 nm. from the baseline) and the “Exclusive Economic Zone” (extending 200 nm. from the baseline, except when the space between two countries is less than 400 nm). Geographical factors (location & relative position) may require agreements to be made on these boundaries with opposing and/or adjacent States when they overlap.</p> <p>This basically gives rise to two types of frontiers: (1) between waters/seabeds under national sovereignty and (2) between national waters/seabeds and the high seas/the Area.</p>
Natural obstacles	<p>Considers those physical-geographical or natural features existing along a border, which might represent a barrier to communication and transport or other inter-personal exchanges (e.g. oceans & seas; mountain ranges; rivers & lakes; deserts; large forests & denser jungles). In those cases where such obstacles do not exist, one can usually speak of a permeable “green” border.</p> <p>In Europe or Asia, natural obstacles have for a long time been a major focus of foreign policy and war goals (i.e. conquering & maintaining areas with such obstacles as a strategic potential for military defence) and were thus often also used to demarcate the territories of different states and to formalise political border lines (see above). In Africa or the Americas, however, the more recently formalised political borders typically conform less to natural borders.</p>
Economic discontinuities	<p>Considers significant differences between neighbouring border areas which can exist with respect to their overall economic performance (i.e. the result of all human economic activities & exchanges), but also in relation to more specific features (e.g. taxation, wages, labour productivity, etc) and complex socio-economic constellations (e.g. regional R&D/innovation potential, standards of living etc).</p> <p>Such performance differences can either be identified by using appropriate macro-</p>

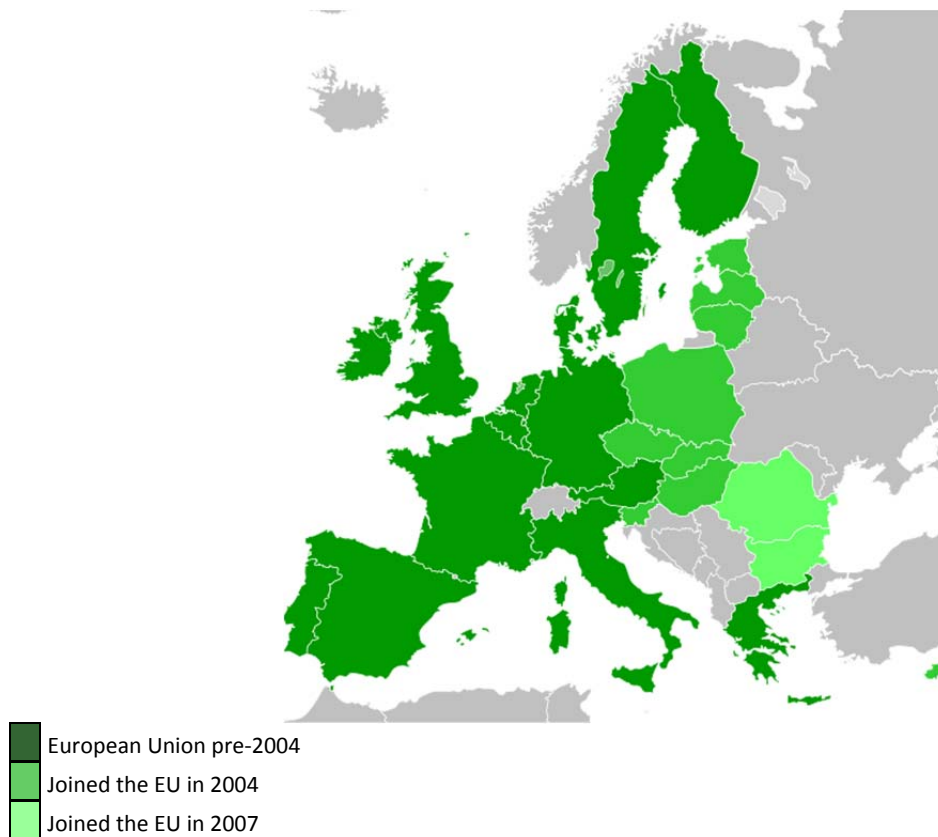
	<p>economic indicators (e.g. GDP per head-PPS; employment & unemployment rates etc) and micro-economic indicators (e.g. general or sector-specific levels of wages or labour productivity; levels of personal or business-related taxation; levels of real estate prices or rents etc), or by applying specific synthetic indicators which are designed to obtain information about more complex phenomena (e.g. for appraising quality of life or the regional R&D/innovation capacity etc).</p> <p>Economic discontinuities tend to be less static in nature as regards their geography and timely existence, because the main reason of their existence are often subject to rapid change (e.g. due to world-wide economic crises or policy interventions eliminating certain problems or leading to a lowering of specific differences).</p>
<p>Socio-cultural dividing lines</p>	<p>Considers diverse elements of culture (e.g. ancestry myths/symbols & shared historical memories, language, art, science, philosophy, beliefs & values, cuisine, clothing, sports, world views etc) as well as their individual perception (i.e. the people’s sense of self & how they relate to others) and their collective transformation through different social groups (e.g. based on nationality, ethnicity, a regional identity, religion or common interests),</p> <p>These aspects are all important determinants for border-regional and cross-border interaction and integration. In case of pronounced differences between neighbouring border areas, those aspects can create a variety of socio-cultural dividing lines and communicative barriers that hamper all sorts of individual or collective exchange relations (e.g. prejudices, mistrust, discriminatory distinction between “us” and “them” due to the belonging to different ethnic, religious or linguistic groups etc).</p> <p>Such socio-cultural dividing lines are somehow difficult to establish (identify), which is mainly due to interpretational and methodological reasons (i.e. precise understanding of complex terms such as culture or ethnic/ethnic groups; data availability on related matters such as cultural practices, language use or the belonging to ethnical groups etc).</p>

Annex 6: "International political borders" in Europe - A map-based representation according to the main forms of existing supranational co-operation & integration

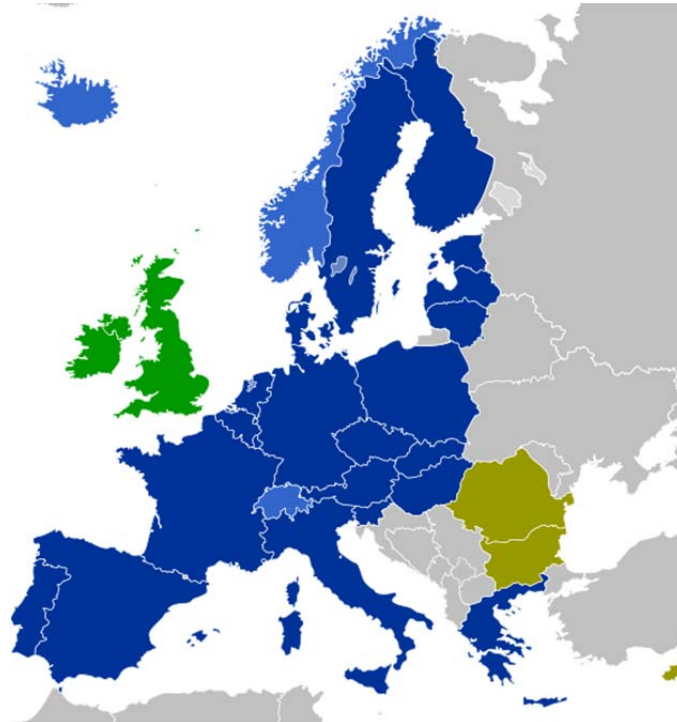
(1) Current membership of the "Council of Europe"



(2) Current membership of the "European Union" and recent phases of EU-enlargement



(3) Current membership of the „Schengen Area“



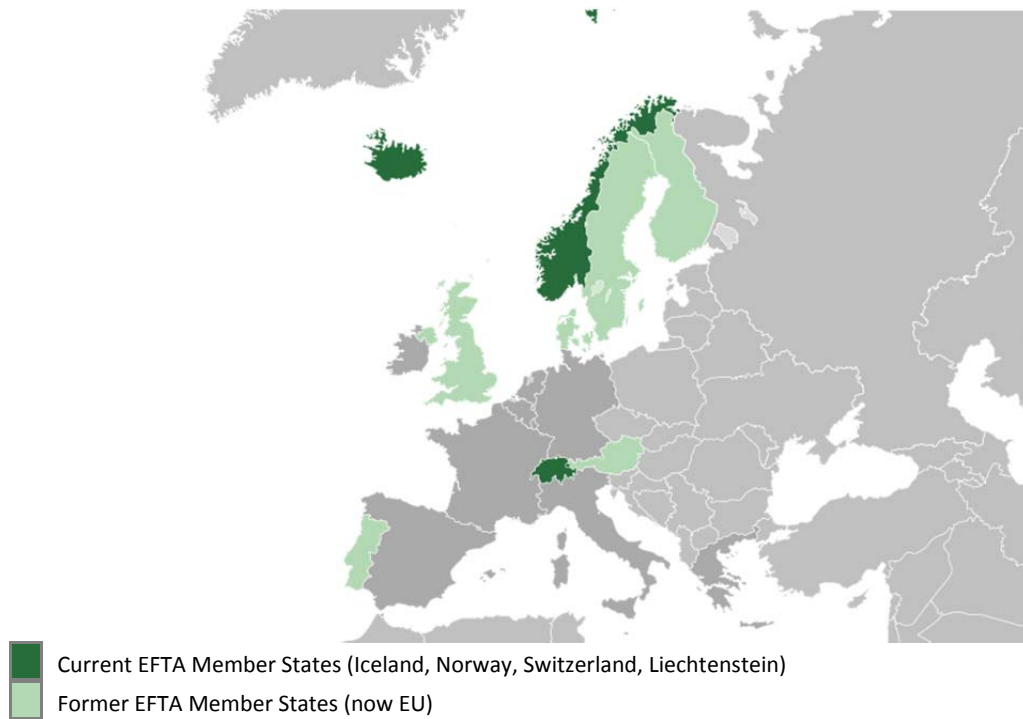
- Fully Schengen members (EU member states which have implemented the Schengen Agreement)
- Associated Schengen members (non-EU member states which have implemented the Schengen Agreement)
- Other EU member states (EU member states which have not implemented the Schengen Agreement yet)
- EU member states which apply only some Schengen laws

(4) Current membership of the “Euro-Zone”

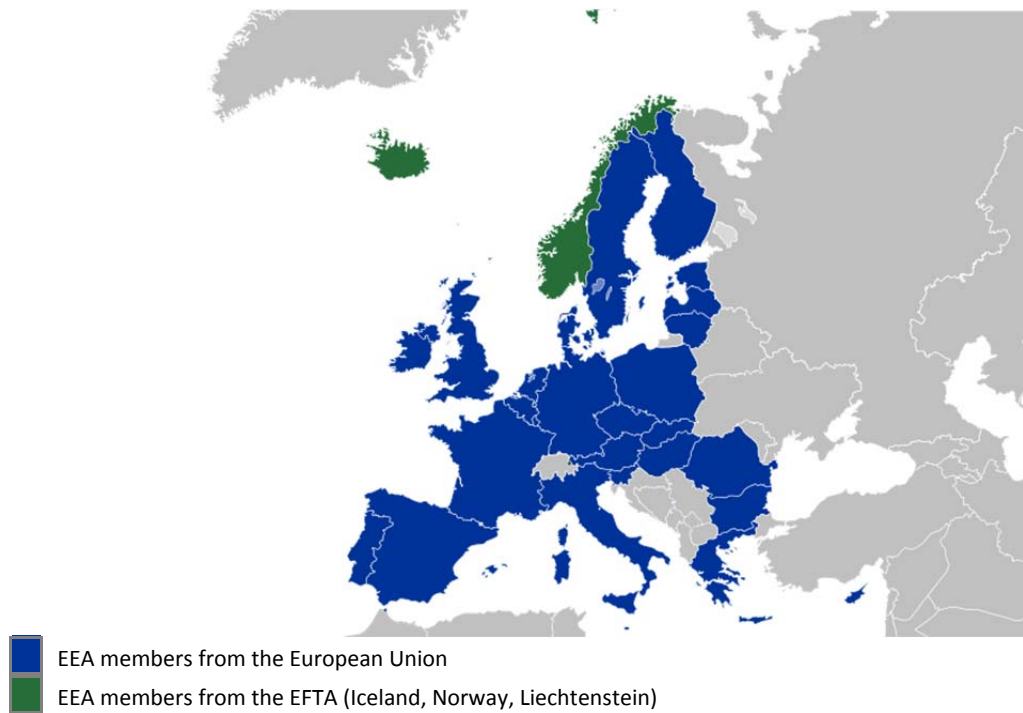


- Countries using the euro de-jure
- Countries and territories using the euro de facto

(5) Current membership of the “European Free Trade Association” (EFTA)



(6) Current membership of the “European Economic Area” (EEA)



Annex 7: Main drivers contributing to a further “tightening” of the external EU-borders

Increased “securitisation”:

The external EU-borders remain fully controlled by the concerned EU-Member States and may be crossed legally only at designated border checkpoints. Over the years, the EU Member States’ capacity for surveillance and control of the external EU-borders has been systematically supported and further increased. Concrete examples are the creation of the “European Agency for the Management of Operational Cooperation at the External Borders” (Frontex) in 2005, an improved access of police and security authorities of all member-states to various information systems (e.g. “Schengen Information System”, “Customs Information System”, “Visa Information System”) and databases (e.g. the EU fingerprint database for asylum seekers “Eurodac”⁶), the establishment of the new “External Borders Fund” (i.e. with 1.82 billion Euros for 2008-2013)⁷, the technical and operational set up of the “European Border Surveillance System” (EUROSUR)⁸ to collect data for strengthening defences against unwanted migrants at the external EU-borders via satellites and cameras in drones or aeroplanes⁹ or wider EU-level policy programmes setting out the Union’s priorities for the area of justice, freedom and security during the period 2010-14 (i.e. the “Stockholm Programme”¹⁰ and the related Action Plan¹¹).

Establishment of “shadow borders”:

From the mid 1990s, several agreements between the EU and its non-EU neighbours were reached which aim at controlling unwanted migration from the Mediterranean neighbours as well as from Central and Eastern Europe. As a consequence, the EU external border regime consistently moved a little further away from the Schengen Area and the EU’s migration controls were pushed beyond the EU-territory through expatriating controls and subcontracting the fight against unwanted immigration (e.g. towards neighbouring Third Countries such as Morocco, Tunisia, Libya and Ukraine).¹² Meanwhile, the operational area of Europol and Frontex also has been widely extended to non-EU countries. Particularly the European Border Agency Frontex has pushed in favour of wider cooperation programs with non-EU countries.¹³

⁶ The Eurodac fingerprint system was introduced in 2000 to identify asylum applicants and persons who have been apprehended in connection with an ‘irregular’ crossing of an ‘external border’ of the Union or of the territory of another EU Member State.

⁷ ECRE-European Council on Refugees and Exiles (2007): *Defending Refugees’ Access to Protection in Europe*, London: ECRE.

⁸ European Commission (2011): *Determining the technical and operational framework of the European Border Surveillance System (EUROSUR) and the actions to be taken for its establishment*. Commission Staff Working Paper, Brussels, 28.1.2011.

⁹ Wicht, Ch. (2010): *Sicherheit um jeden Preis. Das Stockholmer Programm der Europäischen Union*. In: *Blätter für deutsche und internationale Politik* 3/2010, pp. 91-98.

¹⁰ European Council (2010): *The Stockholm Programme: An Open and Secure Europe Serving and Protecting the Citizens*. (2010/C 115/01, 4.5.2010). The Stockholm programme builds on the achievements of its predecessors the Tampere and Hague programmes.

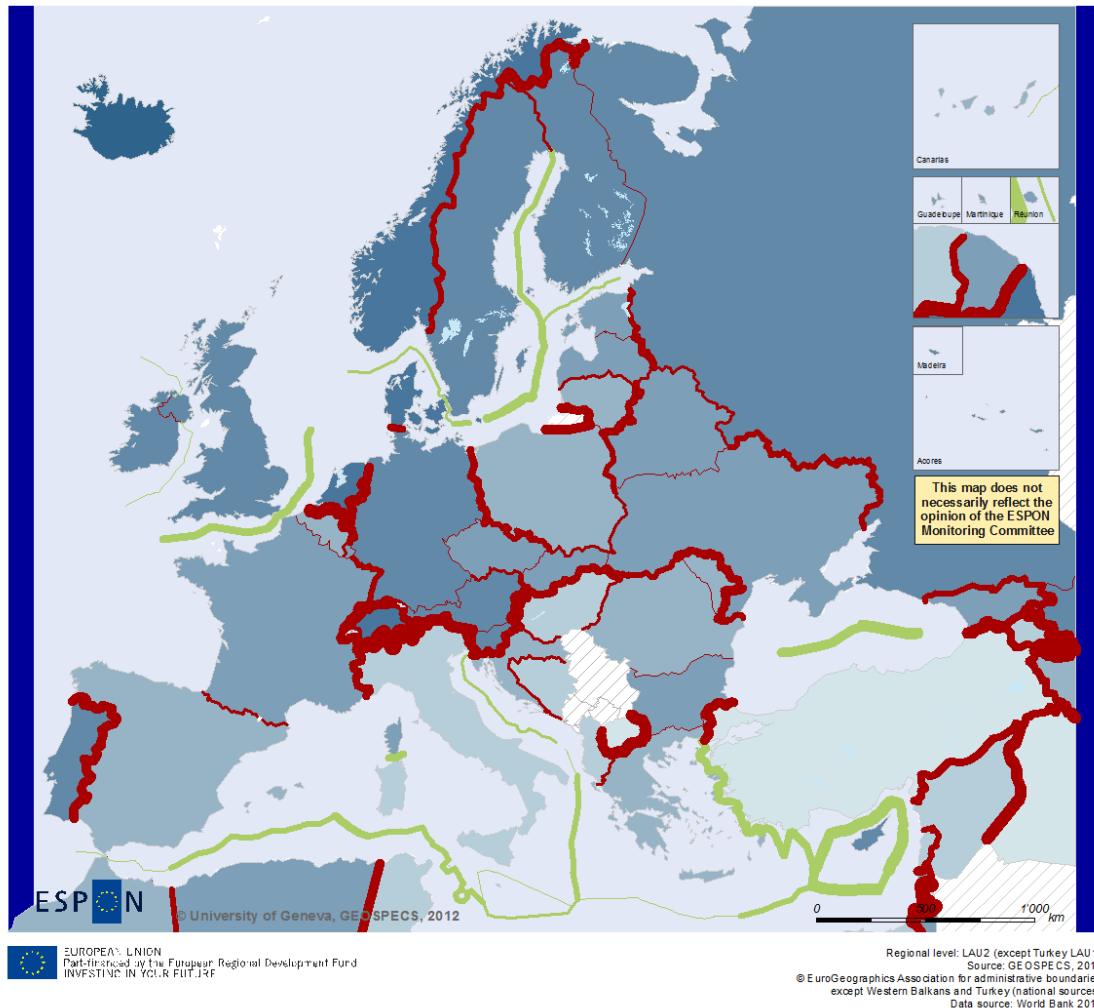
¹¹ COM/2010/0171 final, not published in the Official Journal.

¹² Düvell, F./Vollmer, B. (2011): *European Security Challenges. EU-US Immigration Systems*, Florence: European University Institute/Robert-Schuman Centre for Advanced Studies, pp. 9-11.

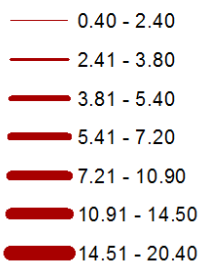
¹³ Klepp, S. (2010): *Italy And Its Libyan Cooperation Program: Pioneer of the European Union’s Refugee Policy?* In: Jean-Pierre Cassarino (Ed.), *Unbalanced Reciprocities: Cooperation on Readmission in the Euro-Mediterranean Area*. Washington D.C. 2010: Middle East Institute, p. 84. See also: Keller, S./Lunacek, U./Lochbihler, B./Flautre, H. (2011): *Frontex Agency: Which guarantees for human rights?* A study conducted by Migreurop (www.migreurop.org) on the European External Borders Agency in view of the revision of its mandate, Brussels: Migreurop, p. 11.

Annex 8: A mapping of various other examples for “economic discontinuities” which exist at European borders

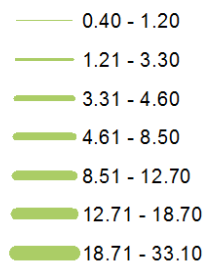
Proportion of employed population (age 15 and more, 2009)



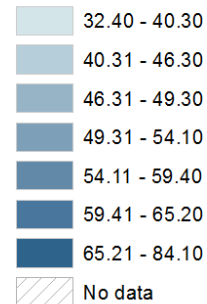
Land Borders



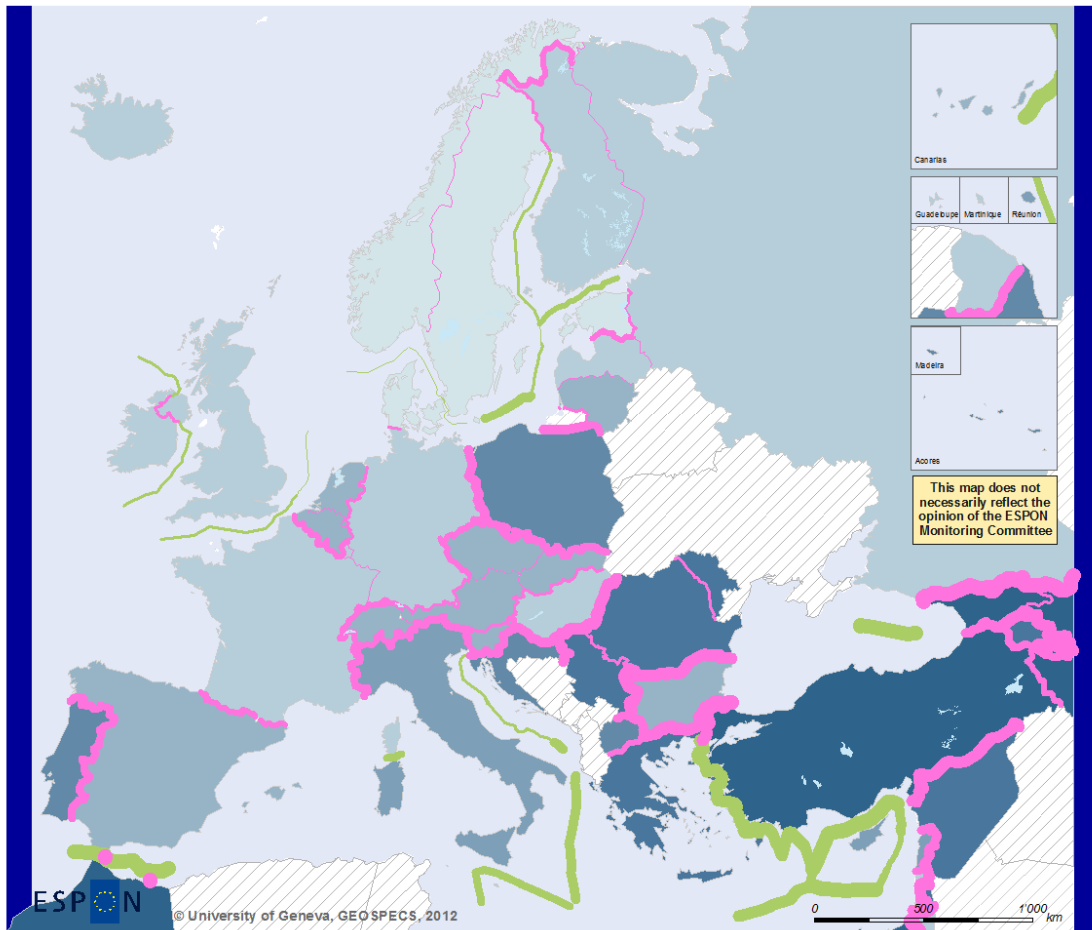
Sea Borders



Share of employed population



Female vulnerable employment in percent of total female employment (census data between 2007-2009)



EUROPEAN UNION
Participated by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)
Data source: World Bank 2011

Land Borders

- 0.30 - 1.70
- 1.71 - 3.30
- 3.31 - 5.20
- 5.21 - 10.60
- 10.61 - 17.40
- 17.41 - 26.00
- 26.01 - 59.20

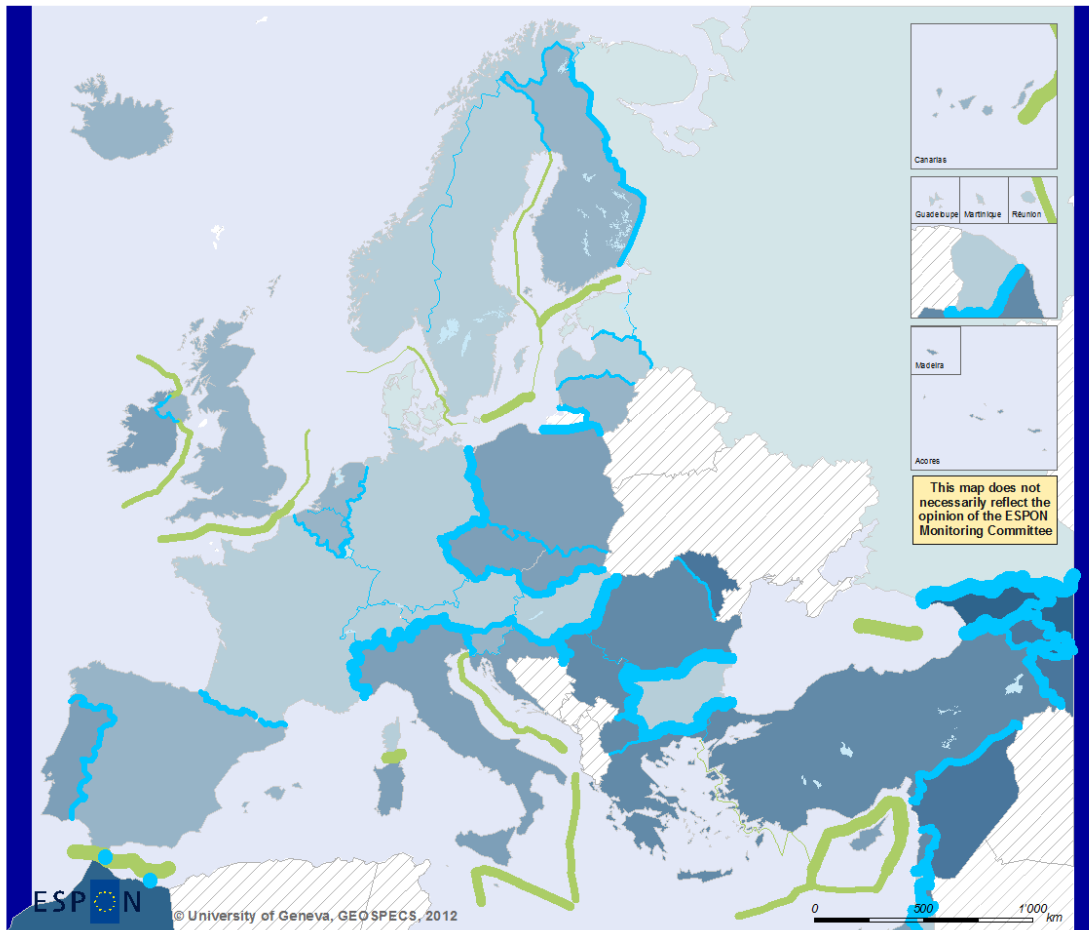
Sea Borders

- 0.10 - 1.50
- 1.51 - 2.80
- 2.81 - 3.70
- 3.71 - 9.70
- 9.71 - 16.50
- 16.51 - 22.00
- 22.01 - 55.50

Share of active female with vulnerable employment

- 3.40 - 4.60
- 4.61 - 7.10
- 7.11 - 11.00
- 11.01 - 15.90
- 15.91 - 22.40
- 22.41 - 40.30
- 40.31 - 64.60
- No data

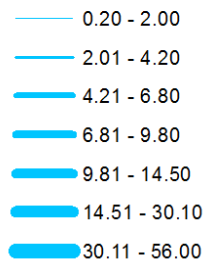
Male vulnerable employment in percent of total male employment (census data between 2007-2009)



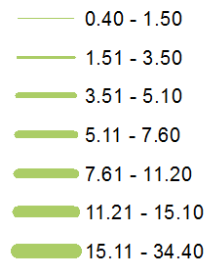
EUROPEAN UNION
Participated by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)
Data source: World Bank 2011

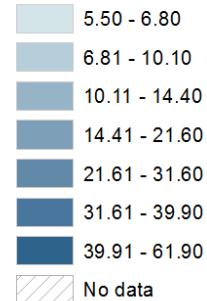
Land Borders



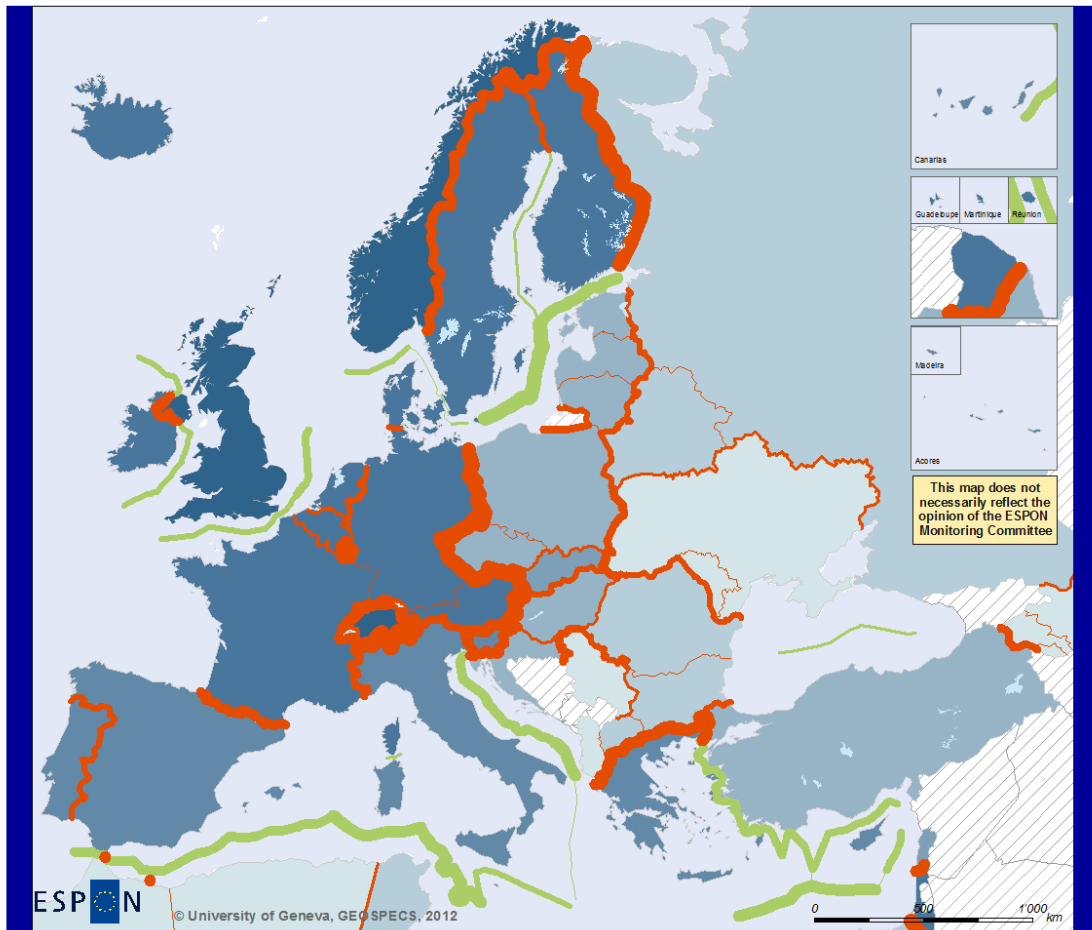
Sea Borders



Share of active male with vulnerable employment



Household final consumption expenditure per capita (constant 2000 US\$, 2009)



EUROPEAN UNION
Participated by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)
Data source: World Bank 2011

Land Borders (difference in US\$)

- 33 - 486
- 487 - 1122
- 1123 - 1961
- 1962 - 3084
- 3085 - 4716
- 4717 - 9289
- 9290 - 18308

Sea Borders (difference in US\$)

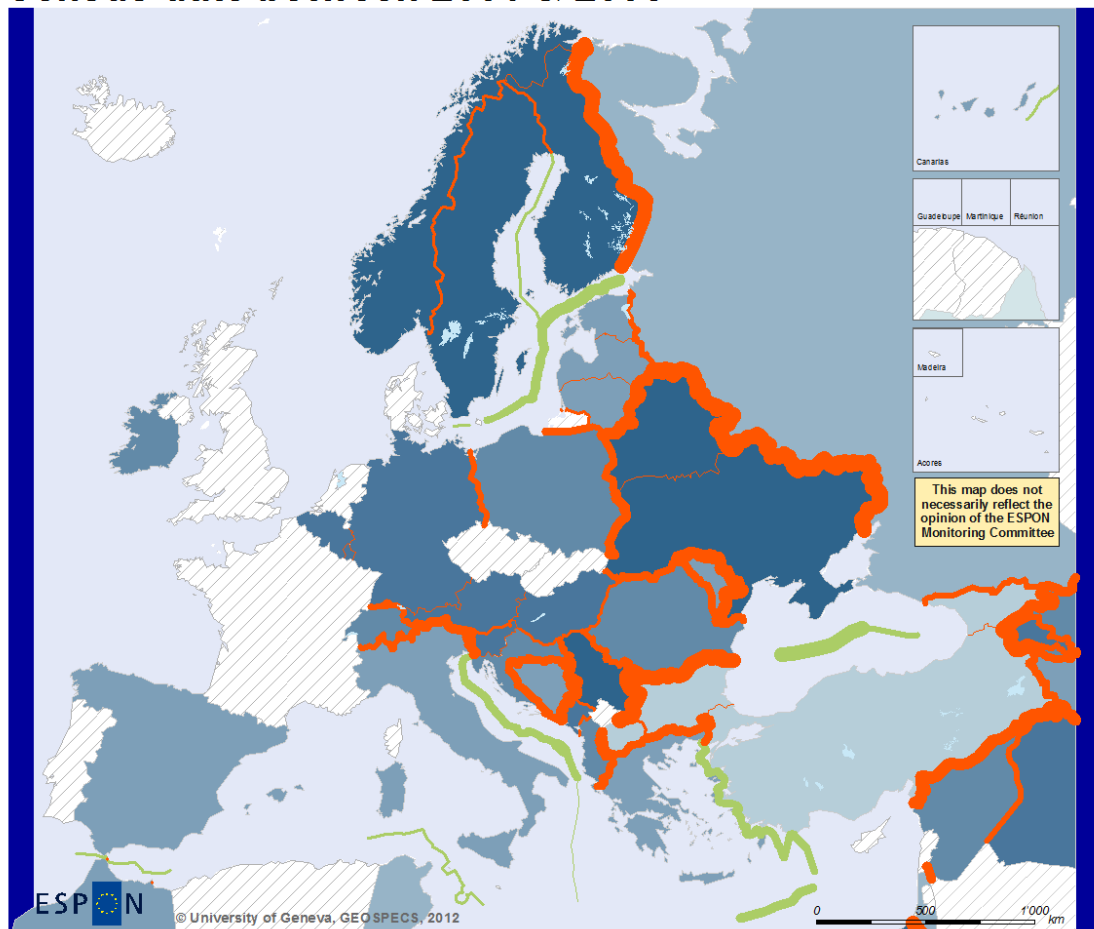
- 105 - 943
- 944 - 2767
- 2768 - 5487
- 5488 - 7135
- 7136 - 8400
- 8401 - 10769
- 10770 - 13240

Household final consumption Expenditure in US\$

- 192 - 1278
- 1279 - 2291
- 2292 - 3946
- 3947 - 4954
- 4955 - 11307
- 11308 - 15623
- 15624 - 22012
- ▨ No data

Percentage share of income or consumption that accrues to lowest 20% incomes.

Census date between 2001 & 2008



ESPON
 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
 Source: GEOSPECS, 2011
 © EuroGeographics Association for administrative boundaries
 except Western Balkans and Turkey (national sources)
 Data source: World Bank 2011

Land Borders

- 0.01 - 0.19
- 0.20 - 0.65
- 0.66 - 1.05
- 1.06 - 1.58
- 1.59 - 2.06
- 2.07 - 2.83
- 2.84 - 4.03

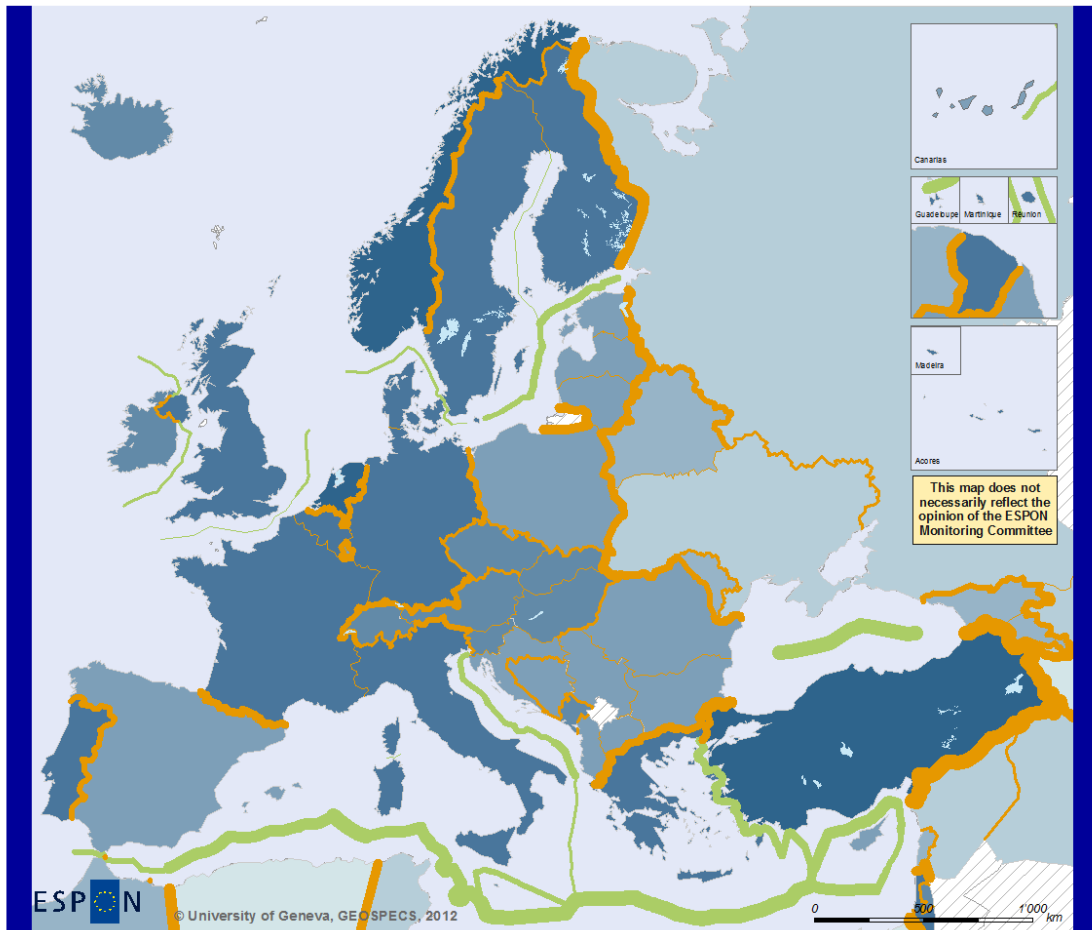
Sea Borders

- 0.24
- 0.25 - 0.60
- 0.61 - 0.88
- 0.89 - 1.64
- 1.65 - 2.33
- 2.34 - 2.82
- 2.83 - 4.20

Share of income that accrues to lowest 20%

- 2.530000 - 3.710000
- 3.710001 - 5.410000
- 5.410001 - 6.180000
- 6.180001 - 6.970000
- 6.970001 - 8.140000
- 8.140001 - 8.780000
- 8.780001 - 9.620000
- No data

Pump price for petrol (US\$ per liter, 2010)



ESPON
 University of Geneva, GEOSPECS, 2012

Regional level: LAU2 (except Turkey LAU1)
 Source: GEOSPECS, 2011
 © EuroGeographics Association for administrative boundaries
 except Western Balkans and Turkey (national sources)
 Data source: World Bank 2011

Land Borders (difference in US\$)

- 0.01 - 0.11
- 0.12 - 0.21
- 0.22 - 0.35
- 0.36 - 0.56
- 0.57 - 0.84
- 0.85 - 1.28
- 1.29 - 2.42

Sea Borders (difference in US\$)

- 0.01 - 0.11
- 0.12 - 0.21
- 0.22 - 0.35
- 0.36 - 0.56
- 0.57 - 0.84
- 0.85 - 1.28
- 1.29 - 2.42

Pump price for petrol (US\$ per liter)

- 0.02 - 0.48
- 0.49 - 1.02
- 1.03 - 1.25
- 1.26 - 1.59
- 1.60 - 1.78
- 1.79 - 2.05
- 2.06 - 2.52
- No data

Annex 9: Ethnic communities in Europe and the revival of ethnic nationalism

As regards the **ethnic groups and communities**¹⁴ existing in Europe, one can identify a total of 87 distinct "peoples". Of those, 33 form the majority population in at least one sovereign state while the remaining 54 constitute ethnic minorities.¹⁵ The total number of national minority populations in Europe is estimated at 105 million people, or 14% of 770 million Europeans. A rough quantitative overview on the general situation of the different peoples existing in Europe is presented below (**see: Box**).

Box: Population shares of the different European peoples

Of the total population of Europe of some 730 million (as of 2005), there are eight peoples of Europe with more than 30 million members residing in Europe:

1. *the Russians (ca. 90 million residing in the European parts of Russia),*
2. *the Germans (ca. 82 million),*
3. *the French (ca. 65 million),*
4. *the British (55 - 61 million),*
5. *the Italians (ca. 59 million),*
6. *the Spanish (ca. 46 million),*
7. *the Ukrainians (ca. 46 million),*
8. *the Poles (ca. 38 million).*

These eight groups between themselves account for some 460 million or about 63% of European population. About 20-25 million residents (3%) are members of diasporas of non-European origin. The population of the European Union, with some five hundred million residents, accounts for two thirds of the European population.

Both Spain and the UK are special cases, in that the designation of nationality (i.e. Spanish and British) may controversially take ethnic aspects, subsuming various regional ethnic groups (see also regionalism in Spain and native populations of the United Kingdom). Also Switzerland is a similar case, but the linguistic subgroups of the Swiss are not usually discussed in terms of ethnicity and Switzerland is considered a "multi-lingual state" rather than a "multi-ethnic state".

Source: http://en.wikipedia.org/wiki/Ethnic_groups_in_Europe.

Despite the fact that the world and also Europe is becoming more unified and interconnected, the belonging to an ethnic group or community still remains an important phenomenon which also tends to maintain "lines of socio-cultural division". **In Europe**, especially since the end of the systems block-confrontation and the fall of the iron curtain in the early 1990s, **clear signs for a re-birth of ethnic nationalism exist**. This has led in some cases to the peaceful drawing-up of new political borders on the European continent (e.g. dissolution of former Czechoslovakia into its constituent states the

¹⁴ Although there is no precise or universally accepted definition of the terms "ethnic group" or "nationality", European ethnography in particular uses the terms ethnic group, people (without nation state), nationality, national minority, ethnic minority, linguistic community, linguistic group and linguistic minority as mostly synonymous. Preference in the usage of these terms may, however, vary with respect to the situation specific to the individual [countries of Europe](#). See in general: http://en.wikipedia.org/wiki/Ethnic_groups_in_Europe.

¹⁵ **Pan, Ch. / Pfeil, B.S. (2002):** Minderheitenrechte in Europa. Handbuch der europäischen Volksgruppen (2002).

Czech Republic and Slovakia), but also to violent ethno-cultural conflicts involving terrorism¹⁶ and even major military confrontations (e.g. in case of former Yugoslavia since the 1990s or recently in the conflict between Russia and Georgia). This paradox between, on the one hand, an increasingly interdependent world with a mass-communication culture and, on the other hand, the revival of small-scale ethno-cultural identification frameworks can mainly be explained by the persisting influence of historic and societal foundations (i.e. chains of memory, myths, symbols) on the mindset of people as well as by the rootedness of territorial identity in pre-modern ethnic symbolism and ethnic modes of organisation.¹⁷

¹⁶ One should also not forget the more long-lasting and also violent ethno-cultural regional conflicts in Western Europe which are partly solved or still on-going (e.g. Catholics versus Protestants in Ireland/Northern Ireland, the Basque movement claiming independence from their respective central governments in France & Spain, the movement in Corsica which claimed independence from the central government in France).

¹⁷ **Smith, A. D. (1995):** Nations and Nationalism in a Global Era. Cambridge, 1995.

Annex 10: Languages in Europe

Beyond the three main linguistic groups (i.e. the Romance, Germanic and Slavic languages), many other languages exist in Europe. The Indo-European language group includes the Baltic languages (i.e. Latvian and Lithuanian), the Celtic languages (i.e., Irish, Scottish Gaelic, Manx, Welsh, Cornish, and Breton), Greek, Albanian, and Armenian. A distinct group of Uralic languages are Estonian, Finnish, and Hungarian, which are spoken in the respective countries as well as in parts of Romania, Russia, Serbia, and Slovakia. Maltese is the only Semitic language official to the EU. Turkic languages include Azerbaijani and Turkish in addition to the languages of minority nations in Russia. There are also non-Indo-European language isolates such as Basque and Georgian.¹⁸ This European linguistic diversity can be mapped either at an overall scale or for specific language groups and sub-areas (see: maps 1-7 below).¹⁹ Although these mapping attempts might not always be fully satisfactory, they generally well illustrate the extreme complexity of the territorial linguistic settings in Europe.

The languages have different statuses in Europe and the EU, for which the following overall classification can be developed:²⁰

- **State Languages:** Languages having an official status throughout a country. State languages are always official languages.
- **Official Languages:** Languages used for legal and public administration purposes within a specified area of a country or reaching over the whole state, such as Catalan in Spain.
- **Regional/Minority Languages:** Languages traditionally used by part of the population of a state that are not dialects, artificially created or migrant languages, such as (1) languages that are specific to a region like Breton in France, (2) languages that are spoken by a minority in a state but are official languages in other, usually bordering, country such as Hungarian in Slovakia and (3) non-territorial languages such as Yiddish and the language of Romani people.
- **Non-indigenous languages:** Languages from other parts of the world spoken by immigrant communities in the EU such as Turkish in Germany or Indian languages in the United Kingdom.
- **Official EU languages:** The official languages of the European Union are Czech, Danish, Dutch, Estonian, English, Finnish, French, German, Greek, Hungarian, Italian, Latvian, Lithuanian, Maltese, Polish, Portuguese, Slovak, Slovene, Spanish and Swedish. Irish became the 21st official language on 1 January 2007. After the accession of Bulgaria and Romania, the Union operates in 23 official languages. Regional languages that have an official status in the EU are Catalan, Galician and Basque.

¹⁸ <http://en.wikipedia.org/wiki/Europe>

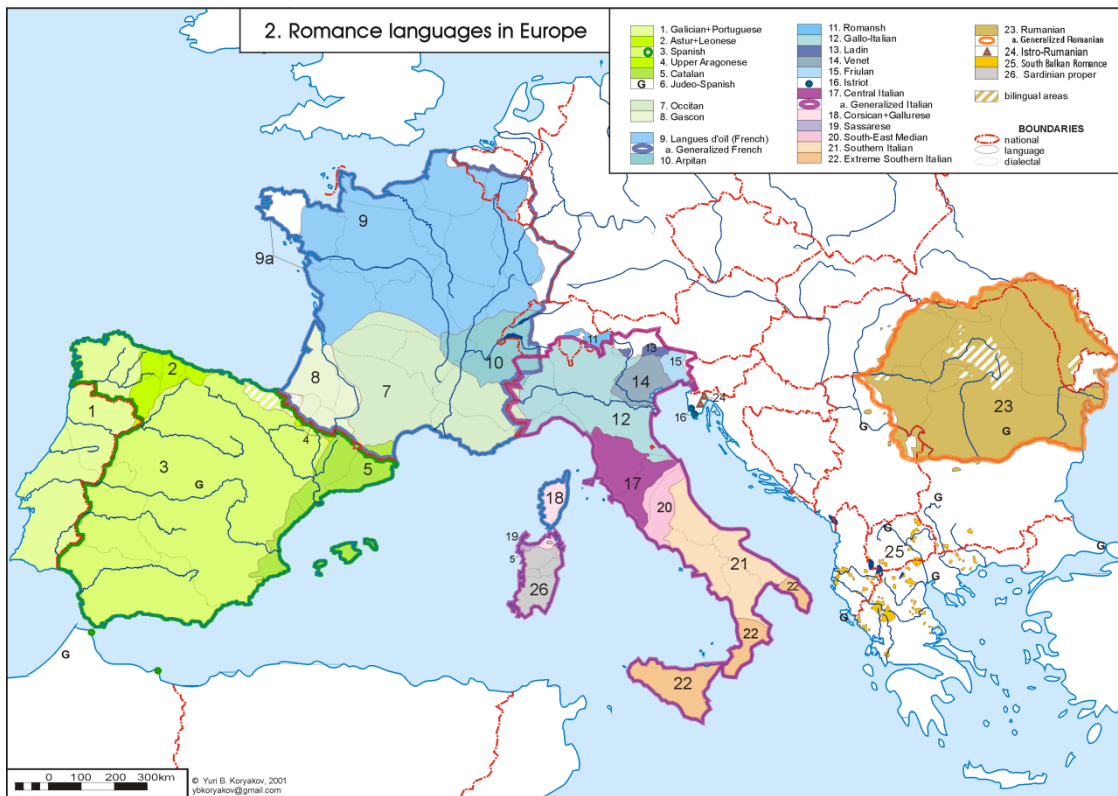
¹⁹ http://en.wikipedia.org/wiki/Languages_of_Europe

²⁰ **European Commission (2006):** *Europeans and their Languages*. Special Eurobarometer 243 / Wave 64.3 – TNS Opinion & Social. February 2006

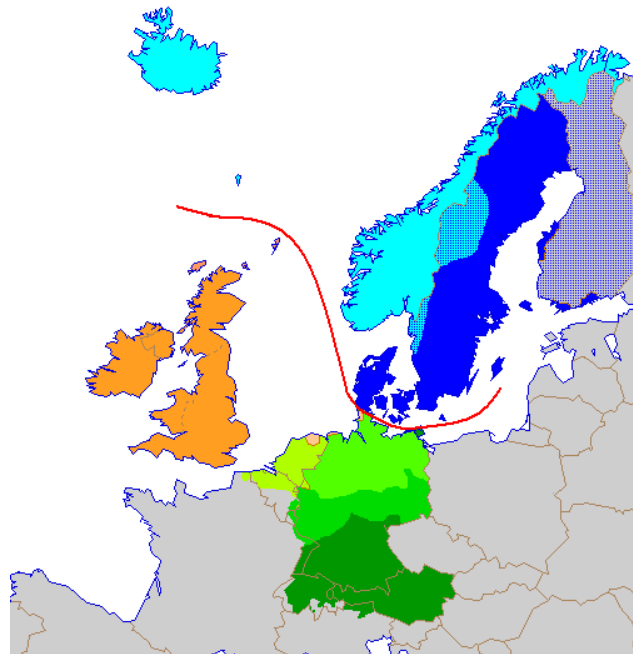
Map 1: Languages in Europe



Map 2: Romance languages in Europe



Map 3: Germanic languages in Europe



West Germanic languages

- Dutch (Low Franconian, West Germanic)
- Low German (West Germanic)
- Central German (High German, West Germanic)
- Upper German (High German, West Germanic)
- English (Anglo-Frisian, West Germanic)
- Frisian (Anglo-Frisian, West Germanic)

North Germanic languages

- East Scandinavian
- West Scandinavian
- Line dividing the North and West Germanic languages

Map 4: Celtic languages in Europe



The modern [Celtic languages](#) are divided into

- the [Brythonic family](#): [Welsh](#), spoken primarily in [Wales](#), [Breton](#) ([Brittany](#), in northwestern [France](#)), and [Cornish](#) ([Cornwall](#), in south west [England](#)),
- the [Goidelic \(Gaelic\) family](#): [Irish](#) (spoken primarily in [Ireland](#)), [Scottish Gaelic](#) ([Scotland](#)), and [Manx Gaelic](#) ([Isle of Man](#), an island in the [Irish Sea](#)).

[Continental Celtic languages](#) became extinct in the first millennium AD, but had previously been spoken across Europe from Iberia and Gaul to Asia Minor.

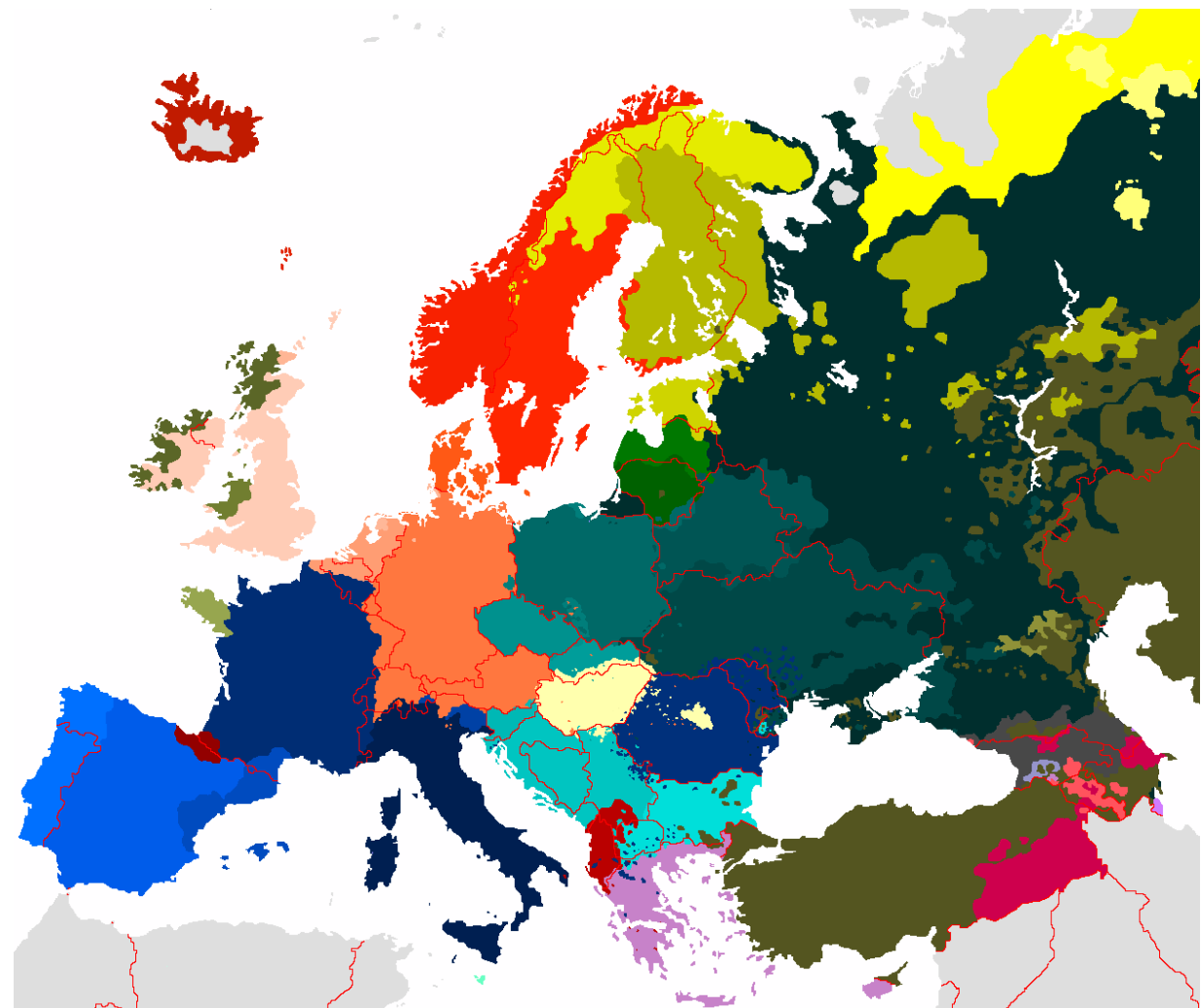
Map 5: Slavic languages in Europe



Map 6: Distribution of Uralic languages in Europe



Map 7: European linguistic classifications



Indo-European

Germanic

Northern

- Icelandic
- Faroese
- Norwegian
- Swedish
- Danish

Western

- German
- Dutch
- Frisian
- English

Romantic

Western

- French and Wallon
- Romansh
- Catalan and Franco-Provençal
- Castilian, Astur-Leonese and Aragonese
- Portuguese and Galician

Eastern

- Italian, Sardinian and Monégasque
- Romanian, Moldovan and Aromanian

Slavic

Eastern

- Russian
- Ukrainian
- Belarusian

Western

- Polish
- Kashubian, Silesian
- Sorbian
- Czech
- Slovak

Southern

- Slovenian
- Serbo-Croatian
- Bulgarian and Macedonian

Celtic

- Irish and Scottish
- Welsh
- Manx
- Breton

Baltic

- Lithuanian
- Latvian and Latgalian

Iranian

- Persian, Ossetic, Kurdish, Tat

Other Indo-European

- Greek
- Albanian
- Armenian

Semitic

- Maltese

- Basque

Caucasian

- Georgian, Avar, Abkhaz, Ingush, Chechen, etc.

Uralic

Finno-Permian

- Finnish, Karelian, Veps, Mordvinic and Mari
- Lapp
- Estonian

Ugric

- Khanty and Mansi
- Hungarian

Altaic

Turkic

- Turkish, Gagauz, Azerbaijani, Tatar, Bashkir, Nogai, Turkmen, etc.

Mongolic

- Kalmyk

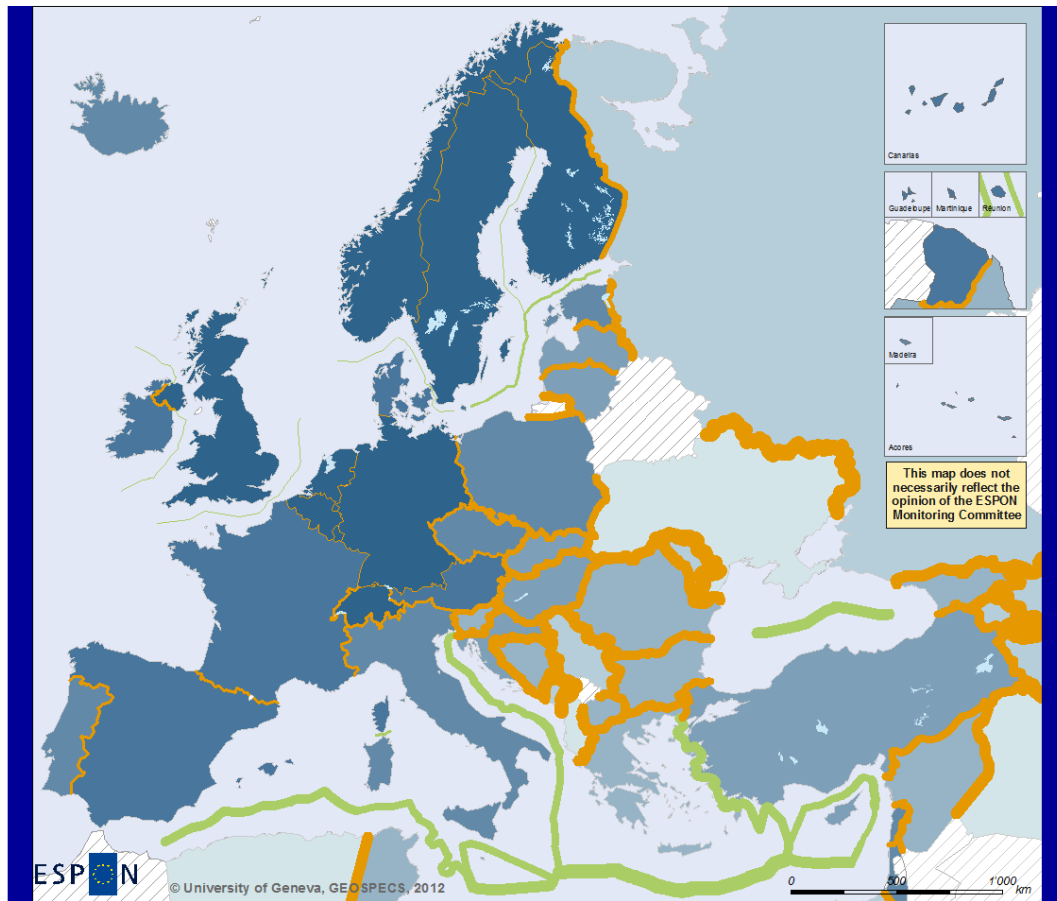
Annex 11: Extensive version of the general typology of border effects

Type of border effect	General reasons explaining border effects	Concrete examples for associated “closure effects” (-) and “opening effects” (+)
Effects associated to political borders	Different status of the political border & different degrees of “openness” for economic exchanges & inter-personal relations.	<ul style="list-style-type: none"> + Smooth & free circulation of persons, goods and services (no controls), due to the status as internal EU-border/Schengen border of full members or associated members/EEA-border and the absence of restrictions to labour market access. + Smooth & free circulation of persons, goods and services (with some controls), due to the status as internal EU-border/non-Schengen border/EEA-border and the absence of restrictions to labour market access.. - Strongly limited circulation of persons, goods and services due to the status as an external EU-border (i.e. import restrictions, sanitary prescriptions, restrictions to labour market access, visa requirements & visa cost, extensive customs checks & control procedures, long waiting times due to different checkpoint opening hours, staff shortage or bureaucracy). - Exchange rate losses due to different currencies used on either side (e.g. between EURO-zone members & non-Euro zone countries).
	Different legal systems, different governance structures (administrative units & powers), and different policies meeting at a political border.	<ul style="list-style-type: none"> + Establishment of activities which provide specialised economic services drawing upon the cross-country differences in customs or tax legislation. - A lack of co-ordination/co-operation and joint planning in the field of public policies due to different administrative structures and powers. - Low quality of public services or social facilities (lacking investment) due to insufficient catchment areas in border / cross-border regions and/or due to legal and financial barriers. - Varying quality in terms of tackling major emergencies, accidents with a cross-border impact due to different legislations and organisation of rescue & disaster prevention services. - Different organisation and functioning of public transport systems and lacking cross-border co-ordination and operation. - Varying levels of crime prevention and public security on either side of the border, due to different legislation & organisation of police forces. - Due to a use of different currencies on either side of a common border, risk of exchange-rate losses and existence of other transaction cost. - Curtailed civil rights of foreigners living as permanent residents on the other side of a border (e.g. voting rights in the home country) or of residents in a border region with respect to aspects on the other side affecting their own quality of life (e.g. installation of waste disposal / incineration facilities, nuclear power plants). - Obstacles for border-crossing business activities (esp. for SMEs & small crafts undertakings) due to different legislations on tax, social welfare and education/vocational training or different technical standards & other formal requirements (e.g. special permits, mandatory membership in intermediate professional organisations etc). - Obstacles for independent professions (e.g. doctors, lawyers, architects etc) due to different legislations or an insufficient de-jure or de-facto recognition of degrees, diploma or other qualifications. - Obstacles for cross-border mobility & labour market commuting (i.e. existence of labour market restrictions, different taxation & social systems, different other administrative/regulatory requirements governing e.g. the access to vocational training & further training, lacking information on job opportunities or on required levels of formations/graduations). - Different environmental legislations/standards or practices, leading to unwanted developments (e.g. pollution of air, soil and water, noise-disturbances) which also negatively affect the quality of life on one or both sides of a border. - Limited admission into a hospital or consultation of a doctor on the other side of the border, due to different health care systems and insurance regulations. - Higher cost for cross-border phone calls or cross-border mail delivery services.
Effects associated to	Different levels of certainty / clarity about the maritime	<ul style="list-style-type: none"> + Non-existence of disputes on maritime boundaries, favouring a coherent off-shore and on-shore regional development which is also further enhanced by a less problematic implementation of supranational regimes or policies (e.g. EU-fisheries policy, joint preservation of coasts & the

maritime boundaries	boundaries existing between states.	marine environment). - Existence of disputes on maritime boundaries, leading to multiple off-shore and on-shore problems (e.g. hampered activity of local fishermen, hampered functioning of ports and of maritime police control, incoherent management & preservation of the sea / the marine ecosystem, hampered development of tourism, distortions in the well-being of local inhabitants).
Effects associated to natural obstacles	Existence or non-existence of a natural obstacle & varying significance of the "barrier effect" represented by an existing obstacle (e.g. high mountain, large river & lake, sea or large maritime separation).	+ High permeability of the border, due to the non-existence of a physical obstacle and/or a high or even very high density of border crossing possibilities (i.e. by road, rail, ship etc) and/or well-developed cross-border transport & communication infrastructures (including public transport services). + Intense economic and inter-personal exchanges or cross-border labour market commuting, due to short distances & travel times. - Reduced permeability of the border, due to the existence of a physical obstacle and/or a low or even very low density of border crossing possibilities (i.e. by road, rail, ship etc) and/or underdeveloped cross-border transport & communication infrastructures (including public transport services). - Limited economic and inter-personal exchanges or cross-border labour market commuting, due to long distances & long travel times.
Effects associated to economic discontinuities	Significantly different levels of economic performance (i.e. observed with respect to the overall situation or a specific issue) between areas located along a common border, acting at the same time as potential "push factors" and "pull factors".	+ Intense cross-border trade / provision of services, due to the non-availability or a different quality of products & services on one side of a border. + Legal cross-border labour market commuting, due to an unfavourable situation in the area of residence and more attractive conditions one on the other side of a border (i.e. stronger economic dynamism & more / better job opportunities, better working conditions, higher wages etc), causing an outflow of workforce. + Legal permanent migration of individuals from one side to the other side of a border, due to lower property prices or rent and/or a better living standard (e.g. wages), often also coupled to the emergence of a flow of "in-commuting nationals" (i.e. persons from one state who are living on the other side of the border but are still working in their former home country). - Dislocation of companies / specific production processes from one side to the other side of a border, due better infrastructure and lower wages / taxes or to other monetary advantages existing on the other side of a border (e.g. better credit & loan conditions; higher public subsidies for companies). - Illegal immigration & employment or risk of social conflicts, due to a very unfavourable economic situation / poor living standard on one side of a border and restrictions existing for cross-border mobility (external borders). - Smuggling, due to cross-border differences in the price or taxation of goods and/or the non-availability of certain goods.
Effects associated to socio-cultural dividing lines	Different interpretation of the common historical legacy & different levels of inter-personal relations existing between both sides of a border	+ Due to positively shared historic experiences, existence of positive instinctive attitudes (e.g. mutual trust, a sense of "belonging together" & a common identity). - Due to negative historic experiences and/or the non-existence of common historic ties, existence of negative instinctive attitudes (e.g. traditional prejudices, mistrust / misinformation, a lack of mutual knowledge/understanding or ignorance).
	Variations with respect to the general ethno-cultural & linguistic settings on either side of a border	+ Existence of similar cultural/moral concepts and behavioural patterns existing on both sides of the border, leading to a better comprehension of the neighbours' "way of thinking and behaving" and a high level of mutual trust. + Due to the fact that the same language is spoken on both sides of the border, cross-border inter-personal and official communication as well as job-access is easier. - Existence of negative instinctive attitudes (e.g. mental barriers/misunderstandings, mistrust, lack of genuine motivation), due to different cultural/moral concepts and behavioural patterns. - Existence of different official languages and a lack of language proficiency (multi-linguism) on both sides of the border which lead to a communicative barrier among individuals, to difficulties in accessing jobs and to more complicated customs / administrative procedures.

Annex 12: Efficiency of customs clearance processes along European borders

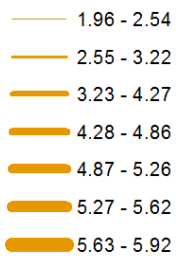
Efficiency of customs clearance process (2009)



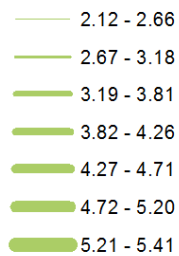
ESPON
 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
 Source: GEOSPECS, 2011
 © EuroGeographics Association for administrative boundaries
 except Western Balkans and Turkey (national sources)
 Data source: World Bank 2011

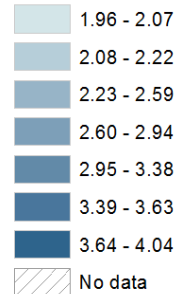
Land Borders (1=High; 10=Low)



Sea Borders (1=High; 10=Low)



Efficiency of customs clearance (1=low to 5=high)



Annex 13: EU-wide analyses of the situation of cross-border workers & problems associated to data gathering

Up to now, only three studies provide an extensive quantitative and qualitative analysis of the EU-wide situation of cross-border workers: At the mid-1990s, a **first study** was done for the European Commission²¹ which analysed the general context and commuting flows in individual cross-border areas located at the borders between EU15/EEA countries & Switzerland. It did, however, not produce any overall quantitative aggregation of the regional flow data. Around the same time, a **second study** was done for the European Parliament²² which had a similar analytical focus than the previous one and also produced an overall aggregation of commuting flows. The **third and most recent EU-wide study** was realised in 2008/2009 for DG Employment²³ and provides a very comprehensive quantitative and also qualitative analysis of the overall situation along the borders of the EU-27/EEA/EFTA Countries. The study referred in general to border regions at the NUTS 3 administrative level which are located along a common border of two neighbouring countries (i.e. thus not relating to a “political” definition of existing cross-border co-operation structures such as Euroregions, Working Communities etc). However, some exceptions were made where NUTS 3 units are too small-scaled to cover the entire border area or where the particular economic importance of close-by urban agglomerations had to be taken into account.²⁴

Producing solid quantitative information on commuting was in all cases a very challenging issue: Identifying cross-border workers on ground of an identical definition across all regions along the EU borders was and is not yet possible and a production of aggregated data on cross-border commuter flows for the EU or even for a given co-operation area often encountered serious problems. One of those which even the most recent analysis of 2009 faced was that (...) *regular data concerning commuting activities is rarely available – with only a few exceptions, namely Switzerland, Germany and Scandinavia – because monitoring is still missing or conducted in much lower frequency.*²⁵ Data existed most often only for larger “border strips” between two countries or a single country (i.e. often not corresponding to / broken down on NUTS 3 or LAU 2 or 1 levels), but in some border regions also appraisements and estimates had to be used in order to compensate for obsolete or unavailable data and to assure an overall comparability of information.

²¹ **Commission of the European Communities (1996):** *Cross-border workers in the European Union*. The Hague, 15th February 1996.

²² **European Parliament (1997):** *Les travailleurs frontaliers dans l'Union Européenne*. Série Affaires Sociales W 16 - 5/1997. Luxembourg, 1997 (PE 166.662).

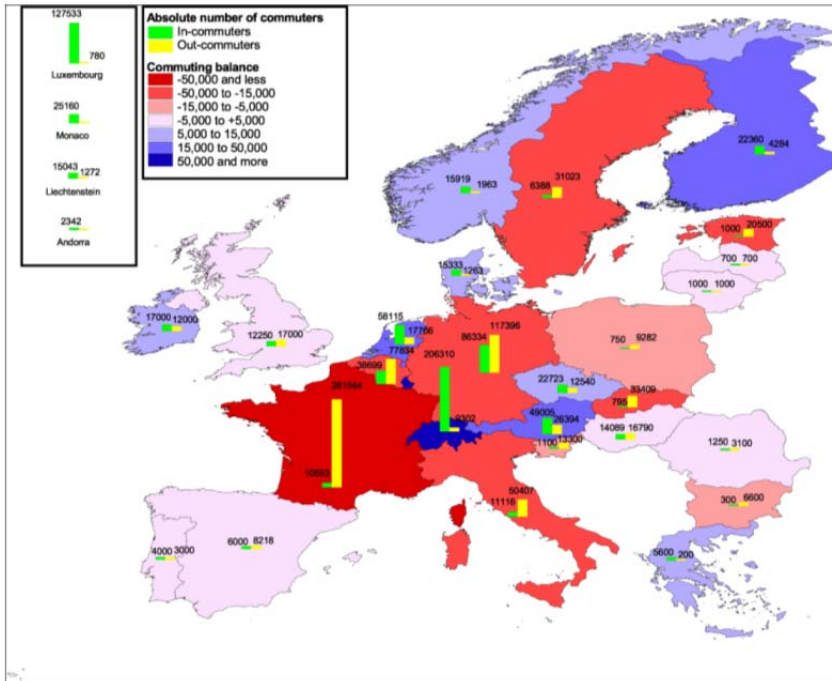
²³ **European Commission, DG Employment and Social Affairs (2009):** *Scientific Report on the Mobility of Cross-border Workers within the EU-27/EEA/EFTA Countries*. Final Report. Munic/Sopron, January 2009.

²⁴ **ibid., p. 8: Footnote:** *In Czech Republic, the Czech border regions of Slovakia and the Baltic countries areas are defined at LAU 1 level, German (with the exception of the Danish border region, which is described at NUTS 3 level) and Austrian border regions are classified according to regional public employment services (PES) districts. The northern and middle part of the border region between Sweden and Finland is classified on a municipal level. Main text: (...) With reference to the statistical data, this definition was used in order to ensure attainability and to provide comparability as accurately as possible. Paying attention to the economic importance of urban agglomerations the range of coverage for potential commuting has to be extended. Correspondingly, also the existing transport infrastructure, e.g. fully developed highways or high-speed trains, as well as population or job density have a significant influence on the catchment area of a border region. Thus, cities located in a second row outside the border region like Berlin, Brussels, Cologne, Krakow or Vienna, are also subject to research activities.*

²⁵ **ibid., p. 9.**

Annex 14: Current scope & focus of cross-border commuting in the EU27/EEA area (+ CH)²⁶

Cross-border commuting balance by countries for the years 2006/2007



Country-specific levels of commuting in larger border areas by type of commuting²⁷

Country	Level of "in-commuting"		Country	Level of "out-commuting"
Poland	0.02%	low	Greece	0.03%
Bulgaria	0.02%		Denmark	0.10%
Romania	0.05%		Lithuania	0.10%
Slovakia	0.07%		Romania	0.13%
Lithuania	0.10%		Latvia	0.14%
Latvia	0.14%		Poland	0.24%
Estonia	0.17%		Norway	0.24%
Spain	0.23%		Luxembourg	0.26%
Sweden	0.25%		Switzerland	0.27%
Slovenia	0.26%		Spain	0.31%
France	0.26%	medium	Portugal	0.36%
Italy	0.42%		Finland	0.39%
Portugal	0.48%		Czech Republic	0.53%
Hungary	0.59%		Bulgaria	0.54%
Greece	0.88%		Netherlands	0.54%
Czech Republic	0.93%		Hungary	0.70%
Germany	1.11%		Austria	1.17%
United Kingdom	1.13%		Sweden	1.22%
Denmark	1.17%		United Kingdom	1.30%
Belgium	1.55%		Germany	1.51%
Netherlands	1.78%	Italy	1.89%	
Norway	1.98%	high	Slovenia	1.95%
Finland	2.02%		Slovakia	2.63%
Austria	2.13%		Belgium	3.12%
Andorra	5.42%		Estonia	3.39%
Switzerland	6.00%		Liechtenstein	4.09%
Ireland	10.55%		France	7.00%
Luxembourg	42.68%		Ireland	7.44%
Liechtenstein	48.41%		Andorra	X
Monaco	53.34%		Monaco	X
EU-15 +EWR/EFTA	1.95%			EU-15 +EWR/EFTA	1.76%
EU-12 countries	0.26%		EU-12 countries	0.72%
TOTAL	1.45%		TOTAL	1.45%

²⁶Both countries show insignificant levels of out-commuting.

Source: secondary data collection

²⁶ *ibid.*, European Commission (2009).

²⁷ Out-commuting: the perspective that commuters leave their country of residence to work in a neighbouring country. In-commuting: the perspective that commuters from a neighbouring country enter the labour market of the respective country.

**Annex 15:
Long-term development of the right of EEC & EC nationals / EU citizens to work in other EU Member States**

Citizen of → to be employe d in ↓	EEC6						EEC9			EC12			EU15			EU25										EU27		
	D	F	L	B	NL	IT	UK (*)	IRL (*)	DK (*)	GR	SP	PT	AT	SK (*)	FIN (*)	LT	LV	EST	HU	PL	CZ	SLK	SL	CY	MA	RO	BG	
D		195 8	195 8	195 8	195 8	195 8	197 3	197 3	197 3	198 1	198 6	198 6	199 4	199 4	199 4	201 1	201 1	201 1	201 1	201 1	201 1	201 1	201 1	200 4	200 4	201 4	201 4	
F	195 8		195 8	195 8	195 8	195 8	197 3	197 3	197 3	198 1	198 6	198 6	199 4	199 4	199 4	200 8	200 8	200 8	200 8	200 8	200 8	200 8	200 8	200 4	200 4	201 2	201 2	
L	195 8	195 8		195 8	195 8	195 8	197 3	197 3	197 3	198 1	198 6	198 6	199 4	199 4	199 4	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 4	200 4	201 2	201 2	
B	195 8	195 8	195 8		195 8	195 8	197 3	197 3	197 3	198 1	198 6	198 6	199 4	199 4	199 4	200 9	200 9	200 9	200 9	200 9	200 9	200 9	200 9	200 4	200 4	201 2	201 2	
NL	195 8	195 8	195 8	195 8		195 8	197 3	197 3	197 3	198 1	198 6	198 6	199 4	199 4	199 4	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 4	200 4	201 4	201 4	
IT	195 8	195 8	195 8	195 8	195 8		197 3	197 3	197 3	198 1	198 6	198 6	199 4	199 4	199 4	200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 4	200 4	201 2	201 2	
UK (*)	197 3	197 3	197 3	197 3	197 3	197 3		197 3	197 3	198 1	198 6	198 6	199 4	199 4	199 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	201 2	201 2	
IRL (*)	197 3	197 3	197 3	197 3	197 3	197 3	197 3		197 3	198 1	198 6	198 6	199 4	199 4	199 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	201 2	201 2	
DK (*)	197 3	197 3	197 3	197 3	197 3	197 3	197 3	197 3		198 1	198 6	198 6	199 4	195 4 199 4	195 4 199 4	200 9	200 9	200 9	200 9	200 9	200 9	200 9	200 9	200 4	200 4	200 9	200 9	
GR	198 1	198 1	198 1	198 1	198 1	198 1	198 1	198 1	198 1		198 6	198 6	199 4	199 4	199 4	200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 4	200 4	200 9	200 9
SP	198 6	198 6	198 6	198 6	198 6	198 6	198 6	198 6	198 6	198 6		198 6	199 4	199 4	199 4	200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 4	200 4	200 9	200 9	
PT	198 6	198 6	198 6	198 6	198 6	198 6	198 6	198 6	198 6	198 6	198 6		199 4	199 4	199 4	200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 4	200 4	200 9	200 9	
AT	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4		199 4	199 4	201 1	201 1	201 1	201 1	201 1	201 1	201 1	201 1	200 4	200 4	201 4	201 4	
SK (*)	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4		195 4 199 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 7	200 7
FIN (*)	199 4	199 4	199 4	199 4	199 4	199 4	199 4	199 4	195 4 199 4	199 4	199 4	199 4	199 4	195 4 199 4		200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 6	200 4	200 4	200 7	200 7	
LT	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4		200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 7	200 7	

LV	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 7	200 7
EST	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 7	200 7
HU	200 9	200 8	200 7	200 9	200 7	200 6	200 4	200 4	200 9	200 6	200 6	200 6	200 9	200 4	200 6	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 9	200 9	
PL	200 7	200 7	200 7	200 7	200 7	200 6	200 4	200 4	200 7	200 6	200 6	200 6	200 7	200 4	200 6	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 7	200 7	
CZ	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 7	200 7	
SLK	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 7	200 7	
SL	200 7	200 7	200 7	200 7	200 7	200 6	200 4	200 4	200 7	200 6	200 6	200 6	200 7	200 4	200 6	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 7	200 7	
CY	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 7	200 7	
MA	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	200 4	201 4	201 4	
RO	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	
BG	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7	200 7		

(*) For Ireland and the United Kingdom, the indicated date of applicability is the one as member states of the EEC, but a similar right previously existed on a bilateral basis (no date found). For Denmark, Sweden and Finland the first date refers to a similar right which existed on ground of the Agreement concerning a common Nordic labour market of 22 May 1954 (later replaced by an agreement signed on 6 March 1982).
 & & & & & = mainstream integration process for the respective phases (i.e. rights on the free movement of workers were applied directly after the EEC foundation or a subsequent EEC/EC/EU accession).
 & & = during the respective integration phases, temporary restrictions on the free movement of workers were applied until the indicated year when those were lifted.
 ... = during this integration phase, temporary restrictions on the free movement are still applied until the indicated final date when those have to be lifted.

Own elaboration realised on ground of information & data as indicated on the web-page: http://en.wikipedia.org/wiki/Freedom_of_movement_for_workers

**Annex 16:
Labour market integration within the EEA and between EU Member States and Switzerland**

Development of the right of EU27 nationals to work in EEA countries and in Switzerland																												
Citizen of → to be employed in ↓	EU15														EU25										EU27			
	DK (*)	SK (*)	FIN (*)	D	F	L	B	NL	IT	UK	IRL	GR	SP	PT	AT	CY	MA	LT	LV	EST	HU	PL	CZ	SLK	SL	RO	BG	
NOR (EEA) (*)	1954	1954	1954	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	2004	2004	2006	2006	2006	2006	2006	2006	2006	2006	2012	2012	
	1994	1994	1994																									
ICE (EEA) (*)	1954	1954	1954	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	2004	2004	2006	2006	2006	2006	2006	2006	2006	2006	2012	2012	
	1994	1994	1994																									
LI (EEA)	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	2004	2004	2011	2011	2011	2011	2011	2011	2011	2011	2011	2014	2014
CH	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2005	2005	2011	2011	2011	2011	2011	2011	2011	2011	2016	2016	
Development of the right of nationals from EEA countries and Switzerland to work in the EU27																												
Country of employment → for citizen from ↓	EU15														EU25										EU27			
	DK (*)	SK (*)	FIN (*)	D	F	L	B	NL	IT	UK	IRL	GR	SP	PT	AT	CY	MA	LT	LV	EST	HU	PL	CZ	SLK	SL	RO	BG	
NOR (EEA) (*)	1954	1954	1954	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	2004	2004	2004	2004	2004	2006	2006	2004	2004	2006	2007	2007	
	1994	1994	1994																									
ICE (EEA) (*)	1954	1954	1954	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	2004	2004	2004	2004	2004	2006	2006	2004	2004	2006	2007	2007	
	1994	1994	1994																									
LI (EEA)	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	2004	2004	2004	2004	2004	2009	2007	2004	2004	2007	2007	2007	
CH	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2005	2005	2005	2005	2005	2009	2007	2005	2005	2007	2007	2007	

(*) Some indicated dates for Denmark, Sweden, Finland, Norway and Iceland refer to a similar right which previously existed on ground of the Agreement concerning a common Nordic labour market (of 22 May 1954, replaced by an agreement signed on 6 March 1982).

☐ = prior Nordic integration process ☐ = mainstream integration process for the EEA (1990s) and for EU15/CH (2002) ☐ & ☐ = mainstream integration process for the EEA and for CH (only new EU Member States)

☐ = temporary restrictions on the free movement of workers were applied after the 2004 enlargement until the indicated year when those were lifted.

☐ = temporary restrictions on the free movement of workers are still applied after the 2007 enlargement until the indicated final date when those have to be lifted.

Own elaboration realised on ground of information & data as indicated on the web-page: http://en.wikipedia.org/wiki/Freedom_of_movement_for_workers

Annex 17: The current status of labour market integration between the EU27 and other Third Countries

There are basically two different types of countries which can be distinguished with respect to their status of labour market integration with the EU27.

(1) Turkey and other non EU-countries having an agreement with the EU

The right of Turkish nationals to move to an EU country to work depends entirely on the laws of that country. Turkish workers who are legally employed in an EU country and who are duly registered as belonging to the labour force there have the following rights:

- After one year's legal employment they are entitled to a renewal of the work permit for the same employer if a job is available.
- After three years' legal employment they may change employers and respond to any other offer of employment for the same occupation.
- After four years' legal employment they enjoy free access to any paid employment in that EU country.
- Turkish nationals working legally in an EU country are also entitled to the same working conditions as the nationals of that country.

Nationals from other Third Countries having an agreement with the EU can legally work in the European Union and are entitled to the same working conditions as the nationals of their host country. These are nationals from

- Algeria, Morocco, Tunisia
- Russia
- Albania, Croatia, the former Yugoslav Republic of Macedonia, Montenegro;
- Andorra, San Marino
- 79 countries of the African, Caribbean and Pacific Group of States.

(2) Non EU-countries not having an agreement with the EU

For nationals from other Third Countries not having an agreement with the EU, the right to work in an EU country mainly depends on the laws of that country unless they are members of an EU national's family. However, EU rules do cover the following areas for workers from all non-EU countries:

- non-EU nationals who are long-term residents in the EU,
- the right to family reunification,
- admission for non-EU researchers,
- admission for students, exchange pupils, unpaid training or voluntary service,
- the rights of highly-skilled workers from outside the EU (EU blue card scheme).

Source: Commission of the European Communities: <http://ec.europa.eu/social/main.jsp?catId=470&langId=en>

Annex 18: The specific status of cross-border workers

The specific status of “cross-border workers” and the particular features characterising their day-to-day life are slightly different from the status and living conditions of a “worker” generally referred to in the free movement of workers principle.

Cross-border workers - employed or self-employed - work on one side of a border but live on the other and return home at least once a week. Cross-border workers have a specific status as “migrant workers” in the country where they work. If they are not a national of the country where they live, they are considered as having sufficient means to support themselves and their family and will therefore have the right to live there. In everyday life, cross-border workers are subject to the laws of both countries. Some of the rights and obligations will depend on the country where they work (e.g. employment laws, tax laws in some cases) and others on the country where they live (e.g. tax laws, real estate taxes, residence formalities etc). Social security rights of cross-border workers mainly depend on the country where they work, while enjoying the same rights as your colleagues with regard to sickness benefits, maternity and paternity benefits, invalidity, old-age and survivors' pensions, insurance against accidents at work and occupational diseases, death grants, early-retirement and family benefits. Cross-border workers and their families are also entitled to all the social advantages granted to workers in the country where they work (e.g. reduced train fares, educational grants, access to educational institutions or parking cards for disabled people).²⁸

From the above-said it also becomes clear that the nationality of a cross-border worker is not a sufficiently solid indicator for identification or classification purposes, as along many borders there are more and more cases where nationals from one country move to the neighbouring country (e.g. for reasons of lower living costs or rent) and commute back to their country of birth for working purposes (i.e. such flows of “in-commuting nationals” can be observed along the borders between F-B, F-L, B-L, D-L, SK-DK).

²⁸ http://ec.europa.eu/youreurope/citizens/work/cross-border-worker/your-rights/index_en.htm

Annex 19: Main obstacles to commuting in EU27/EEA/EFTA cross-border areas²⁹

The recent DG EMPL study attempted via an expert survey to assess the significance of obstacles which exist to commuting in different types of cross-border areas³⁰: The survey result revealed the following (see also table below): At first glance it is clear (...) that obstacles on mobility are lowest within EU-12 cross-border regions and highest between EU-15 and EU-12 cross-border regions. The biggest problems between “new” and “old” member states are different languages, lack of information, acceptance of qualifications and labour market restrictions. Within EU-15 as well as within EU-12 cross-border regions different languages, lack of information, infrastructure and different tax systems seem to be the biggest obstacles.³¹ Moreover, (...) those frictions can be traced back to structural differences in current social and legal systems, still persisting between the “old” and “new” member states. With regard to EU-15 it is caused by long lasting processes of harmonisation (by EU regulations and bilateral agreements) in the last decades, with regard to EU-12 caused by the similarity of post socialist structures that systems seem to intertwine better internally. Infrastructural problems are very similar in most cross-border regions: cross-border public transport is often inadequate, ticket prices, tolls or border crossing fees are too expensive and high-speed-connections hardly developed or not exposed to competition. As a matter of fact the cross-border infrastructure is better between EU-15 and EU-12 member states than within EU-12 member states.³²

Table: Significance of obstacles to cross-border mobility (mean values)

1 = minor obstacle; 5 = major obstacle

	All cb regions	within EU-15 cb regions	within EU-12 cb regions	between EU-12 and EU-15 cb regions
Language	3.03	2.86	2.65	3.34
Lack of information	3.01	3.01	2.75	3.26
Tax systems	2.83	2.73	2.96	3.01
Infrastructure	2.74	2.83	2.87	2.40
Acceptance of qualifications	2.69	2.54	1.94	3.11
Other rights to social insurances	2.58	2.65	1.84	2.75
Labour market restrictions	2.44	2.03	1.81	3.34
Rights to pensions	2.40	2.42	1.60	2.74
Mentality	2.24	2.20	2.09	2.45

white minor obstacle (1.00 – 2.25) yellow medium obstacle (2.26 – 3.00) orange major obstacle (above 3.00)

Survey on cross-border workers' mobility

²⁹ European Commission, DG Employment and Social Affairs (2009): *Scientific Report on the Mobility of Cross-border Workers within the EU-27/EEA/EFTA Countries*. Final Report. Munic/Sopron, January 2009.

³⁰ Obstacles on mobility in cross-border regions existing between the old EU Member States (EU15), between the new EU Member States (EU12) and between the EU-15 and the EU-12.

³¹ *ibid.*, p. 43.

³² *ibid.*, p. X.

Annex 20: Obstacles to cross-border mobility existing in the five Nordic countries³³

The Nordic Labour Journal and the Freedom of Movement Forum have recently drawn up a list of the ten most important border obstacles for working life (out of 39 identified in total), based on the number of people they affect and how serious the consequences are for the individuals:

1. People who have worked for several years in one country and take early retirement from a different country receive a lower pension if they do not meet the demands for early retirement in both countries. Their pay-out can be considerably reduced as a result.
2. People on partial sick leave in one country cannot take up part-time work in a different country without losing their sickness benefit. Accepting any work in a different country involves changing the social insurance host country, which again has consequences for the sick leave.
3. People living in border areas are not allowed to approach the labour market on the other side of the border when they seek labour market training.
4. Someone hired in one country risks not receiving any unemployment benefit if they fail to register with that country's unemployment benefit fund from day one. In Sweden you need a whole year's uninterrupted membership in order to claim unemployment benefit. The Freedom of Movement Forum says it would be more reasonable to demand at least eight weeks' membership.
5. People living in Sweden and working for a staffing agency/temp agency do not receive money from their unemployment benefit fund in between jobs.
6. Border commuters who become unemployed during a period of sickness leave risk losing all of their benefit when declared partially fit for work, because the two countries can't agree on who is responsible for paying the benefit.
7. Swedes who live in Sweden and work in Norway and receive Norwegian rehabilitation benefits as a result of being injured or otherwise ill, will run into trouble when trying to document this fact in Sweden. This is because Norwegian authorities refuse to fill in the necessary Swedish unemployment benefit form (the E301). This will have consequences for the size of a person's benefit if he or she become unemployed.
8. A person living in Sweden and working in Denmark who get injured or for other reasons remains incapable of working for a long period of time must, after medical treatment, travel daily to Denmark to attend a rehabilitation programme. It would be easier if this could happen in the country of residence.
9. Men who work in Norway with a wife/partner who neither lives nor works in Norway has no right to paternity leave around births or parental leave to look after children. The right is derived from the rights of the mother.
10. People on parental leave cannot break it off to take up work in a different Nordic country. The consequence would be a reduction of the parental benefit to the basic level when that work ends, i.e. the right to parental benefit in the former country of work ends and is replaced by basic level parental benefit in the country of residence.

³³ <http://www.nordiclaborjournal.org/i-fokus/border-obstacles/article.2011-06-15.8869556173>

Annex 21: The EU external border regime

Jan Roters, IOER/ July 2011

Territorial exclusion of the European Union

The European ‘territory’ is volatile and subject to continuous re-bordering and de-bordering processes.³⁴ Its character has arisen from a multiplicity of transcontinental networks of economic, geopolitical and socio-cultural affiliation. *“Europe is home today to millions of people from non-European backgrounds, many religious and cultural dispositions, networks of affiliation that stretch right across the globe. It is as much a site of longings rooted in myths of origin and tradition – regional, national and continental – as it is a site of cosmopolitan identities and attachments, a place of plural and hybrid composition, drawing on varied geographies of cultural formation.”*³⁵

After fall of the ‘iron curtain’ in 1989, flows of people, goods and capital have taken on new forms, directions and volumes, crossing once impermeable borders and lifting the historic division between East and West. *“We need to view the spaces and borders of Europe, not in terms of territory and fixed spatial units, but as dynamic zones in which various forms of connectivity (including networks) and discontinuity are continually shaped and formed. Dynamic zones exist where borders between inside and outside are eroded, and where global pressures interact with more static territorial arrangements to constitute new local, regional and transnational spaces.”*³⁶

During the last decades, however, a new division between “intern” and “extern” was imposed by intergovernmental and supranational regulations of the emerging European Union. The Schengen Agreement is the most prominent example of this type, as it paved the way for the construction of a physical dividing line between the notion of “us” and “them”, ignoring the individual social, historical, political or economic circumstances.³⁷ The free movement of people between Schengen and non-Schengen countries became increasingly suppressed by the erection of functional barriers at the ‘external borders’ of the EU and well beyond (involving for instance such countries as Morocco, Tunisia, Libya and Ukraine).

*“For, inside the current European ‘club’, citizens of the member states are encouraged to network and wander around freely in order to increase comfort for all, but at the new outer borders, the entrance gates of the enlarged club are and will be strongly patrolled and guarded (...). The enlargement of the European Union will bring along huge investments securing and tightening the outer borders of the European Union (...).”*³⁸

³⁴ Düvell, F./Vollmer B. (2011), [European Security Challenges. EU-US Immigration Systems](#), Florence: European University Institute/Robert-Schuman Centre for Advanced Studies, p. 8. See also: Nelles, J./Walther, O. (2011): [Changing European borders: from separation to interface? An introduction](#). Artículo – Journal of Urban Research, 2011/6.

³⁵ Forum-Europa – Forum of Concerned Citizens of Europe (2010), [Living with Diversity: For a Politics of Hope without Fear. An Open Letter to Europe](#).

³⁶ Vgl. Delanty, Gerard/Rumford, Chris (2005), *Rethinking Europe: Social theory and the implications of europeanization*. London and New York: Routledge, p. 135.

³⁷ L. Topaloglou, D. Kallioras and S. Venieris (2009), [Tracing the Determinants of Economic Cross-Border Interaction in the European Union](#), *Spatium*, 21 (1), p. 4.

³⁸ Kramsch, O./Pijpers, R./Plug, R./ Van Houtum, H. (2004), [Research on the Policy of the European Commission. Towards the Re-bordering of the European Union. EXLINEA Project Study Report](#). Nijmegen Centre for Border Research, p. 14. See also: Van Houtum, H. (2002), [Borders of Comfort: Spatial Economic](#)

Particularly refugees and asylum seekers are affected by the external border regime of the European Union. So far, over 15,000 documented refugees have lost their lives at the EU 'external borders'.³⁹ As many as 1,500 people have died in the Mediterranean during the first six months of 2011 in desperate attempts to reach European shores.⁴⁰ Moreover, the “*shifting of border controls further and further away from the EU’s physical borders makes it extremely difficult to monitor what happens at the crucial moment when refugees and people in need of international protection come into contact with the authorities of the would-be asylum country for the first time, and allows people to be pushed back without anybody in Europe ever knowing about them.*”⁴¹ Several institutions have outlined the potential or *de facto* violations of the EU Member States’ obligations under international law, notably the Refugee Convention and the Children Convention.⁴²

Bordering Processes in and by the European Union, in: *Regional and Federal Studies*, Vol. 12/4; Kennard, A. (2002), *The Changing Role of Border Regions in Central and Eastern Europe*, in H. Ingham and M. Ingham (eds.) *EU expansion to the east: prospects and problems*, Cheltenham, UK: Edward Elgar; Brown, D. (2002), *Storming the Fortress: the External Border Regime in an Enlarged Europe*, in H. Ingham and M. Ingham (eds.) *EU Expansion to the East: Prospects and Problems*, Cheltenham, UK: Edward Elgar.

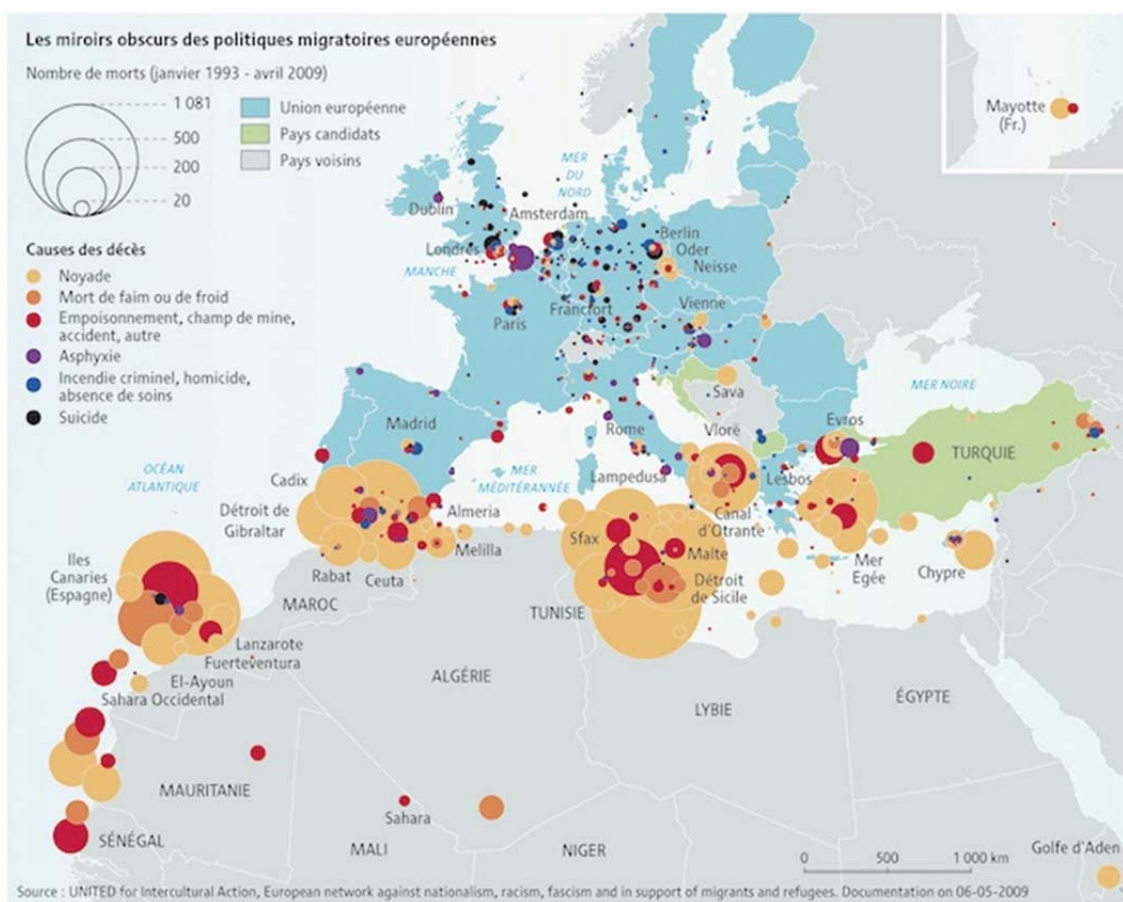
³⁹ United Against Racism (2011), [List of 15551 documented refugee deaths through Fortress Europe](#), Amsterdam: United.

⁴⁰ Human Rights Watch (2011), [EU: Put Rights at Heart of Migration Policy](#).

⁴¹ European Council on Refugees and Exiles (ECRE) (2007), [Defending Refugees’ Access to Protection in Europe](#), London: ECRE.

⁴² Ibid. See also: Human Rights Watch (2010), [Buffeted in the Borderland. The Treatment of Asylum Seekers and Migrants in Ukraine](#), Washington: HRW. Border Monitoring Project Ukraine (2010): [Access to Protection Denied: Refoulement of Refugees and Minors on the Eastern Borders of the EU – the case of Hungary, Slovakia and Ukraine](#), Munich: BMPU.

Map 1: Refugee deaths through Fortress Europe



However, the function of the EU ‘external borders’ is not so much one of a fortress but rather of a mechanism facilitating the exclusive selection of migrants, which is closely related to the development of a common European identity. “Current political forces have expressed a key interest in controlling the numbers of ‘redundant’ and allegedly difficult to integrate ‘non-western’ immigrants and refugees in order to preserve social cohesion and protect national labour markets within European borders. It has reached a point where a decrease in the numbers of asylum seekers is now viewed as a success. This has resulted in a policy that is so focused on a strict border regime and assimilation, that the migration motives of those who want to enter the EU are merely being categorised into productive/unproductive, friendly/fiendish and good/bad, with the direct dichotomous consequence of being allowed entrance or not.”⁴³

The EU external border regime itself ‘produces’ the unwanted foreigner who is excluded from the emergence of a European identity and illegalized in the territorial environment of the ‘native’ European citizen.⁴⁴ “Border enforcement is a mechanism facilitating the extraction of cheap labour by assigning criminal status to a segment of the working class – illegal immigrants.”⁴⁵ “The effect of this border regime is to produce a movement of selective and differential inclusion of economically valuable migrants, which corresponds to the permanent

⁴³ Van Houtum, H./Pijpers, R. (2007), *The European Union as a Gated Community: The Two-faced Border and Immigration Regime of the EU*, *Antipode*, 39 (2), p. 299.

⁴⁴ Bojadzije, M./Saint-Saens, I. (2006), *Borders, Citizenship, War, Class: A Discussion with Etienne Balibar and Sandro Mezzadra*, in: *New Formations*, Vol. 58, No. 1, p. 10.

⁴⁵ Sassen, S. (1988), *The Mobility of Labor and Capital: A Study in International Investment and Labor Flow*. Cambridge: Cambridge University Press, p. 36-7.

production of a plurality of statuses (finding its limit in the illegal alien who is bound to become a permanent inhabitant of European political space), which tends to disrupt the universal and unitary figure of modern citizenship."⁴⁶ The institutionalisation of a common European identity on the basis of an exclusive selection process that distinguishes between "legal" and "illegal" migration harbors the potential to undermine the democratic legitimation not only of the EU 'external borders' but also of the EU itself.⁴⁷

Fortification and surveillance of the EU 'external borders'

The European Union has 11,000 kilometres of 'external land borders' and 43,000 kilometres of 'external sea borders'. Art. 2 of the EU's Schengen Borders Code defines 'external borders' as „*the Member States' land borders, including river and lake borders, sea borders and their airports, river ports, sea ports and lake ports, provided that they are not internal borders*“.⁴⁸ In contrast to the mainstream of academic border studies, the Schengen Borders Code thus provides a harmonised definition of what 'the border' is according to European Community law.

"In fact, while some authors have rightly identified the changing and dynamic nature of the borders in Europe from territoriality towards a hugely disperse and complex web of non-physical lines which move every time a person exercises mobility (...), actual policy strategies at EU level still present the strengthening of the principle of territoriality, and its securitization (...). Indeed, the actual common borders regime, and the European policy on border security, appears to be primarily focused on the development of non-tangible, technology-based and dispersed borders centred on the need to track and 'manage' the individual through the use of new technologies (i.e. biometrics) and Europe-wide data bases."⁴⁹

While the responsibility for controlling borders lies squarely with the Member States, since the creation of the Schengen zone their capacity for surveillance and control of the EU's 'external borders' has been more systematically supported and developed at the EU level. The EU is making substantial investments in this field and introduced various new agencies and surveillance technologies, not least through the creation in 2005 of the European Agency for

⁴⁶ Mezzadra, S. (2007), *Citizen and Subject. A Postcolonial Constitution for the European Union?* in: Globalization, migration, human rights: a new paradigm for research and citizenship, Bruylant, Brussels, p. 39. *It should be mentioned in this context, that "once a person decides (or is forced) to cross a border in an 'illegal' way he or she will be framed as different from that moment on" since the embodiment of being an "illegal" migrant and being seen by others as "illegal" "may have huge implications for one's well-being and self-image."* See: Van Liempt, I. (2010): Reviews: *'Illegal' Traveller: an auto-ethnography of borders.* *Shahram Khosravi, Palgrave Macmillan, Global Ethics Series, 2010*, in: Journal of Borderland Studies, Vol. 25, p. 261.

⁴⁷ Balibar, E. (2003), *L'Europe, l'Amérique, la guerre*. Paris: Editions la Decouverte.

⁴⁸ [Regulation \(EC\) No 562/2006 of the European Parliament and of the Council of 15 March 2006 establishing a Community Code on the rules governing the movement of persons across borders \(Schengen Borders Code\)](#), OJ L 105, 13.4.2006.

⁴⁹ Carrera, S. (2007), *The EU Border Management Strategy FRONTEX and the Challenges of Irregular Immigration in the Canary Islands*, CEPS Working Document No. 261, Brussels: CEPS, p. 5. See also: Bigo, D./Carrera, S./Guild, E./Walker, R. (2007), *The Changing Landscape of European Liberty and Security: Mid-Term Report on the Results of the CHALLENGE Project*, CHALLENGE Paper No. 4, pp. 7-9.

the Management of Operational Cooperation at the External Borders (Frontex) and a new External Borders Fund of 1.82 billion Euros for 2008-2013.⁵⁰

The interoperability of surveillance systems is at the heart of new EU policies, such as the Stockholm Programme.⁵¹ Using satellites and cameras in drones and aeroplanes, the extension of the European border control system Eurosur⁵² will collect data to strengthen defences against unwanted migrants at the EU ‘external borders’.⁵³ Police and security authorities of all member-states will receive access to the Schengen Information System (SIS), to the Customs Information System (CIS), to the Visa Information System (VIS) and to the EU fingerprint database for asylum seekers (Eurodac).⁵⁴ In order to deal with the influx of data, the creation of an administrative department under the command of Europol and Frontex is planned. Since 1999, Europol, ‘the European Union law enforcement Agency that handles criminal intelligence’ is involved in certain aspects of migration on the territory of the EU Member States. Also planned is an electronic system of registration for travelling in and out of the sovereign territories of the EU member-states. Information on incoming travellers would in the future be stored electronically and linked up using a so-called “entry/exit system”. This would for example allow the immediate detection of expired visas, whereupon the responsible department would be alarmed.⁵⁵

“Further to this, there is a certain trend involving private businesses, notably in developing, introducing and training staff to new surveillance technology (...). For instance, the Maritime Security Service project (MARISS) is by implemented by Telespazio (Finmeccanica-Thales joint venture) (...). And the development of an EU sea-border surveillance system (...), funded through an EU-FP7 grant, was awarded to a Finmeccanica-Selex-led Seabilla business consortium; Finmeccanica-Selex also won another contract with Libya for a ‘border control and security system’”.⁵⁶ “Security businesses are also involved in immigration law enforcement operations, for instance, G4S is operating detention facilities for IMs (‘irregular’ migrants), enforcing ‘overseas escorted repatriations on scheduled and charter flights globally’ in the UK and has other operations in France, Italy, Spain and Germany. (...) Hence a trend to privatising certain aspects of migration and border control is underway.”⁵⁷

‘Securitization’ of EU external border crossing points is supplemented by electronic controls based on data bases (Schengen Information System, Eurodac), advanced passenger information and digitalised IDs (chips, iris scanning).⁵⁸ In addition, heart beat and mobile

⁵⁰ European Council on Refugees and Exiles (ECRE) (2007): [Defending Refugees’ Access to Protection in Europe](#), London: ECRE.

⁵¹ European Council (2010), [The Stockholm Programme: An Open and Secure Europe Serving and Protecting the Citizens](#), 2010/C 115/01, 4.5.2010.

⁵² European Commission (2011), [Determining the technical and operational framework of the European Border Surveillance System \(EUROSUR\) and the actions to be taken for its establishment. Commission Staff Working Paper](#), Brussels, 28.1.2011.

⁵³ Wicht, C. (2010), [More security at any price. The Stockholm Programme of the European Union](#).

⁵⁴ Ibid. *The Eurodac fingerprint system was introduced in 2000 to identify asylum applicants and persons who have been apprehended in connection with an ‘irregular’ crossing of an ‘external border’ of the Union or of the territory of another EU Member State.*

⁵⁵ Ibid.

⁵⁶ Düvell, F./Vollmer B. (2011), [European Security Challenges. EU-US Immigration Systems](#), Florence: European University Institute/Robert-Schuman Centre for Advanced Studies, p. 10.

⁵⁷ Ibid. See also: Transnational Institute (2009), [Neonopticon. The EU security-industrial complex](#), London: TI.

⁵⁸ Düvell, F./Vollmer B. (2011), [European Security Challenges. EU-US Immigration Systems](#), Florence: European University Institute/Robert-Schuman Centre for Advanced Studies, p. 10.

carbon dioxide detectors are deployed at border crossing points to detect unwanted immigrants hidden in carriers or cargo.⁵⁹ Conventional controls at the green borders (e.g. patrols on foot or by car, motor bike, snow mobile and quod), mostly with Eastern European countries (Russia, Belarus, Ukraine and Moldova) are supplemented by fixed and mobile document examination systems, CCTV, night vision equipment, thermal cameras and movement detectors. This technology is also delivered to non-EU countries.⁶⁰

Blue borders are controlled by maritime vessels and fixed-wing aeroplanes, though in 2002 Spain, in response to a rise in migration across the Straits of Gibraltar, began to introduce an Integrated External Policing System for its 'external borders'.⁶¹ In September 2004, Italy, Spain, France, Portugal and the Netherlands signed an agreement establishing the European Gendarmerie Force (EGF). Romania has since also signed the agreement and a partnership agreement exists with Poland.⁶² *"The EGF is a 3000-strong army tasked with civilian duties, which can and should also be deployed in crisis areas inside and outside Europe. The paramilitary outfit works closely with the border police force Frontex, for example in using coast guard boats, helicopters and aeroplanes to prevent refugee boats in the Mediterranean coming ashore and driving them back out to sea instead."*⁶³

Meanwhile, the budget of the EU border agency Frontex increased substantially from €19 million in 2006 to €88 million in 2010. Frontex has no enforcement staff or enforcement powers, but coordinates operational cooperation between EU Member States to improve the integrated management of the EU 'external borders'. These cooperation arrangements can be implemented with the support of border guards, customs officials and police authorities from non-European states.⁶⁴

The agency carries out two types of operations: surveillance of border areas in order to remove third-country nationals from EU territory, and operations aimed at the group return of unwanted migrants from multiple Member States. The second category comprises 'joint return operations' (JROs), which have increased considerably in number (1,622 persons returned in 2009, compared with 428 in 2007). Moreover, the Agency's budget for coordinating JRO flights has risen from €0.5 million in 2005 to over €7 million in 2010.⁶⁵

In addition to routine operations specific projects and targeted enforcement operations are conducted by Frontex to secure the 'external borders' of the EU:⁶⁶

1. *CRATE (Frontex), 'Centralised Record of Available Technical Equipment' intending to improve the operations led by FRONTEX by swiftly detecting the 'deployable' vessels by the EUMSs to be used for the FRONTEX operation.*

⁵⁹ Ibid. See also: Frontex (2010), [Frontex within integrated Border management concept – Structural approach in planning capability](#), presentation at EDA Annual Conference 2010.

⁶⁰ Düvell, F./Vollmer B. (2011), [European Security Challenges. EU-US Immigration Systems](#), Florence: European University Institute/Robert-Schuman Centre for Advanced Studies, p. 10.

⁶¹ Ibid. See also: Frontex (2010), [Frontex within integrated Border management concept – Structural approach in planning capability](#), presentation at EDA Annual Conference 2010.

⁶² Wicht, C. (2010), [More security at any price. The Stockholm Programme of the European Union](#).

⁶³ Ibid. See also: [European Gendarmerie Force Official Website](#).

⁶⁴ Keller, S./Lunacek, U./Lochbihler, B./Flautre, H. (2011), [Frontex Agency: Which guarantees for human rights?](#) A study conducted by Migreurop (www.migreurop.org) on the European External Borders Agency in view of the revision of its mandate, Brussels: Migreurop, pp. 6-7.

⁶⁵ Ibid.

⁶⁶ Düvell, F./Vollmer B. (2011), [European Security Challenges. EU-US Immigration Systems](#), Florence: European University Institute/Robert-Schuman Centre for Advanced Studies, pp. 9-11.

2. *Hera (2006), Minerva and Hermes (both 2007), Frontex operations which efficiently stopped the arrival of 'boat people' on the Canary Islands and mainland Spain. Nautilus (2007) addressing the flow to Italy and Malta was less successful due to lack of collaboration of Libya.*
3. *RABITs, 'Rapid Border Intervention Teams' of Frontex, an EU network of over 700 personnel and technical equipment (aircraft, mobile RADAR units, heartbeat detectors etc) first deployed in 2010 on the Greek-Turkish border.*
4. *EUROSUR, enhancing border surveillance through technical advances (e.g. Earth observation satellites, unmanned aerial vehicles, etc.) (...).*
5. *Operation Hermes (2010), mapping the flows and routes of irregular migration within the EU; promote a European police networks of traffic police (Tispol), waterway police (Aquapol) and railway police (Railpol) (...).*

Resources were mobilised and distributed through targeted programmes, such as⁶⁷

- *ARGO (2002-2007), €25 million, an action programme for administrative cooperation for external borders, visas, asylum and immigration. One of six aims was to 'strengthen the fight against illegal immigration networks and the prevention of illegal flows of immigrants' involving training, exchange of staff, data exchange, setting of common operative centres and staff and activities in non-EU countries.*
- *AENEAS (2004-2006), €120 million, a programme for financial and technical assistance to third countries for migration and asylum. Two of five objectives were concerned with irregular migration. Projects included return to Morocco and Albania, border controls between Libya and Mali, regional collaboration to prevent irregular migration from Senegal and other sub-Saharan countries, and information programmes to deter potential irregular immigrants.*
- *Framework programme (FP) 'Solidarity and Management of Migration Flows' (2007-2013), €5.8 billion, two of the four areas are (a) 'controls and surveillance of external borders' and (b) 'return of Non-EU Member Country nationals residing illegally in the EU'. An additional €900 million went to an information system and €285 million to Frontex. The FP is divided into four funds:*
 - *External Borders Fund (2007-2013), €1.82 billion, including €10 million annually to Frontex, for supporting 'states who endure, for the benefit of the Community, a lasting and heavy financial burden arising from the implementation of common standards on control and surveillance of external borders and visa policy'.*
 - *European Return Fund (2008-2013), €676 million, community funding for the return of irregular immigrants.*
 - *European Refugee Fund, €699 million, community funding for refugee reception.*
 - *European Integration Fund (2007-2013), €825 million, to support economic, social, cultural and political integration of third-country nationals.*

This implies that at least 43 percent of the EU's migration management funding in addition to the EU Member States' funding was or will be spent on measure preventing or addressing

⁶⁷ Ibid, p. 11.

unwanted migration. In comparison, only 14 percent and 12 percent are spent on immigrant integration, respectively refugee reception.⁶⁸

Implementation of external shadow borders

From the mid 1990s, several agreements between the EU and its non-EU neighbours were reached that aimed at controlling unwanted migration from the Mediterranean neighbours as well as from Central and Eastern Europe.⁶⁹ As a consequence, the EU's migration controls were pushed beyond its territory, resulting in an externalised and internationalised regime of "shadow borders"⁷⁰. During the last two decades, the EU external border regime consistently moved a little further away from the Schengen Area, through expatriating controls and subcontracting the fight against unwanted immigration.

A variety of concrete politics were implemented by the EU through which the EU externalises to third countries a part of the control of immigration flows:⁷¹

1. *Readmission (i.e. return and deportation) agreements with countries of transit and origin. To date 17 have been implemented with countries in Europe, Asia and Africa.*
2. *Deployment of 'liaison officers to control migration flows' (...).*
3. *Missions to control the borders of other countries, notably the EU Border Assistant Mission (EUBAM) to combat illegal migration on the Ukrainian-Moldavian border.*
4. *Projects contributing to 'capacity building' in border and migration controls including the setting up of refugee reception and irregular immigrants detention facilities in third countries, e.g. in Ukraine, for instance, through the ERIT (...) and GUMIRA projects (...).*

*"A readmission agreement is an instrument through which signatory states commit to readmit into their territory their nationals who were apprehended while residing irregularly within the territory of a foreign state, but also other foreigners who transited through their soil. Readmission agreements can be either bilateral agreements, concluded between an EU Member State and a third country, or Community agreements, concluded between the EU – thus committing the 27 Member States – and a third country. Since the European Council of Seville of June 2002, 'readmission clauses' are required to be systematically included in every economic, trade or cooperation agreement between the EU and third countries. These clauses and the readmission agreements form one of the central features of the EU's policy of externalisation, which became official with the Hague Programme in 2004, and through which the EU externalises to third countries a part of the control of immigration flows. Since then, all development aid, and even all 'economic and trade cooperation', has been subordinated to the negotiation of these agreements."*⁷²

With the development of the European Neighbourhood Policy (ENP) in 2004, plans were made for visa and trade relaxations for EU neighbour states. In return, the EU demanded from its neighbours reliable border controls and the honouring of readmission agreements:⁷³ *"Once*

⁶⁸ Ibid.

⁶⁹ Ibid, p. 12.

⁷⁰ Ibid, p. 8.

⁷¹ Ibid.

⁷² Migreurop (2009), [Dangers of Readmission Agreements](#), Social Watch, Thematic reports, p. 17.

⁷³ *"Meanwhile, there are hardly any European development aid, reconstruction, trade or technical cooperation negotiations or agreements with EurAsian, African, Asian or South American states that do not also include*

certain conditions have been met, such as cooperation on illegal migration and effective mechanisms for readmission, the objective could be to agree Mobility Packages with a number of interested third countries which would enable their citizens to have better access to the EU. (...) In the context of broader packages, establishing readmission agreements, strengthening cooperation on illegal immigration and working together on effective border management can all be prerequisites for visa facilitation."⁷⁴ For example, of the 494 million Euros that Ukraine received between 2007 and 2010, 30 million were earmarked for setting up internment camps.⁷⁵

Meanwhile, the operational area of Europol and Frontex also has been widely extended to non-EU countries. Europol is responsible for providing "*operational intelligence and support and training sessions, which are open to law enforcement officers of third countries.*"⁷⁶ Frontex should "*establish technical working arrangements for joint operations with relevant third countries, and invite them to participate in operational activities where appropriate.*"⁷⁷

Particularly the European Border Agency Frontex has pushed in favour of wider cooperation programs with non-EU countries.⁷⁸ The agency proposed for instant to patrol in Libyan waters with a view to intercepting unauthorized migrants. Accordingly, the 2007 Frontex report on Libya reassessed Libya's reluctance to become Party to the 1951 Geneva Convention on refugees.⁷⁹ However, the report did not mention the human rights situation in Libya or the dreadful conditions faced by migrants in detention. Instead, the report includes an impressive list of technical material required by Libya to improve its border management, including 10 ships, 12 reconnaissance aircrafts, 18 helicopters, 22 fully equipped command centers, 86 trucks, 100 rubber boats, 240 jeeps, and more.⁸⁰

a paragraph on 'illegal migration' and readmission policies. Immigration concerns, notably over irregular migration are embedded in many other policy fields and represent a driving force in the development of a common European Union migration policy and a potentially global regime". (Düvell, F./Vollmer B. (2009): [Irregular Migration in and from the Neighbourhood of the EU. A comparison of Morocco, Turkey and Ukraine](#). Clandestino Report, p. 8).

⁷⁴ Commission of the European Communities (2006), [The Global Approach to Migration one year on: Towards a comprehensive European migration policy](#). Communication from the Commission to the Council and the European Parliament. Brussels, COM(2006) 735 final, 30.11.2006, p. 7.

⁷⁵ Wicht, C. (2010), [More security at any price. The Stockholm Programme of the European Union](#).

⁷⁶ Commission of the European Communities (2006), [The Global Approach to Migration one year on: Towards a comprehensive European migration policy](#). Communication from the Commission to the Council and the European Parliament. Brussels, COM(2006) 735 final, 30.11.2006, p. 9.

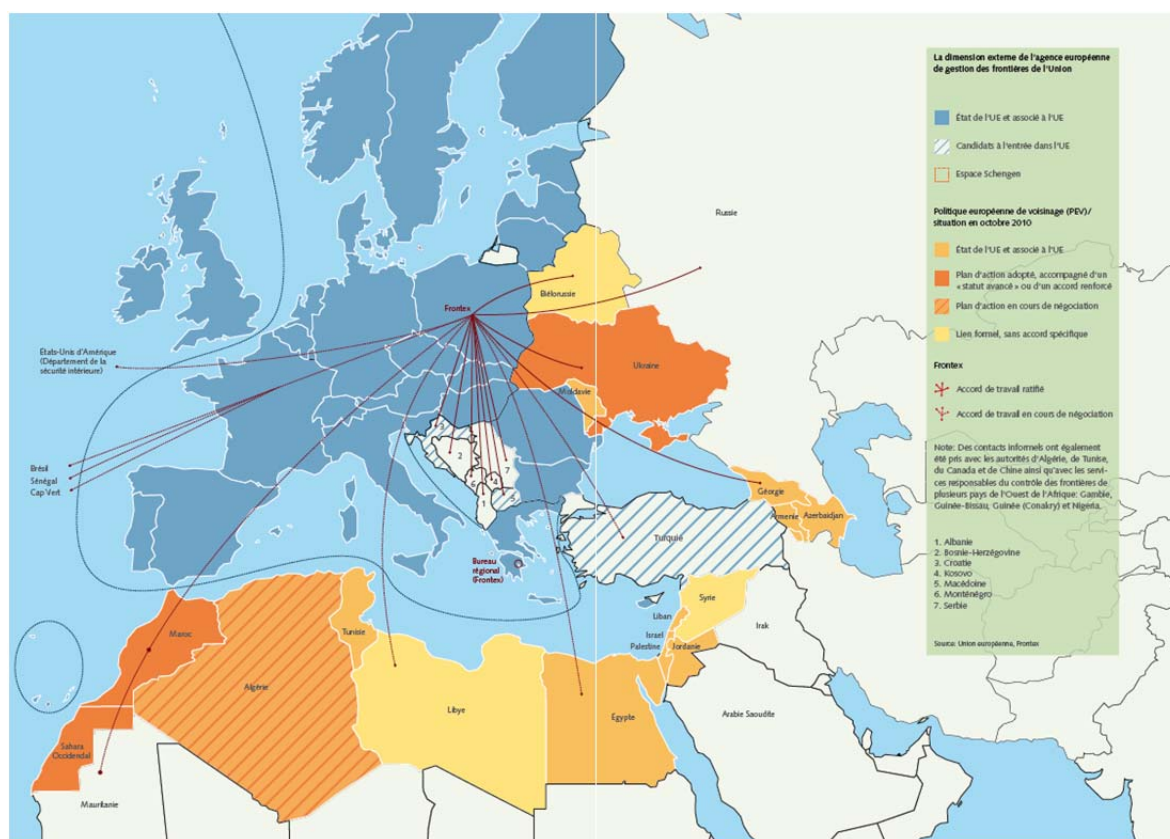
⁷⁷ Ibid.

⁷⁸ Klepp, S. (2010), [Italy And Its Libyan Cooperation Program: Pioneer of the European Union's Refugee Policy?](#) In: Jean-Pierre Cassarino (Hg.), *Unbalanced Reciprocities: Cooperation on Readmission in the Euro-Mediterranean Area*. Washington D.C. 2010: Middle East Institute, p. 84. See also: Keller, S./Lunacek, U./Lochbihler, B./Flautre, H. (2011): [Frontex Agency: Which guarantees for human rights?](#) A study conducted by Migreurop (www.migreurop.org) on the European External Borders Agency in view of the revision of its mandate, Brussels: Migreurop, p. 11.

⁷⁹ Frontex (2007), [Frontex-Led EU Illegal Immigration Technical Mission to Libya 28 May–5 June 2007](#), Warsaw: Frontex, pp. 9, 19.

⁸⁰ Klepp, S. (2010), [Italy And Its Libyan Cooperation Program: Pioneer of the European Union's Refugee Policy?](#) In: Jean-Pierre Cassarino (Hg.), *Unbalanced Reciprocities: Cooperation on Readmission in the Euro-Mediterranean Area*. Washington D.C. 2010: Middle East Institute, p. 84.

Map 2: The external dimension of the EU border agency Frontex / Source: Keller, S. et al. (2011)



“The Agency’s annual reports focus deliberately on statistical results in terms of detection, apprehension and ‘refusal of entry of illegal immigrants’ at the main borders of the EU (...). The 2007 report, for example, states that 130,000 third-country nationals were refused entry to the EU; in the 2008 report the figure is 140,000. Neither report mentions the possible presence among those refused entry of potential asylum seekers or vulnerable individuals (lone minors, etc.). The specific protection needs of migrants do not appear to be taken into account, and nowhere is reference made to the principle of non-refoulement as laid down in Article 33 of the 1951 Geneva Convention.”⁸¹

The European Council on Refugees and Exiles (ECRE) questions the role of Frontex beyond the EU’s ‘external borders’, in terms of whether it can legally be involved in these kinds of operations but also whether it can do so with guarantees that its actions remain in full compliance with relevant European Community law, namely the Schengen Borders Code, the Asylum Procedures Directive and its own founding Regulation.⁸² Activities of Frontex could prevent the departure of people in need of protection from countries of origin or transit, in contravention of the right to free movement under the Universal Declaration of Human Rights that includes the right to leave one’s own country. Meanwhile, it is important to recognise that *“FRONTEX alone is authorised to evaluate the operations that it coordinates and hence any*

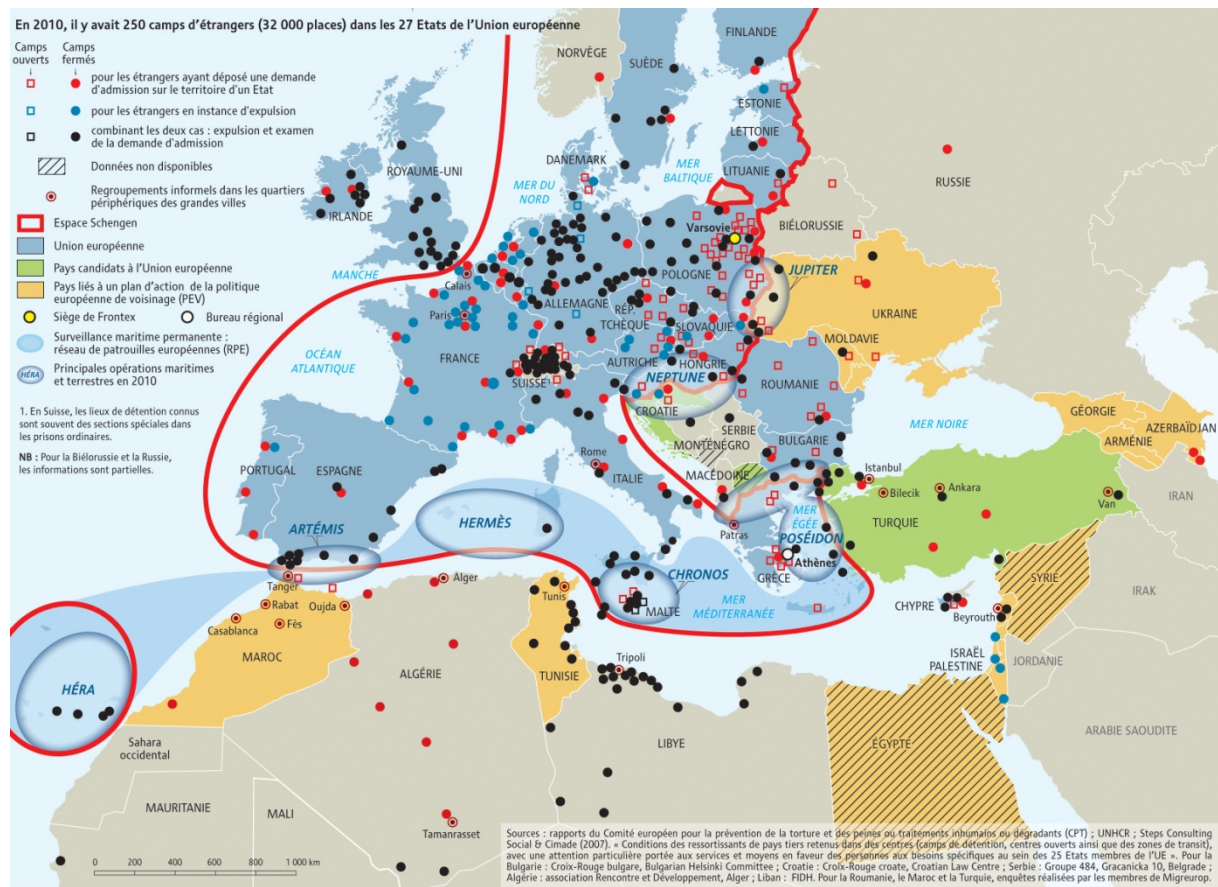
⁸¹ Keller, S./Lunacek, U./Lochbihler, B./Flautre, H. (2011), *Frontex Agency: Which guarantees for human rights?* A study conducted by Migreurop (www.migreurop.org) on the European External Borders Agency in view of the revision of its mandate, Brussels: Migreurop, p. 11.

⁸² European Council on Refugees and Exiles (ECRE) (2007), *Defending Refugees’ Access to Protection in Europe*, London: ECRE.

rights violations that they may give rise to – but that it does not consider itself responsible for them.”⁸³

In this context it should be mentioned that the *European Council Decision of 26 April 2010 supplementing the Schengen Borders Code* states that “no person shall be disembarked in, or otherwise handed over to the authorities of, a country in contravention of the principle of non-refoulement, or from which there is a risk of expulsion or return to another country in contravention of that principle”.⁸⁴ Under this decision, Member States are obliged to provide rescued and intercepted persons with the appropriate information so that those individuals may explain why disembarking in the proposed location would contravene the principle of non-refoulement.⁸⁵

Map 3: The external dimension of the EU migration policy



Non-EU countries, notably Turkey and Morocco, have sometimes complained that they have been turned into mere ‘buffer zones’ or ‘dumping grounds’ for migrants unwanted in the EU.⁸⁶ In member states of the European Union, as well as in neighbouring countries (Libya,

⁸³ Keller, S./Lunacek, U./Lochbihler, B./Flautre, H. (2011), *Frontex Agency: Which guarantees for human rights?* A study conducted by Migreurop (www.migreurop.org) on the European External Borders Agency in view of the revision of its mandate, Brussels: Migreurop, p. 38.

⁸⁴ Council of the European Union (2010), *Council Decision of 26 April 2010 supplementing the Schengen Borders Code*, OJ 4.5.2010.

⁸⁵ Keller, S./Lunacek, U./Lochbihler, B./Flautre, H. (2011), *Frontex Agency: Which guarantees for human rights?* A study conducted by Migreurop (www.migreurop.org) on the European External Borders Agency in view of the revision of its mandate, Brussels: Migreurop, p. 25.

⁸⁶ Düvell, F./Vollmer B. (2011), *European Security Challenges. EU-US Immigration Systems*, Florence: European University Institute/Robert-Schuman Centre for Advanced Studies, p. 14.

Morocco, Turkey, Ukraine) and beyond (Mauritania, Lebanon), the presence of an ever increasing number of zones of detention conceals policies and practices contrary to international commitments which some of these states are bound to. The Migreurop network claims that “in Cyprus, Greece, Italy , Malta [...] migrants are automatically placed in detention, whatever their humanitarian and/or legal situation is, including those rescued or intercepted at sea after long journeys”⁸⁷.

Refugees and asylum seekers run the risk of being detained without trial or sentence, in prison-like conditions, suffering in some cases additionally from mistreatment and physical or psychological violence. In 2007, a report solicited by the European Parliament stated that: “*The deprivation of freedom and the conditions in detention centres create or aggravate psychological or psychiatric disorders. (...) Depriving children of their freedom can however have a particularly harmful impact on these children and lead to the onset of psychological disorders in the short or long-term*”.⁸⁸ The Migreurop network regards the institutionalization of the detention of migrants as part of a deterrence policy, which criminalizes those considered undesirable.⁸⁹

Furthermore, the recent upheaval and probable political transformation in North Africa had severe impacts on the situation of refugees within the EU external border regime.⁹⁰ Hundreds of thousands of people fled Libya since the crisis began in February 2011. As of June 14, according to the International Organisation for Migration (IOM), one million refugees had left the country; more than 500,000 heading off to Tunisia, more than 300,000 to Egypt and 70,000 to Niger. Every day, refugees arrive in Tunisia to stay in already overpopulated camps. The majority are nationals from Sub-Saharan African countries themselves in conflict like Somalia, Sudan, Eritrea or Ivory Coast.⁹¹

*“The European Union still didn’t take any initiative to host these people or to save those lost at sea. On the contrary, it is reinforcing border surveillance through the deployment of the Frontex agency in the Mediterranean while the coalition forces vessels don’t provide assistance to the boat-people. The UNHCR estimates that more than 2,000 people have been reported missing since February.”*⁹²

All EU Member States are bound by the principle of non-refoulement, as enshrined in the 1951 Refugee Convention. They must therefore ensure that whenever exercising extraterritorial migration controls, those individuals affected who are seeking international protection, are granted access to a fair and efficient asylum procedure.

Impacts of the EU external border regime on local border traffic

⁸⁷ Migreurop (2010), [Call for the closure of camps for migrants, in Europe and beyond](#). Paris: Migreurop, p. 1.

⁸⁸ European Parliament (2007), [The conditions in centres for third country nationals \(detention camps, open centres as well as transit centres and transit zones\) with a particular focus on provisions and facilities for persons with special needs in the 25 EU member states](#), IP/C/LIBE/IC/2006-181, Dec. 2007.

⁸⁹ Migreurop (2010), [Call for the closure of camps for migrants, in Europe and beyond](#). Paris: Migreurop, p. 1.

⁹⁰ Düvell, F./Vollmer B. (2011), [European Security Challenges. EU-US Immigration Systems](#), Florence: European University Institute/Robert-Schuman Centre for Advanced Studies, p. 16.

⁹¹ Migreurop (2011), [Appeal. A flotilla to stop deaths in the Mediterranean](#), Brussels: Migreurop.

⁹² Ibid. See also: Human Rights Watch (2011), [EU: Put Rights at Heart of Migration Policy](#); Afrique-Europe-Interact (2011), [Video Clip of the situation in the Refugee-Camp Choucha at the Tunisian-Libyan border \(24th of May 2011\)](#).

The ‘external borders’ of the enlarged Union cut not only across transcontinental transit routes of migrants and refugees, but as well across neighbouring areas that traditionally have had very close relations. The EU Commission therefore aimed to facilitate the crossing of the EU ‘external borders’ by locals of the bordering area of the neighbouring country. In 2006, a corresponding regulation laid down specific rules on local border traffic (LBT) at the ‘external land borders’ of the Member States that should allow derogating, for persons living in a border area, from the general rules on border checks set out in the Schengen Borders Code.⁹³ *“The aim is to avoid creating barriers to trade, social and cultural interchange or regional cooperation with neighbouring countries. The Regulation authorises Member States to conclude bilateral agreements with neighbouring non-EU countries, provided these agreements fully comply with the parameters set by the Regulation.”*⁹⁴

The regulation requires that border residents,⁹⁵ defined as people lawfully inhabiting for at least one year an area that does not extend more than 30 kilometres from the ‘external borders’,⁹⁶ can cross multiple times the ‘external borders’ of the EU and stay in the border area in the neighbouring member state up to seven consecutive days. Local residents are entitled to the “L” visa for the purposes of local traffic, valid from one to five years. These visas are not issued at the border. The cost for the visa is the same (unless the member state waves the fees) as the fee charged for issuing a short-term multiple-entry one.⁹⁷

To obtain this visa the person needs a valid travel document; documents proving his/her status of border resident and the existence of legitimate reasons for frequent border crossing, such as family links, social, cultural or economic motives. Evidence for sufficient funding in relation to the stay may also be required. Residents are excluded from the local border traffic permit for whom an alert has been issued in the Schengen Information System (SIS) for the purposes of refusing them entry. Also excluded from the permit is everyone who is considered to be a threat to public policy, internal security, public health or the international relations of any of the Member States, and in particular where an alert has been issued in Member States’ national databases for the purposes of refusing entry on the same grounds.⁹⁸

The regulation, however, does not provide for very generous concessions from the EU: *“Firstly, the zone defined as ‘border area’ (...) encompasses a relatively narrow territory of 30 kilometers. It is quite likely that people with links with the new EU member states (...) will*

⁹³ European Commission (2006), [Regulation \(EC\) No 1931/2006 of the European Parliament and of the Council of 20 December 2006 laying down rules on local border traffic at the external land borders of the Member States and amending the provisions of the Schengen Convention](#), Brussels, OJ 30.12.2006.

⁹⁴ European Commission (2011), [Second report on the implementation and functioning of the local border traffic regime set up by Regulation No 1931/2006](#), COM(2011) 47 final, Brussels, 9.2.2011, p. 2.

⁹⁵ Citizen of the European Union and “nationals of third countries and members of their families, whatever their nationality, who, under Agreements between the Community and its Member States, on the one hand, and those third countries, on the other, enjoy rights to move freely equivalent to the right of citizens of the Union”. (European Commission (2006), [Regulation \(EC\) No 1931/2006 of the European Parliament and of the Council](#), L 405/10).

⁹⁶ “‘(B)order area’ means an area that extends no more than 30 kilometres from the border. The local administrative districts that are to be considered as the border area shall be specified by the States concerned in their bilateral Agreements as referred to in Article 13. If part of any such district lies between 30 and 50 kilometres from the border line, it shall nevertheless be considered as part of the border area”. (Ibid, L 405/9).

⁹⁷ Ibid, L 405/12-15. See also: Kostadinova, Valentina Ilcheva (2010), [Ambiguous Borders: the European Commission and the reconstruction of borders](#), Ph.D. thesis, University of Birmingham, p. 252.

⁹⁸ European Commission (2006), [Regulation \(EC\) No 1931/2006 of the European Parliament and of the Council](#), L 405/12-15.

live beyond this zone. Furthermore, although the visa can be issued for up to five years, the procedure for obtaining it (the required documents), as well as the necessary actions (in the majority of the cases it is most likely the local residents will need to undertake a fairly long journey to the closest consular or diplomatic mission of the EU member state, since no visas are issued at the border) are not doing enough to facilitate the process for the local residents.”⁹⁹ Furthermore, the Regulation does not affect the provisions of Community and national law applicable to third-country nationals relating to long-term stays, access to and exercise of economic activity or customs and taxation matters.¹⁰⁰

Since the Regulation was adopted, only four LBT agreements have entered into force:¹⁰¹

- Hungary-Ukraine in January 2008
- Slovakia-Ukraine in September 2008
- Poland-Ukraine in July 2009
- Romania-Moldova in October 2010.

From these agreements, however, only the Romania-Moldova agreement fully complies with the LBT Regulation:

“The other agreements either have a border area that goes beyond what is allowed by the Regulation (HU-UA; SK-UA, albeit in a limited area), or require travel medical insurance contrary to the Regulation (PL-UA). In addition, Slovenia and Croatia have a bilateral agreement on border traffic cooperation that dates from 2001 and that is incompatible with the Regulation in several important respects.”¹⁰²

Agreements that will soon enter into force:¹⁰³

- Poland-Belarus: The Commission was consulted on a draft agreement and indicated that the travel medical insurance required for border crossings was not compatible with the Regulation. No map of the Belarusian border area was provided, so it was impossible to assess whether that area complies with the Regulation. The draft agreement has not been amended. Poland and Belarus signed the agreement on 12 February 2010. The ratification procedures are ongoing in both countries. The agreement is expected to enter into force in early 2011.
- Latvia-Belarus: In August 2009, a draft agreement between Latvia and Belarus was transmitted for consultation. The Commission noted two incompatibilities with the Regulation: the requirement to possess travel medical insurance as well as the lack of an obligatory condition to prove residence in the border area and legitimate reasons for frequent border crossing. In December 2010, Latvia informed the Commission that the agreement was signed

⁹⁹ Kostadinova, Valentina Ilcheva (2010), *Ambiguous Borders: the European Commission and the reconstruction of borders*, Ph.D. thesis, University of Birmingham, p. 253.

¹⁰⁰ European Commission (2006), *Regulation (EC) No 1931/2006 of the European Parliament and of the Council*, L 405/8.

¹⁰¹ European Commission (2011), *Second report on the implementation and functioning of the local border traffic regime set up by Regulation No 1931/2006*, COM(2011) 47 final, Brussels, 9.2.2011, p. 2.

¹⁰² Ibid.

¹⁰³ Ibid., p. 3. *The Commission had been consulted on the draft agreements between Latvia and the Russian Federation, between Lithuania and the Russian Federation and between Romania and Ukraine. These agreements were found compatible with the Regulation, but they have not yet been signed. In October 2008 the Commission commented on draft agreements between Bulgaria and Serbia and between Bulgaria and FYROM, but since then it has not been further consulted on these drafts.*

on 23 August 2010 and that Latvia had ratified in October 2010. The draft agreement has not been amended.

- *Lithuania-Belarus: The Commission was consulted on a draft agreement and considered that it complied with the Regulation. Lithuania and Belarus signed the LBT agreement on 20 October 2010. Ratification procedures are ongoing. The agreement is expected to enter into force in 2011.*
- *Norway-Russian Federation: The Commission was consulted on a draft agreement and assessed it as complying with the Regulation. Norway and the Russian Federation signed the LBT agreement on 2 November 2010. Ratification procedures are ongoing. The agreement is expected to enter into force in 2011.*

In its first report on the implementation and functioning of the local border traffic regime, the Commission found that the LBT agreements lay down stricter conditions than those that would be allowed by the LBT Regulation. It also found that none of the agreements in force or signed use the full range of facilitation measures:

“In particular, restrictions are foreseen regarding how long a person can stay in the EU. Where the Regulation allows a person to stay in a Member State for up to three months within a given period, certain (draft) agreements reduce the maximum stay to 15 days within a given period, or to 90 days within 180 days. Three agreements require the person to have been resident in the border area for three years; the others require only a one-year period of residence, in accordance with the Regulation. Lastly, the LBT permits are not issued free of charge, as the Regulation allows, but subject to a fee of between 20 and 35 Euros.”¹⁰⁴

Table 1: Number of local border traffic permits issued / Source: European Commission (2011)¹⁰⁵

	<i>Number of permits</i>	<i>Period^d</i>	<i>Total eligible population</i>	<i>Permits issued compared to eligible population</i>
<i>Hungary</i>	58 055	1/2008- 5/2010	400 000 – 450 000	approx. 13 %
<i>Poland</i>	31 652	7/2009– 3/2010	1.2 million	approx. 2.7 %
<i>Slovakia</i>	1 106	9/2008 -6/2010	415 000	approx 0.3 %
<i>Romania</i>	20.308	10/2010- 12/2010	1,2 million	approx. 2 %
<i>Slovenia</i>	15 623 valid border passes currently		250 000	approx. 6.2 %

The Commission provides as well the official numbers of local border traffic applications that were refused:¹⁰⁶

¹⁰⁴ Ibid.

¹⁰⁵ Ibid. *There is a high uptake by people living in areas bordering Romania, because of strong ties between Romania and Moldova, and Hungary, because most of these people belong to the Hungarian ethnic minority and have strong ties to Hungary. People living near the borders of Slovenia and Poland make less use of LBT permits, and people living near the Slovakian border use them least of all.*

¹⁰⁶ Ibid, pp. 4-5. *The percentage of applications refused thus ranges from 13 % (SK), to 4,7 % (RO) to 1.4% (HU) and 0.85 % (PL). It can thus be considered as relatively high in Slovakia, low in Romania and very low in the other two Member States. The main reasons for refusal are SIS alerts or that applicants are unable to provide legitimate reasons for frequent border crossing. Slovenia informed the Commission that it*

- Hungary refused 838 applications from December 2007 to May 2010, solely on the basis of SIS alerts or bans on entering and staying in the country.
- Poland rejected 272 applications in the period July 2009 to March 2010, mainly on the basis of SIS alerts, but also because the person's current permit was still valid.
- Slovakia refused 169 applications in the period from September 2008 to June 2010, mainly because applicants did not give any well-founded economic reason for frequent border crossings, as required by the agreement.
- Romania refused 972 applications from October to December 2010, mainly because applicants did not give any well-founded reason for frequent border crossings or were considered to present risks related to irregular immigration.

The Commission interprets the partial information on how long the relatively few¹⁰⁷ LBT permit holders stayed in each country as a proof, that the “LBT regime, where applied, thus fulfils its purpose of allowing interchange and cooperation across the borders”¹⁰⁸, since “it is clear that LBT holders cross the respective borders very regularly to stay for just a few hours or one or two days at a time.”¹⁰⁹

- Hungary does not have details regarding the number of crossings, but noted that the permits are used daily or every second day in practice, with an average stay of one day. During the period July 2009 to February 2010, there were approximately 1 550 000 crossings with an LBT permit. In terms of the aggregate duration of stay within a period of six months from the first entry, permit holders almost always stay for the maximum period of three months.
- Poland registered 883 696 LBT crossings during the period July 2009 to April 2010, with numbers tending to rise. The average number of visits to Poland per LBT permit is 20.4 and the average stay is around six hours.
- Slovakia reported that LBT permits holders usually stay one or two days.
- Romania did not send information on duration of stay and numbers of crossings in practice.
- Slovenia has no exact information on the frequency of LBT crossings. Holders of LBT permits are allowed to stay for up to seven consecutive days in the designated border area, but most of them return on the same or the following day.

Several authors assume that the ‘securitization’ of the EU external border regime in fact effectively undermine the declared aim in the LBT regulation and in the official documents of the European Neighbourhood Policy (ENP) to prevent the emergence of new dividing lines on the continent.¹¹⁰ Moreover, there seems to be a general discrepancy between the stated

does not make formal refusals: instead, applicants withdraw their application if they are informed that they do not meet the necessary conditions.

¹⁰⁷ See Table 1 for the share of permits issued compared to the eligible population of the five selected countries. As for Slovenia the bilateral agreement with Croatia on border traffic cooperation dates from 2001 and is incompatible with the LBT Regulation.

¹⁰⁸ European Commission (2011), [Second report on the implementation and functioning of the local border traffic regime set up by Regulation No 1931/2006](#), COM(2011) 47 final, Brussels, 9.2.2011, p. 5.

¹⁰⁹ Ibid.

¹¹⁰ Saari, Sinikukka (2006), [Balancing between Inclusion and Exclusion: The EU's Fight against Irregular Migration and Human Trafficking from Ukraine, Moldova and Russia](#). Working Paper ‘Challenge’. London School of Economics, p. 4-5. See also: Kostadinova, Valentina Ilcheva (2010), [Ambiguous Borders: the European Commission and the reconstruction of borders](#), Ph.D. thesis, University of Birmingham, p. 229.

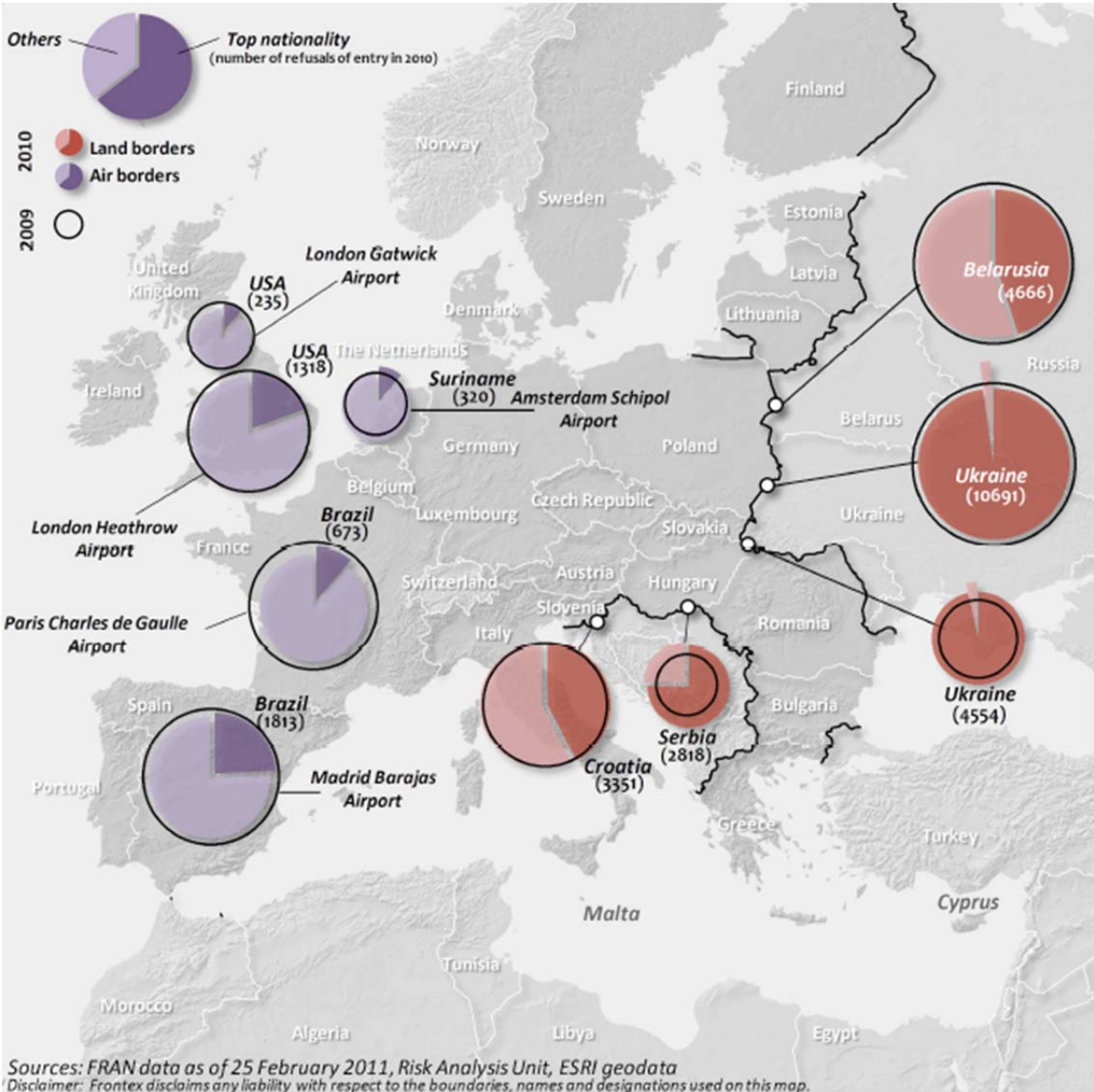
objectives in the official ENP documents and the assumptions guiding the measures undertaken. From its inception, the ENP could in fact not have been directed to a de-bordering but directly related to re-bordering, 'securitization' and territorial exclusion of the European Union.¹¹¹

“Despite the talk about Europe without dividing lines, the enlargement and the growing progress in home and justice affairs (JHA) of the EU unintentionally strengthens the trend of exclusion and produces the risk of marginalising the non-members. It has been noted that as the 'area of freedom, security and justice' expands and deepens within the Union, the outer edges grow sharper.(...) It has become increasingly evident that states that are neither EU members nor candidate countries are in danger of becoming permanent outsiders of the new Europe.”¹¹²

¹¹¹ See the reference documents for the ENP at http://ec.europa.eu/world/enp/documents_en.htm.

¹¹² Saari, Sinikukka (2006), *Balancing between Inclusion and Exclusion: The EU's Fight against Irregular Migration and Human Trafficking from Ukraine, Moldova and Russia*. Working Paper 'Challenge'. London School of Economics, pp. 4-5.

Map 4: Main areas of refusals of entry and share of top nationality in 2010 / Source: Frontex



In this context, the European Commission itself expresses the impact of ‘security requirements’ on challenges to improve the potential territorial exclusion of border areas: “Poland has called for a change in the way the Regulation defines the border area. Poland considers that the current definition leads to the division of integrated areas and excludes political and economic centres. Defining the eligible border area was one of the most difficult points during the discussion of the draft Local Border Traffic Regulation in 2006. While cross-border movements should indeed be facilitated, the security requirements of the entire Schengen area also had to be considered, as the LBT regime is an exemption from the general rules for external border crossings.”¹¹³ “The Commission therefore believes that the LBT Regulation strikes the right balance between facilitations and the security concerns of the Schengen area as a whole. Consequently, the Commission is not considering amending the

¹¹³ European Commission (2011), [Second report on the implementation and functioning of the local border traffic regime set up by Regulation No 1931/2006](#), COM(2011) 47 final, Brussels, 9.2.2011, p. 6.

LBT Regulation”.¹¹⁴ It is important to bear in mind that Poland previously was required to give up its visa-free policy with Ukraine, Moldova and Russia in order to conform to the Schengen regime.

Finally it must be stated that particularly for the trans-border communities between Poland and Ukraine, Hungary and Ukraine, Romania and Moldova, Poland and Belarus, Finland and Russia, the Baltic States and Russia, as well as the Russian exclave Kaliningrad surrounded by Poland and Lithuania, the visa requirements at the new EU ‘external borders’ mean a rough intervention in their former shared living environment and cut existing cross-border contacts.¹¹⁵

¹¹⁴ Ibid., p. 8.

¹¹⁵ Saari, Sinikukka (2006), [*Balancing between Inclusion and Exclusion: The EU's Fight against Irregular Migration and Human Trafficking from Ukraine, Moldova and Russia*](#). Working Paper ‘Challenge’. London School of Economics, p. 5.

Annex 22: Multilingual borderlands in Europe

Jan Roters, IOER, September 2011

State borders and linguistic boundaries

Institutional channelling draws on an almost universal belief that all individuals should belong to a nation, have a national identity and a state citizenship. While researchers have noted that both the state and sovereignty are historically contingent, it is still the celebrated memories of a violent past that lead the citizens of many states to think that bordered state sovereignties are the fulfilment of a historical destiny. Language is also deeply associated with the nation, even though it may be a source of controversy and divide social groups. Language policies are mainly under state control, even in the EU.¹¹⁶

Territorial modern states have also regulated linguistic practices in their bounded territory, and linguistic characteristics have often been used as key markers to mobilize people as a nation within an existing state or alternatively to secede from an existing state and establish a separate state. As a result, state borders often coincide with linguistic boundaries and they reinforce each other. In multilingual states, language arrangements are often territorial, delimitating juxtaposed monolingual regions. In those cases administrative borders might reinforce linguistic boundaries.¹¹⁷

Geographers traditionally distinguish between subsequent, antecedent, and superimposed boundaries. In the first case, the boundary has been drawn after a population established itself. It follows an existing cultural (linguistic) divide. In the second case the state boundary has been drawn first and different groups (i.e. people sharing similar cultural features like a language) settled later at the different sides of the boundary. In the third case, the state boundary has been established later and crossed existing patterns.¹¹⁸

In Europe we find extremely old state boundaries (Portugal/Spain, Spain/France) and extremely recent ones (Kosovo/Serbia). Some states have been established as a response to national territorial claims based on national and linguistic identities: for example Slovenia, Slovakia or Kosovo. In other cases, linguistic boundaries followed old political boundaries: the limes of the Roman Empire as boundaries between Germanic and Romance languages. Yet in more numerous cases, state boundaries have been drawn across existing linguistic communities, and subsequent processes of state formation and nation building have either homogenized linguistically and culturally the population of the state or created ethnic minorities. European borderlands vary greatly linguistically.¹¹⁹

Some state boundaries are clear cut linguistic boundaries (Spain/Portugal, although this is not true if Galician is conceived as a variant of Portuguese); others typically separate linguistic

¹¹⁶ Paasi, A./Prokkola, E.-K. (2008), *Territorial Dynamics, Cross-border Work and Everyday Life in the Finnish-Swedish Border Area*, in: Space and Polity, Vol. 12, No. 1, pp. 14-16. See also: Murphy, A. B. (1999), *The sovereign state system as political-territorial ideal: historical and contemporary considerations*, in: T. J. Biersteker and C. Weber (Eds), *State Sovereignty as Social Construct*, pp. 81-120. Cambridge: Cambridge University Press.

¹¹⁷ Mamadouh V. (2011), *Borders - Borderlands - Boundaries*, Amsterdam: A Toolkit for Transnational Communication in Europe.

¹¹⁸ Ibid.

¹¹⁹ Ibid. See also: Knippenberg, H./Markusse, J. (eds. 1999), *Nationalising and denationalising European border regions, 1800-2000, Views from geography and history*. Dordrecht: Kluwer Academic Publishers.

minorities from the main state where the language is spoken (for example Slovenian speakers in Italy and Austria, Hungarian speakers in Transylvania, German speakers in Poland and the Czech Republic), Finnish Speakers in Northern Sweden, Swedish speakers on the Åland islands and in Southern Finland, or linguistic minorities in both states (Basque speakers in Spain and France, Catalan speakers in the same two countries).¹²⁰

Map 1: Languages of Europe



Source: Wikipedia, [EuroLinguistics](#).

Finally some state boundaries separate states sharing the same language (like Austria and Germany, Belgium and France, Belgium and the Netherlands), while strongly institutionalized territorial linguistic boundaries (like the one between Flanders and Wallonia or the one between Southern and Northern Cyprus) are no established (official) state boundaries.¹²¹

Both Europeanization and globalization have dramatically transformed the role of state borders. The European integration project aims at removing barriers to communication and mobility at the borders between Member States. By definition, globalization processes implies the intensification of (long distance) cross-border relations. In this context, linguistic

¹²⁰ Mamadouh V. (2011), [Borders - Borderlands - Boundaries](#), Amsterdam: A Toolkit for Transnational Communication in Europe.

¹²¹ Ibid.

similarities between groups on both sides of an existing state border can be instrumental in fostering cross-border encounters and initiatives.¹²²

Official and regional languages in Europe

In the European Union, language policy is the responsibility of member states and EU does not have a common language policy; European Union institutions play a supporting role in this field, based on the principle of subsidiarity, they promote a European dimension in the member states' language policies. The EU asserts that it is in favour of linguistic diversity and currently has a European Commissioner for Multilingualism, Androulla Vassiliou. The EU encourages all its citizens to be multilingual; specifically, it encourages them to be able to speak two languages in addition to their mother tongue. Though the EU has very limited influence in this area as the content of educational systems is the responsibility of individual member states, a number of EU funding programmes actively promote language learning and linguistic diversity.¹²³

As of 1 January 2007, the official languages of the European Union, as stipulated in the latest amendment of *Regulation No 1 determining the languages to be used by the European Economic Community* of 1958, are:¹²⁴

Language	Official in (<i>de jure</i> or <i>de facto</i>)	Since
Bulgarian	Bulgaria	2007
Czech	Czech Republic Slovakia	2004
Danish	Denmark Germany	1973
Dutch	Netherlands Belgium	1958
English	Ireland Malta United Kingdom	1973
Estonian	Estonia	2004
Finnish	Finland	1995
French	Belgium France Italy Luxembourg	1958
German	Austria Belgium Denmark Germany Italy Luxembourg	1958
Greek	Cyprus Greece Italy	1981

¹²² Ibid.

¹²³ European Commission (2003), *Promoting Language Learning and Linguistic Diversity: An Action Plan 2004 – 2006*, Brussels, 24.07.2003, COM(2003) 449 final.

¹²⁴ European Union (2007), *Consolidated version of Regulation No 1 determining the languages to be used by the European Economic Community*. See also: European Commission: *Languages of Europe - Official EU languages*.

Hungarian	Hungary Austria Romania Slovakia Slovenia	2004
Irish	Ireland United Kingdom	2007
Italian	Italy Slovenia	1958
Latvian	Latvia	2004
Lithuanian	Lithuania	2004
Maltese	Malta	2004
Polish	Poland	2004
Portuguese	Portugal	1986
Romanian	Romania	2007
Slovak	Slovakia Czech Republic	2004
Slovene	Slovenia Austria Italy	2004
Spanish	Spain	1986
Swedish	Sweden Finland	1995

The number of member states exceeds the number of official languages, as several national languages are shared by two or more countries in the EU. Dutch, English, French, German, Greek, and Swedish are all official languages at the national level in multiple countries (see table above). In addition, Czech, Danish, Hungarian, Irish, Italian, Slovak, and Slovene are official languages in multiple EU countries at the regional level. Furthermore, not all national languages have been accorded the status of official EU languages. These include Luxembourgish, an official language of Luxembourg since 1984, and Turkish, an official language of Cyprus.¹²⁵

- Austria has one official language, German. However it also has Croatian, Hungarian and Slovenian minorities, all of whose languages are protected under federal laws.
- Belgium has three official languages: Dutch (59%) in the North, French (31%) in the South and a small minority speaks German. Its bilingual capital, Brussels (10%), is mainly French with Dutch as minority. These languages have the status of 'official language' only in specified language areas as defined by the constitution. In Flanders, 59% and 53% of the Flemings know French or English respectively; in Wallonia, only 19% and 17% know Dutch or English. In each region, Belgium's third official language, German, is notably less known than Dutch, French or English. Wallonia recognises all of its vernacular dialect groups as regional languages, Flanders does not.

¹²⁵ Wikipedia, [Languages of the European Union](#). See also: European Union (2007), [Consolidated version of Regulation No 1 determining the languages to be used by the European Economic Community](#). See also: European Commission (2010): [Languages of Europe - Official EU languages](#).

- In the Czech Republic, several municipalities of Zaolzie area have official bilingualism (Czech and Polish). Bilingual signs are permitted if a minority constitutes at least a 10% of the population of the municipality.
- Estonia has one official language, Estonian, but there is also a sizeable Russian-speaking community (30% in 2000) who speak Russian. Russian and other minority languages can theoretically be used in communication with local government and state institutions within the borders of certain constituencies where most permanent residents belong to a respective national minority (Article 51 of the Constitution). In reality this provision has never been applied due to the fact that only citizens of Estonia are legally counted as national minorities and a significant part of ethnic Russians living in Estonia are either the citizens of Russian Federation or do not have any citizenship at all due to citizenship policy of independent Estonia after 1991 and are therefore deprived of the right to be identified as a national minority of Estonia. Many Estonians can speak Russian, but many Russians are not fluent in Estonian including those who are Estonian citizens, however fluency varies considerably between age groups.
- Finland has two "national languages", Finnish and Swedish, and the minority languages Sami (Northern Sami, Inari Sami and Skolt Sami), Romani and Finnish Sign Language are recognized by the constitution. Swedish is spoken by a minority, about 5.5% native speakers (Swedish-speaking Finns) concentrated along the coast and on the Åland Islands. Municipalities are bilingual if the Swedish or Finnish minority is at least 6–8 %. Åland is monolingually Swedish by law. Sami is official language (besides Finnish) in the municipalities of northern Finland.
- France has a strict monolingual policy for the French Republic to conduct government business only in French. There are, however, levels of fluency in regional languages: Alsatian, Basque, Breton, Catalan, Corsican, Flemish and Occitan/Provençal. The entire population of France is reportedly French dominant in language.
- Germany has German as its official national language. Low Saxon ("Low German") is recognized as a regional language in eight North German states. Lower Sorbian is an official minority language in Brandenburg, Upper Sorbian in Saxony, Sater Frisian in a part of Lower Saxony, and North Frisian varieties and Danish in Schleswig-Holstein. A language without its own territory, Romany (including the language of the Sinte people) is an official minority language as well. Germany is home to large numbers of people from the Mediterranean region, and some of their languages, such as Turkish, Kurdish and Arabic are widely used throughout the country. However, those languages are considered foreign and thus are given no official status.
- Gibraltar is a British overseas territory whose sole official language is English. Given Gibraltar's size, most of the population is also fluent in Spanish due to its vicinity with Spain. Gibraltarians also use Llanito as their local vernacular.
- Ireland, where two languages have some form of official status. Irish (one of the Goidelic languages) is the first official language while English is the second.

Approximately 1.7 million Irish citizens are either fluent or semi-fluent in Irish, where an estimated 42% of the population are competent Irish speakers. However, the English language is used as the main community language outside of designated Gaeltacht regions. Though people who completed their education through Gaelscoil are found to be using Irish as their main language, with its daily use by citizens increasing.

- Italy. The official language overall is Italian, while bilingualism is applied in some territories. In the province of South Tyrol German is co-official. In the Aosta Valley region French is co-official, as is Slovene in some municipalities of the provinces of Trieste and Gorizia. Ladin municipalities of South Tyrol are trilingual (Italian, Ladin, and German). Italian law n. 482/1999 enforce bilingualism also in Sardinia (with Sardu), Friuli (with Friulian), Western Alps in Piedmont (with Occitan) and other linguistic minorities.
- Kosovo has two official languages, Albanian, and Serbian. Other languages such are Turkish, Bosnian, and Roma hold official status on a regional level.
- Latvia has one official language, Latvian, but also a sizeable Russian-speaking minority (37%) in 2000. Most Latvians can speak Russian.
- Luxembourg is a rare example of a truly trilingual society, in that it not only has three official languages, Luxembourgish, French and German, but has a trilingual education system. For the first four years, Luxembourgish is the medium of instruction, before giving way to German, which in turn gives way to French. (In addition, children learn English and another European language, usually Spanish or Italian.) Similarly in the country's parliament, debates are conducted in Luxembourgish, draft legislation is drafted in German, while the statute laws are in French.
- Malta has two official languages, Maltese and English. Italian is also spoken by a large percentage of the population.
- The Netherlands has two official languages, Dutch which is the primary language and Frisian which is recognized as a minority language and spoken by between 300,000 and 700,000 people. Frisian is mostly spoken in the province of Friesland (Fryslân) where it is the official first language, though a large majority of the population speaks Dutch most of the time. Low Saxon is recognized as a regional language in the northeastern provinces of the country, and Limburgish is an official regional language in Netherlands Limburg.
- Poland — 20 Bilingual communes in Poland (mostly Polish-German) speak forms of the German language. Historic languages in the country like Prussian, Kashubian, Silesian and Yiddish of the Polish Jewish community has greatly declined to near extinction from the two World Wars.
- Portugal – although Portuguese is practically universal, the Mirandese language, a related Leonese language is spoken in Miranda do Douro, in northeastern Portugal, is officially recognized (see: Languages of Portugal)

- In Romania, the official language is Romanian but significant minority languages are recognized on the local level. The biggest ethnic minority is the Hungarian community of 1.4 million (6.6 %).
- Ex-Soviet republics and Warsaw Pact countries: many people fluently speak Russian, especially in Slavic countries within the area of the former USSR (typically in Belarus and Ukraine), along with Moldova, which has a Slavic minority. However, few Polish, Slovak or Czech people speak Russian, despite huge expenditures in the past.
 - Republics of Russia. The language of titular nation is also official in those republics (though usage of a titular language is often not widespread).
 - Chuvash, Bashkir and Mari residents of Tatarstan also speak three languages: their own Chuvash language, Russian and Tatar.
 - Among the Maris, widespread trilingualism has been reported (Mari-Russian-Tatar; Mari-Chuvash-Russian; Mari-Udmurt-Russian; even four languages used intermittently: Mari-Tatar-Udmurt-Russian in Mari-Turek areas)
 - In the 1980s, almost all the Karelians were bilingual, speaking both Karelian and Russian (being Karelian-Finnish bilingual in Finland). Trilingualism Karelian-Finnish-Russian also occurred in the Karelian ASSR.
 - Abkhazia. According to Georgian law, Georgian and Abkhazian are official languages; according to Abkhazian law — Abkhazian and Russian. The elder generation of Abkhazis spoke Georgian, Russian and Abkhazi.
- Slovakia has a Hungarian minority of 520,000 (9.7%).
- Slovenia. In the coastal area (Koper, Izola and Piran) Italian is also an official language, in addition to Slovene. In the eastern part of Prekmurje, Hungarian is used as an official language next to Slovene. In the bilingual areas, all children are taught both languages.
- Spain, where several *autonomous communities* have their own official language, additional to Spanish, official all over Spain:
 - Euskadi and Navarra: Basque, unrelated to any known world language.
 - Galicia: Galician.
 - Valencia and Balearic Islands: Catalan (officially called Valencian).
 - Catalonia: Catalan and Aranese (Occitan).
 - There are a number of languages which have official recognition of some kind but which are not fully official:
 - Asturian in Asturias,
 - Leonese in Castile and León,
 - Aragonese in Aragón.
- Sweden, with no official language (as of spring 2009), but Swedish as the main language and Finnish, Meänkieli, Romani, Sami and Yiddish recognized as minority languages. Meänkieli, a variant of Finnish, is spoken in Tornedalen and Haparanda in

North Bothnia. Meänkieli, Finnish and Sami have a special status in the areas where speakers are significant minorities.

- Switzerland has four national languages; German, French, Italian and Romansh. The cantons Valais, Fribourg and Bern are bilingual (French and German), while canton Graubünden is trilingual (German, Romansh and Italian).
- In most countries of the Former Socialist Federal Republic of Yugoslavia, Serbian, Croatian, and Bosnian are understood by all three groups (see Serbo-Croatian)
- In Carpathian Ruthenia, Ukraine, Slovaks living near Uzhgorod speak Ukrainian and Hungarian in addition to their mother tongue, Slovakian. In villages near Mukachevo Germans (Swabian dialect speakers) also speak Hungarian and Ukrainian.
- The United Kingdom
 - Ulster Scots, a variety of Scots, is spoken by some in Northern Ireland, but again English is far more commonly used and Ulster Scots is less actively used in media. Irish and Ulster Scots now both have official status in Northern Ireland as part of the 1998 Belfast Agreement.
 - Scotland. 58,652 Gaelic speakers, mostly concentrated in the Highlands and the Hebrides, the traditional heartland of Gaelic culture. Also Scots with approximately 2 to 3 million speakers - a Germanic language closely related to English.
 - Wales with 611,000 Welsh speakers, including the majority of the population in parts of north and west Wales.
 - England, No official multi-lingualism, despite the presence of immigrant languages in urban centres and the Cornish language after two centuries of extinction was revived in the Cornwall region in the early 20th century.¹²⁶

Transnational language proficiency in the European Union

The most widely spoken mother tongue in the EU is German, while 51% of adults can understand English. French is an official language common to the three cities that are political centres of the Union: Brussels (Belgium), Strasbourg (France) and Luxembourg city (Luxembourg), while Catalan, Galician and Russian are the most widely used non-recognized languages in the EU.¹²⁷

Knowledge of languages to a conversational level other than as a mother tongue							
Country	English	German	French	Spanish	Italian	Russian	Polish

¹²⁶ Wikipedia, [Multilingual countries and regions of Europe](#). See also: Van Parijs, P., [Belgium's new linguistic challenges](#).

¹²⁷ Wikipedia, [Languages of the European Union](#). See also: European Union (2007), [Consolidated version of Regulation No 1 determining the languages to be used by the European Economic Community](#). See also: European Commission (2010): [Languages of Europe - Official EU languages](#).

(EU27)							
Austria	58%	4%	10%	4%	8%	2%	0%
Belgium	59%	27%	48% ¹	6%	3%	0%	0%
Bulgaria	23%	12%	9%	6%	1%	35%	0%
Cyprus	76%	5%	12%	2%	1%	2%	0%
Czech Republic	24%	28%	2%	0%	1%	20%	3%
Denmark	86%	58%	12%	5%	1%	1%	0%
Estonia	46%	22%	1%	0%	0%	66% ²	0%
Finland	63%	18%	3%	2%	1%	2%	0%
France	36%	8%	6%	13%	5%	0%	0%
Germany	56%	9%	15%	4%	3%	7%	1%
Greece	48%	9%	8%	1%	1%	3%	0%
Hungary	23%	25%	2%	1%	2%	8%	0%
Ireland	5%	7%	20%	4%	1%	1%	1%
Italy	29%	5%	14%	4%	1%	0%	0%
Latvia	39%	14%	2%	1%	0%	70% ³	2%
Lithuania	32%	19%	1%	0%	0%	80%	15%
Luxembourg	60%	88%	90%	1%	5%	0%	0%
Malta	88%	3%	17%	3%	66%	0%	0%
Netherlands	87%	70%	29%	5%	1%	0%	0%
Poland	29%	19%	3%	1%	1%	26%	0%
Portugal	32%	3%	24%	9%	1%	0%	0%
Romania	29%	6%	24%	3%	4%	0%	0%
Slovakia	32%	32%	2%	1%	1%	29%	4%
Slovenia	57%	50%	4%	2%	15%	2%	0%
Spain	27%	2%	12%	10%	2%	1%	0%
Sweden	89%	30%	11%	6%	2%	1%	1%
United Kingdom	7%	9%	23%	8%	2%	1%	1%
Croatia*	49%	34%	4%	2%	14%	4%	0%
Turkey*	17%	4%	3%	0%	0%	1%	0%

* Candidate country Source: European Commission (2006): *Europeans and their Languages*.

1 40% native speakers, totalling 88%.

2 About 30 % native speakers, totalling more than 90%

3 More than 30 % native speakers, totalling close to 100%

Conventional understandings of languages as separate entities, and of language speakers as, either mother tongue (L1) speakers, or foreign language (L2) speakers, are too simplistic to provide a proper account of the diversity of observed encounters in multilingual contexts. It is now widely acknowledged that competences in languages might be partly overlapping and complementary and asymmetrical.¹²⁸

Beyond the formal mode of a standardized language (these are generally languages supported by state institutions and formal education as national and/or as foreign languages), modes of communication include *lingua franca* (LF), *code switching* (CS) and *lingua receptiva* (LaRa). In the LF mode, the common language is negotiated between interlocutors according to their linguistic background and to the situation. In the CS mode, speakers switch between different

¹²⁸ Mamadouh V. (2011), *Tool(s) - Toolkit*, Amsterdam: A Toolkit for Transnational Communication in Europe.

languages to convey content. In the LaRa mode, speakers speak different languages and have enough passive knowledge of the other language(s) to understand each other.¹²⁹

Languages of Regional Communication (ReLan) are being used beyond the realm of the local community (for example in multilingual regions when different language groups coexist or in transnational communication). The region might be a borderland divided by state or administrative borders (such as Tyrol) or a macro-region composed of multiple states (like Scandinavia or Central Europe). These transnational ReLan are especially relevant when state borders become porous, making transnational encounters more frequent due to globalization and Europeanization processes.¹³⁰

When the speakers involved are almost exclusively L1-speakers of the regional language, we speak of a *Regional Vernacular Language* (ReVer). When L2 speakers are predominant in the regional communicational encounters and have the ownership of the language (and not L1 speakers or institutions represented them), we speak of *Regional Lingua Franca* (ReLF). In the more balanced cases, we speak of a *regional vehicular language*, for which we use the acronym ReLoC (*Regional Language of Communication* as opposed to *Regional Languages of Identification*).¹³¹

This typology can be illustrated with the example of German, which is also a national language of Germany, Austria, Switzerland and Belgium and a native language of many of the majority of the inhabitants of the first three states in the list. German is also a ReVer, a Regional Vernacular in a much wider region, including L1-speakers in Germany, Austria, Switzerland, borderlands in France (Alsace), Denmark, Belgium, Italy (South Tyrol), Poland (Silesia) and the Czech Republic and in Transylvania.¹³²

In addition German is a *Regional Vehicular* (ReLoC) when it is used as a language of communication in Central Europe when an L1-speaker from the German lands meets a Central European, i.e. Czech, Slovak, Pole or Hungarian speaking German as an L2. Finally, German can become a ReLF when it is the language of communication of a Dutch, Czech, Pole or Hungarian or other L2-speakers of German in the Central European macro region.¹³³

There are many ReLan in Europe, especially in regions crossing political borders (state borders or linguistic relevant administrative borders). Some are mainly ReVer (like Catalan along the French Spanish border or Hungarian in the Carpathian Basin), other mainly Regional Vehicular or ReLoC (Czech in former Czechoslovakia or Serbian in former Yugoslavia) and other ReLF (like French in Southeastern Europe, Russian in former Eastern Europe, and English increasingly everywhere in Europe). ReLF could also adequately describe a situation of mutual intelligibility between languages in a region, like between Danish, Norwegian (Bokmål) and Swedish in the Nordic countries ("Scandinavian" as ReLF).¹³⁴

Linguistic boundaries as regional development obstacles

¹²⁹ Ibid.

¹³⁰ Janssens R./ Mamadouh V./Marác L. (2011), [*Languages of Regional Communication \(ReLan\)*](#), Amsterdam: A Toolkit for Transnational Communication in Europe.

¹³¹ Ibid.

¹³² Ibid.

¹³³ Ibid.

¹³⁴ Ibid.

Language barriers are the foremost hindrance to labour mobility in the EU. Language barriers astronomically increase migration costs, hence hampering intra-European mobility.¹³⁵

The EU law on the free movement of workers and on European citizenship prohibits any discrimination, *de jure* or *de facto*, between national and non-national workers. As the EU is mainly composed by unilingual member states, employment in another member state leads to the requirement for workers to be fluent in the language of that member state, resulting in a *de facto* discrimination based on nationality. Although the language requirement is guaranteed as a legitimate discrimination, employers are free not to require proficiency in the national language, but instead in a third language (e.g. English). Nevertheless, such a faculty is infrequently exploited (except perhaps for academic positions).¹³⁶

Legal and administrative barriers to intra-EU mobility are very low, an illustration being the important mobility across regions sharing a common language such as Netherlands-Flanders, Germany-Austria, France-Wallonia, Ireland-UK, etc. The removal of the legal and administrative barriers to intra-EU mobility does not count for much since this rate is almost equal to the mobility with non-EU countries where legal and administrative barriers are prominent. Cultural similarity appears to have a more pronounced effect on relative trade flows than does shared membership in an economic union. A constant impediment shared by both non-EU countries and other member states seemingly hinders cross-border mobility but not intra-national mobility. Naturally, language barriers are the distinguishable factor explaining both high intra-national mobility and low cross-border mobility, independently of the country of destination, be it inside or outside the EU.¹³⁷

Interactions between border regions are influenced by perceptions formed previously in the respective countries, as well as by the languages spoken on the two sides of the border. It has been difficult for Ukraine, for example, to construct a new identity which is distant from Russian identity, considering the high level of linguistic and cultural Russification of the East and South Ukraine. Language is considered to be one of the most important conditions for the origins of national, regional and cultural identities, since it plays a symbolic role in uniting or separating people across borderlines. Taking this into consideration, it may be suggested that border region interactions are more intense in those cross border areas where language could act as a unifying symbol, such as in the Estonian-Russian border.¹³⁸

Personality, personal histories and cultural environments are important properties for trust to occur in a cross border context. Sources of trust include experiences, which lead to expectation patterns, and collective memories, which in a cross border context might play a particularly important role. Problems at the German-Polish border arise out of these collective

¹³⁵ Portuese, Aurélien, *Law and Economics of the European Multilingualism* (2009). European Journal of Law and Economics, 2010, p. 20. See also: Bonin H. et al. (2008), *Geographic Mobility in the European Union: Optimising Its Economic and Social Benefits*, IZA Research Report Series N°19, p. 81. See also: Fertig, M./Schmidt, C.M. (2002), *Mobility within Europe – What do we (still not) know?*, IZA Discussion Paper N°447. See also: European Foundation for the Improvement of Living and Working Conditions (2006), *Mobility in Europe. Analysis of the 2005 Eurobarometer Survey on Geographical and Labour Market Mobility*.

¹³⁶ Portuese, Aurélien, *Law and Economics of the European Multilingualism* (2009). European Journal of Law and Economics, 2010, pp. 19-20.

¹³⁷ Ibid., p. 20. See also: European Foundation for the Improvement of Living and Working Conditions (2006), *Mobility in Europe. Analysis of the 2005 Eurobarometer Survey on Geographical and Labour Market Mobility*. See also: Srivastava, R. K./Green, R. T. (1986), *Determinants of bilateral trade flows*, in: The Journal of Business, 59(4), p. 624.

¹³⁸ Smallbone, D. et al. (2007), *Challenges and prospects of cross border cooperation in the context of EU enlargement*, Kingston University, p. 78. See also: Topaloglou (2005), *A Border Region Typology in the Enlarged European Union*, in: Journal of Borderland Studies, 20 (2), pp. 67-90.

memories, for example in the development of entrepreneurship along the German- Polish border, with interesting implications in terms of what triggers or hinders trust development and learning processes at the regional level.¹³⁹

Until the mid-1990s, Polish border regions were characterised by a ‘bazaar economy’. Although admitting that this has not been restricted to border regions alone, border regions appear to have offered a supportive frame for the extension of the particular bazaar economy, which is based on export activity. Market-places near border are spatial anchoring points of the bazaar economy. External influences included the dominance of German customers and their purchasing power. Internal influences on border development included identification with the region; and ‘a sense of belonging to the region’, which are based on common orientations in values and culture. This is difficult to achieve in border regions, such as German-Polish cases, because of their mutual history with its long tradition of uncertainty for the Polish side (‘packed suitcase’ symptom); the consequent lack of trust to be observed on both sides; and the feeling of competition the author observes, due to the ‘open border’ on both sides. Overall, the border region suffers from a lock-in situation of a particular sort, because German firms are still hesitant to cooperate with Polish firms, neglecting opportunities for cross-border economic relations.¹⁴⁰

The fact that actors refrain from entering a linguistically different market, whilst it would be monetarily rational to enter, does not automatically lead to the conclusion that actors act irrationally. The home-based bias emphasizes that a lack of familiarity, due to cultures and languages, impedes investments. The familiarity-caused home-based bias brings about the aversion to the discomfort created by contacts with the unknown – adding non pecuniary dimension to the entry decision. In most cases in the EU, there is a complete correlation between a language and a specific country. Therefore, the linguistic group-based bias – determined upon the linguistic community – corresponds to the home-based bias – determined upon the country. Consequently, linguistic group-based and home-based biases for our purpose are used indistinctly. Firms have the tendency to evolve in the vicinity of their experiences with the linguistic group-based bias playing a fundamental role in this respect. Indeed, there is a strong tendency for companies to stay within the same language group. Therefore, the linguistic-based bias leads firms not to envisage entry in cross-linguistic markets.¹⁴¹

When firms envisage entering cross-linguistic markets, the decision-making process encapsulates a ‘psychic distance’. Psychic distance includes factors (particularly language)

¹³⁹ Ibid, p. 106. See also: Krätke, S. (1998), *Problems of Cross-border Regional Integration. The Case of the German-Polish Border Region*, in: *European urban and regional studies*, 5 (3): 249-262. See also: Höhmann, H.-H., Malieva, E. (2005), *The Concept of Trust. Some Notes on Definitions, Forms and Sources*, in H.-H. Höhmann, F. Welter (eds.) *Trust and Entrepreneurship. A West-East perspective*, Cheltenham: Elgar, pp. 7-23.

¹⁴⁰ Smallbone, D. et al. (2007), *Challenges and prospects of cross border cooperation in the context of EU enlargement*, Kingston University, p. 106. See also: Krätke, S. (1998), *Problems of Cross-border Regional Integration. The Case of the German-Polish Border Region*, in: *European urban and regional studies*, 5 (3): 249-262.

¹⁴¹ Portuese, Aurélien . [Law and Economics of the European Multilingualism](#) (2009). *European Journal of Law and Economics*, 2010, p. 12. See also: French, K. R./Poterba, J. M. (1991), *Investor diversification and international equity markets*, in: *American Economic Review*, 81(2), 222–226. See also: Coval, J. D./Moskowitz, T. J. (1999), *Home bias at home: Local equity preference in domestic portfolios*, in: *The Journal of Finance*, 54(6), 2045–2073. See also: Grinblatt, M./Keloharju, M. (2001), *How distance, language, and culture influence stockholdings and trades*, in: *The Journal of Finance*, 56(3), 1053–1073. See also: Welch et al. (2001), *The persistent impact of language on global operations*, in: *Prometheus*, 19(3), p. 195.

preventing or disturbing firms learning about and understanding a foreign environment. Understanding is evidently inconceivable if languages differences render the information unintelligible. Obviously, the learning process is facilitated (learning costs lubricated) when a common language is shared.¹⁴²

Due to the European integration, ‘national culture’ as has become the major feature of the psychic distance between member states. We shall understand ‘language distance’ as a sub-category of cultural distance, being itself a category of psychic distance. Language distance is bundled into the psychic distance package. We include the requirement of linguistic competence into the cognitive cultural intelligence of the targeted market, which plays an important role in the concept of cultural distance. There could be no cultural intelligence of a market without linguistic competence. Intelligence presupposes the mastering of knowledge after a process of learning, a process that postulates a free flow of information. Psychic distance incurs ‘psychic costs’, consisting in the overestimation of risk costs. An illustration of psychic costs as risk costs exaggerating factor is witnessed with banks offering smaller loans at a higher interest rate to more culturally distant borrowers.¹⁴³

Perceivably, costs are dramatically increased altogether with an expected benefits’ decrease. Language distance incurs some liabilities of foreignness which are impediments to effective negotiations and alliance evolution. Whereas languages are viewed as keys to market understanding, there is an under-investment in learning foreign languages, leading to an inefficient equilibrium.¹⁴⁴

¹⁴² Portuese, Aurélien, [Law and Economics of the European Multilingualism](#) (2009). European Journal of Law and Economics, 2010, p. 12-13. See also: Johanson, J./Vahlne, J. E. (1977), *The internationalization process of the firm—a model of knowledge development and increasing foreign market commitments*, in: Journal of International Business Studies, 8, 22–32. See also: Nordström, K./Vahlne, J. E. (1992), *Is the globe shrinking? Psychic distance and the establishment of Swedish sales subsidiaries during the last 100 years*, in paper presented at the international trade and finance association’s annual conference, April 22–25, Laredo, US. See also: Barkema, H. G. et al. (1996), *Foreign entry, cultural barriers, and learning*, in: Strategic Management Journal, 17(2), 151–166.

¹⁴³ Portuese, Aurélien, [Law and Economics of the European Multilingualism](#) (2009). European Journal of Law and Economics, 2010, p. 13. See also: Melitz, J. (2007), *Language and foreign trade*, in: European Economic Review, 52, 667–699. See also: Evans, J./Mavondo, F. T. (2002), *Psychic distance and organizational performance: An empirical examination of international retailing operations*, in: Journal of International Business Studies, 33(33), 515–532. See also: West, J./Graham, J. L. (2004), *A linguistic-based measure of cultural distance and its relationship to managerial values*, in: Management International Review, 44(3), 315–343. See also: Welch et al. (2001), *The persistent impact of language on global operations*, in: Prometheus, 19(3), p. 194. See also: Johnson, J. P. et al. (2006), *Cross-cultural competence in international business: Towards a definition and a model*, in: Journal of International Business Studies, 37, p. 536. See also: Giannetti, M./Yafeh, Y. (2009), *Do cultural differences between contracting parties matter? Evidence from syndicated bank loans*, in: ECGI-Finance working paper no. 224/2008.

¹⁴⁴ Portuese, Aurélien, [Law and Economics of the European Multilingualism](#) (2009). European Journal of Law and Economics, 2010, p. 13. See also: Bartlett, C./Ghoshal, S. (1989), *Managing across borders: The transnational solution*. Boston: Harvard Business School Press. See also: Palich, L./Gomez-Mejia, L. R. (1999), *A theory of global strategy and firm efficiencies: Considering the effects of cultural diversity*, in: Journal of Management, 25, 587–606. See also: Zaheer, S. (1995), *Overcoming the liabilities of foreignness*, in: Academy of Management Journal, 38, pp. 341–363. See also: Luo, Y./Shenkar, O. (2006), *The multinational corporation as a multilingual community: Language and organization in a global context*, in: Journal of International Business Studies, 37, p. 322. See also: Williams, E. M. J./Chaston, I. (2004), *Links between linguistic ability and international experience of export managers and their export marketing intelligence behaviour*, in: International Small Business Journal, 22(5), p. 477. See also: Konya, I. (2002), *Modeling cultural barriers in international trade*, in: Review of International Economics, 14(3), pp. 494–507.

Firms select countries in their internationalization process from culturally close to culturally distant markets. This process of ‘cultural selection’, applied to the EU context, leads to market fragmentation of the EU ‘single’ market in relation to ‘linguistic selection’. *Ceteris paribus*, we can deduce that firms select markets within the EU countries as follows:¹⁴⁵

1. Domestic market
2. Foreign market with language commonality
3. Foreign market allowing receptive multilingualism (e.g. Scandinavia)
4. Foreign market having a foreign language (language distance).

Linguistic distance establishes socio-economic and communicative barriers between states and even regions within individual states and also generates specific day-to-day border problems which can only be overcome in practice by an increased language proficiency of the people living in the vicinity of these linguistic boundaries (i.e. through bi- or multilingualism).¹⁴⁶

Multilingual borderlands as territorial cohesion potentials

Historically, Europe has always been multicultural and multilingual. This very fact is the foundation of its diversity richness. Both Europeanization and globalization have also stimulated international migration making linguistic superdiversity a key characteristic of contemporary Europe. Transnational identities and affiliations create challenges for institutions in Europe, including both the ability and the political will to respond to increasing linguistic and cultural diversity.¹⁴⁷

Multilingualism and linguistic diversity are core values of the European Union as enshrined in article 22 of the European Charter of Fundamental Rights: *The Union shall respect cultural, religious and linguistic diversity*. The European Union has adopted numerous documents that encourage multilingualism in EU institutions but also commits its members to apply them. EU actions are focused mainly on the following policies and sectors: culture, communication, education, training, translation, interpretation, information technologies and research.¹⁴⁸

The European Commissioner for Multilingualism, Androulla Vassiliou has underlined the importance of regional and minority languages as development potential for multilingual border regions. In many regions of Europe the autochthonous minorities contribute in a

¹⁴⁵ Portuese, Aurélien. *Law and Economics of the European Multilingualism* (2009). European Journal of Law and Economics, 2010, p. 14. See also: Benito, G. R. G./Gripsrud, G. (1992), *The expansion of foreign direct investment: Discrete rational location choices or a cultural learning process?*, in: Journal of International Business Studies, 23(3), p. 464. See also: Nordström, K./Vahlne, J. E. (1992), *Is the globe shrinking? Psychic distance and the establishment of Swedish sales subsidiaries during the last 100 years*, in paper presented at the international trade and finance association’s annual conference, April 22–25, Laredo, US. See also: Welch et al. (2001), *The persistent impact of language on global operations*, in: Prometheus, 19(3).

¹⁴⁶ Stumm, T. (2011), *Conceptual clarifications for achieving a more comprehensive understanding of borders, border effects and related policy action. Report to the GEOSPECS “border group” (Follow-up to the 2010 November meeting at the ESPON- CU). Final Draft 1.0*, January 2011, p. 20.

¹⁴⁷ Mamadouh V. (2011), *Borders - Borderlands - Boundaries*, Amsterdam: A Toolkit for Transnational Communication in Europe.

¹⁴⁸ European Commission (2005), *A New Framework Strategy for Multilingualism*, COM (2005) 596, Brussels 22.11.2005.

natural way to bilingualism and multilingualism. Vassiliou encourages regional and local authorities to launch joint cooperation activities across multilingual border regions to overcome linguistic barriers. Special attention to safeguard cultural identity and language diversity should be paid to protection of more than 150 regional and minority languages, spoken by more than 50 million Europeans as their mother tongues.¹⁴⁹

Examples for multilingual borderlands, in which minority languages are being actively spoken, are:¹⁵⁰

- German-speaking Community in Belgium (border region Belgium, Germany, the Netherlands),
- South Tyrol, Italy (German-speaking, Ladin and Italian groups/minorities),
- Lausitz/Lusatia, Upper and Lower – Lusatian Sorbs (border region Germany, Czech Republic, Poland),
- German-Danish border region – Germans in Denmark, Danes in Germany and North Frisians (border region Germany, Denmark),
- Carinthia – Carinthian Slovenes (border region Austria, Slovenia, Italy).

Geographers generally distinguish between borderlands according to the degree to which each borderland is integrated in its state territory and the degree to which both sides of the border are integrated with each others. The ideal embodied by the European integration project and more specifically the European Union is that of fully integrated borderlands.¹⁵¹

A more differentiated mapping of language use in Europe shows the linguistic overlapping along the borders of European states (e.g. also West and East of France, South of Poland, borders of Russia with Estonia & Finland, South of Finland) and also that many more linguistic islands exist within states especially in Eastern Europe (e.g. Balkans, Bulgaria, Romania, Ukraine, Russia). This also suggests that many of the linguistic border lines following a country's or region's political border need in fact to be "converted" into less sharply delineated borderlands.¹⁵²

While national identities appear to create partly ambivalent attitudes among border citizens, their cross-border heritage and practical understanding of the border can create multilingual places of everyday interactions between citizens with shared experiences. Border communities are 'problem-solving entities' which try to achieve economic and social

¹⁴⁹ Bandov, G. (2011), *Language policy of the European Union – Strategy of realization of multilingual Europe*, presentation at the 'Conference on concepts and consequences of multilingualism in Europe 3', Pécs (Hungary) - Osijek (Croatia), June 8-11, 2011. See also: Network to Promote Linguistic Diversity (2011): [EC supports language learning between neighbour countries](#), Commissioner Vassiliou, Cardiff: NPLD.

¹⁵⁰ RML2future (2010), [Network for Multilingualism and Linguistic Diversity in Europe, Interim Report](#), Bozen: EURAC, p. 8.

¹⁵¹ Mamadouh V. (2011), [Borders - Borderlands - Boundaries](#), Amsterdam: A Toolkit for Transnational Communication in Europe.

¹⁵² Stumm, T. (2011), *Conceptual clarifications for achieving a more comprehensive understanding of borders, border effects and related policy action. Report to the GEOSPECS "border group" (Follow-up to the 2010 November meeting at the ESPON- CU). Final Draft 1.0*, January 2011, p. 20.

affluence for the local people while remaining aware of the historical conflicts and their negative effects on the development of the border region.¹⁵³

Map 2: Linguistic classifications



Source: Wikipedia, [Ethnic groups in Europe – Linguistic classifications](#).

¹⁵³ Paasi, A./Prokkola, E.-K. (2008), *Territorial Dynamics, Cross-border Work and Everyday Life in the Finnish–Swedish Border Area*, in: Space and Polity, Vol. 12, No. 1, p. 26. See also: Anderson et al. (2003), pp. 17–18.

Recent scholarship has not simply problematised the location of borders, but has also begun to raise the question of ‘who borders?’ As we have already seen, Europe’s borders are no longer only the business of nation-states and this is one sense in which it can be asserted that borders in Europe increasingly exhibit cosmopolitan qualities. There are in fact many other dimensions to the cosmopolitan borders of Europe.¹⁵⁴

(1) Many actors now participate in borderwork and borders are not easily owned by political elites and/or institutions of the state.

(2) There exists a multiplicity of borders (not only supranational, national and sub-national, but those belonging to the various ‘Europes’ formed by Schengen, of the Council of Europe, the EEA, etc.).

(3) There is a fuzziness or blurring of borders in Europe resulting from a lack of distinction between inside and outside, the borderlands at the edges of the EU polity and the fact that national borders can become EU borders. In terms of borders each member-state is becoming the representative of the others.

(4) There exists a great deal of mobility across borders (for some, but not all). Many Europeans cross borders with ease (borders can enhance mobility within the EU space of commercial and information flows); borders are not necessarily the enemy of mobility.¹⁵⁵

Multilingual borderlands in Central Europe could take advantage of the special position on a frontier whose formal barriers are crumbling. The European Union and the creation of a common market, free trade and a common currency are giving ever more significance to such multilingual, multicultural transition zones.¹⁵⁶

Many multicultural and multilingual border regions have endured conquest, injustice and conflict between nation-states over the years. Yet the underlying resilience of the diverse ethnic, cultural and linguistic groups spring from their need to sustain viable working relationships with each other. The multilingual capacities and multicultural environments have much to offer to their respective nation-states precisely because the inhabitants of the frontier zone have had, over the centuries, to work out a *modus vivendi* which gives viability to and defines their society. The existence of these communities challenges the nation-state's more homogeneous definition of what makes a society distinctive.¹⁵⁷

¹⁵⁴ Rumford, C. (2008), *Introduction: Citizens and Borderwork in Europe*, in: *Space and Polity*, Vol. 12, No. 1, p. 8. See also: Balibar, E. (2003), *Europe: an “unimagined” frontier of democracy*, in: *Diacritics*, 33(3/4), pp. 36–44. See also: Rumford, C. (2007), *Does Europe have cosmopolitan borders?*, *Globalizations*, 4(3), pp. 1–13. See also: Balibar, E. (2002), *Politics and the Other Scene*. London: Verso, p. 78.

¹⁵⁵ Rumford, C. (2008), *Introduction: Citizens and Borderwork in Europe*, in: *Space and Polity*, Vol. 12, No. 1, p. 1–12.

¹⁵⁶ Armstrong, W. (1998), [*Belonging, Ethnic Diversity and Everyday Experience: Co-Existing Identities on the Italo-Slovene Frontier*](#), Geography Department, McGill University, p. 20.

¹⁵⁷ *Ibid.*, p. 24.

Annex 23. Outermost Regions related policy documents

OR-specific Commission communications and consultation

- Commission report on the measures to implement Article 299(2) - the outermost regions of the European Union, COM/2000/0147 final

This communication defines the future strategy that must address the sustainable development of these regions. 3 elements:

- traditional economic activities: special measures to assist agriculture and fishing should be continued, subject to review where appropriate, adapted or intensified in certain fields, in the light of experience;
 - promoting growth as a result of diversified economic activity: upgrade other activities and attract investment and innovation. Coordinate the way existing instruments are used (Structural Funds, loan facilities, State aid discipline, taxation, customs duties etc.) to support new productive sectors and the SMEs. Strategic fields: information society, research and development;
 - relations between the ORs and their geographic environment. Ors are placed in a difficult competitive situation but their "frontier" position could prove an advantage if it is put to proper use. The European Union must pay heed to these two facets of the outermost regions.
- Report from the Commission on implementation of Article 299(2) of the EC Treaty: measures to assist the outermost regions, COM/2002/0723 final
This document is a review of initiatives taken since the former 2000 communication. As a conclusion, it is stated that « The main feature of 2002-2003 has been the particularly major and sensitive challenges facing the outermost regions. Furthermore, the general promotion of sustainable development in these regions requires a variety of responses with contributions from several Community policies. The common aim of these measures must be to assess the specific needs of these regions adequately and provide corresponding responses in line with Community law and resources. The Commission is aware of what is at stake and has already developed a panoply of initiatives to this end; it will continue the general strategy to be implemented with regard to these regions. »
- Communication from the Commission on a stronger partnership for the outermost regions: assessment and prospects (COM (2004) 343 Communication of the Commission of 26 May 2004. In 2004, the EU defined a strategy based on an integrated approach with three main

strands: accessibility and reduction of the effects of the other constraints, competitiveness and regional integration. This approach, given the permanent nature of the disadvantages facing the OR, remains valid but will require further development in order to rise to the new challenges.

- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Strategy for the Outermost Regions: Achievements and Future Prospects. In September 2007 the Commission recognised the need: "to continue the effort to adapt Community policies and for specific support whenever necessary". The adoption, since 2007, of new programmes and measures in support of the OR is testimony to the continued awareness of the specificities of the OR, and should enable them to make clear progress in the context of the three strands of the strategy.

The European Commission, aware that the outermost regions (OR) are particularly vulnerable and exposed to these challenges and in order to gather input for its reflections on the development of the European strategy for these regions, launched a wide-ranging consultation in September 2007 with the European institutions, the Member States, the outermost regions, socio-professional groups, research centres and universities, and organised an inter-institutional and partnership conference on 14 and 15 May 2008 in Brussels.

- Public consultation on future strategy for outermost regions (2007-2008). The numerous contributions received show that the respondents are keen to explore and make the most of the EU's outermost regions, as well as to see the emergence of a renewed strategy marking a change of paradigm – the OR as "regions of opportunity", rich in potential for development – while ensuring that their specific characteristics are taken into account.
- Outermost regions – an asset for Europe – Communication from the Commission policy, 17.10.2008, COM(2008) 642. This Communication responds to the call on the Commission from the Heads of State and Government to present the results of the public consultation and proposals on the subject (Conclusions of the European Council, December 2007, page 59) and proposes a change of approach for the development of the strategy, opening the way for the new paradigm, and makes recommendations to ensure optimal use of the instruments and possibilities available in the current financial framework (2007-2013).
 - Outposts of the European Union in the world
 - Ideal location for experimentation to combat the effects of climate change

- Remarkable biodiversity and wealth of marine ecosystems
- Scientific portals for their geographical areas
- High-quality agricultural produce

Cohesion policy (2007-2013)

Cohesion Policy provides the ORs with important support designed to help them achieve greater economic and social convergence with the rest of the Community. On top of the €5 billion that these regions will receive for the 2007–13 period from the European Regional Development Fund (ERDF), the Cohesion Fund (for the Portuguese ORs) and the European Social Fund (ESF), the EU's Cohesion Policy has earmarked additional funding to offset higher costs faced by the ORs, at the rate of €35 per inhabitant per year (a total of €979 million for all the regions).

- Fifth Cohesion Report (2010) – extract from the official conclusions, COM(2010) 642 final: “The report has shown that in some cases geographical or demographic features could intensify development problems. This is particularly true of the outermost regions but also of northernmost regions with very low population density and island, cross-border and mountain regions, as explicitly recognised by the Lisbon Treaty. It will be necessary to develop targeted provisions to reflect these specificities, without unnecessarily multiplying instruments and programmes. Territorial cohesion also means addressing urban-rural linkages in terms of access to affordable and quality infrastructures and services, and problems in regions with a high concentration of socially marginalised communities.”

ORs' memoranda & Forum for Outermost Europe

The Conference of Outermost Regions Presidents gathered for the first time in 1995, two years before the Treaty of Amsterdam was signed and the Outermost Regions status was created. In March 1999, the Presidents of these regions adopted a first Memorandum, defining a strategy for the development of Outermost Regions, based on the principles of article 299§2 of the Treaty : equality of chances, coherence of common policies, partnership and assets valorisation.

The Conference elaborated a second Memorandum in 2003, which served as a basis for the first joint memorandum produced by France, Spain, Portugal and the 7 ORs. This document in turn gave way to the 2004 EC communication proposing a global OR strategy in the form of an integrated approach based

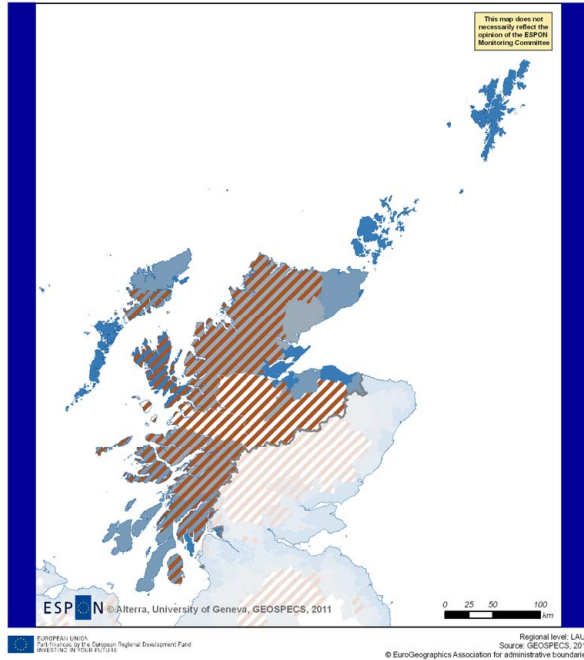
aiming at accessibility, competitiveness and regional integration. Since then, the EC presented new communications to renew this approach.

In 2009, OR Presidents wished to reaffirm the necessity to propose a differentiated approach for applying common policies on their territories, in order to face ORs' specific issues. They proposed a global strategy in favour of durable economic and social development in the perspective of 2020. ORs underline the assets they represent for the EU and ask for the creation of a unique horizontal framework, gathering all measures taken in favour of their economic and social development, to ensure a proper coherence and efficiency.

Spain, France, Portugal, and OMRs, taking reasserted in 2010 by means of a common contribution the necessity for a renewed community strategy towards the ORs. The said strategy should fall within the framework of the 2020 EU Strategy priorities, in a distinct manner, on the basis of the principles of the valorisation of potentialities, equal opportunities, coherence, and partnership, and must be applied in a proportionate manner, adapted to the specific reality of these territories. This must translate, within an economy which leans more heavily on knowledge and innovation and is more open to the world, which takes as its aim sustainable development and job generation, and which takes into account the specific impact on these regions of the new challenges.

Annex 24: Case study: Highland Council area, Scotland

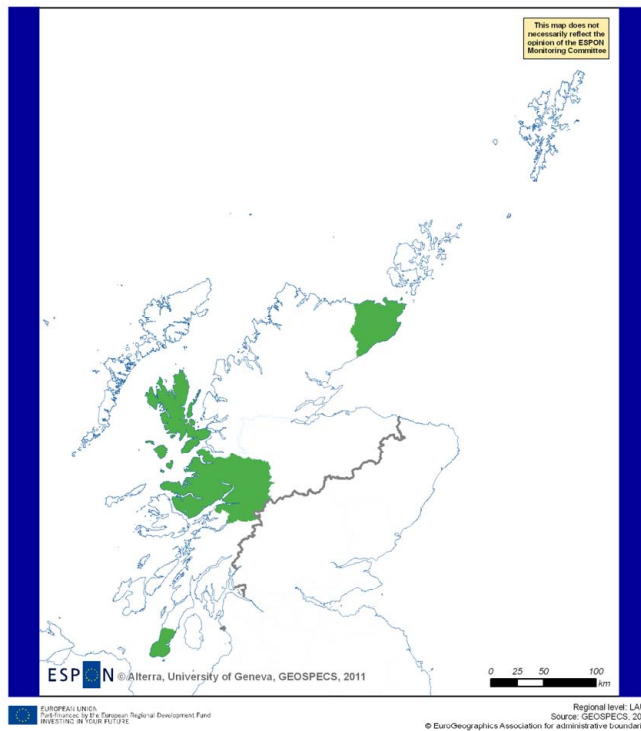
Highlands and Islands (1)



GEOSPECS specificities areas

- Limit of the case study
- NUTS0 boundary
- NUTS3 boundary
- Mountain areas**
- ▨ Mountain areas
- Travel time to coast (in seconds)**
- 0 - 900
- 900 - 1800
- 1800 - 2700

Highlands and Islands (3)



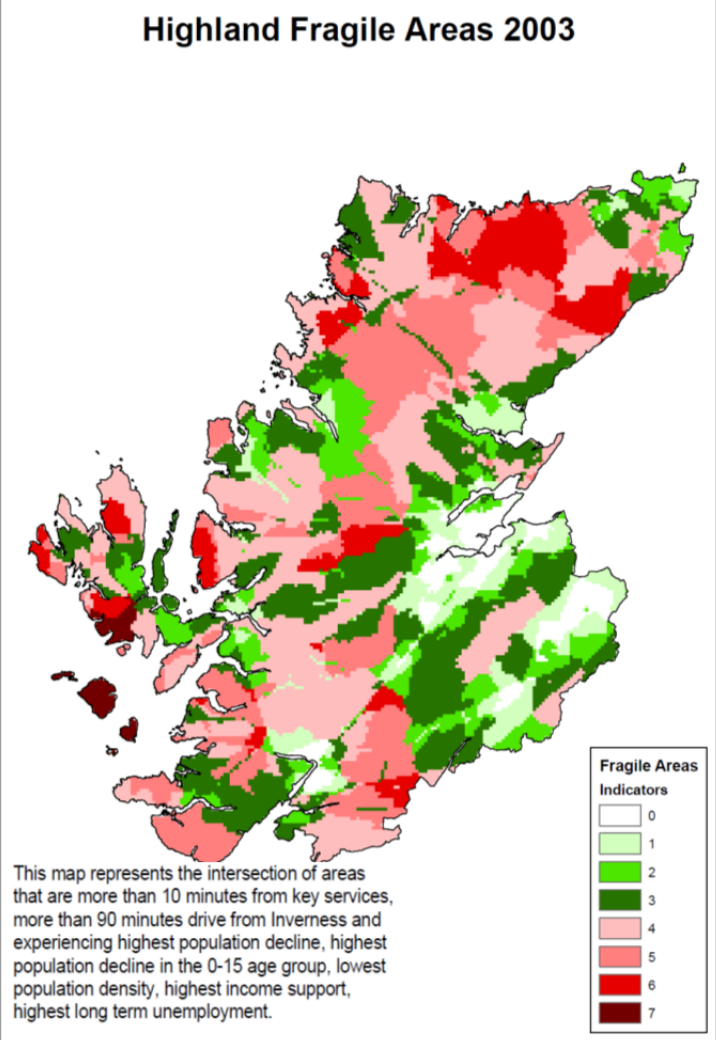
GEOSPECS specificities areas

- Limit of the case study
- NUTS0 boundary
- NUTS3 boundary
- Sparsely populated areas**
- Sparsely populated areas

Many geographic specificities overlap in the Highland Council area. Firstly, the Highlands are obviously a mountainous area. Secondly, most of the outer boundaries of the Council area are coasts. Thirdly, it includes some islands, the most famous of which is the Isle of Skye. Finally, with an average population density of 9 persons per km², the Highlands are among the most sparsely populated areas in Scotland and Britain, and even Europe. While one might argue that the mountainous terrain is a factor accounting for the sparseness of population, historic events have also strongly contributed. Before the 19th century, the Highlands were home to a much larger population depending on subsistence agriculture, including transhumance. The *Highland Clearances* forced thousands of people to emigrate to the lowlands or overseas. These were partly linked to the process of agricultural changes throughout the UK, but also to other factors, such as the Industrial Revolution and the outlawing of the traditional Highland way of life after the unsuccessful Jacobite rising of 1745. Current settlement patterns remain strongly influenced by these events in the 18th and 19th centuries.

Today, the combination of geographic specificities influences the socio-economic structure of the area in many ways. On one hand, the “attractive”, “unique” landscape serves to attract tourists and amenity migrants, making tourism the most important branch of employment next to the public sector. On the other hand, the provision of services of general interest is much more expensive in a setting where people live in dispersed small settlements. The higher costs for transportation, in terms of time and money, due to the rugged terrain, reinforce these challenges. In addition, the area (apart from Inverness) is less attractive for businesses than an urban agglomeration, and the resulting lower number of employment opportunities means that many young people move away.

The Highland Council has identified parts of its area as “fragile”, indicating that they may be in danger of long-term declines due to their remoteness, ageing population, lack of economic opportunity and access to essential services (Highland Council, 2006a). One stakeholder claimed that some mainland communities can be compared to islands, in that they show island-type fragility. The terrain can, for instance, make a mainland community almost as inaccessible as an island, even if the place appears accessible on a map when looking at the distance “as the crow flies” (Ross & McKinnon, 2011).



Map taken from: Highland Council, 2006a

Economic, Social and Environmental processes related to the geographic specificity

Economy

Economic specificity related to geographic specificity

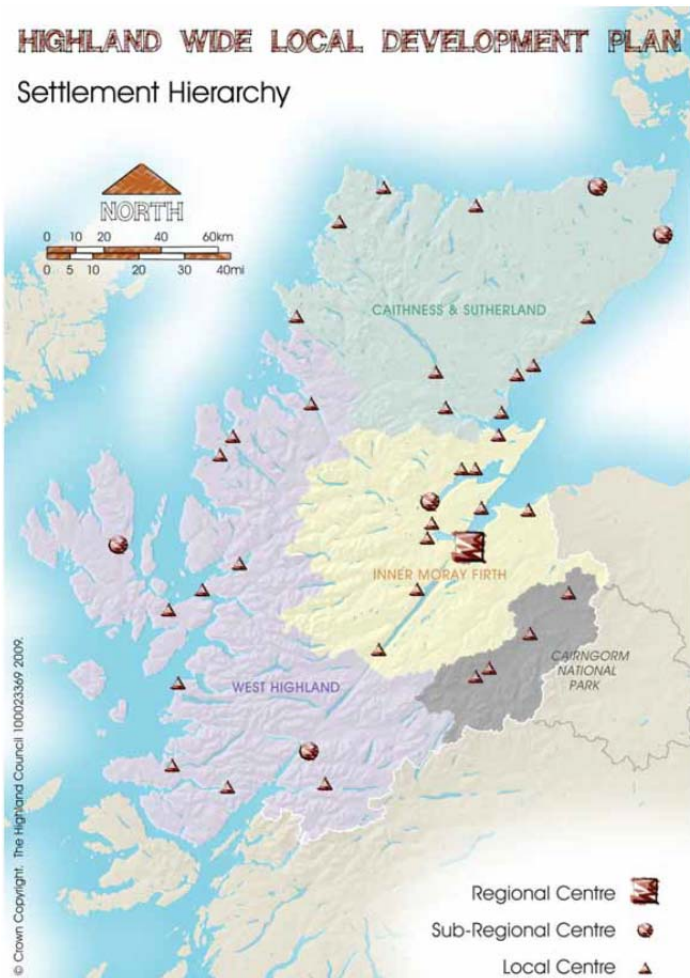
Many aspects of the economy of the Highlands are – at least indirectly – influenced by geographic specificities. Some examples:

- The famous rugged landscape of the Highlands is one important factor in attracting tourists – a reason why tourism as a sector is more important in the area than in the rest of the country (see section below). At the same time, this contributes to higher-than-average levels of seasonal employment – coupled with the obvious seasonal cycles of agricultural activity (Scottish Government, 2008).
- Market isolation in sparsely populated, remote areas means that firms can hold more market power here than in urban areas (Laird, 2009). The increased market power – coupled with a higher price for the transportation of goods to remote areas – leads to higher prices. In 2003, petrol prices in the rural areas of Scotland were found to be, on average, 9.7% higher than in urban areas whilst food was 11.0% higher (Laird, 2009).
- Due to the peripheral situation and the low population density of the Highlands, in the past some controversial projects were implemented with relatively little resistance such as the construction of the Dounreay nuclear power plant close to Thurso or military sites as in Forres or Dunoon (Kruppa, 2008). All of the named examples have since been decommissioned, taking with them the associated employment opportunities.
- Agriculture in the Highlands is dominated by livestock production. Apart from being influenced by the rugged terrain (making the growing of crops more costly), this is mainly due to the geographical location of Scotland. The short growing season and the wetness in this northerly, maritime climate contribute to low productivity as do the naturally acidic soils¹⁵⁸ (The Royal Society of Edinburgh, 2008). Similarly, the most famous agricultural product of Scotland – whisky – has an intimate relation with the Highlands. As its production relies on the availability of large volumes of water, most distilleries are either in mountainous areas or located on rivers that originate in mountains.
- The combination of geographic specificities creates enormous opportunities for renewable energy generation (hydro and wind in mountain areas; wave, tidal, underwater current, and offshore wind at the coasts).

¹⁵⁸ Areas of high rainfall and low temperature, with freely draining soils of low base status, will acidify naturally. Large areas of Scotland therefore have naturally acidic soils (SNH, 1995)

- Finally, the sparsely populated and peripheral character of the area influences the way in which business owners interact: according to a study from 2007, business owners from the Highlands and Islands stated that personal connections/ social relationships were important in forming networks – sometimes even more important than good business sense (Atterton, 2007). This sense of community is often identified as being particularly prevalent in mountains.

Nonetheless, it must be kept in mind that there are strong regional variations in the economy of the Highlands. A successful core around the Moray Firth (including Inverness) has to face different challenges than the more outlying areas. The map (right) from the Highland Wide Local Development Plan shows that the only “regional centre” is in Inverness, and smaller-scale centres are grouped around the fringes of the area, mainly on the coasts. In contrast, the interior – which contains most of the actual mountainous Highlands – contains few “centres” and thus faces different challenges.



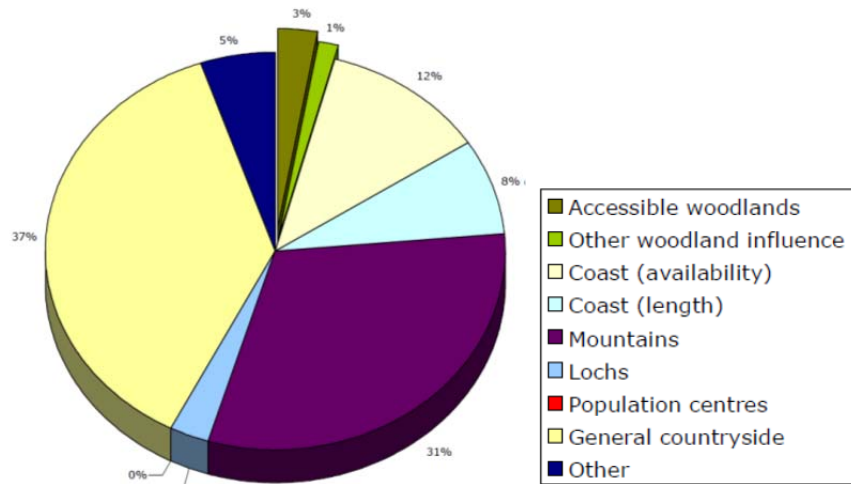
Map taken from: Highland Council, 2009a

Tourism

In the Highlands, tourism is a significant part of the local economy, accounting for 13.5% of employment (excluding self employment), and around £584m in overnight visitor expenditure. About 2.34m overnight trips are made to the Highlands each year. As in Scotland as a whole, the main market is the domestic (UK) one, which accounts for 1.84m, or 79% of trips (Highland Area Tourism Partnership, 2006). Across Scotland, tourism expenditure is almost £1,500 per resident. However, the figure for Highland is more than twice that amount, at over £3,500 (Cairngorms National Park Authority, 2010).

The landscape is key in attracting visitors. According to the survey “The Visitor Experience” (Harris Interactive, 2008), 90% of visitors declared that “scenery” was an important or very important factor in choosing Scotland as a holiday destination – making it the most important factor overall. The Highlands and the Isle of Skye were visited by 37% of UK tourists and 64% of international tourists (thus ranking second place directly after the city of Edinburgh, which is visited by 84% of international tourists).

Using the Scottish Recreational Survey (ScRS), one study has even modelled how different physical features play a role in attracting Scottish recreational visits to each Council area. For the Highland Council area, the role of mountains (31%) is clearly much greater than it is for Scotland as a whole (3%) (Cairngorms National Park Authority, 2010).



Attribution of ScRS recreation trips to area features in Highland. Image taken from: Cairngorms National Park Authority, 2010

The values for tourists are recognized in policy documents: “The major strengths of the Highlands - and by far the main reason that visitors come here - are the quality of its landscapes and natural heritage and the iconic images that they present. The region boasts more Munros¹⁵⁹ and National Scenic Areas than anywhere else in Scotland [...] and offers a wealth of accessible wildlife in a backdrop of magnificent land and seascapes. The quality of the natural heritage is the critical resource of Highland tourism and the one that, despite its international reputation, consistently exceeds our visitors’ expectations” (Highland Area Tourism Partnership, 2006).

The landscape also serves as a backdrop – or even “resource” – for a number of outdoor activities, ranging from mountain biking to canoeing, from rock climbing to bird watching. A study from 2003 found that 63% of visitors to the Highland Council area participated in some sort of sporting activity. The most popular were low level walking of between 2 and 8 miles (46%), or over 8 miles (11%) and hill walking (21%). Just under a quarter (23%) of all tourists interviewed for the survey said that a sporting activity was the *main* activity that they wished to pursue when visiting the area (George Street Research, 2003). In addition, more than one in ten visitors named wildlife watching (including marine wildlife and bird watching) as an activity pursued during their stay. Hunting activities (grouse shooting, deer stalking, etc) are also an important part of the market, but are promoted through completely different channels – there are hardly any crossovers between everyday tourists and hunting tourists (Simpson, 2011).

In an attempt to quantify the importance of outdoor activities for 2002/2003, a study found that net annual expenditure from trips made by UK residents to the Highlands and Islands area for the purposes of walking or mountaineering amounted to £245.7m (George Street Research & Jones Economics, 2004a), whereas the net annual expenditure from trips made by UK residents to the Highlands and Islands for snowsports amounted to £28.8m (George Street Research & Jones Economics, 2004b). While the exact numbers can be called into question, this shows that tourism in the Highlands is structured differently than tourism in high mountain areas such as the Alps, where

¹⁵⁹ Munros are Scottish mountains over 3000 feet (914 m) high.

snowsports are responsible for a greater proportion of income than summer tourism activities. In fact, tourism in the Highlands is even more seasonal than in Scotland overall, with almost two thirds of UK (54% in Scotland) and 84% of overseas visitors (72% in Scotland) between April and September (Highland Area Tourism Partnership, 2006).

Apart from attracting tourists, geographic specificities also pose challenges for the further development of this sector: “the dispersed nature of communities in the Highlands, which covers almost one third of the total Scottish land mass, adds to the challenge of spreading the benefits of tourism to the more outlying areas whose economies depend so heavily on it” (Highland Area Tourism Partnership, 2006). In 2002, the Scottish Parliament noted “The operation of an integrated transport network is essential to the tourist industry in Scotland, particularly in the North and West where visitors need to travel by various modes of transport to reach their destination. As inter-modal transport networks are not always well integrated this can cause difficulties and has been blamed for falls in revenue from tourists from the UK market. The low quality of many roads and rail networks causes problems for many tourism businesses in remote rural areas. In particular travel to the Highlands and Islands is costly in terms of both time and money.” Despite this recognition, the situation has only partly improved in the subsequent decade.

In general, tourism infrastructure appears to create less of a conflict with other types of land use than in some other countries (such as campaigns objecting to the extension of ski resorts in protected areas in the Alps). While such debates do arise¹⁶⁰, the principle issue is windfarms. Opponents of windfarms suggest the structures would spoil the Highland landscape and thereby deter tourists, as well as endangering rare bird species, which are also attractive to tourists (Warren and Birnie, 2009).

As for policies: there are no particular policies that specifically address the opportunities or constraints that derive from mountainousness in the tourism sector. Generally, policies tend to be put in place *not* based on environmental characteristics but targeting opportunities for tourism. For instance, a policy for wildlife tourism will eventually benefit mountainous areas since the most interesting species are particularly located in mountains; it is, however a policy targeted at the opportunity of wildlife, not at the mountains as such (Simpson, 2011).

Even if no policies are directly *targeted* at mountain areas, there *are* tourism policies both at Highland and Scottish (and British) level. To maintain visibility, the Scottish government funds the tourism agency *VisitScotland*, which launches promotion campaigns. Mountains, lochs and castles are the most popular images for advertisements. More often than not, these images come from the Highland area – thereby probably creating a slight advantage for Highland (Simpson, 2011).

Last but not least, an over-reliance on one single economic sector can be dangerous. For example, in 2001, the outbreak of foot and mouth disease led to a significant dip in tourist numbers in the UK’s mountain areas, including the Highlands, although there were no occurrences in the area. In

¹⁶⁰ Recurring issues include path erosion and more general pressures from high numbers of mountain bikers and walkers and the proposed extension of mountain bike tracks, as well as the expansion or renewal of infrastructure at the few ski resorts.

uninfected rural areas of Scotland, of which a large proportion were in the Highlands, losses to tourism were estimated at £65 million (Fraser of Allander Institute et al, 2003).

Specific transport infrastructure issues related to geographic specificity

Geographic specificities influence transport infrastructure in several different ways in the Highlands. The *Local Transport Strategy 2010/11 – 2013/14* notes: “Some of the distinctive features which set it apart from the rest of the UK are as follows:

- Remoteness within the UK and Europe
- Fragile rural economy
- Culture, climate and topography
- Dispersed low density population
- Seasonal variations
- Sparse network with long diversions
- Single track roads
- Cost and distribution of fuel » (Highland Council, 2009).

In particular, the dispersed settlement pattern creates additional costs for the local authority: “Highland has the greatest length of roads and the largest number of bridges to maintain of any other local authority in Scotland. The dispersion of our population ranges from the relatively dense Inner Moray Firth to the super sparse remote areas of Sutherland. [...] Many of our areas are difficult to serve by conventional public transport due to the low population and large distances to be covered” (Highland Council, 2009).

The sparse population does not only create challenges for the maintenance of an adequate road network, but also makes the provision of public transport unprofitable in most cases: “Bus services are far less frequent in the region. The ability to run profitable services has been weakened by the dispersed settlement pattern. [...] The region’s rail network is limited, offering no coverage of the region’s north-west and with infrequent services on most lines” (Scottish Government, 2008). In this way, local people are forced to rely on private cars for their mobility. The table below shows that, across Highland, accessibility to public transport is lower and car dependence is higher than the average for Scotland. Therefore those without cars in the largely rural areas can face issues of social exclusion.

	% of households (2005/06)			
	People who drive every day	1 or more cars	Greater than 14 mins to nearest bus stop	Less frequent than 1 per hour bus service
Highland	47%	78%	9%	20%
Scotland	41%	68%	3%	4%

Table taken from: Highland Council, 2009

A study on public transport prepared in 2010 for HITRANS calculated the travel time on public transport needed to access different hospitals in the Highland area (mva consultancy, 2010). Examples of three hospitals are shown below. Areas marked in red are those in which a return journey by public transport would take significantly longer than by car, in green areas the difference is less pronounced; in grey areas, a return journey by public transport is not possible. The maps demonstrate that public transport connections are concentrated along some dominant routes and unavailable in other areas.

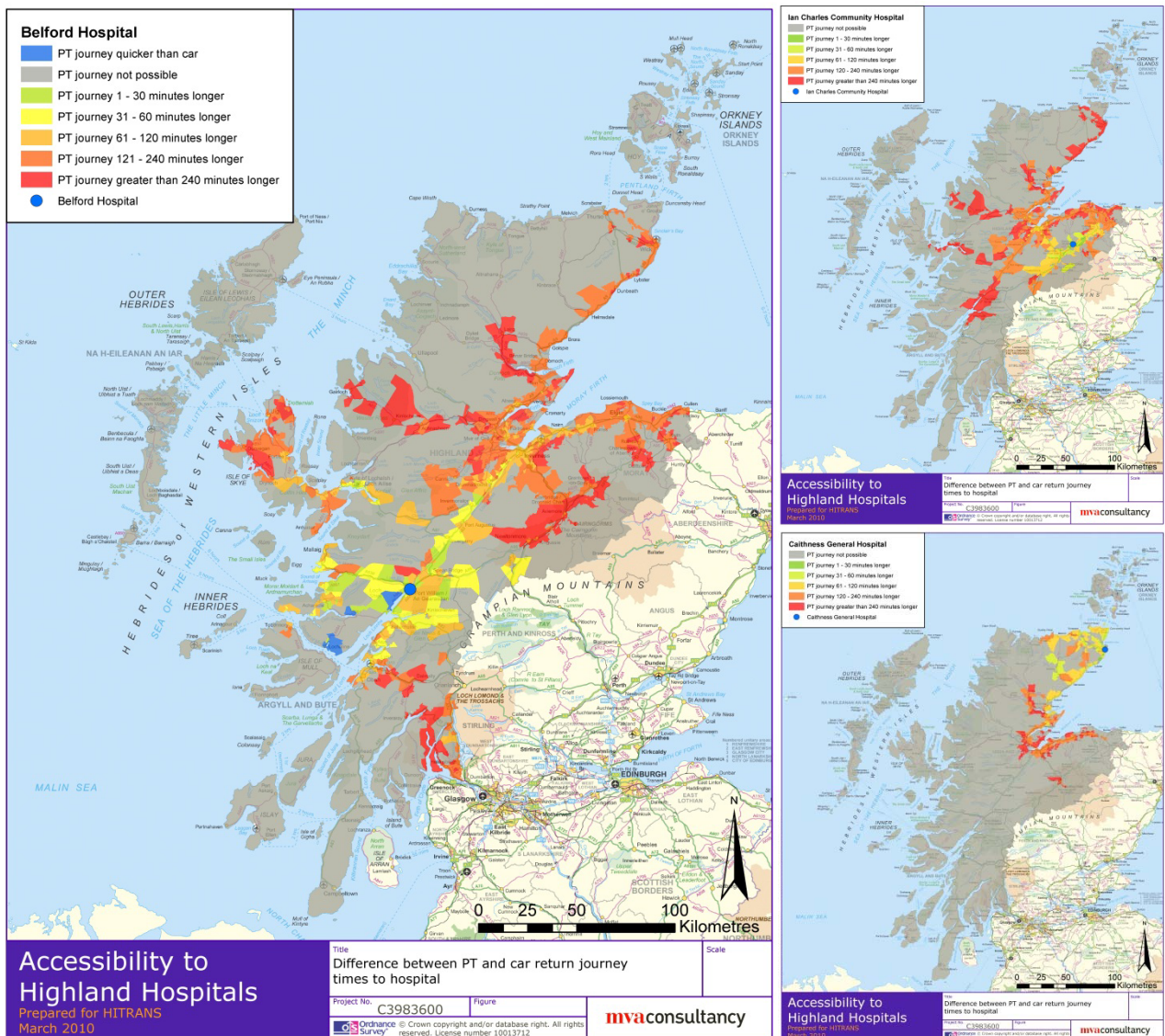


Image taken from: mva consultancy, 2010

The mountainous terrain works to reinforce the challenges deriving from sparseness. Much of the road network across rural areas is characterised by winding single carriageway roads with passing places, resulting in relatively long journey times. Even though issues are not as severe as in the Alps

or Norway, for instance, the terrain often limits the design of routes. As there are numerous lochs in the Highlands, engineers are frequently faced with steep slopes on one side of the road but water on the other. Modernizing this type of road is possible, but very expensive. For instance, travel to Berriedale (in Caithness) requires crossing a wide valley with particularly steep slopes. Building a bridge over the valley would be possible, but would necessitate a bridge with the dimensions of the Forth Road Bridge (>2km long), an investment that no one is prepared to make. The same is true for railway lines: many were built in the 19th century, following the cheapest (often winding) route. Constructing new (faster) lines would require investments in the magnitude of hundreds of millions (Jarvis, 2011).

Apart from creating challenges for the construction of transport infrastructure, the mountainous terrain increases the efforts that are necessary to keep them passable: “In the Scottish Highlands, the combination of hard metamorphic and igneous rocks, glacially steepened valley slopes and high rainfall is ideal for generating debris flows and slides” (Transport Scotland, 2008). Landslides affecting the road network in some way occur somewhere in the Highlands almost annually. Many affect only minor routes – but these can be locally very significant, in some cases being the only access routes to remote communities (Transport Scotland, 2008). Climate change, with its predicted amplification of extreme weather events, may change the frequency of debris flow events. Forest harvesting can also have dramatic effects on the stability and drainage pattern of a slope (Transport Scotland, 2008).



Image taken from: Transport Scotland, 2008

The combination of all these factors leaves some of the most remote areas of Highland with roads as the only transport option – they represent a “lifeline link”. Bridges, in particular, are critical (and many need repair work): in some locations, people would be faced with a 70-mile detour if a single bridge was closed or restricted (Ross, 2011). A single event, such as an accident, heavy snowfall, flood, or landslide, may thus cause much stronger perturbation of daily life than in a comparable lowland area. Not only is this a factor for quality of life but also for economic prospects: even where such events are rare in reality, business owners may *perceive* the area as inaccessible and hence be reluctant to set up companies (Duthie, 2011).

Finally, tourism also has an effect on transport requirements. Almost all main routes in Highland display significant seasonal variation, with August flows up to three times the volume of January flows (Highland Council, 2009). A few initiatives attempt to make public transport more attractive for tourists; for instance, one project is trying to make real-time information on public transport connections available for smartphones – a feature that is arguably more of a necessity in rural areas than in urban cores (Duthie, 2011). However, not all initiatives are successful. The “Heather Hopper” bus service that operated in the Cairngorms from 2005 to 2008 to improve connections within the area had to be discontinued due to lack of demand (Cairngorms National Park Authority, 2011a).

In terms of policies: the Scottish government (with the help of the EU) has undertaken measures to alleviate the situation of some residents (mainly island populations, but also a few non-insular

remote areas). One of these is the *Air Discount Scheme (ADS)*¹⁶¹. This aims to tackle the problem of high air fares for the remotest communities in the Highlands and Islands by providing a discount of 40% on the core air fare on eligible routes. It is mainly aimed at island populations (people who reside in the Island of Colonsay, Isaly and Jura, North-West Sutherland, the Orkney Isles, the Shetland Isles and the Western Isles), but also at Caithness (the northeasternmost corner of Highland). A review of the Scheme in 2008 revealed its importance: nearly 70% of respondents who undertook non-business trips indicated they undertook more trips as a result of the ADS. Nearly two-thirds of ADS users strongly agreed that their community was a better place to live as a result of the ADS. On a scale from 1 to 10, average ratings ranged from 7.5 for agreeing that the scheme has improved connectivity to employment to 8.2 for agreeing that connectivity to important services improved for the local community (Scottish Government, 2008). Nevertheless, the assessment of the scheme is not entirely positive: a feeling prevails that the involved airlines raised ticket prices to gain from the scheme – although this is hard to prove (Duthie, 2011). In contrast to PSO schemes¹⁶² that are applied in other countries, the ADS does not allow the government to fix a maximum ticket price. In addition, air travel remains expensive even with the 40% discount: some say the scheme benefits those who can generally afford to fly, but does not enable those who could not previously afford to use air transport (Jarvis, 2011).

Another proposal that has raised some discussion in recent years is a *fuel tax derogation*. Fuel prices being slightly higher in remote areas, the idea is that a tax derogation of 5p per litre would alleviate pressure on the population of remote areas (who are forced to travel further than urban people for everyday services). A pilot scheme has been introduced for a few of the Scottish islands, but the Highland Council's lobbying efforts for a central Highland pilot area have so far been unsuccessful. The introduction of a derogation scheme would also be dependent on approval by the European Commission (Highland Council, 2011). As comparable schemes throughout Europe have always only applied to islands, some stakeholders deem it difficult to introduce a fuel tax derogation for any mainland communities. The debate centres particularly around the question of whether this would provoke "fuel tourism" from urban centres. However, the Scottish pilot scheme also applies to Skye – an island connected to the mainland with a bridge. Some stakeholders therefore argue that remote mainland areas are comparable to communities on Skye, with the same elevated prices for fuel (Duthie, 2011).

A last example of policy intervention in the transport sector also has an ambivalent track record. For older (over 60) and disabled persons, a Scotland-wide *Concessionary Travel Scheme* applies for bus trips, and residents of Highland enjoy half fare travel on train journeys within Highland. This should make travel easier for those groups of the population who may find use of private cars difficult. However, the scheme has arguably had more benefits for urban than rural people, since the necessary bus services simply do not exist in the more remote, rural areas of Highland. The scheme costs about 190 million pounds a year. Some argue the money would be better spent if used to maintain bus services with adequate frequency in those parts of Highland (Duthie, 2011).

¹⁶¹ Supported by the EU under the European Commission's Aid of Social Character mechanism

¹⁶² For instance, Iceland, Norway and Sweden use a PSO approach: the Public Service Obligation allows the government to contract the services and thus fix prices with the providers, whereas the ADS is a traditional subsidy that allows no influence on price (Jarvis, 2011).

In any case, there is a limit to what policies can achieve in the field of transport. For example, the Cairngorms mountains “form a physical barrier to transport and physical communications between communities”, but are “a barrier on which any public or private initiatives can have only a minor effect” (Cairngorms National Park Authority, 2010).

Services of general interest

The delivery of Services of General Interest is doubtlessly more challenging in sparsely populated areas than in others, a situation which has led to complaints by the affected regional authorities. Highland Council has pointed out that it incurs additional costs in excess of £12 million per year to provide services to the 26% of its population which live in supersparse areas¹⁶³, i.e. it claims it spends about £12 million more than it would need to if those people lived in an area similar to the lowland coastal town of Nairn. In addition, some services are delivered at lower levels in the supersparse areas, and Highland Council estimates that it would cost it more than £800,000 to bring these services up to the levels provided in other, more densely populated, areas (Highland Council and Argyll and Bute Council, 2004). Highland Council also claims that it deserves compensation for this situation, comparable to the *Special Islands Needs Allowance*.

Some examples:

Highland Council has made a conscious effort to keep small schools open in remote places where the only alternative would be to send children to a boarding school (Ross, 2011). The most striking example may be Inverie Primary School, which serves the community of approximately 120 people on the Knoydart peninsula. Inverie is, according to its website, “the largest settlement in mainland Britain not connected to the road network” – it can be accessed by ferry on Mondays, Wednesdays and Fridays. The Inverie Primary School Handbook notes: “The school roll: for 2010-2011 is 10 (1 pupil in P1, 1 in P2, 2 in P4, 3 in P5 and 3 in P7). The projected school roll for 2011 – 2012 is 10.”

An important step in providing access to education across the area was the formal establishment of the University of the Highlands and Islands (UHI) in February 2011 as the culmination of a partnership that began in the mid-1990s and received significant investment from both European and Scottish sources. The University comprises 13 academic partners located across the region. It has positioned itself part way between the Open University with strong emphasis on on-line approaches, and a traditional campus-based university, where face-to-face lectures and seminars are backed up by the use of a virtual learning environment (Simco and Campbell, 2011).

As also described below, young people are moving away from the area. Currently the Highlands and Islands has 25% fewer 15 to 30 year-olds than would be the case if its population distribution mirrored the Scottish average (Highlands and Islands Enterprise, 2009a). Under 10% of those leaving school will take up higher education within the Highlands and Islands (Ross & McKinnon, 2011). A core purpose of the UHI is to make a contribution to addressing the population gap, particularly

¹⁶³ The definition used in this study for a “supersparse area” was anywhere which was more than 40 km (25 miles) by road from any settlement with a population of 7,000 or more in the 2001 census.

within remote and rural areas of the region. This is reflected in the current strategic plan, which states:

“Highlands and Islands Enterprise and other stakeholders see UHI as a major contributor in dealing with [challenges such as] increasing the population of the highlands and islands, creating a knowledge economy and high value jobs, assisting the creation of new and more ambitious businesses.” (UHI, 2008)

The creation of UHI has been greeted enthusiastically by stakeholders. For instance, Councillor Ian Ross sees it as “one of the most significant steps in a generation for the Highlands” – making qualifications available in the area that were impossible to obtain there before, and thus providing a possible alternative to moving away (Ross, 2011). In addition, the university is hoped to attract R&D activities in key sectors and create spinoffs with related employment opportunities (Ross & McKinnon, 2011).

With regard to health services, surveys in 2002 and 2003 suggested that 94% of Scotland's rural residents could reach a GP within 15 minutes and 86% could reach a hospital within 30 minutes (Farmer, 2007). However, the possibility of accessing specialist care is much different. In emergencies that require specialist care, the person concerned is flown to Glasgow (Ross, 2011).

An important factor in maintaining sufficient access to health services in rural/remote areas is the Rural General Hospital initiative – a concept unique to the National Health Service in Scotland. All of these hospitals (Shetland, Orkney, Stornoway, Fort William, Oban and Elgin) are within the Highlands and Islands (though only Fort William is in the Highland Council area). In these areas with low population density, people would otherwise find access to health services very time-consuming. Also, “communications technology [...] is proving valuable, for example through tele-radiology and tele-histopathology, screening for emergency conditions, as well as paramedic pre-hospital thrombolysis supported by tele-links to coronary care” (Skerratt, 2010).

Another example is the treatment of waste. One study presented the constraints facing waste management in the Highlands and Islands as follows (Sustainable Development Research Centre, n.d.):

- Low population density leading to low waste production per km²
- Significant distances between settlements leading to large comparative transport costs
- Low levels of manufacturing industry leading to low opportunities for use of recycle locally.

Similarly, a decline in post office services is deplored in rural areas: “The post office is often the last remaining local service available as banks, pubs, and village shops close. The loss of the rural post office will only serve to deepen social and financial exclusion for the people living in those areas. There are significant vulnerable groups especially in the remoter areas that will be affected by continuing closures. These include the elderly, people on low incomes, people in ill health, benefit recipients, single parents and people without bank accounts” (The Royal Society of Edinburgh, 2008). One survey among residents of rural areas also deplored this development, pointing out that “the postie and, sometimes, gardeners have traditionally served as unofficial social workers, offering a means of keeping an eye on the welfare of vulnerable individuals and keeping them informed” (Scottish Council for Voluntary Organisations, 2011).

In these examples, it seems to be mostly the lack of a “critical mass” of population that makes a sufficient level of services difficult. As before, the mountainous terrain is only partly responsible for the low population densities and dispersed settlement patterns.

ICT

Supply side:

“Telecoms connectivity is inherently more commercially attractive in urban areas due to the lower deployment costs per user. In the Highlands and Islands, as with most rural areas, it is more challenging to put forward a convincing case for widespread telecoms connectivity provided by the private sector” (Highlands and Islands Enterprise, 2009). Nevertheless, the Highlands and Islands do not compare unfavourably with the rest of the country: ADSL coverage (at any speed) is 95%, compared to the UK average of 99.8%. In fact, levels of ADSL coverage in the Highlands and Islands are better than rates in many major economies (e.g., Japan, Spain, Italy, Germany or the USA). This is in large part due to significant public sector investment in telecoms, such as the projects “Broadband for Scotland”, “The Broadband Reach Project” or “Connected Communities”. There has also been public-sector support for *mobile* coverage by Vodafone and O2 (previously BT Cellnet) via the provision of public-sector masts and European funding (Millard, 2005). Current coverage of 2G mobile services is comparable with other rural parts of the UK (MacLennan, 2011).

Whilst the Highlands and Islands have good basic level connectivity, there is growing concern that the region will fall behind in terms of broadband in the future, and especially for next generation access. In 2009, the average speed in Inverness was reported to be 2.52 Mbps, as compared to 6.38 Mbps in Edinburgh (BBC news, 2009b). In the Cairngorms National Park, broadband speeds rarely exceed 0.5Mbps (Cairngorms National Park Authority, 2010). The costs of deploying Next Generation Access (NGA) to all of the Highlands and Islands would be significant (about £200 to 300 million according to Ross & McKinnon, 2011), mainly because lower population densities lead to higher costs per premises, and because phone lines are on average longer in the Highlands and Islands, so that replacing them with fibre is more expensive (Highlands and Islands Enterprise, 2009). In addition, travel to install new equipment is expensive and time-consuming, and neighbours in remote communities are more likely to share internet connections than in cities, further reducing the client base of providers (Bernardi, Buneman, & Marina, 2009). Nevertheless, the area will profit from further public investment in the rollout of broadband: in October 2010, HIE successfully bid to be one of the initial four rural areas in the UK to receive a funding package from Broadband Delivery UK. The objective is to ensure delivery of broadband at 30 Mbps or above to the entire region by 2020 (HIE, 2011e). This would enable the region to be one of the most digitally connected in Europe (Ross & McKinnon, 2011).

Demand side:

While geographic specificities create obstacles for the spreading of ICT services, they create a higher demand for them at the same time. ICT is thought to “overcome” isolation in several ways: homeworking can compensate for a lack of local jobs, mail-order services can compensate for a lack of shops, e-learning eliminates the need for students and teachers to travel to a certain

university/school, etc. The Highlands and Islands has actively tried to make use of these opportunities, mainly via the Highlands and Islands Enterprise (HIE) and government subsidies (Ross & McKinnon, 2011).

The Highlands and Islands were successful in attracting a particular type of ICT-related service providers: call centres. Since the establishment of the first call centre in 1993 in Thurso, numbers have grown significantly, and today about 30 “contact centres”, employing about 3400 people, are found in the area. Call centre managers underline that the main reason is the availability of relevant infrastructure – mainly ISDN access. This, in turn, is due to a major public investment in this infrastructure in the early 1990s (collectively known as the “Highlands and Islands Initiative”). Other reasons for call centres to establish in the area were labour availability and costs: the region had a good reputation regarding levels of education; one reason why labour has been available is that HIE used grant aid to direct companies to locations which had recently suffered from large-scale job losses¹⁶⁴ and where there was little alternative industry (Richardson & Belt, 2001). At the same time, it cannot be overlooked that over-reliance on a relatively small number of inward investors is also a risk.

As for other sectors: There is evidence that the use of ICT in the Highlands in the field of further education is much stronger than in other areas: in 2005, a study found that “currently the UHI do as much videoconferencing as all the rest of the universities in the UK put together” (Rennie & Mason, 2005). Also, take-up of courses offered by the Open University (a distance-learning institution) is particularly high in the Highlands (Price et al., 2002).

A number of activities are ongoing with public sector support:

HIE recently initiated a pilot project on homeworking with the Vertex company as a partner. The goals of the project are: to advance Vertex’s growth aspirations through access to untapped labour source; to provide further options for people disadvantaged in the labour market through geography and other barriers; to produce wider environmental benefits (by avoiding commuter travel) (Wilson, 2010). An initial review of the pilot project has drawn an enthusiastically positive conclusion: “The performance metrics are all positive at this stage: productivity and quality indicators are above the average for Vertex staff and continue to improve; and absence and sickness rates are lower. Critically, after approaching 8 months, 11 of the 12 recruits remain in Vertex’s employment – a higher retention rate than average”. Recruits “view the whole experience as positive; providing significant lifestyle gains in terms of reduced commuting; balancing work with other demands such as caring; and in operating from a peaceful and preferred working environment” (Smart Consultancy, 2010).

Other (Scotland-wide) activities include the GLOW Initiative (a schools intranet which digitally links Scotland’s 800,000 educators and pupils) and the eCare framework (to enable information sharing between public sector agencies for the care of citizens).

¹⁶⁴ For example, HIE successfully directed companies to Forres and Dunoon, which had lost defence structures, to Thurso which had lost nuclear power production, and to Kinlochleven, where aluminium smelting had decreased. There has been less success in directing call centres to less populous and more remote areas (Richardson & Belt, 2001).

In August 2006, the Scottish Telecare Development Programme (TDP) was announced and has since been awarded £20 million. Until 2009, over 15,000 new users of telecare services were reported (jit, 2010). Telecare generally refers to remote care of older or disabled persons in their homes with the help of sensors that are connected to a monitoring centre. The gains were estimated to be in terms of expedited hospital discharges (about 1,500 since the beginning of the programme), avoidance of unplanned hospital admissions (6,600) and avoided care home admissions (2,650), resulting in an estimated value of efficiencies funded through the TDP of £48.4 million (jit, 2010a).

Social

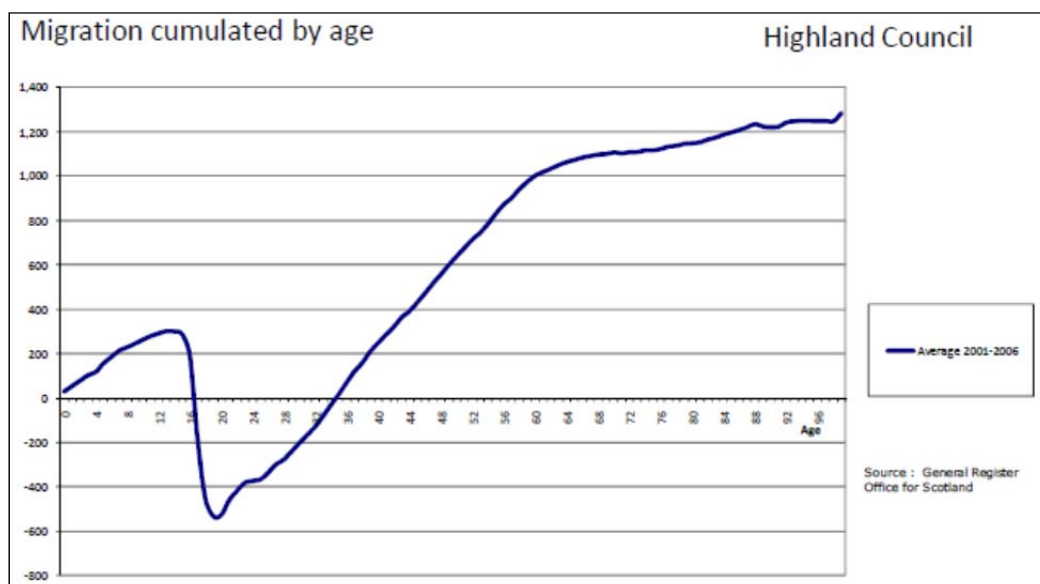
Demographic processes

The population of Highland was over 219,000 people in 2008 (Highland Council, 2009a). Population continues to grow. The *Inner Moray Firth* (the area around Inverness) is the most significant driver: the population grew by 8.1% between 2001 and 2009. This compares to a decrease of 0.8% in the very remote area of *Caithness and Sutherland*, and an increase of only 2.9% in *Lochaber, Skye and Wester Ross* (HIE, 2011a, b and c).

The population of Highland is ageing. The number of people aged 65 and over currently varies between 25% and 12%. Population projections estimate that, across Highland as a whole, the number of people aged 65 and over – and particularly those over 75 - will continue to increase (Highland Council, 2009a).

This age structure is attributed, on one hand, to a trend of retirement to rural areas by people who can afford to buy property and, on the other, the outmigration of young people in search for higher education and employment opportunities (The Royal Society of Edinburgh, 2008). Even though the region is considered to be family-friendly, there are real concerns about poor job availability, low wage levels and a lack of career progression opportunities among young people. In addition, opportunities for higher and further education are considered to be inadequate and not up-to-date. Finally, a lack of access to necessities such as housing and transport also work as drivers of migration (Highlands and Islands Enterprise, 2009).

The graph below clearly demonstrates the issue: It shows net migration by age.



The *Highland Wide Local Development Plan* clearly acknowledges the challenges of an ageing population: one objective is “To provide for developments which cater for Highland’s ageing population”. It does not, on the other hand, mention young people as a separate objective.

Residential attractiveness

The Highlands are doubtlessly “attractive”. One indicator is the large number of houses being acquired by incomers, whether as a second home or as a new home by someone recently retired (or, of course, by those who want to come to work). For example, average house prices in the Highland Council area rose by 134% between 2000 and 2005, from £ 59,796 to £ 140,041 (The Royal Society of Edinburgh, 2008). This is leading to a situation in which housing is becoming unaffordable for some local people who wish to remain, including those who are able to get employment : “affordable housing remains a major challenge for the sustainability of rural communities in Scotland. The implications of this lack of basic infrastructure are that younger generations are priced out of their locale, particularly in areas closer to commuting towns and cities; and that businesses find it hard to establish or grow due to lack of affordable housing stock for their workforce.” (Skerratt, 2010).

An informal survey conducted among the local communities and visitors to the area about the key values of Scotland’s “hills and islands” revealed the following:

- Environmental value: wildlife and iconic landscapes
- Economic value: landscape for tourism and landscape for recreation
- Social value: strong sense of community
- Cultural value: cultural identity traditions and distinctiveness (The Royal Society of Edinburgh, 2008).

Thus, the landscape and cultural identity are key features. The former relies heavily on the geographic specificities of the area: mountainous terrain, coasts and islands together create the iconic landscape of the Highlands and Islands. Low population densities ultimately play a role too (as open, empty landscapes are generally perceived as much more attractive than densely built-up agglomerations). The latter – cultural identity – is, however, only indirectly linked to geographic specificities; although arguably “the relative isolation of mountain communities is one reason for their strong sense of identity based on place and shared history” (Price et al. 2002).

Obviously, the relative importance of each element is highly subjective: when asked about the significance of mountains for the identity of the area, stakeholders gave different answers. A staff member of Highland Council who has spent all her life in the area viewed culture (music, tartans, traditions....) as a much more important element for the “identity” of the area than the mountains. She also pointed out that tourists – who have chosen the destination with the expectation of certain outdoor activities – may be much more excited about seeing mountains than locals, who are occupied with day-to-day business and simply “have no time to climb up the mountains” (Villegas, 2011).

Incidentally, all interviewed stakeholders who have *moved into* the area consider the mountains a key part of the Highland identity (Ross & McKinnon, 2011; Jarvis, 2011; Simpson, 2011). The interest of incomers in the mountains becomes apparent in one example: a stakeholder who is member of a

local mountaineering club mentioned that, a few years ago, only one member of the entire club had grown up in the area (Simpson, 2011). Another stakeholder pointed out that it is the combination of mountains *and coasts* that makes the Highlands unique (Duthie, 2011).

In summary, two opposite trends may be observed in the Highland area: outmigration of young people and in-migration of older people. A possible conclusion is that the area is indeed attractive as a living space, but certain “hard factors” (lack of employment, lack of access to certain services) force some segments of the population to make their living elsewhere. Geographic specificities can be seen to influence both of these processes: on one hand, they create a unique landscape perceived as attractive, with distinct recreational opportunities; on the other, they limit access to key services and contribute to limiting (employment) opportunities.

Geographic specificity as factor in Protected Designations of Origin

The relatively poor quality land, and its focus on livestock production, mean that the Highlands have had a limited capacity to produce food. There are, however, important exceptions: meat and fish processing, distilling, as well as fruit and vegetables (The Royal Society of Edinburgh, 2008). Quality food products from Scotland are one example of a niche market which has seen considerable growth in recent years despite constraints such as BSE and the Foot and Mouth outbreak (Burnett & Danson, 2004). Within the Highlands, a number of specific food initiatives are tied to specific geographic areas, e.g. Skye and Lochalsh Food Link Group, Lochaber Larder, and Cairngorm Farmers' Market (EuroMARC, 2007).

When it comes to quality food designations of the EU (PDO and PGI designations), none are exclusive to the Highland Council area. Scottish Farmed Salmon, Scotch Lamb and Scotch Beef receive their designation if they are produced on Scottish territory. However, the lamb and beef are all derived from animals which are very much part of hill and mountain area economies and communities (EuroMARC, 2009).

Interestingly, Scotch whisky is not protected by a European designation. It is, however, protected by the Scotch Whisky Act of 1988, whose global application is ensured by the Scotch Whisky Association. The product itself is strongly reliant on Scotland's geography and location : water and peat bog are territorial characteristics strongly related to the qualities of each distinct whisky (Larson, 2007). Maturation in casks is only appropriate in a relatively cool climate such as Scotland's – in warmer temperatures, too much of the spirit evaporates over the years. In addition, the whisky industry relies heavily on Scottish imagery for marketing, exploiting the highland or island setting as an attribute that aids marketing. The industry is intimately associated with the mountains (and islands) and creates global identity for the area as a place of premium quality food and drink production (The Royal Society of Edinburgh, 2008).

This is generally true for all quality food products from Scotland. The idealised representation of “an unpeopled landscape, including ‘wilderness’, coupled with a socio-cultural heritage dominated by aristocratic holdings and pre-modern peasantry” (Burnett & Danson, 2004) can be criticized, but was certainly successful in creating a global image for Scotland. The Highlands punch well above their weight in terms of images of “Scottishness”. Most of the famous images of ‘wild’ rugged landscape

originate in the Highlands (deer, heather, mountains, etc.), as well as most of the cultural connotations (such as tartans, bagpipes, castles, Gaelic cultural heritage).

Although all these elements are part of Scottish identity, marketing strategies do not stress the “mountain” qualities of a product as strongly as other European mountain foods (for example from the Alps) frequently do. In the area, “food from the Highlands” would be a much more common and accepted term than “mountain food”, as noted in 2007: “In Scotland the historical emphasis has been on Scottish food with its perceived attributes of extensive production in an unspoilt environment comprising hills, burns (streams) and rolling or upland pastures, and an attachment to Scottish cultural heritage such as the Clans, tartans, and the built environment of castles and small stone-built farm steadings” (EuroMARC, 2007).

Environment

Protected Areas & Biodiversity

The Highlands have significant biodiversity values, as demonstrated by the numerous designations: Scottish, UK, European and global. 47% of the Usable Agricultural Area of the Highlands is classed as High Nature Value farmland (Scottish Government, 2011). Over a quarter of Scotland is covered by protected areas (Warren, 2009). The map on the right shows that there is a greater proportion of these in the Highlands than in the lowlands.

Of Scotland's two national parks, 37% of Cairngorms National Park is in the Highland Council area. A study (Cairngorms National Park Authority, 2010) found that the designation as a protected area had a positive effect on the area, but this is hard to prove (given the necessary overlap of innumerable factors in *any* area). It observes that

there has been an increase of approximately 1,000 jobs in the Park since the national park was established in 2003 – tourism and financial and business services are responsible for most of this increase. In addition, the Park's population has grown by over 5% since designation - three times the rate for Scotland as a whole (1.7%). "The National Park is seen to be an attractive place to live and work and there is evidence to suggest that comparable areas have grown more slowly over recent years. Designation as a National Park in 2003 may not in itself be responsible, as it did coincide with a time when quality of place was becoming more important and when wider employment opportunities were improving. Nevertheless, through the recent recession the Cairngorms National Park's economic and social health has remained strong" (Cairngorms National Park Authority, 2010).

Tourism in the National Park earns more than £100m in Gross Value Added (GVA) and employs about 3,600 people. It thus represents almost a third of the park's economy. The bulk of the jobs, and the

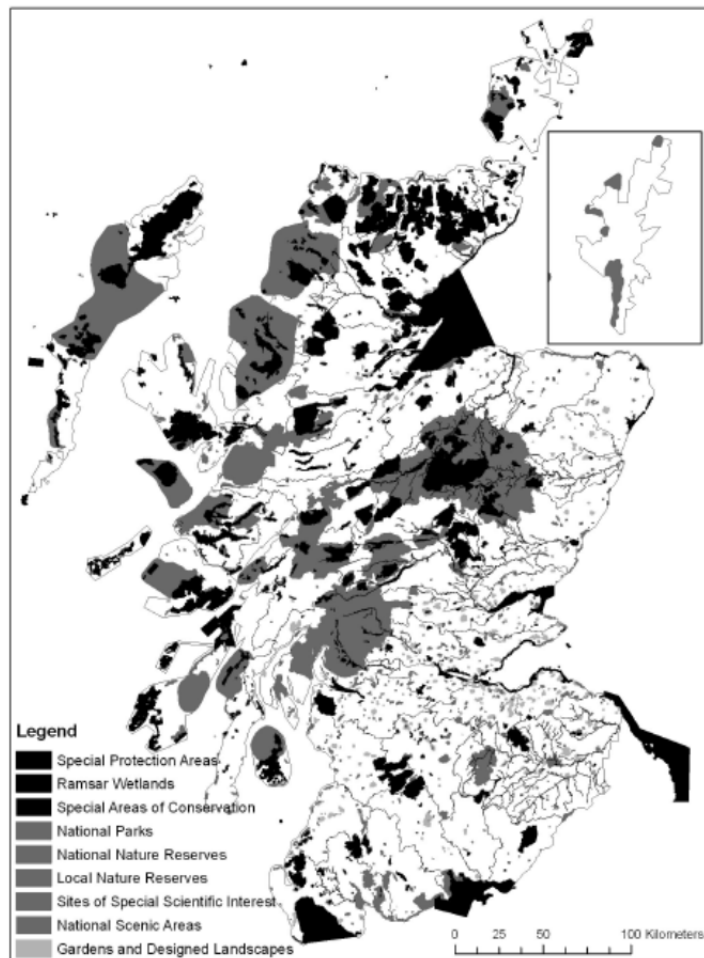


Figure A6.1. Map of Scotland showing areas designated for their natural heritage value. Designations are classed into three tiers depending on the level of protection applied; the most protective tier is indicated by the darkest shading.

Map taken from: *Nick Forrest Associates Ltd et al, 2008*

value added, are in providing accommodation and serving food and drink. Real GVA in the tourism cluster grew perceptibly around the time of designation (Cairngorms National Park Authority, 2010). 52% of visitors to the park claim that the National Park status was “very” or “quite” important in the decision to visit (Cairngorms National Park Authority, 2010a). This was confirmed by the enterprise survey, in which two thirds said that national park status was quite or very important in attracting their visitors (Cairngorms National Park Authority, 2011a). Whilst tourism offers clear benefits to the area, a negative consequence has been the growth of second homes. Recent reports state that there are over 1800 holiday homes within the park (Stockdale & Barker, 2009).

Species and habitats

The Highland Council area is significant in British, and even European terms, for its biodiversity, containing 455 (40%) of the 1150 Priority Species and 51 (78%) of the 65 Priority Habitats identified in the UK Biodiversity Action Plan (Highland Council, 2010a). Notably, the Cairngorms National Park contains 25% of Britain’s threatened species – two-thirds of these are of Europe-wide importance (Cairngorms National Park Authority, 2011a). While this poses a major responsibility for effective conservation and management, it also provides a clear tourism opportunity.

A study on “The Economic Impact of Wildlife Tourism in Scotland” found that wildlife tourism in Scotland is concentrated in the Highlands and Islands (with 50% of wildlife trips and 45% of wildlife tourism nights), with the Highlands and Islands also profiting from the highest “net economic impact”, namely £32 million (International Centre for Tourism and Hospitality Research, 2010).

More specifically:

- In 2003, Cetacean-related tourism (i.e. whale-watching) was estimated to account for 2.5% of the total income from tourism in West Scotland¹⁶⁵. In remote coastal areas, cetacean-related tourism may account for as much as 12% of the area’s total tourism income. The direct economic income (i.e. expenditure on excursion tickets) from cetacean tourism activities was estimated to be £1.77 million per annum. 23% of surveyed whale watchers visited West Scotland specifically to go on whale-watching trips (Parsons et al., 2003).
- Grouse shooting was believed to contribute up to £23,3 million to Scotland’s GDP (Game & Wildlife Conservation Trust Scotland, 2010). For the sporting estates on which grouse shooting takes place, this is a vital source of income: more than one third of grouse-shooting estates rely on it to bring in at least 25% of estate revenue (Price et al., 2002).
- Another source calculates the value of *all* types of shooting activities (grouse shooting, deer stalking, etc) in all of Scotland to be £240 million – in addition, the value of these activities is generated in the ‘low season’ (The Royal Society of Edinburgh, 2008).
- It is estimated that the total expenditure made by anglers in a year amounts to over £42 million in the Highlands (Scottish Executive, 2004).

Although none of these species are endemic to the Highlands and Islands, many of them rely on a type of geographic specificity. Whale-watching evidently needs a coast. This is also true for salmon and sea trout angling, which makes up about 65% of all angling in Scotland (Scottish Executive, 2004).

¹⁶⁵ *The area covered by this study includes the West Coast mainland of Scotland from the Kintyre Peninsula (Argyll) in the south to Cape Wrath (Highlands) in the north and also the offshore islands of the Inner Hebrides (Mull, Coll, Tiree, Islay, Jura, the Small Isles and Skye) and the Western Isles (Lewis, Harris, Benbecula, North/South Uist and Barr)*

Grouse mainly live on mountains and moorland, which are more frequent in sparsely populated areas. The same can be said for deer, which need a wide habitat to roam, also including forests.

In most cases, it is not a species that attracts visitors, but the overall experience. The loss of any “typical” species that is frequently watched (ospreys, capercaillie, eagles, dolphins, otters) may be a threat as it would “send a negative message about the biodiversity of the Highlands, contrary to the current public perspective of it being an oasis for wildlife” (Willet, 2011).

This is not only true for animal species. Both open Caledonian pine forests and heather moorland are particularly “typical” of the Scottish landscape and provide habitat for many key species. Far from being wild, heather moorland is a cultural landscape, maintained by a combination of muirburning (burning the heather in small patches to create a mosaic of heather of different ages which maximizes populations of grouse for shooting) and grazing by sheep and deer (Warren, 2009). While these landscapes may not specifically attract visitors, they certainly contribute to the unique landscape of the Highlands.

Natural Resource Exploitation: Renewable Energies

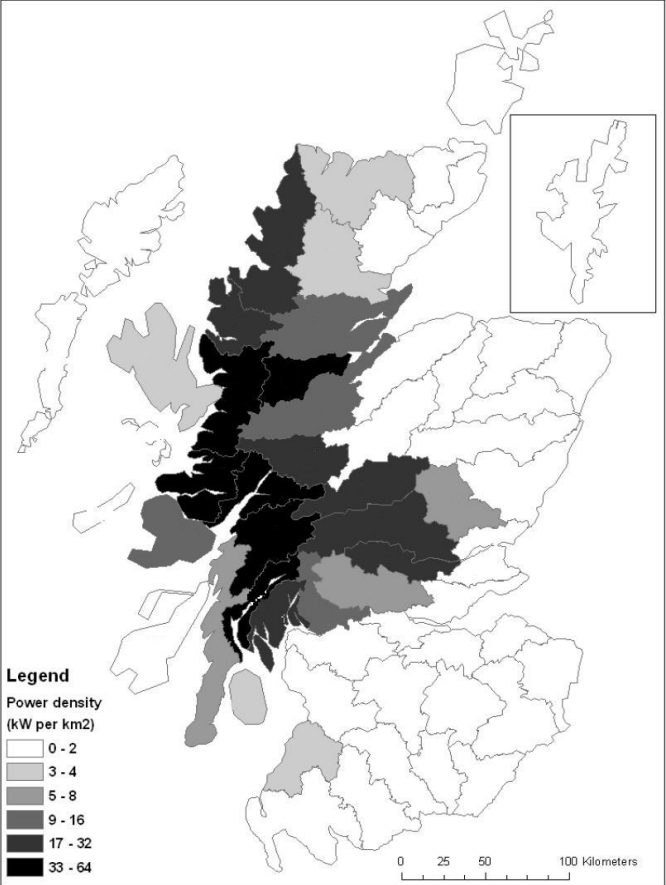
The Highland Council area is extremely well placed for the development of renewable energy initiatives using wind, water, tidal current, and wave power –all of them relying directly on geographic specificities.

Hydropower

Even though hydropower produces about 6% of Scotland’s electricity already (HI Energy n.d.), considerable potential remains. As the map shows, the potential for hydropower is almost exclusively in the Highlands – unsurprisingly, as an incline is necessary to generate power from flowing water.

Marine Renewables: Wave and tidal

Western Europe, the west coasts of North and South America, New Zealand and Australia are the regions of the world where waves with the highest energies are found (Scottish Enterprise, 2005). In Europe, Scotland is among the top locations for marine energy, with around 25% of Europe’s tidal stream resource and 10% of its wave resource (Forum for



Map of Scotland divided into 60 catchments. Shading indicates potential hydropower within that catchment, divided by the area of the catchment, to give power density. Map taken from: *Nick Forrest Associates Ltd et al., 2008*

Renewable Energy Development in Scotland, 2009).

As the prevailing wind direction and the area of greatest fetch are westerly, west-facing sites generally have the greatest wave energy resource. The most attractive sites are where deep water can be found close to the shore, as seabed friction progressively removes energy from ocean waves (Scottish Executive, 2007). The best potential exists around the Scottish islands, but the Highland Council area partly also profits from these potentials along the northernmost part of the Scottish mainland coast and the coast south of Skye – a map can be found in: Scottish Executive (2007).

Present tidal energy technology requires current speeds to reach about 2.5 m/s at the peak of a spring tide. In contrast to the wave resource, potential tidal resource sites are fewer and confined to relatively small areas (Scottish Executive, 2007). Nevertheless, it is estimated that up to 10GW could be produced in the Pentland Firth, a quarter of the possible capacity within the EU (RSPB Scotland et al., 2006). Sites with a possible generating capacity of 1.2 GW were leased out in 2010 (Dutta, 2010).

One source estimates that 10% of Scotland's electricity can come from marine renewable sources by 2020 (Scottish Executive, 2007a).

Offshore wind

“With an estimated 25% of Europe's offshore wind resources and long-standing expertise in offshore practices, such as oil and gas, Scotland has a competitive advantage and is uniquely placed to take an early lead in the development of offshore wind” (Offshore Wind Industry Group (OWIG), 2010).

Scottish territorial waters have some advantages over more southerly sites in that their wind speeds are higher and the sites themselves are generally closer to shore. However, they also represent particular challenges, such as their depth, seabed conditions, and weather conditions (Scottish Enterprise, 2010).

Exclusivity agreements have been granted to companies for the development of offshore wind farms in 4 sites in the Highlands and Islands with an overall potential of up to 3.5 GW. The world's first deepwater offshore wind project is operating close to the Moray Firth, some 15 miles off Caithness, in 45 metres of water.

Onshore wind

The level of wind resource in the Highlands is amongst the best in the world, with wind speeds averaging nearly 8.5 m/s annually for most good sites (Highland Council, 2006). Nevertheless, possible development areas are limited¹⁶⁶, mainly due to restrictions either from protected areas or “visibility from dwellings” – more so for large-scale developments than for small-scale wind turbine projects.

Biomass

The mature and extensive forests of the Highlands offer significant opportunities in the development of biomass energy – in fact, Scotland's forests represent 60% of the UK resource base). Projects using both wood and products from wood processing (sawdust, wood fibre) are in operation,

¹⁶⁶ See a map by Highland Council on “Prospective development zones for national and major onshore wind farms designed for meeting national/regional energy requirements” at:

<http://www.highland.gov.uk/NR/rdonlyres/EE171B27-12FB-4D20-A17C-DCF441FA0C07/0/fig624a1.pdf>

including a plant that can produce 100,000 tonnes of wood pellets, enough to heat 20,000 homes a year (Hi-Energy).

Overall

The *Highland Renewable Energy Strategy and Planning Guidelines* (2006) estimates the potential for the different energy sources in the Highland area – under different levels of planning constraints¹⁶⁷:

Levels of energy production (GWh) and installed capacity under different nominal levels of planning constraint based upon the results of the Renewable Energy Resource Assessment for Highland

Resource type	Type of planning regime								
	Highly constraining			Moderately constraining			Lightly constraining		
	Power (GWh)	Capacity (MW)	No. of units	Power (GWh)	Capacity (MW)	No. of units	Power (GWh)	Capacity (MW)	No. of units
New onshore wind (@2MW)	170	68	34	1,280	518	259	26,310	9772	4886
Offshore wind	80	12	3	6,020	1,064	266	31,690	5,680	1,420
Tidal stream	0	0	0	190	N/A	36	8,580	N/A	3,230
Biomass (wood fuel)	1027	140	N/A	2054	280	N/A	3081	420	N/A
Biomass (crops)	50	11	N/A	879	N/A	N/A	1746	N/A	N/A
New hydro	37	N/A	N/A	64	N/A	N/A	224	N/A	N/A
Other technologies	550	N/A	N/A	1087	N/A	N/A	2162	N/A	N/A
Overall total	1914	>250	>40	11,574	>1,800	>600	73,793	>20,000	>8,000

Resource type	Power (GWh)	Capacity (MW)	Number of units
Existing wind (incl. approved)	713	200	150
Existing hydro (incl. approved)*	1800	600	50
Existing total	2513	800	200

Obstacles

If the potentials are this great, why have they so far not been adequately exploited?

A reason that is often identified is the lack of capacity in the national grid: grid capacity is very limited in North and North-West Scotland, where much of the offshore potential (wave, tidal, wind) is located. This is mainly due to the distance to major industrial centres and cities where the demand is greatest. A risk exists that the development of the grid will not proceed as quickly as the development of energy sources (OWIG, 2010; The Royal Society of Edinburgh, 2008; Forum for Renewable Energy Development in Scotland, 2009; Nick Forrest Associates Ltd, The Scottish Institute of Sustainable Technology (SISTech), Black & Veatch Ltd, 2008). Equally, the construction of large

¹⁶⁷ For comparison: the latest estimates report that in 2006 Scottish final energy consumption was 172.8 TWh (terawatt-hour): <http://www.hi-energy.org.uk/Renewables/Why-Renewable-%20Energy/How-energy-is-used-in-Scotland.htm>

overhead transmission lines is often very controversial, often leading to long and expensive public inquiries (Howard, 2011; Warren and Birnie, 2009).

However, market forces also have a strong influence on renewable energy development – sometimes stronger than the factors that are within government control: “discount rate applied to future cashflows”, “investment recovery period”, “electricity revenue price” have been listed among the most influential factors for investment, and a “difficulty in recruiting skilled personnel” was named more than once as a challenge. In some cases, a further need is to develop technologies (Nick Forrest Associates Ltd et al., 2008; Forum for Renewable Energy Development in Scotland, 2009).

Particularly for onshore energy sources (hydropower, wind), the extent of protected areas also constitute a factor, as they limit the number of available sites. For instance, 337 potential hydro schemes would be located in protected areas (Highland Council, 2006; Nick Forrest Associates Ltd et al., 2008). Potential for conflict also exists between wind farms and certain bird species (particularly bird collision with rotors): More than 55% of installed wind farms are on peatland, which includes a high proportion of sensitive areas for birds (Bright et al., 2008). More generally, aesthetic impacts are an issue for wind farms and the “destruction” of a perceived pristine landscape is an argument that is often raised against further development of wind farms¹⁶⁸. The larger the installation, the stronger the reservations against it. At the same time, the development of windfarms can also bring considerable income to local communities which can be invested in community facilities (Warren and Birnie, 2009).

Policies

The huge potential of renewable energies in Scotland is reflected in government objectives. Scotland’s renewable *electricity* target for 2020 was raised in 2010 from 50% to 80% - after the previous target of 31% for 2011 was estimated to be met easily (Scottish Government, 2010). The main mechanism to encourage renewable energy production is the Renewables Obligation (Scotland) Order (ROS), under which suppliers of electricity must produce an increasing proportion of their output from renewable sources – 11.1% in 2010/11. If they do not meet the target, they must pay a penalty which is directed to competitors who comply with the obligation.

Ecosystem services

“The main non-market benefits in mountain areas are derived from biodiversity, wildlife and landscape, recreation opportunities, cultural heritage and hydrological protection” (Crabtree, Macdonald, & Hanley, 2002). This is certainly true for the Highlands. For instance, there are “unique opportunities for hill walking and rock climbing” (-> recreation) and the area is home to rare or iconic species and habitats such as the Scottish crossbill, the Scots pine, the Capercaillie, or heather moorland (-> biodiversity) (Crabtree, Macdonald, & Hanley, 2002).

The Highlands are the main source of freshwater of Scotland. Scotland has 91% of the volume of standing freshwater in Britain, and water covers 5% of the Highlands and Islands. The volume of Loch Ness alone (7452 million m³) exceeds the combined volume of all the lakes and reservoirs in England

¹⁶⁸ Different campaign groups exist, see for instance: <http://www.countryguardian.net/>

and Wales. Out of the mountains flow no less than 400 salmon rivers, providing the basis for an internationally important salmon fishery (Warren, 2009).

The Cairngorms National Park (2011) has analyzed the relative importance of ecosystem services in its mountain habitats in the Strategic Environmental Assessment:

Importance of the Ecosystems Service		High								
		Medium- High	Enclosed Farmland	Woodland	Open Waters	Moorland	Semi-natural Grasslands	Mountains	Urban	
Importance of the Ecosystems Service		Medium-Low								
Importance of the Ecosystems Service		Low								
Provisioning Ecosystems Services	food									
	fibre									
	fuel									
	fresh water									
	distinctive wild species									
Regulating Ecosystems Services	climate regulation (local temperature regulation, emission and storage of greenhouse gases)									
	hazard regulation (eg flooding, landslides, wildfire)									
	disease and pest regulation									
	soil quality									
	water quality									
	seed dispersal									
	air quality and noise									
	pollination									
	Cultural Ecosystems Services	knowledge - ecological and geological								
		recreation - enjoyment, physical and mental health								
patterns and forms of settlement										
aesthetic experience of landscape										
sense of place										
tradition										
awareness and appreciation of the historic environment										
spiritual and personal association or connection with place, history and tradition										
spiritual and personal association or connection with nature										
Supporting Ecosystems Services	societal identity and pride									
	Biodiversity									
	biomass production									
	atmospheric oxygen production,									
	natural weathering processes									
	erosion									
	soil formation and retention									
	nutrient cycling									
	water cycling									
	river processes									
	provisioning of habitat									
	provision of rock/minerals									
	provision of landform									
photosynthesis										
evolutionary processes										

Climate change

UK Climate Projections in 2009 designed scenarios for different future periods. For “Scotland North”, the “high emissions scenario” estimates that the increase in summer mean temperature will be around 1.2°C (winter: 1°C) and change in summer precipitation -2% (winter + 4%) by the 2020s. By the 2050s, summer mean temperature could increase by 2.4°C (winter 1.8°C), with summer precipitation decreasing by -10% (winter: + 13%) (UKCP09).

For the Scottish uplands, Ellis & McGowan (2006) estimated that overall, a mean annual increase of 1°C would be associated with an isotherm shift of about 200 to 275 m uphill or 250 to 400 km of a move northwards (Coll et al., 2010).

If the Gulf Stream ceased to exist, however, Scotland would become a much colder place to live in – although it is deemed unlikely that this kind of dramatic change will take place within the next century (Pachauri & Reisinger, 2007).

Highland biodiversity would definitely be affected by climate change:

“The variable climate of the Scottish uplands contributes greatly to their biodiversity, with a diverse mix of Atlantic, arctic, arctic-alpine and boreal elements occurring within a limited geographical area, and many species on the edge of their global distribution range [...]. Within this continuum of microclimates, most high-altitude plant species are adapted to slow growth with survival at a particular altitude determined by the altitudinal range over which a species is adapted, thus they may be unable to compete with upward migrating lowland species” (Coll et al., 2010). Climate change also brings significant challenges for upland birds (Pearce-Higgins, 2011).

Maritime mountains are deemed to be particularly vulnerable: “Scotland’s highest mountains are located within the Atlantic biogeographic zone [...], and the relatively mild, wet climate renders species here particularly sensitive to changes in the winter and spring half year. While it might be expected that oceanic mountains would be buffered against climatic change by their more limited annual temperature range, by comparison with higher mountains such as the Alps, the lack of a nival zone limits the potential upward migration of species” (Coll et al., 2010).

Biodiversity will also be affected in coastal areas. Some seabirds that breed in Scotland are experiencing severe reductions in their numbers. Reductions of breeding pairs have been observed among the Kittiwakes, the Arctic Skua and the Arctic Tern. Although direct evidence is still lacking, increased winter sea surface temperatures disrupting the food chain are thought to be driving the declines. In the future “anticipated sea-level rise and a greater number of more severe storms may reduce available breeding habitat for shoreline-nesting species (e.g. terns) and wash away nests” (Wright, 2009). In addition, with rising sea level and more frequent storms, exposed dunes, such as those at Morrich more (on the east coast of Highland) could become more mobile, so that new coastal habitat is created inland (Angus et al., 2011).

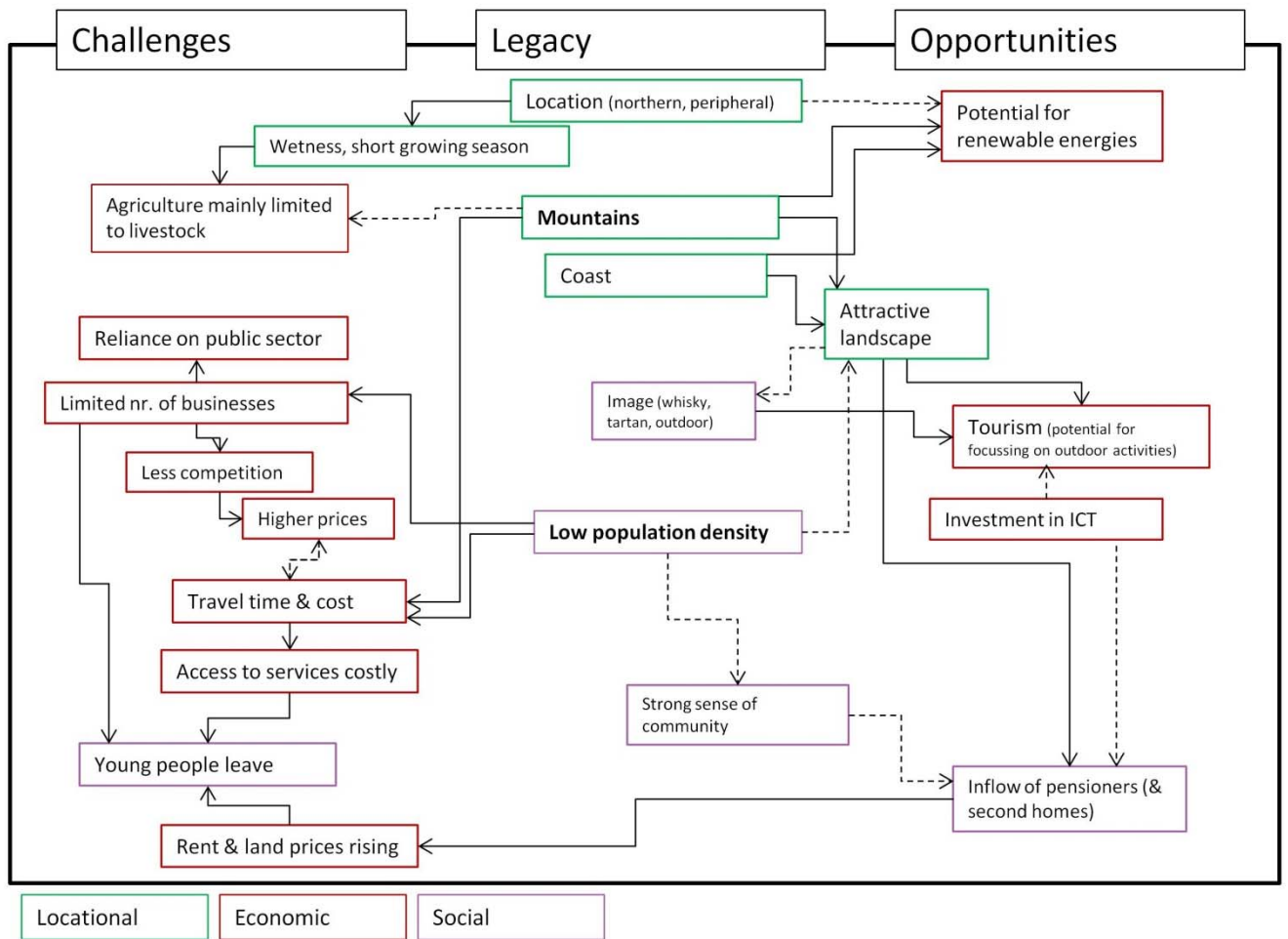
However, it is not only biodiversity that will be affected. Highland Council keeps track of severe weather events and their impacts. Between 2001 and 2008, 110 events were recorded: 22% heavy rainfall, 11% high winds and heavy rain, 11% high winds and heavy snowfall, 9% high winds, 7% high

winds and rain, 7% heavy snowfall (Highland Council, 2010b). The effects were often significant: “[...] Road networks have also been severely impacted on numerous occasions; in particular landslides and flooding have resulted in significant damage. School closures, ferry cancellations, and road closures have occurred frequently as a result of severe weather with notable impacts for businesses and those responsible for the delivery of essential services” (SCCIP, 2010). Landslides are more frequent in mountainous areas, so that the Highlands are particularly affected by this kind of transport disruption.

Precipitation is also an issue. In addition to the inevitable impacts of reduced snow cover on the skiing industry, the predicted decrease of summer precipitation may influence agricultural activities, or increase the risk of wildfires. An analysis by SEPA (2008) showed that “river flow variability has increased between 1964 and 2008 in the high level catchments where snow is an important factor”. Since flow variability is likely to increase even further, this can have impacts on hydropower schemes, for instance and, as has already happened in dry summers, whisky distilling.

The Scottish Council for Voluntary Organisations (2011) recently conducted a survey on the groups that are most vulnerable to climate change effects in the Highlands and Islands. Especially in the context of rural areas (which are often sparsely populated), a number of groups were identified as particularly vulnerable: elder people, those on low incomes, those suffering ill health and those with young children (for example, lack of access to medication when roads are closed, isolation, delayed delivery of essential goods such as fuel, communication loss due to storm interruptions of mobile phone, internet,...).

Synthesis



Generalisation from case study

Many of the mentioned features of the Highlands are characteristic for many of the mountain areas in Europe: out-migration of young people, in-migration of older people (amenity migrants), under-representation of the industrial sector, over-representation of tourism and the public sector, opportunities for renewable energy production, lower levels of service provision, and so on.

On the other hand, the accumulation of so many different geographic specificities (the combination of mountains, islands, and coasts and the general remoteness from the European core), has been called unique by many of the interviewed stakeholders. In this regard, the Highlands offer some features that set them apart from other mountain areas in Europe.

In addition, the area benefits from a distinct “image” that is recognized not only across Europe but arguably worldwide. This image is only partly linked to the geographic specificities, since cultural elements (historic way of life in clans, Scottish dancing, bagpipe music, kilts, whisky production, ...) contribute at least as much. While other areas in Europe certainly also profit from distinct touristic images (think of “Provence”, “Alps”, “Athens”), these emerge over decades and are hard to create artificially.

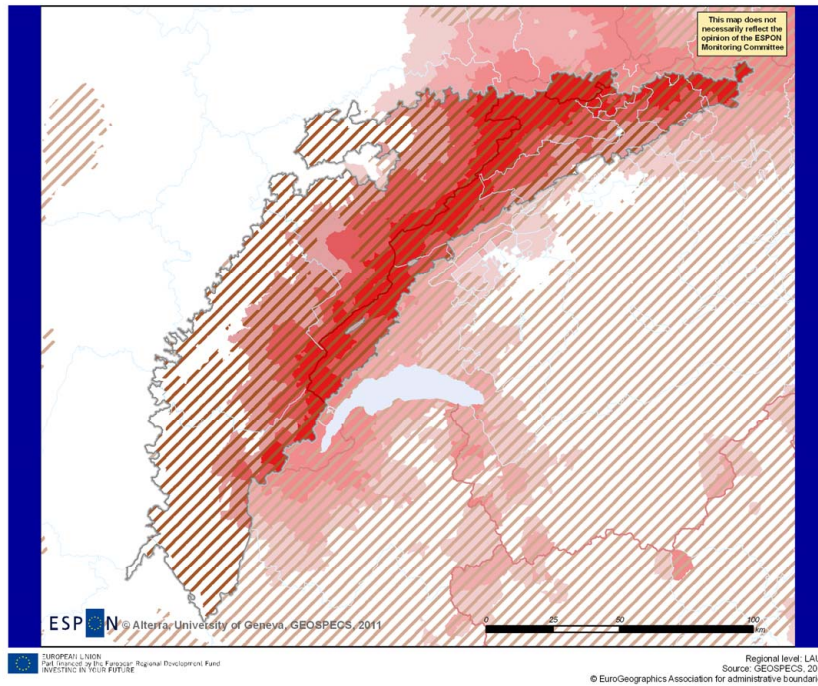
Finally, it cannot be overlooked that the Highland Council area is part of an affluent country at the European scale, which has implications for the amount of public support that is given. As noted in the section on ICT, a number of projects with UK or Scottish subsidies have made this area one of the best-served with internet connections. Had this been left to the private sector, this remote and sparsely populated area would surely have much lower coverage. Similarly, Highlands and Islands Enterprise each year supports small businesses and innovatory projects with significant sums of (public) money.

Before the EU enlargement of 2004, the area was also quite successful in attracting Structural Funds: for the period 2000-2006, Highlands and Islands received £ 526 per capita, whereas the Southern Scottish Council areas *Borders* and *Dumfries and Galloway* received £ 174 per capita (Price et al, 2002). In the current Programming period, the Highlands are listed as a “phasing out” area. Overall, when evaluating the relative success of the area, it must be kept in mind that public money has contributed to this success.









Annex 25: case study Jura massif

GEOSPECS Case Studies

Jura massif



GEOSPECS specificities areas

-  Lac léman
-  Case study - Jura - delineation
-  NUTS0 boundary
-  NUTS3 boundary
- Mountain areas**
-  Mountain area
- Travel time to the border**
-  0 - 900
-  900 - 1800
-  1800 - 2700

The Jura is a middle mountain range on the border between France and Switzerland (the highest peak reaches 1,720 m). Therefore its limitations (e.g. in terms of access to services or transport infrastructure) are less pronounced than in high mountain areas.

Compared to other European mountain areas, the Jura massif has an uncharacteristically high proportion of employment in industry (and a comparatively lower importance of the tourism sector). This is what makes the area successful (if success is measured by low unemployment rates and high incomes). Historically, the emergence of the watchmaking sector is indirectly linked to the mountains: In the 19th century, the difficult conditions of farming in a mountain area and in a harsh climate meant that many farmers in the Jura were looking to supplement their meagre incomes in the winter months – this offer perfectly met the needs of watchmakers who were looking for manufacturers of parts and pieces.

Ligier (1999) characterized the Jura as being constantly “between” or “next to” something: next to the Alps, between France and Switzerland, between several metropolises (Geneva, Zurich, Lyon, Strasbourg...). This feeling of being “in between” – or on the flipside, “on the periphery of” something – is definitely symptomatic. During interviews with stakeholders from the area, an impression emerged that the Jura’s position on the *border* is a more defining feature for the people of the area than the mountainous terrain – although the same language (French) is spoken in both parts of the Jura. Even though the economic “fabric” throughout the entire Jura is relatively homogenous (a comparatively high proportion of employment in the industrial sector, know-how in microtechnology and related activities such as watchmaking, machine construction, etc), the Swiss part of the Jura is home to more companies, and thus offers more jobs, higher wages, etc. For this reason, a significant flow of cross-border workers towards Switzerland has emerged: many well-educated French residents regularly commute over the border to work in Swiss companies. The opposite flow is made up of consumers - profiting from their higher purchasing power due to higher wages and to the CHF-EUR exchange rate. One stakeholder went as far as stating “the French come to work in Switzerland, the Swiss come to consume in France”.

In order to foster cross-border cooperation, the *Communauté de Travail du Jura* was formed in 1985, later renamed as the *Conférence TransJurassienne* (CTJ). It unites the *Conseil régional de Franche-Comté*, the *Préfecture de Région Franche-Comté* and the Swiss cantons of Berne, Vaud, Neuchâtel and Jura. This means that the CTJ covers an area that is much larger than the massif (except for the “hole” where the canton of Fribourg would be). At the same time, not all fringes of the massif are covered by the CTJ, as a small part of the massif is situated in the department of Ain in the region of Rhône-Alpes. Different working groups, ranging from “transport” to “health”, meet regularly, implementing common projects, publishing studies, etc. In comparison another border area, the “Rhin supérieur», activities in the Jura area tend to be more spatially focussed, i.e. covering a specific area than the entire CTJ space (Reitel and Moine, 2005).

Apart from this transboundary structure (and the INTERREG programme), other institutions tend to concentrate on one side of the border. On the Swiss side, *arcjurassien.ch* groups all cantons that have part of the Jura massif. On the French side, the *Comité de massif du Jura* is designed to discuss policy options for the sustainable development of the entire massif. A comparable Comité exists for all other French mountain massifs. However, the Comité does not maintain its own dedicated website, nor has any of the representatives of its secretariat (the *Commissariat du massif*) responded to any information requests for the purpose of this case study.

1. Economic, Social and Environmental processes related to the geographic specificity

2.1. Economy

Economic specificity related to geographic specificity

The Jura Arc has historically been very industrial – from the 19th century, the main occupation was watchmaking, but nowadays more generally the fields of engineering/mechanics/microtechnology. On the French side, one third of employees were working in the industrial sector in 2003, as compared to the national (i.e. French) average of 18% (Commissariat à l'Aménagement du Massif du Jura, 2006). In the Swiss Jura Arc, the watch industry accounted for about 10 % of regional employment in 2005 – in comparison, the hotel business only employed about 1 % (Kebir and Crevoisier, 2008).

Several factors have contributed to this situation. Firstly, alternatives are limited: for example, agriculture is not possible to the extent that it would be in non-mountainous areas. The “usable agricultural area” in the French Jura takes up 35% of the surface, compared to the French average of 43.6% (Commissariat à l'Aménagement du Massif du Jura, 2006). A harsh climate and infertile soils limit high-elevation land use to forestry and pastoralism (Breitenmoser et al, 2007). Historically, the long cold winters during which snow limited travel and made field work impossible led to an availability of a labour force in those months: Farmers tried to find a second income, and watchmaking was an obvious choice. Watchmaking know-how had come to the Jura Mountains as early as the 1750s with the Catholics that fled from religious intolerance under the Swiss Calvinists in Geneva¹⁶⁹. From then on, the know-how spread relatively evenly in the entire massif, until the Swiss gained an advantage at the end of the 19th century, when they were first to realize that the time of automatisisation had come (Moine, 2003). Since then, a situation evolved in which employment opportunities concentrate on the Swiss side of the Jura where watchmaking benefits from a distinct quality image, whereas the French side also has a number of businesses in the watchmaking industry, but which are more limited to subcontracting activities.

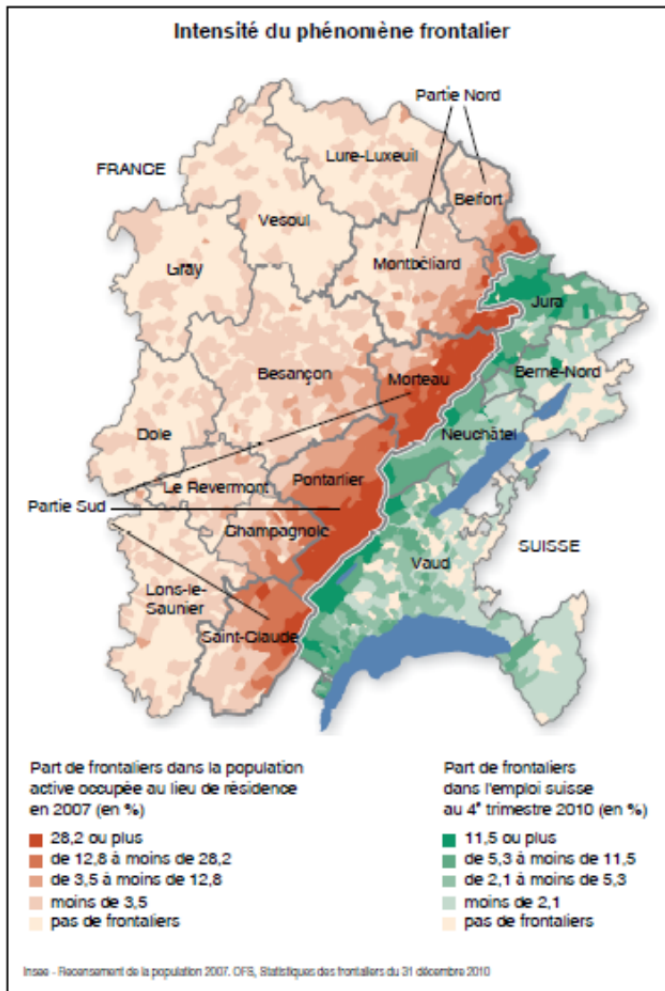
Nowadays the competitiveness of the Jura Arc is (still) based on non-material resources, like the know-how and competences that regenerate in the territory thanks to the local workforce. At the same time, the absence of tertiary functions leads to a drain of capital and is also a weak point of the area (République et Canton de Neuchâtel, 2008).

Border

The industrial structures on both sides of the border are similar, being characterized by export-oriented businesses, an engineering culture, specific competences in mechanics and microtechnology, that are used in domains like watchmaking, automobile and machine construction.

¹⁶⁹ (Catholic) watchmakers first settled in Neuchatel at the foot of the massif – a town that traditionally maintained a close relationship with the mountain areas of the Jura (for their agricultural produce). In contrast to the Alps at the same time, the Jura was populated, and the farmers working in the massif needed to supplement their meager income. An activity that could be maintained from their homes in the winter months was ideal – a need that met well with the needs of the watchmakers in Neuchatel looking for manufacturers of components (Moine, 2011).

However, there are important differences between the two countries. For instance, the business tax is between 66% and 93% higher for companies established in France than for companies established in Switzerland (Mission Parlementaire sur la Politique Transfrontalière, 2010). Overall, Switzerland has a Total Tax Rate of 30.1% - compared to France with a rate of 65.8% (World Bank Group & PwC, 2011). In addition, the volatility of the exchange rate – especially in the past two years – creates challenges for businesses.



Map taken from: OSTAJ, 2011

The most formative link between the two sides of the border is the workforce: the flow of cross-border workers is proof that the demands on both sides of the border are compatible. However, these flows are very much focussed on one direction: from France to Switzerland.

In 2009, 30,800 cross-border commuters had a job in the Swiss part of the Arc Jurassien. This is equivalent to a doubling of numbers within the past 10 years (OSTAJ, 2010). Today, the workplace is not necessarily situated in very close proximity to the border, as the phenomenon of cross-border commuting is spreading more and more. Cross-border workers mostly occupy posts in industry, notably in the consumer goods industry. A much smaller proportion of executives cross the border. The high net incomes in Switzerland attract many qualified French workers, so that the French side of the massif is confronted with a lack of qualified workers in certain sectors (Commissariat à l'aménagement du Massif du Jura, 2006). This is deplored by some stakeholders who point out that the French companies incur the costs

of training young people but then do not reap the benefits from their investment (Loesener, 2011; Marmier, 2011; Sage, 2011). Others retort that without the employment in Switzerland, the training opportunities in France would have long since been lost (Moine, 2011).

The table below gives an idea of the magnitude of wage differences between France and Switzerland (Conférence TransJurassienne, 2010). In 2006, a cross-border worker who worked in the Swiss Jura Arc received a gross hourly salary of 50% more than a worker in Franche-Comté (this

SALAIRES MOYENS	France	Suisse	%
Directeur Financier	119 513 €	131 426 €	9,97
DRH	100 668 €	114 895 €	14,13
Comptable	39 705 €	54 753 €	37,90
Secrét. (direction)	38 442 €	60 527 €	57,45
Secrét. (compta.)	25 134 €	43 499 €	73,07
Ouvrier Qualifié	25 424 €	40 740 €	60,24
Contremaître	34 825 €	51 180 €	46,96

Table taken from : Conférence TransJurassienne 2010

does not take into account different costs of living etc) (OSTAJ, 2009).

While the flow of workers is directed from France to Switzerland, a different flow works the other way around : that of consumers. Due to the exchange rate between the Swiss Franc and the Euro – and the value of the Franc has significantly increased in recent months – people working in Switzerland profit from a higher purchasing power. Many Swiss residents living close to the border do their shopping on the French side –where commerce is thriving as a result. Proportionally, commerce is twice as important in the French Jura than it would be in a comparable area (Sage, 2011). Hyperbolically: “The Swiss come to consume in France and the French come to work in Switzerland” (Marmier, 2011).

Overall, an ambivalent picture emerges: on the one hand, the French side of the massif seems to depend on the Swiss side (for employment, for income), while industry in the French Jura Arc is stagnating. At the same time, Switzerland is a source of prosperity. In any case, the Jura arc is not an example of a *mountain economy that succeeded*, it is much rather a prosperous region *because of its proximity to Switzerland* – and is only “coincidentally” a mountainous area (Sage, 2011).

Cross-border economic relations

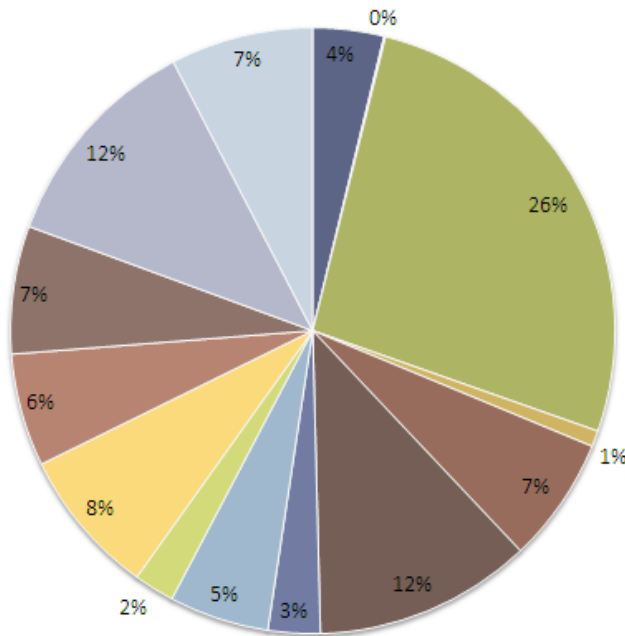
Are there any strategic business relationships that unite both parts of the Jura arc? Stakeholders do not view the cross-border relationships between businesses as very intense or strategic; rather, they are structured in classic contractual relationships in which one side (the subcontractor) provides parts and pieces and the other creates the added value. Also, the potential of relations between industry and research institutes is only partly exploited, and education opportunities are developed in a strictly national logic, without using complementarity on both sides of the border (Conférence TransJurassienne, 2010).

A study of stakeholders revealed strong scepticism toward cross-border (industry) projects and their effectiveness. Some don't find the Jura Arc the pertinent radius of action, others have a negative perception of potential partners, or find cross-border projects too burdensome in terms of administration. The border seems to function as a “filter of information”: actors appeared to only have approximate knowledge of the institutions on the other side of the border. Also, the border seemed to reinforce distrust (in terms of doubts about the quality of potential partners). The cross-border relationships are of course much stronger for businesses that operate on both sides of the border (“entreprises bi-localisés”) but directors of these businesses primarily evoke the disadvantages: costs of management, transport, administration, border controls, fiscal differences, etc. (Conférence TransJurassienne, 2010).

Of course, a vast array of INTERREG projects¹⁷⁰ aims to reinforce the relationships between actors on both sides of the border. These are a first step, and ultimately cross-border cooperation “is an evolution in small steps” (Loesener, 2011).

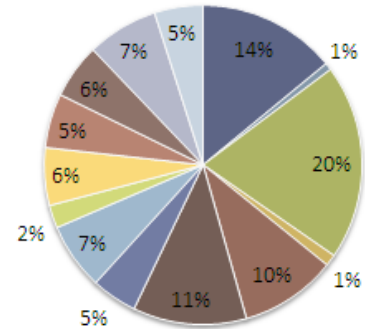
¹⁷⁰ A list of current projects in INTERREG France-Suisse can be found here: <http://www.interreg-francesuisse.org/les-realizations/3214,liste-des-projets.html>

Employment structure in the Jura massif

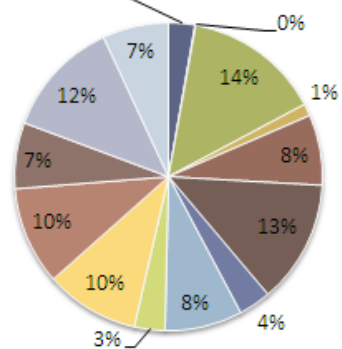


- Agriculture, Fishing, hunting, forestry
- Mining and quarrying
- Manufacturing
- Electricity, natural gas and water
- Construction
- Wholesale and retail trade, repair of motor vehicles and personal goods
- Hotels and restaurants
- Transport, Storage and communications
- Financial intermediation
- Real estate, renting and business activities
- Public administration and defense, compulsory social insurance
- Education
- Health and Social work
- Other

Employment structure in European mountains: average



Employment structure in France: average



Tourism

The large basins of population around the massif can be seen as a major asset, since most tourists come from neighbouring areas. On the French side of the massif, 23% of visitors came from the region Rhône-Alpes and 16% from Franche-Comté in 2004 (Commissariat à l'Aménagement du Massif du Jura, 2006). Similarly, the Swiss Jura arc is said to receive about 80% of its tourists from Switzerland (Lachat, 2011).

However, tourism plays less of a role in the Jura than in other European mountain ranges and some even consider the offers “lower-than-standard”. One stakeholder traces this back to the abundance of alternative employment opportunities in the area: Since so many people work in (microtechnology and similar) industries, the tourism sector is simply not a priority – especially since other sectors are so much more profitable (Sage, 2011).

Ligier already in 1999 diagnosed a “cruel, almost lethal” absence of powerful *images* – even though a number of options present themselves to the Jura massif: “Time” (think of the Bell logo of Comté cheese), “living quality” (again, cheese, and also wine, etc), “innovation” (watchmaking, microtechnology), outdoor activities around hiking and cycling (Ligier, 1999). A French “image study” from 2004 also found that the degree of familiarity with the Jura massif was lower than for competing destinations such as the Alps, the Massif Central or the Pyrenees (Hn conseil ingenierie, 2008). However, this lack does not seem to have been addressed sufficiently in recent years.

In 2003, a new “label” overarching the French side of the massif¹⁷¹ was created: “Montagnes du Jura”. The goal is to market the Jura massif as an entity, firstly towards France and French-speaking Europe and secondly towards the Dutch-speaking parts of Belgium. The “Montagnes du Jura” label is trying to advertise a year-round destination, instead of a summer or winter destination (Montagnes du Jura, 2006). However, all stakeholders that were questioned were either unwilling to comment on the success of the label or had never heard of the label before.

Two stakeholders saw a great opportunity in concentrating on family-friendly tourism and family activities (as opposed to the mass-tourism of the Alps), but at the same time perceived a lack of coordination between the different providers (Marmier, 2011, Loesener, 2011). Some coordinated projects are underway (such as the “route du sel”, “la route des vins du Jura”, “les routes du Comté”) but generally a joint marketing effort of different providers seems to be a long way off – let alone a cross-border marketing effort that would combine the French and the Swiss parts of the massif.

A focus on “mountain” tourism is not as strongly developed as in other areas. As the Jura massif only comprises summits of medium height, snow cover in winter is uncertain, and hence skiing and related offers are far fewer in the Jura than in other mountain ranges (Lachat, 2011). The landscape is viewed as having a value for tourism – however, not “in itself”, but as a “frame” for different leisure activities. For instance, touristic brochures regularly illustrate possible visits to cultural sites, handicrafts or local products *in a setting of* a (sometimes stereotypical) mountainous landscape – but not the landscape on its own (Chételat and Ley, 2010).

Transport infrastructure

The Jura spreads between two main development axes, along which the population concentrates:

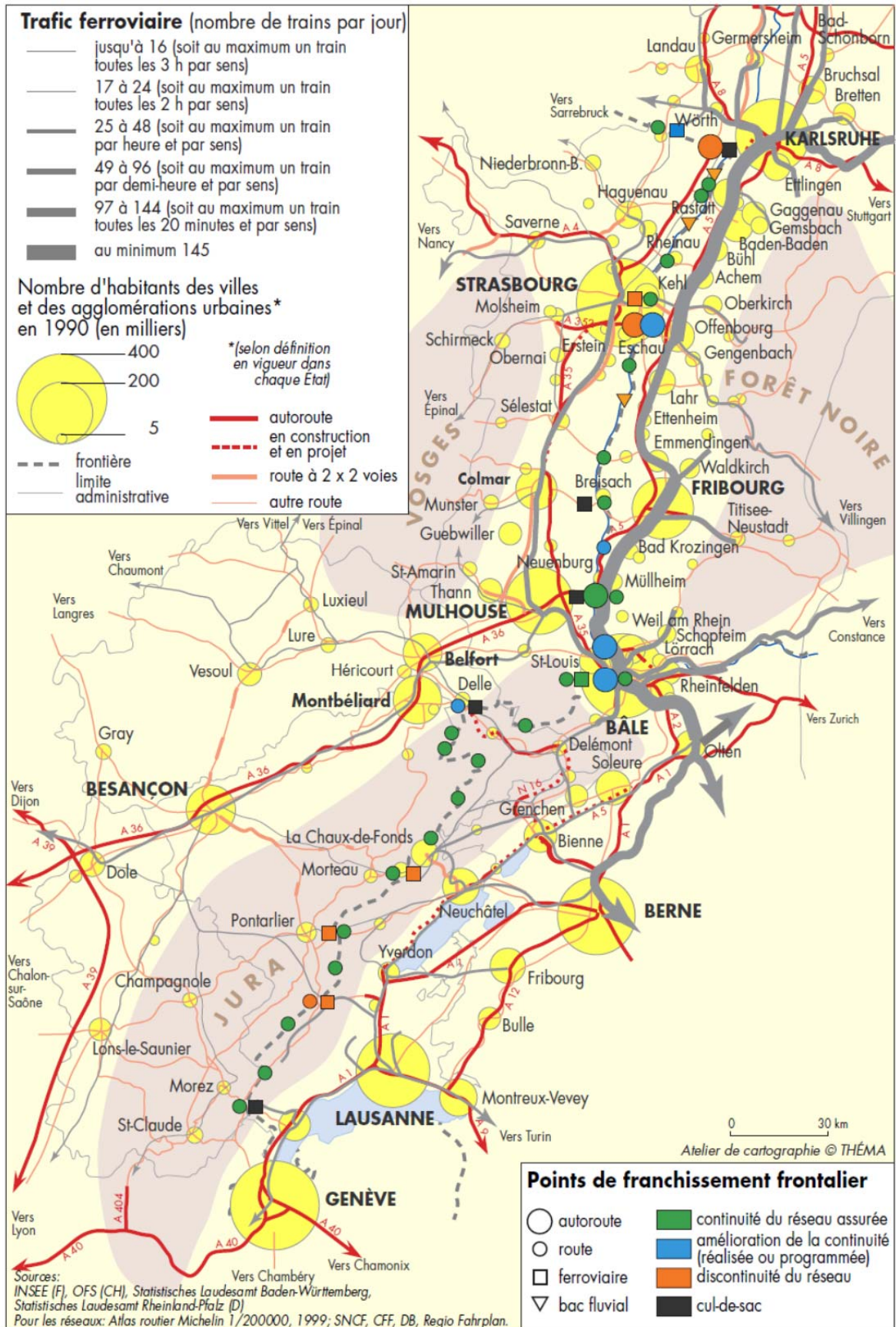
- The “Rhine-Rhone” axis: Basel, Mulhouse, Belfort, Montbéliard, Besancon, Dole
- The “métropole lémanique”: Lausanne, Geneva, Annemasse, Thonon, Evian, Annecy

¹⁷¹ Co-financed by the *Comités départemental du tourisme* (CDT) of all departments that have part of the Jura, as well as the French DATAR (Délégation à l'Aménagement du Territoire et à l'Action Régionale) and by the EFRD

Between these two axes, the Jura massif constitutes a geographic barrier that hinders exchange. The main lines run parallel to the massif. The frontier region is not very permeable in spite of only medium altitudes. The road network is weak and does not centre around any urban pole (Programme opérationnel INTERREG IV France-Suisse, 2007). The *topography* makes road construction more costly (for example by necessitating more engineering constructions such as bridges and tunnels) (Brasey-Duthe, 2011), but the main obstacle is the *lack of population density*, a feature of many mountain areas: as the massif is not strongly urbanized, it is not worthwhile having too many connections (Loesener, 2011).

Nevertheless, the accessibility of the massif is satisfactory: no point is more than 45 minutes away from a highway on-ramp, which allows quick connections to towns such as Bern, Neuchatel, Geneva, Strasbourg, Dijon or Lyon (Commissariat à l'Aménagement du Massif du Jura, 2006). Therefore, an improvement of the transport network does not emerge as a major priority for the massif. One stakeholder questions whether a highway (for example) would really improve the lives of the people in the Jura or serve to attract companies – seeing that other factors (such as fiscal policy or a qualified workforce) play a much more important role in the location decisions of companies (Marmier, 2011).

As for the *border* itself: In general, the main cross-border roads offer a sufficient capacity (even if some border crossings have a high level of traffic during rush hour). Since roads are managed by different authorities (with different competences, rules and budgets) on the two sides of the border, some discontinuities are apparent in the characteristics of the roads and in their development perspective (CTJ, 2010a).



Map taken from: REITEL and MOINE, 2005

As for rail traffic: Frequencies are low (even if on the path to improvement) owing to a kind of vicious ESPON 2013

circle in which offers stay restricted due to a limited number of passengers, and passengers prefer road transport due to the limited offers of the railway network (Moine, 2011). At an international scale, its traditional position in the *periphery* of both countries certainly contributed to the Jura being given low priority in the construction of (rail) connections – viewed from Paris, it is easier to bypass the Jura than to cut through it (Moine, 2011). At a regional scale, the low population density (and associated low profitability of public transport) have reinforced this tendency. The Conférence TransJurassienne in its *Schéma de cohérence des mobilités transfrontalières* indicated that a rate of one crossborder train every 2 hours would be the goal in order to make public transport a real alternative to car ownership (CTJ, 2010a). However, the current economic crisis may entail a suspension of such projects.

Services of general interest

The Jura does not have large urban centres that could offer services to the population or to large (international) companies (Programme opérationnel INTERREG IV France-Suisse, 2007). Nevertheless, there are many small and medium towns and levels of (access to) services seem to be generally sufficient. Even if quantity of infrastructure is lower than in urban areas, they are generally deemed to satisfy the needs of the population (Loesener, 2011; Marmier, 2011; Moine, 2011). For example, there is a school in practically every mountain village (Loesener, 2011). On the Swiss side, students have access to two institutions of higher education located within the mountain area: the University of Neuchatel and the Haute-Ecole ARC. The University of Besancon (in Franche-Comté) is not actually situated in the massif, but very close.

For the French Jura, health facilities are more often situated on the outskirts of the massif, whereas the centre is disadvantaged - but all major towns have a health establishment. In addition, rural areas face the problem of retiring GPs (Commissariat à l'aménagement du Massif du Jura, 2006). Apart from these questions of quantity, quality is also an issue. For instance, specialist health treatments can only be found outside the massif (Marmier, 2011). Then again, it is common sense to assume that certain specific services are only available in urban agglomerations.

As noted in the section on "transport" above, the sparse population density (the lack of a "critical mass" of clients) is more influential on the level of services than the mountainous terrain in itself – which only creates obstacles in winter, when blocked roads may hinder access to certain services (Sage, 2011; Moine, 2011). In this domain again, the border is more of an obstacle to the free access to services. On the one hand, since border areas are by definition peripheral areas, they have less infrastructure (Brasey-Duthé, 2011). On the other, since Switzerland is not part of the EU, it is very difficult to profit from any service "on the other side". In the field of health care, for instance, agreements exist between the States for emergency situations: a French resident can be treated in a Swiss hospital in case of emergency and vice versa. However, the mechanisms for reimbursement of the costs incurred in the other country are enormously bureaucratic, contrasting with the agreements of the French-Belgian border, for instance, where a transboundary health card makes reimbursement effortless (Loesener, 2011; Brasey-Duthé, 2011; Moine, 2011).

Statistical analysis confirms that the people in the Jura massif are not overly disadvantaged when it comes to access to services:

- In 2006, 91% of population lived within commuting distance (i.e. 45minutes) of a functional urban area (FUA) of more than 100.000 inhabitants (and even 43% lived in commuting distance to a FUA of over 750.000 inhabitants). These urban areas are deemed centres of services.
- 48% of people live in a municipality from which it is possible to access an airport within 45 minutes - as compared to 62% on French average and 77% on Swiss average, but compared to an average of only 35% for European mountain areas overall.

2.2. Social

Demographic processes

About 1,2 million people lived in the Jura massif in 2006 (667.000 in France and 559.000 in Switzerland).

Overall, the territory covered by OSTAJ has seen a slight increase in population between 1999 and 2007, in line with the population growth in France and Switzerland. However, the OSTAJ covers the entire region of Franche-Comté as well as 4 Swiss cantons, i.e. an area larger than only the Jura massif. In Franche-Comté, communities with less than 2,000 inhabitants were growing with on average more than 1% annually, whereas communities with more than 5,000 inhabitants were shrinking. A similar trend was observable in the 4 Swiss cantons that have part of the Jura massif, where communities with less than 10,000 inhabitants were growing much faster than larger ones. Overall, growth is less pronounced in the municipalities in immediate proximity to the border (OSTAJ, 2010).

For the French part of the Jura, the *Commissariat à l'aménagement du Massif du Jura* has concluded that the inner parts of the massif are characterized by low population densities – though on average, these are comparable to other French massifs (Commissariat à l'aménagement du Massif du Jura, 2006).

The unemployment rate is comparatively low in the whole massif, due to its competitive advantage in the microtechnology (and related) industries. For the same reason, the “brain-drain” phenomenon plays much less of a role in the Jura than in other European mountain areas – it is linked more to the border, as described above (young people educated in France moving to better-paid occupations in the Swiss part of the Jura). Hence, there is no direct connection to the mountainous nature of the area (Moine, 2011). The CTJ (amongst others) is investigating how to set up a system for bi-national vocational training or joint certificates - but differences in the national regulations pose challenges (Moine, 2011, Loesener, 2011). The economic crisis of 2009 has also hit the Jura and led to unemployment rates rising more quickly in the border areas (i.e. the regions in immediate proximity to the border) than in the rest of the massif– some claiming that in case of crisis “it is the French workers who are dismissed first” by Swiss companies (Marmier, 2011; Sage, 2011). The unemployment fees are nevertheless paid by the French authorities (Sage, 2011).

As described above, many French residents regularly cross the border to work in Switzerland. The situation in the Jura reflects a general trend in all French border regions: the number of French residents working in neighbouring countries is 30 times higher than the number of people who work in France and live in a neighbouring country (see map: the size of the arrow marks the amount of workers crossing the border).

At the same time, the French border areas in the Jura are facing rising land prices and rent prices as an increasing number of people from Switzerland set up their main residence there (Commissariat à l'aménagement du Massif du Jura, 2006) – fuelled by the higher purchasing power due to the exchange rate between Swiss Franc and Euro. This can create phenomena of exclusion (GRET & ThéMA, 2006).



Map taken from: *Mission Parlementaire sur la Politique Transfrontalière, 2010*

Identity

Ligier, in an extensive description of the identity of the Jura, comes to the conclusion that it suffers from an “inferiority complex” and an “almost unhealthy modesty” – even though the Jura does not lack assets (from its strategic position in the middle of Europe to its industrial specificities). He traces this underlying feeling back to the Jura’s permanent description as being situated “between” or “next to” something: between Switzerland and France, between Rhine and Rhône, between the four metropolises Lyon and Strasbourg, Geneva and Zurich – and, of course, next to the Alps. The Jura massif, unable to compete with the Alps and all their superlatives, acknowledges its higher neighbour by naming one of its summits “La-Vue-des-Alpes”. In a similar vein, most descriptions of the Jura use terms such as “small”, “medium”, “isolated”, “cold”, “dispersed”, “modest” (Ligier, 1999).

Border as a dividing line between two identities?

A view “from the outside” seems to reveal a relatively homogenous identity. Even though Switzerland is an external frontier of the EU, the border territory between French-speaking Switzerland (La Suisse romande) and France share many common characteristics. This situation is due not only to the large flows of cross-border workers, but also to similar socio-economic and environmental problems. The linguistic unity of the territory is an undeniable factor of cultural unity (Programme Opérationnel INTERREG IV France-Suisse, 2007).

The common tradition of watchmaking (and nowadays microtechnology) is also characteristic on both sides of the Jura massif. Worldwide, magazines are advertising mechanical watches “made in Switzerland”. Even though competitors (from countries such as Japan) try to penetrate the same market, they have not succeeded. In the minds of the consumer, quality watches remain associated with a country – Switzerland – and with certain regions – in particular Geneva and the Swiss Jura (Kebir and Crevoisier, 2008). Incidentally, its *image* is the Swiss watch’s main trump, after the

spreading of quartz technology had made precise and reliable watches affordable and easily available from the 1980s.

In order to make use of this regional identity more directly, a grouping of Swiss tourism offices established the brand “Watch Valley”, so as to market the whole area coherently and attract visitors. Interestingly, while “Watch Valley” has been welcomed by international tour operators, the actors within the watchmaking production system are distancing themselves from the concept (for reasons of competition), and the local population rejects the term for being, firstly, English, and secondly incorrect, as the Jura is not a “Valley”.

Overall the image as the worldwide leading location for quality watches is more linked to the Swiss Jura than to the French parts. Nevertheless, as described in the section above, French workers in the Jura traditionally have part in the production process, but more in “subcontracting” roles.

In terms of identity as perceived from *within* the Jura, it is worth noting that, at least on the Swiss side, this is not a trivial matter. This is probably best proven by the secession of the *canton* of Jura from the *canton* of Berne in 1978 after a referendum, following 40 years of vehement pressure from separatist groups. A number of theories have been advanced as to why independence became so important for people in the Jura at this particular point in time, ranging from the economic situation to Catholicism (see, for example, Volmert 2008). All authors agree, however, that language is a necessary (if not sufficient) account for separatism: the building of the identity of the *canton* of Jura often drew on opposition to the adjacent German-speaking regions.

Nevertheless, considering both sides of the Jura together, the impression emerges that it would be too optimistic, to speak of a “common identity”. Ligier notes that only few descriptions of the Jura evoke it as a territorial unit – this being even reflected in designations: on the French side, the term “Jura” refers to the *département*, on the Swiss side to the *canton*. A real identity for the “Arc jurassien” has not emerged, which is also being reflected in the number of prejudices that exist on both sides of the border. In earlier days, religion fuelled perceived differences (the Swiss side being mainly Protestant, the French side mainly Catholic); more recently, it has been the difference in purchasing power that causes resentment (Ligier, 1999). As one (small) step to overcome this divide, he suggests the publication of road maps that depict the whole Jura massif (instead of either side), or the establishment of a TV/radio station or newspaper that covers the entire area.

Others give similar evaluations: one stakeholder compared the Jura to Québec: Even though both areas speak the same language, the countries are different – in their accent, in their history, in their political-administrative setup, ... (Sage, 2011). Another acknowledges that the two parts of the Jura massif have evolved in their own way, especially after the Second World War, and that “competition” is often mentioned as a catchword when talking to people from the area (e.g. competition for trained personnel, for companies). The *Conférence Transjurassien* (CTJ) is an important factor in the efforts to “reweave the bonds”, but this takes time, and above all, it takes trust (Loesener, 2011).

Mountains as a factor of identity?

Are any of the elements of the Jura’s identity linked to its status as a mountain massif? On the one hand, as described above, the origins of watchmaking in the Jura are indirectly linked to its geographic position as a mountainous area on the periphery of an agglomeration. For this reason, the imagery used for marketing quality watches regularly relies on (past) practices of “farmer-

watchmakers” and production in the isolated, snow-covered valleys of the Jura (Kebir and Crevoisier, 2008).

Another significant link between the population of the Jura and “their” mountains comprises the typical “wooded pastures”. A survey conducted among actors from the Swiss Jura reveals that the “pâturages boisés” - i.e. a half-open landscape of natural appearance but of anthropogenic origin – is viewed as *typical* but also as *desirable* for the Jura. For some of those surveyed, the landscape was a reflection of a certain living environment, a witness of a heritage and a culture that is still alive (Chétalat and Ley, 2002). On the French side, as discussed below, Comté cheese is also linked to identity.

Geographic specificity as factor in the Protected Designations of Origin

The agricultural production of the massif is heavily specialized in dairy farming: on the French side, pastures make up 70% of usable agricultural area, and even 80% in the “zones de montagne”¹⁷² (compared to 10% for cereals and 0.5% for vineyards). This agriculture is synonym of quality with cheese production of strong added value – as proven by four AOC (*appellation d’origine contrôlée*)¹⁷³: Comté, Morbier, Mont d’Or and Bleu de Gex (Commissariat à l’aménagement du Massif du Jura, 2006). These cheeses are also protected by European PDO designations. The areas of origin of these designations are situated in France; Switzerland, not being an EU Member State, has no EU quality food designations (although famous cheeses also originate from here: Tête de Moine, Vacherin Mont d’Or, La Chaux d’Abel).

In terms of volume, Comté is the first AOC in France, with a production of 50,000 tons a year. The massif produced about 8,200 tons of Morbier in 2007, compared to 2,700 tons in 2000. These positive dynamics are in contrast with the difficulties faced by industrial milk products (butter, powder), UHT milk, and even mass consumption cheeses (Ricard, 2009). The importance of an AOC designation can be illustrated by comparing Comté to Emmental: Comté farmers get 14% more revenue per litre of milk and Comté generates 5 times more jobs than Emmental per litre of milk used. The price differential between the cheeses was 46% in 2004 in favour of Comté (Larson, 2007). Jean-Jacques Bret even claims: “If Comté had not been protected by an AOC, it would undoubtedly have met with the same fate as Emmental, and the Jura Massif – like other mountainous areas – would have gradually been deserted” (cited in: Larson 2007).

Apart from contributing to employment in the area and its identity, Comté production also contributes to landscape conservation via extensive livestock management (herd density below 1 head per hectare) and low external inputs (minimal fertilization). Both promote the conservation of open landscapes and a diverse flora (Larson, 2007).

Comté is also strongly promoted towards visitors of the area. On the “Routes du Comté”, tourists can visit cheese dairies, cheese making museums, farms, etc. Many of these focus strongly on historical

¹⁷² The *Schéma interregional d’aménagement et de développement du massif du Jura* distinguishes between the “zone massif” and “zone montagne”, of which the “massif” occupies the larger space – for details please follow the URL: http://territoires.rhonealpes.fr/IMG/pdf_JURA_20sch_C3_A9ma_20massif.pdf

¹⁷³ A few other food products also originate in an area of which the Jura massif has a part: Porc de Franche-Comté, Saucisse de Morteau / Jésus de Morteau, Volailles de l’Ain, Emmental français est-central.

cheese-making methods– thereby trying to show that production is in continuity of the past. Also, the links to the Franche-Comté region is stressed, construing the image of a “natural” and “traditional” product (Dumain, 2003). In the 2002 Guide to the *Routes du Comté*, the cheese is presented as “a cultural link between man and the Jura Massif”.

2.3. Environment

Protected Areas & Biodiversity

On the Swiss side, the *Parc Jura vaudois* was established in 1973 and recently became a candidate for a Regional Nature Park (*Parc naturel régional Jura vaudois*). It comprises 30 communities (530 km²) with 31,977 inhabitants (4.7% of the population of the canton Vaud). One of the reasons for its creation was the desire to avoid a further expansion of military activities in the area – apparently successful, as no further military sites have since been established in the area (PNR Jura vaudois, 2011).

The park offers many opportunities for touristic activities (over 500km of walking paths and over 240km of cross-country ski tracks) and its location close to several agglomerations means that potential exists to expand touristic activities. However, there are only 33 hotel establishments within the park (with about 30,000 overnight stays in 2007) – with an occupancy rate of about 23% for the entire region. By comparison, the number of lodging offers is much higher in the neighbouring *Arc lémanique* area (PNR Jura vaudois, 2011). At the same time, its low population density (certainly induced by its peripheral position on the border and its mountainous topography) means that the landscape is less affected by human intervention: the mosaic landscape containing grazing lands and woods (“pâturage boisé”) offers ideal conditions for about 650 plant species.

On the French side, the *parc naturel régional du Haut-Jura* (Jura Mountains Regional Natural Park) was created in 1986 and includes 113 municipalities, with a total population of 71,000 inhabitants, across three French departments: Ain, Doubs and Jura.

The fact that the parks are adjacent is deemed to “offer synergies” (PNR Jura vaudois, 2011) in terms of knowledge exchange and collaboration in environment protection and tourism activities. A transboundary park is nevertheless not envisaged between the two. In contrast, a transboundary park is foreseen at a different section of the border: the project of a *PNR Doubs*. In 2008, a feasibility study¹⁷⁴ was undertaken on the French side (by a responsible *comité de pilotage*) and since then “Working Groups” have been put into place within the *syndicat mixte du Pays horloger* (the designated supporting structure on the French side) which are supposed to “define strategic orientations”. On the Swiss side, an *Association pour un Parc Naturel Régional du Doubs* was founded in 1999, but the park is still awaiting approval by the Confederation. In addition, at the level of the CTJ, a commission «PNR Doubs» with representatives from both countries was formed with the aim of fostering exchanges and in the long run developing a joint charter¹⁷⁵.

¹⁷⁴ Links to the different parts of the feasibility study can be found on this website: http://www.pays-horloger.fr/haut-doubs-morteau-horlogerie-projet-depnr_fr.php

¹⁷⁵ Further references to this process are at <http://www.conference-transjurassienne.org/les-groupes-de-travail/amenagement-durable/parc-naturel-transfrontalier/> and <http://www.franche->

No assessments exist as to the contribution of any of the existing or potential parks to local economic development. However, it was estimated for the nearby *Parc régional Chasseral* in the canton of Bern that it could create a regional added value of between 1.1 million CHF and 3.9 million CHF – this means the park would not play the role of an “engine” for the economy but rather a catalyst for tourism and rural regional development (Siegrist et al, 2007).

Natural Resource Exploitation: Particular Resources: Mountain Forests

The Jura massif has ideal conditions for forests: a cool and humid climate, good geological characteristics but only moderate altitudes, which leads to solid and homogenous timber.

In the Swiss Jura, 48% of territory is forested – compared to the Swiss average of 30%. Of the total woodland area in Switzerland, 18% is in the Jura massif (OFEV, 2010). In the French Jura, 43% of area is forested - compared to the French average of 28% (Commissariat à l’aménagement du Massif du Jura, 2006). Thus, the forests play an economic role (and more generally in terms of protecting watersheds and against natural hazards).

An initiative even tries to attain an AOC label for coniferous wood from the Jura – it claims that this wood deserves a quality label due to its extraordinary robustness. The label would apply equally to wood from the French and Swiss Jura (www.aocboisdujura.ch).

A study for the canton of Jura shows that the wood resources of the area are not exploited to their full potential: the *Plan directeur cantonal des forêts* foresees an annual exploitation of about 230,000m³ in order to avoid an overageing of forest stands and to maintain sustainable forest management – however, the realised annual exploitation amounted to about 170,000 to 180,000 m³ in the past 10 years. Between 10% and 20% of annual potential is not exploited (Eschmann & Girardin, 2011; République et canton du Jura, 2011); though this is not atypical in European mountains. The volume of exploitation primarily hinges on the forest owners – under-exploitation can therefore be explained by difficulties in the wood market (with a strong pressure on prices since the 1980s) and the fragmentation of forest property (as private forests are small) (Eschmann & Girardin, 2011). A similar situation is encountered in Franche-Comté, where there are about 200,000 forest owners (so that statistically every 5th person in Franche-Comté owns some forest). In addition, sawmills are only of a small size and low capacity. The *mountains* are therefore not the main reason for under-exploitation, but the ownership structure. Again, as for tourism, the remark has been made that forestry is not to be considered as a “vital” sector for the Jura massif, as enough employment opportunities exist in industry (Sage, 2011).

The *border* does not appear to pose a particular challenge for the exploitation of forest resources – more so for their commercialisation. For instance, the limited number of customs posts requires detours, onerous customs formalities and rules for tonnage limits and maximum heights of vehicles pose challenges when crossing the border (Eschmann & Girardin, 2011). For the canton of Jura, it is

comte.fr/fileadmin/Demo/PDF/Conseil_Regional/politiques_regionales/amenagement_du_territoire/presentation_reunion_elus_23sept08.pdf

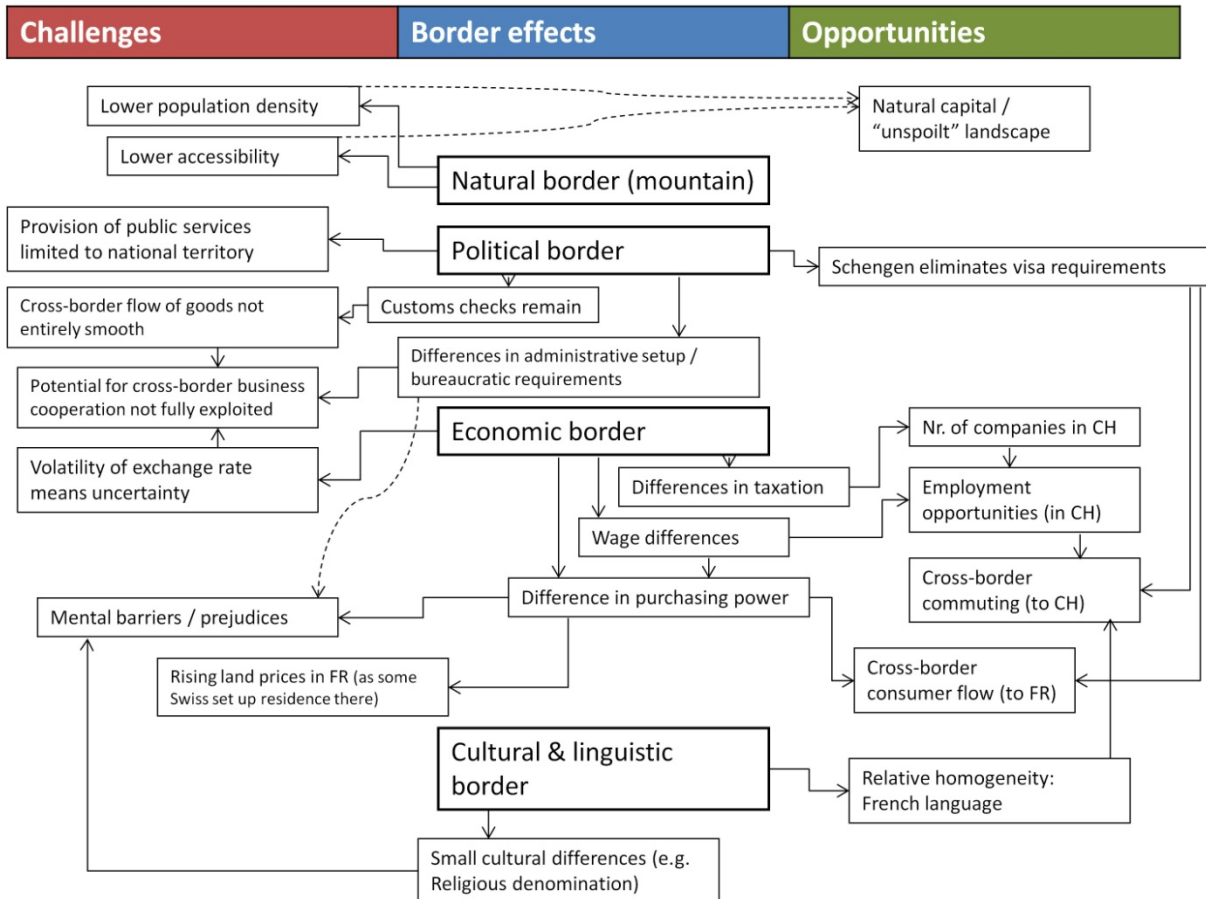
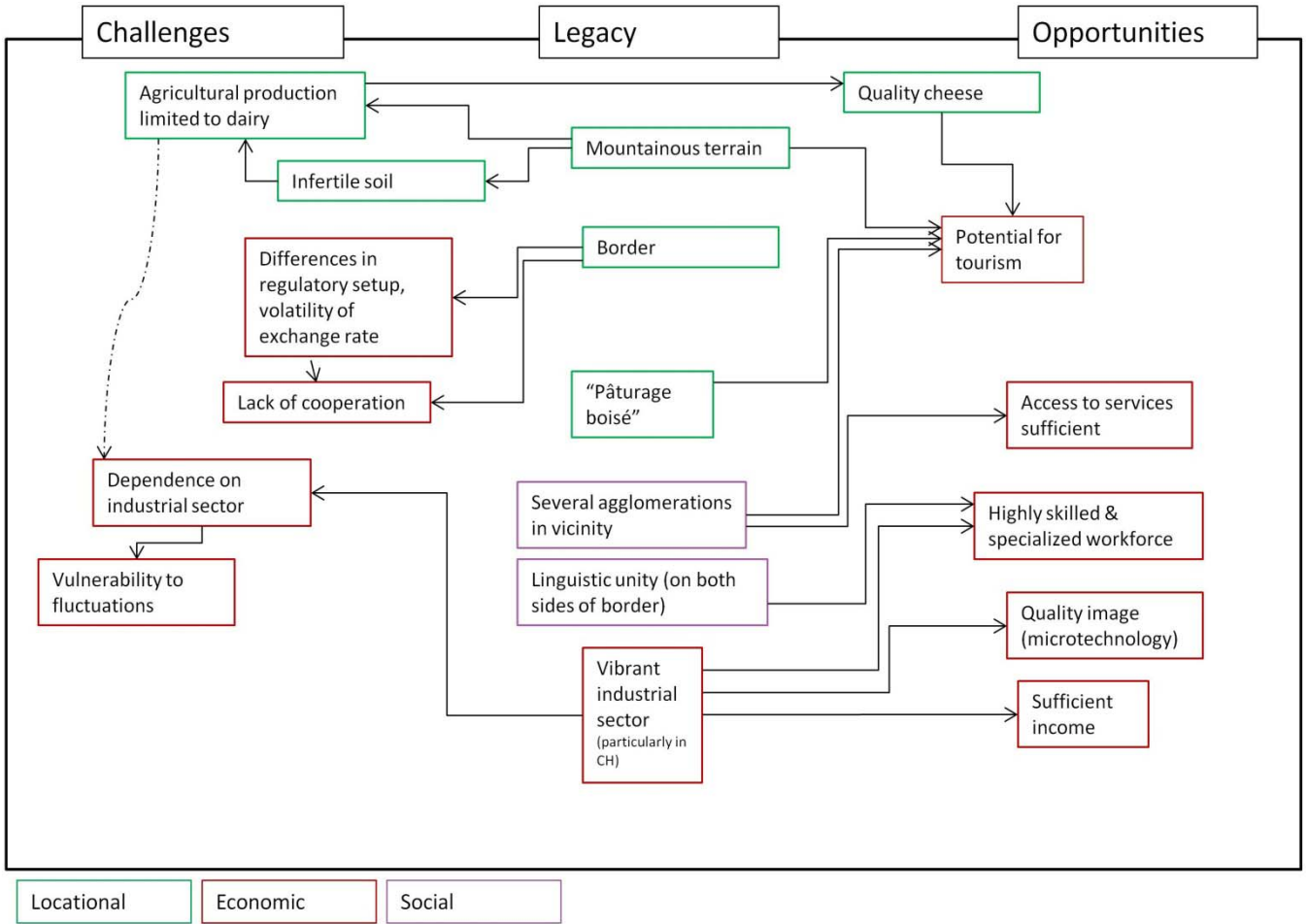
estimated that usually about half of the extracted timber is sold in France and half in Switzerland. However, at the moment, the high value of the Swiss Franc is creating problems for exports to France (Eschmann & Girardin, 2011).

As indicated above, forests could even be regarded as part of the identity of the Jura massif: a particularly typical type of landscape is the “pâturage boisé” (“forested grazing land” – in France the term “pré-bois” is more frequent). It is part of the culture and heritage of the area, and has even been called the “emblem” of the Jura Arc (Magnollay, 2011). On the one hand, it offers a home to a diversified flora & fauna (for example, the wood grouse and the hazel hen find perfect conditions there); on the other hand, it has been perceived as an “attractive” landscape, thereby indirectly benefiting the tourism industry (Conférence TransJurassienne, 2008). However, this is a cultural landscape which requires continued human management. These landscapes are threatened in many areas: the less productive grazing areas are being abandoned and thus becoming overgrown with bushes, whereas the more productive areas (especially close to farms) are used more intensely for dairy cows. Different groups are therefore calling for the conservation of these forested grazing lands. In an INTERREG project, a “manual” for the management of these sylvopastoral landscapes has been developed (Conférence TransJurassienne, 2008). However, the agreement of all property owners and foresters is necessary to achieve the stated goals (Eschmann & Girardin, 2011).



Image taken from: Conférence Transjurassienne, 2008

2. Synthesis



3. Generalisation from case study

For border areas, the Jura massif may be an interesting (even if uncharacteristic) case study. Despite the fact that the same language is spoken on both sides, and despite a relatively homogenous economic structure, the stronger dynamics (and the more pronounced quality image) of the industrial sector in the Swiss Jura, the differences in tax rates, along with the generally higher living standards and associated higher incomes in Switzerland, has led to a situation in which most of the cross-border flows are oriented towards Switzerland. The Jura massif is a prosperous region, and even though the know-how on which this prosperity is based is spread evenly across the massif, it is the Swiss side that could be called the engine of development.

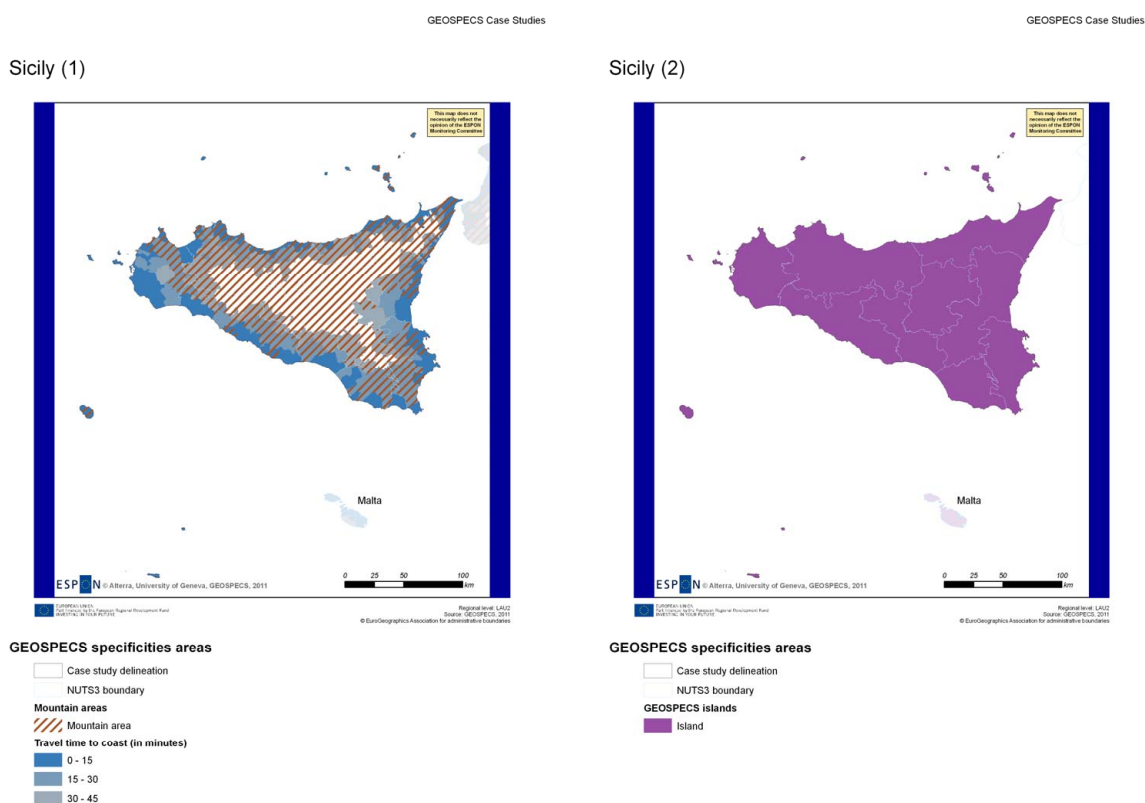
As a case study for border areas, the conclusion is that discontinuities play a more important role along external EU borders than along internal borders: for instance, the provision of services across the border poses more challenges than for internal EU borders (as exemplified by the case of emergency health treatment); onerous customs formalities are named frequently as a barrier to the exchange of goods; many stakeholders have evoked the difficulties caused by the volatility of the exchange rate. In addition, Switzerland has one of the lowest Total Tax Rates in Europe (even though this is not linked to EU membership or non-membership).

For mountain areas, the Jura massif must be regarded as an exceptional case. Its specialisation in one particular branch (microtechnology) makes it prosperous, but this characteristic is only indirectly linked to its mountainous terrain – and certainly hard to reproduce in other areas, seeing that the quality image that the Jura enjoys took decades to emerge. Compared to other mountain areas in Europe, the importance of tourism, agriculture, forestry, and even the public sector in general, is lower. The Jura massif is not so much an example of a successful mountain economy, but more an example of a successful area that is also mountainous.

Annex 26: Case study Sicily

1. Description of the case study area and its geographic specificity

The Italian region of Sicily consists of one large island, Sicily, and a cluster of smaller islands including Mozia, the Stagnone Lagoon, Pantelleria, Ustica, the Aeolian Islands, the Pelagian Islands and the Egadi Islands. The region size totals an area of 25,711km², with a population of just over 5 million, and a population density is 196.4 persons/km². Sicily is found at the South-western periphery of Italy and is separated from mainland Italy through the Strait of Messina, which is about 3km wide at the north of the island, and 16km wide at the southern end of the island. The island of Sicily is characterised by a hilly landscape, as can be seen from the map below.



Most residential and tourism related settlements are based in coastal areas while the agricultural industry is concentrated in the centre. Sicily, and the smaller islands, are characterised by highly active volcanoes which also serve to enrich the soil on the islands.

Due to its islandness and location at the centre of the Mediterranean, Sicily has had a turbulent history which involved a number of conquests by foreign empires. The constant occupation of the island by the Greek and Roman empires, to the Byzantine Empire until Italian unification in 1861, has meant that the islanders have had little control over their destiny and have always depended on an external centre of economic influence and power. The Italian unification was met with great resistance by Sicilians who considered it a form of

occupation and exploitation. This has had deep repercussions on the way Sicily interacts with the main centre of governance in Italy and may have led to the emergence of the Mafia as a way of social organisation. According to Prof. Salvatore Lupo, the consequential inability of central government to control Sicily has led to an informal relationship between the official power structures in Rome and the underground economy in Sicily.¹⁷⁶

This turbulent history has impacted the psyche of the islanders who feel a very strong link to the Sicilian identity and feel separated from the rest of the country and the continent. Notwithstanding this cultural detachment, Sicily has always depended on others for economic support .

The economy of Sicily is diversified, with the services sector making up the largest share of Sicily's GVA¹⁷⁷ largely consisting of employment in the Public Administration. Other strong sectors when compared to Italy's average include agriculture and fishery and construction. Tourism, together with transport and communication, amounts to approximately 23% of Sicily's GVA with the smaller islands depending disproportionately more on the Tourism Industry as they are strongly linked with being a sun and sea destination due to their geographical location and islandness.¹⁷⁸ The current strength of the role of agriculture in Sicily's economy is also a direct relationship to its islandness, which has resulted in a stronger attachment to historically important traditions such as fishing and farming. The Sicilians have taken advantage of their inherited assets in the agricultural area and have expanded to organic and agri-tourism markets.

Islands are faced by both challenges and opportunities for economic and social development. Its geographic characteristic, i.e. it being surrounded by sea, is not the sole feature that distinguishes an island from other territories. In fact, several behavioural traits also add to their uniqueness with the term "insularity" encompassing these more fully. "Insularity" is therefore used to define the broader and more encompassing characteristics of "islandness" and is understood to imply that the following three conditions are met:

- In the main part surrounded by the sea;
- Dependent on centres of economic, social and cultural activity outside the territory;
- Peripheral in relation to the main centre of economic, social and cultural activity.

The interaction of these three conditions, which often accentuates the permanent and severe handicaps which islands face, will be considered when assessing how the economic, social and environmental structure and trends of Sicily have been affected by the islands' insularity. Desk research was

¹⁷⁶ DRAKE, R. (2010). Review of Lupo, Salvatore, *History of the Mafia*. H-Italy, H-Net Reviews. URL: <http://www.h-net.org/reviews/showrev.php?id=29352>

¹⁷⁷ Estimated at 33.2% in 2006; Source: SMILIES – Small Mediterranean Insular Light Industries Enhancement & Support; 'Local Studies Sicily', Project co-financed by ERDF; URL: http://www.regione.sicilia.it/cooperazione/print/doc/Sicily_Local_study.pdf

¹⁷⁸ SMILIES – Small Mediterranean Insular Light Industries Enhancement & Support; 'Local Studies Sicily', Project co-financed by ERDF; URL: http://www.regione.sicilia.it/cooperazione/print/doc/Sicily_Local_study.pdf

supplemented by field work in the preparation of this case study with a questionnaire being sent out to a number of stakeholders.

As the largest island in the Mediterranean, it may be argued that Sicily does not suffer from the effects of insularity like other islands do. However, when one looks at the three dimensions of insularity it is clear that the sizeable population and land mass have merely mitigated some of the effects of insularity. In particular the dependence on centres of economic and administrative importance is strongly apparent, and has been nurtured in the past by national policy such as the 'Fund for the South'.

The proximity of Sicily to the region of Calabria on mainland Italy has resulted in the two regions sharing a number of similarities when it comes to development challenges. Indeed there are a number of challenges shared by the entire South of Italy. In order to distinguish between the problems arising from insularity on Sicily and those of the South of Italy it is necessary to understand that the islands are peripheral to the administrative, social and economic centres by geographical construction; however it is not a characteristic that is unique to islands. In the case of Southern Italy, Calabria is also exhibiting the signs and consequences of peripherality, which is why a number of prevalent issues on Sicily manifest themselves also in Calabria. In addition, for a number of reasons, some of which are shared by Sicily, Calabria also manifests a dependence on the centre of Italy. However the third characteristic of insularity, which is the geographic characteristic of being separated from the mainland by the sea, is unique to the island of Sicily and the surrounding islands, which adds an insular dimension to their development challenges and make these even more disadvantaged than other southern regions on the mainland.

2. Economic, Social and Environmental processes related to the geographic specificity

2.1 Economy

Employment and Development Levels

GDP per capita in 2008 stood at €17,520, 6.6% of national GDP, and 70.3% of EU27 average. Sicily remains lagging behind the growth of the rest of Italy. Although in 1998-2002 the island had an average growth of 2.0% as against a national average of 1.7%, the gap began to widen again with the difficult international situation (both economically and geopolitically) from 2002 onwards, with GNP growth in 2005 stalling at 0.45% as against a national value of 1.7%.

The difference in the structure of the Sicilian economy in relation to the national economy, as well as that of the South overall and the Convergence regions, is mainly the low presence of industry and the predominance of the service sector – 33.2% as against a national value of 20.6% - largely consisting of employment in Public Administration. Manufacturing only comprises 25% of companies and only 10.4% of capital companies (as against a national average of 21.7%).

The Sicilian economy is characterised by a few large industries and a galaxy of over 394,000 micro and SMEs. These can be considered a resource of the Sicilian islands, giving space to the generation of employment and possibly creative, albeit limited, entrepreneurship. However with 80% of them being self-employed individual companies lacking critical mass, these firms would be generally under-capitalised and are likely to have a low propensity to invest in R&D and innovation, resulting in a low incidence of patents and other similar intellectual assets.¹⁷⁹ Micro-firms in peripheral regions tend to suffer in a disproportionate manner from the disadvantages usually associated with such firms¹⁸⁰.

Limited economic diversification possibilities and detachment from the core of economic activity could curtail the extent of investment in innovative business activities and increase the potential losses from failures associated with such undertakings. These traits are linked to the characteristics of insularity, whereby the detachment from mainland can lead to an insular mind-set¹⁸¹ making people more risk averse and unwilling to take on risky investment projects and set up new enterprises. A reflection of this may be seen in the low number of degree-holders in scientific and technological disciplines in Sicily, at around two-thirds the national level, when already the levels for Italy as a whole are below EU average.

Sicily has a regional governance system which is detached from the main centre of governance in the country. With responsibilities for administration in many

¹⁷⁹ SMILIES – Small Mediterranean Insular Light Industries Enhancement & Support; ‘Local Study Sicily’

¹⁸⁰ CORDINA G. (2010), ‘Small Enterprises in Small States: A Case of Double Disadvantage?’, Department of Economics, University of Malta

¹⁸¹ CASTELLS M. (2006), ‘Globalisation and Identity: A Comparative Perspective’, Barcelona; URL: http://www.llull.cat/rec_transfer/webt1/transfer01_foc01.pdf

areas, such as road and rail networks, governance in Sicily may be perceived to be relatively weak which exacerbates difficulties typically associated with insularity including costs and availability of transport and relatively high costs of doing business. The regional road infrastructure in Sicily, for instance, is inadequate¹⁸². The same can be said of the provision of public transport with only 32.3% of individuals choosing to travel by these means, compared to the 67.7% that choose private transportation¹⁸³. These effects combine to result in higher unemployment rates and a larger number of obstacles for those trying to set up their own business.

There is one particular area in which Sicily has been able to gain a comparative advantage over other regions; this is the area of organic farming. Since 2002, Sicily has been the Italian region with the highest surface dedicated to organic agriculture which, together with Sardegna, makes up for more than a third of Italy's organic farms¹⁸⁴. This may be due to a number of factors, including the historical importance of farming and the current, above average, prominence of this industry. In addition, Sicilians may have been better able to preserve traditional farming techniques, as a result of it having been relatively sheltered from modern day technology, which may have enabled it to gain a comparative advantage in this field.

The strong social ties on the islands also play a role in shaping their economy. According to the socio-economic literature on industrial districts, the family has a significant role among the 'economically relevant' institutions of the community in Italy. It is considered a possible source of internal savings and of free labour that could have fostered the proliferation of family-run businesses typical of industrial districts. In addition, a larger family size encourages the construction of interpersonal trust relationships and networks that facilitate the reduction of transaction costs and the circulation of information¹⁸⁵. This is a characteristic which dominates most of Italian, and indeed Mediterranean, landscape, but it is amplified in Sicily where the effects of insularity have resulted in individuals being more dependent on the extended family and a network of contacts to find employment and to do business.

The smaller Sicilian islands, which are inherently characterised by double-insularity, have a slightly different economic perspective from the main island, and may indeed be considered to possess the same insularity characteristics but to a heightened degree. They are more dependent on tourism as a main source of income, followed by agriculture, fishing and traditional crafts. They feature an ageing population with many in the younger generation leaving the islands for study and work purposes. The larger islands are connected to Sicily and Italy by

¹⁸² Piano Regionale dei Trasporti e della Mobilita – Dipartimento Trasporti e Comunicazioni nell Assessorato del Turismo delle Comunicazioni e dei Trasporti 2002

¹⁸³ Piano Regionale dei Trasporti e della Mobilita – Dipartimento Trasporti e Comunicazioni nell Assessorato del Turismo delle Comunicazioni e dei Trasporti 2002

¹⁸⁴ SAYRE, L. (2005). *The EU's organic tiger*. Article on the website of the RODALE INSTITUTE of November 10, 2005. URL: <http://newfarm.rodaleinstitute.org/international/features/2005/1105/italy1/sayre.shtml>

¹⁸⁵ DI GIACINTO, V., NUZZO, G., 'The Role of Institutional Factors in Fostering the Development of Industrial Districts in Italy' Banca D'italia Research Unit

regular, year round, air and ferry connections, but suffer from accessibility issues to a more pronounced extent.^{186 187}

Insularity manifests itself in Sicily as a detachment from the centre of governance in Rome, and from the centre of economic activity in the Milan/Torino area of the North of Italy. This peripherality gives rise to a number of effects in the Sicilian economy. This can mostly be seen in the governance issues that affect Sicily. The sense of detachment from the main decision makers leaves islanders feeling that their needs are not being catered to. There is a historical trend in Sicilians attempting to achieve self-governance over the centuries. Although as a region Sicily is autonomous in a number of decisions, there is still a large area of influence that it is unable to take ownership of. Historically the weakness of local governance was one of the contributing factors that led to the rise of a secondary unofficial governing structure on the islands, which then evolved into an underground economy and social system that creates further development challenges to the islands.

Insularity also manifests itself as a dependence on the centres of political, social and economic activity. This dependence has evolved through the historical turbulence experienced by the islands, and has been reinforced by policy decisions in the 20th century such as the Fund for the South which was as a redistribution of income from the more prosperous North of Italy to the poorer South. This fund has served to foster this dependence and deepen it further. This dependence on the rest of the country manifests itself in a higher than average public sector employment in Sicily, where a vicious cycle has emerged with people entering public sector employment for the lack of other employment opportunities, and the growth of the public sector, further crowding out private employment opportunities.

The islandness of Sicily, the detachment from the mainland by the sea, has also shaped its economy. The physical and mental separation from the mainland has affected the Sicilian economy in a number of ways. The physical separation has resulted in increased costs to businesses due to dependence on ferries and sea transportation for goods and due to increased transportation time for individuals needing to go to the capital or other large cities on the mainland.¹⁸⁸ This effect is especially damaging in the case of perishable goods.¹⁸⁹

The islandness has also contributed to shaping Sicily's image as a tourist destination, which has resulted in a number of positive contributions to this sector. This image can serve to keep Sicily from reaching its future development potential, firstly by overwhelming the historical and cultural capital of the island

¹⁸⁶ AZZOPARDI, R.M. 'Lipari and the Impact of the European Social Fund' (2011), Regional Studies Association Conference

¹⁸⁷ TRAPANI SICILIA (n.d.). Egadi Islands. Website of the province of Trapani. URL: http://www.trapani-sicilia.it/english/isole_egadi.htm

¹⁸⁸ Piano Regionale dei Trasporti e della Mobilita – Dipartimento Trasporti e Comunicazioni nell Assessorato del Turismo delle Comunicazioni e dei Trasporti 2002

¹⁸⁹ Piano Regionale dei Trasporti e della Mobilita – Dipartimento Trasporti e Comunicazioni nell Assessorato del Turismo delle Comunicazioni e dei Trasporti 2002

which often goes unnoticed, and secondly by propagating, especially among policy makers, a distorted image of idyllic living in Sicily which is hardly representative of the true quality of life on the islands.

Sicily exhibits signs of dependence on the centre of economic activity and peripherality from this same centre. In addition, it is surrounded by the sea and therefore physically detached from mainland Italy. The landmass and population size in Sicily, however, has served to partially mitigate the peripherality and dependence characteristics of insularity. This puts Sicily at the lower end of the insularity spectrum as the island may be large enough to create its own, smaller, centre of economic, social and political gravity. However, there are still a number of effects arising from this reduced insularity that are posing development challenges to the islands. As described earlier, the psychological detachment from mainland has implications on innovation and an entrepreneurial spirit on the islands.

On a local level, Sicily has officially identified 23 Production Districts with a strong territorial vocation, which includes a shared strategic plan for cluster participants with vertical and/or horizontal integration in order to promote the development of these industries. While clusters are common in many areas, they may be especially necessary in insular ones as they compensate for the lack of natural mass.

The European Sustainable Development Strategy, which focused mainly on the conservation and management of human natural resources, has had an impact on the region of Sicily, and especially on smaller islands such as Lipari, one of the Aeolian Islands.¹⁹⁰¹⁹¹ The European Social Fund addresses employment issues, ensuring accessibility to and promoting participation in the labour market. In addition, it also works to prevent social exclusion and combat discrimination by ensuring the access and inclusion of 'disadvantaged workers' in Sicily¹⁹².

Tourism

A challenge to the economic health of an island is often its limited economic resource base. Tourism can be an economic catalyst for island development. The extra market demand produces economies of scale, thereby increasing efficiency and decreasing costs of production. Tourism also increases competition, encourages new start-up businesses, democratises market structures, and deters rent seeking behaviours and corruption. This competition can provide greater consumer choice, trade openness and increase the quality of life for residents. However, seasonality in island tourism is a challenge to the economic sustainability of the island and the well-being of the islanders. Escalating land

¹⁹⁰ AZZOPARDI, R.M. 'Lipari and the Impact of the European Social Fund' (2011), Regional Studies Association Conference

¹⁹¹ Operational Programme 'Sicily'. ERDF regional operational programme for Sicily 2007-2013. URL: http://ec.europa.eu/regional_policy/country/prordn/details_new.cfm?gv_PAY=IT&gv_reg=ALL&gv_PGM=1044&gv_defL=7&LAN=7

¹⁹² http://ec.europa.eu/employment_social/esf/discover/esf_en.htm

prices represent another economic concern in islands forcing local residents out of the housing market. This promotes out migration, leading to a possible dissolution of the culture, and second home ownership by foreigners.

Sicily is known as an island that has many tourism products, but the reality which prevails is that it continues to be perceived mainly as a "sun and sea" destination. It is seemingly contradictory: while Sicily is perceived primarily as a land of art and culture with all its traditions, so much so that this is embodied in the concept of "Sicilianity", however the "sun and sea" image, mostly promoted for internal (Italian) tourism strongly remains. This concept is strongly linked with the fact that Sicily is an island, and that it is peripheral to the economic centre, making it a 'destination' that the economic centre travels to. The image of sun and sea is also linked to the climatic conditions linked to its geographical position and high volume of coastal areas prevalent on islands. It is also reinforced by structural problems, such as those in the field of transport, which create difficulties to internal travel.¹⁹³ This sun and sea image is not conducive to the development of other higher value-added niches, such as cultural tourism, agri-tourism and sports tourism.

The motivational dimensions related to the islands as destination choices are those of discovery, relaxation, togetherness and escape, which are closely linked with the physical and social separation from mainland. Islands provide a sense of adventure to travellers; the physical separation from the mainland, necessitating a conscious decision to cross the water, is an important dimension. Islands are also perceived by visitors to offer a significantly different environment to the pace and pressures of "normal" life. The picture of difference, peace and "another time" represents a key attraction for visitors to islands. Islands, to tourists, also represent a finite geographical environment, one with defined and frequently relatively small delimiters which are easy to cope with physically in terms of internal travel and in psychological terms as well. In the case of Sicily, this 'island' image prevails notwithstanding the existence of the large residential and commercial hubs of Catania and Palermo given that these cities contrast substantially with the remainder of the island.

Sicily's prime touristic environmental resources are the coastal regions that are easily damaged, heavily used, and therefore require careful visitor management.¹⁹⁴ The large amount of waste (solid and liquid) created by tourism is a problem since space for its disposal on islands is limited. The comparison between the Sicilian provinces has shown that the coast of Messina is the one with the highest pressure from tourism: Taormina, Giardini Naxos and the Eolie Islands have a very high concentration of tourists, especially during the summer, both in relation to their surface as well as in relation to their population size¹⁹⁵. A number of eco-tourism and agri-tourism initiatives have been launched in Sicily, which has helped to mitigate the focus on coastal areas and move more tourism inland.

¹⁹³ <http://www.videomediterraneo.it/notizie/attualita/1348-catania-sicilia-trasporti-inefficienti.html>

¹⁹⁴ Sustainable Tourism and Carrying Capacity in the Mediterranean Area Focus on Sicily; Santonocito S.D. 3rd IRT International Scientific Conference Vol.1

¹⁹⁵ Sustainable Tourism and Carrying Capacity in the Mediterranean Area Focus on Sicily; Santonocito S.D. 3rd IRT International Scientific Conference Vol.1

Exploiting cultural and environmental resources to attract tourism and promote development is one of the priorities of Sicily's Operational Programme 2007-2013. This priority aims at the promotion of sustainable tourism by enhancing the cultural and natural potential of the region. The preservation of historical premises and support to SMEs linked to the management of the cultural heritage and the environmental networks are envisaged.

Specific transport infrastructure issues

Messina, to the North East of Sicily, is the main hub of transport for ferries from the main island to mainland Italy via the ports at Villa San Giovanni, Reggio Calabria and Salerno, as well as to other smaller islands. One of the ferries is equipped to carry train wagons over the Strait. The length of a journey between Palermo and Rome takes around 13 hours. There are three international airports in Sicily; namely in Catania, Palermo and Trapani. Smaller airports exist both on the island of Sicily as well as on the smaller islands.

The poor state of Sicilian transport infrastructure is widely acknowledged in Sicily¹⁹⁶. This may contribute to Sicilians feeling marginalised from national policy as compared to the rest of Italy. Italian priorities are focused on the centre of Italy, with special focus on the hubs of Rome and Milan while the Sicilian region suffers from decreases in the transportation of goods and a reduction in long-distance trains. Many in Sicily also feel the effects of their peripherality from and their dependence on the centre reflected in the failure to invest in local regional transport, even when some projects are severely needed. An example of this is in the expansion of the airport of Catania which cannot grow any further due to the runway running against railway tracks¹⁹⁷. These issues are further exacerbated by the susceptibility of Sicilian public transport to strikes¹⁹⁸¹⁹⁹.

A Regional Transport Plan for Sicily²⁰⁰ has been drafted in an attempt to improve the quality and efficiency of the transport system, to sustainably improve the potential and competitiveness of industry and to improve the quality of life by reducing the marginalisation of Sicily in national and international connections. The focus is on the rationalisation of the current infrastructural resources, the integration of the plurality of carriers, and the development of more eco-friendly transport, improving the railway network, supporting maritime transport and planning the construction of a large hub at the service of the entire Mediterranean basin.

¹⁹⁶ Piano Regionale dei Trasporti e della Mobilita – Dipartimento Trasporti e Comunicazioni nell Assessorato del Turismo delle Comunicazioni e dei Trasporti 2002

¹⁹⁷ <http://www.videomediterraneo.it/notizie/attualita/1348-catania-sicilia-trasporti-inefficienti.html>

¹⁹⁸ TISCALI SICILIA (2011). *Palermo: rientra sciopero selvaggio autisti trasporto pubblico*. Article on Tiscali Sicilia of 10 August 2011. URL: http://notizie.tiscali.it/regioni/sicilia/feeds/11/08/10/t_16_02_ADN20110810194251.html?sicilia

¹⁹⁹ <http://www.ferroviesiciliane.it/?p=6777>

²⁰⁰ Piano Regionale dei Trasporti e della Mobilita – Dipartimento Trasporti e Comunicazioni nell Assessorato del Turismo delle Comunicazioni e dei Trasporti 2002

The weaknesses in the transport system adversely affect economic sectors such as the tourism industry. A number of recommendations have been put forward in a report on the needs of the sector to support the tourism industry²⁰¹. Many of the measures introduced in the OP for Sicily target the transport sector. Funding of rail transport in urban and metropolitan areas is also being promoted. There is an effort to establish a more balanced transport system by increasing the importance of rail networks and ports²⁰².

In addition, plans have been put forward that design the longest suspension bridge ever, linking Sicily with mainland Italy through the Strait of Messina, which is 3km wide at its narrowest point and achieves significant water depth. This should withstand strong winds prevalent in the area, up to 216km/hr, and seismic action corresponding to 7.1 magnitude on the Richter scale. Estimates of the cost and time associated with this project hover around €6 billion and eleven years. It is expected to be 60m wide with 12 lanes for traffic and two lanes in the middle for trains. The bridge would accommodate 140,000 vehicles and 200 trains per day and is expected to cut transit times²⁰³. Italy's former ministers of infrastructure, Altero Matteoli, and the economy, Giulio Tremonti, both supported the project²⁰⁴. However, at this point, no work has yet been done and the official bridge website does not seem to be functioning.²⁰⁵

Ex-Prime Minister Silvio Berlusconi and other supporters of the bridge expect it to boost Sicily's economy by making it easier to deliver products and services to and from the island. Currently, trains and cars must embark and disembark on ferry boats that cross the Strait of Messina.²⁰⁶ However, some people, like Gaetano Cipolla, a Sicilian native and professor of language and literature at St. John's University in New York, believe that the money designated for the bridge could better "improve the lives of Sicilians" if it were used for more urgently needed infrastructure projects, such as roads, highways, and train service²⁰⁷.

There is furthermore a cultural and human aspect to traveling to and from Sicily by ferry.²⁰⁸ The romantic image of islands is a big barrier to projects aimed at linking islands to mainland. Much of the criticism to such projects indeed stems from such beliefs.

Other arguments, from environmental organisations, reflect more tangible concerns including severe ecological damage to the Strait and the shore areas of

²⁰¹ Primo Rapporto sul Turismo in Sicilia; Assessorato del Turismo, delle Comunicazioni e dei Trasporti 2001

²⁰² http://ec.europa.eu/regional_policy/country/prordn/details_new.cfm?gv_PAY=IT&gv_reg=ALL&gv_PGM=1044&gv_defL=7&LAN=7

²⁰³ BRIDGEPROS (n.d.). *Strait of Messina Bridge Project*. Article on website Bridgepros.com. URL: http://bridgepros.com/projects/Strait_of_Messina_Bridge/

²⁰⁴ <http://www.sicilytoday.net/home.html>

²⁰⁵ <http://www.strettodimessina.it/>

²⁰⁶ <http://www.sicilytoday.net/home.html>

²⁰⁷ Arba Sicula: Journal of Sicilian Folklore and Literature. Ed. Gaetano Cipolla

²⁰⁸ <http://www.sicilytoday.net/home.html>

both Sicily and Calabria. Opponents also cite warnings from some engineering experts who say the bridge could be weakened or damaged by high winds, earthquakes, and tidal waves that have struck Messina and Calabria in past years²⁰⁹. Another concern is that many fear that huge amounts of taxpayers' money would be siphoned off by the Sicilian and Calabrian mafias, who control most public works projects in the south of Italy²¹⁰. An additional issue in this debate is the fact that the bridge would connect Sicily to a part of the mainland which is itself peripheral and which suffers from much of the problems afflicting Sicily itself. This would limit the potential value added that would be obtained from such an infrastructure.

2.2 Social

Demographic processes

Sicily's population is registering a slow but constant increase, which is mainly linked to net inward migration. There is a higher number of women than men, which is attributed to the higher emigration of men. The birth rate is 9.8 units per 1,000 inhabitants, slightly above the national average of 9.4. The index of the elderly reveals there are 120.2 persons over the age of 64 for every 100 persons under 15 years of age, considerably lower than the national average of 144.²¹¹

Although there are marked tendencies for outward migration at a younger age, particularly from the areas of Catania and Messina, net immigration is positive, which may reflect the island's attractiveness to foreigners as well as the incidence of irregular immigration. In 2005, approximately 90,000 immigrants were estimated to reside in Sicily, or approximately 1.8% of its population, Tunisians make up the most immigrants, followed by, Moroccans, Sri Lankans, Albanians, Chinese and Romanians²¹². These figures are however low compared to other regions of Italy²¹³.

A study²¹⁴ revealed that four out of ten Sicilians, if given the choice, would opt to leave the island. This is higher in the younger working age groups, with 76% of young Sicilians appearing to be ready to leave Sicily so as to satisfy their professional aspirations. Between 1995 and 2009 on average 13,500 people p.a. have left Sicily and settled in other regions in Italy. Those that choose to remain

²⁰⁹ BBC NEWS (2009). *Italy revives Sicily bridge plan*. Article on BBC online of 6 March 2009. URL: <http://news.bbc.co.uk/1/hi/7928949.stm>

²¹⁰ <http://news.bbc.co.uk/1/hi/7928949.stm>

²¹¹ IStat: Regional Statistical Yearbook, Sicily 2010

²¹² CONSOLI M.T. (2006), 'Migration phenomenon in Sicily', Department of Sociology University of Catania

²¹³ *North and South: The Tragedy of Equalisation in Italy*, Carlo Lottieri & Carlo Stagnaro Istituto Brumo Leoni, Turin, Frontier Centre for Public Policy, 2007

²¹⁴ http://www.demopolis.it/newsfocussicilia.php?subaction=showfull&id=1257953167&archive=&start_from=&ucat=13,23&template=News&category=23&sortby=5&PHP_SELF=newsfocussicilia.php

in Sicily do so either to work in a pre-existing family business or because no opportunities to do so come their way particularly due to a low educational background²¹⁵.

Sicily's migration patterns can be indirectly linked to several repercussions of insularity. The lack of job opportunities, the weak system of governance and the lack of an entrepreneurial culture all serve to encourage young men to leave the islands. Local authorities have tried to address this phenomenon by investing substantial amounts of money towards this region's development. In the 1950s a southern Italy development fund known as the "Cassa per il Mezzogiorno"²¹⁶ was established by the national government with the aim of stimulating economic growth and development in the southern Italian regions. Its effect, however, has been largely unsuccessful. In addition, following Italy's entry in the EU, billions of euros have been injected in Sicily to raise the region's development. Allegedly, however, the Mafia, is still very influential and has hindered governmental efforts to institute reforms in the region. The poor governance structure present in Sicily has emerged as a result of the island's detachment and peripherality from its centre of governance. This is impairing the island's great development potential that results from its large landmass and population size.

Settlement patterns

Data shows that population is denser in the capital city of each province, in coastal cities and in agriculturally-renowned areas. Coastal cities are particularly popular due to job opportunities in the tourism sector as well as better sea trade and transport links. In recent decades, in fact, Sicily faced huge migration from the inner, rural and mountainous territories to the coastal areas which left these territories greatly under-populated and has caused the decline of the primary sector.²¹⁷ The main reason for this was that tourism resorts (that are broadly found in the coastal areas) are being promoted as a solution to the problem of underdevelopment in Sicily. Furthermore, issues related to greater exposure to defence vulnerabilities that were of concern in the past are no longer considered so vital with the advantage of better communication and transport links superseding these concerns in recent years. Post-war industries also began setting shop in coastal cities that favoured the permanent movement of workers and their families to these industrial areas²¹⁸.

This has also led to a significant anthropic load on the coasts and a general deterioration of the environment and the coastal ecosystem, as well as to serious risks for the population's health²¹⁹. The

²¹⁵ GEOSPECS field research

²¹⁶ http://www.laterzalibropiuinternet.it/download/Nuovi_Profili_triennio/NProfili_triennio214.pdf

²¹⁷ CIRELLI, C., MERCANTANTI, L., PORTO, C.M., (2003) 'Sustainable Development of Sicily East Coast Area', 43rd Congress of the European Regional Science Association Jyväskylä (Finland)

²¹⁸ CIRELLI, C., MERCANTANTI, L., PORTO, C.M., (2003) 'Sustainable Development of Sicily East Coast Area', 43rd Congress of the European Regional Science Association Jyväskylä (Finland)

²¹⁹ CIRELLI, C., MERCANTANTI, L., PORTO, C.M., (2003) 'Sustainable Development of Sicily East Coast Area', 43rd Congress of the European Regional Science Association Jyväskylä (Finland)

most damaging factors are considered to be the development of disorderly buildings along the beach and the permanent or transitory mass tourism that pours into the coastal areas, especially during the summer months. Certain areas in the eastern part of Sicily witnessed unsustainable increases in population between the '50s and '80s. The industrial growth, lacking planning and respect of local peculiarities, has in fact introduced dis-amenities that the areas could not bear. The industrial area is today accused of contributing to the creation of the so-called "rubbish society", because of the degradation of the natural environment, the pollution (of water, land and air), unruly urbanisation and more generally because of a general deterioration of the quality of life²²⁰.

Migratory movements

A large number of immigrants from non-EU member states have settled in Italy in recent years in search for better job opportunities and an improved quality of life. A number of these immigrants are in the region illegally. In Italy illegal immigration, which in 2005 counted for 60% of total immigrants, is fuelled mainly by visitors who remain after the expiry of their visa. Another 25% of immigrants are estimated to arrive illegally from other Schengen countries whereas 'only' 15% of illegal immigration in 2005 came from routes of the Mediterranean.²²¹

Illegal immigration is an even greater reality for Sicily due to its cross-border dimension with Northern Africa. This phenomenon is even more pronounced with respect to the island of Lampedusa that faces disproportionately higher pressures from African immigrants as a result of its close proximity to this continent. Its population, estimated at 5500, has been severely outnumbered by immigrants. Another cross-border element in this respect is that with Malta wherein disputes have allegedly arisen in recent months over the responsibility to take in migrants rescued at sea. Controversy arose over whether responsibility should lie with Malta's relatively large search and rescue area versus Lampedusa's nearest safe port of call.²²²

Some social pressure that is felt due to migration flows includes integration problems as a result of the larger size of immigrant families and the fears of appropriation of jobs due to migrants being exploited as cheap labour. According to author Maria Luisa Romano, those that are in Sicily legally seem to give a

²²⁰ BARILARO C., "Problemi ambientali e sviluppo nell'area costiera megarese", in Atti del XXVI Congresso Geografico Italiano, Genoa, 1992

²²¹ CAMILLONI, S. (2006). *Viminale: il 60% dei clandestini resta con il visto scaduto*. Article on Stranieri in Italia of 14 August 2006.
URL:<http://www.stranieriinitalia.it/news/viminale14ago2006.html>

²²² MIGRANTS AT SEA (2011). *Italy Criticises Malta Regarding Search and Rescue Response*. Blog entry of 8 April 2011. URL:
<http://migrantsatsea.wordpress.com/2011/04/08/italy-criticises-malta-regarding-search-and-rescue-response/>

SANSONE, K. (2011), « President reaffirms Malta's migration policy to Italians », *Times of Malta*, URL: <http://www.timesofmalta.com/articles/view/20120321/local/President-reaffirms-Malta-s-migration-policy-to-Italians.412066>

KLEPP, S., (2011). "A Double Bind: Malta and the Rescue of Unwanted Migrants at Sea, a Legal Anthropological Perspective on the Humanitarian Law of the Sea", *International Journal of refugee Law*. URL:
<http://ijrl.oxfordjournals.org/content/early/2011/06/22/ijrl.eer017.abstract>

higher value to education, with less frequent absences from immigrants. The immigrant population is prospering economically, with the ability to speak English giving them a more competitive edge in the tourism industry.²²³

The social discomfort related to immigration led to the imposition of penalties of approximately €5000 to €10,000 on illegal immigrants as well as detention of up to six months.²²⁴ This approach was not supported by the EU.²²⁵ In addition, no formal agreement has yet been reached at EU level on burden sharing, with only some countries taking on migrants on a voluntary and one-off basis.

The main reason for the strong immigration inflow into Sicily is, therefore, its cross-border dimension and proximity to North Africa – an area that has witnessed a surge in migration outflows in recent years. However, the problems that the island region faces are accentuated due to the islands' insularity. This is particularly the case since migrants tend to be confined to the area in which they disembark with limited assistance coming from other regions in Italy and even less assistance coming from other EU member states.

Residential attractiveness

The residential attractiveness or otherwise of Sicily is considered to be a highly controversial and debatable topic amongst locals and foreigners alike. The two types of capital mostly cited in this debate concern economic and social capital. On the one hand, economic capital is considered to be the least attractive component of Sicilian lifestyle whereas social capital is considered to be both an advantage and disadvantage by locals.²²⁶

The lack of job opportunities and the lower per capita incomes vis-à-vis the average prevailing in Italy are often considered to be the main disadvantages of living in Sicily. In addition, organised crime is still considerably strong in Sicily, which acts as a deterrent for enterprise to set up on the island. Lastly, Sicily is not considered to have a successful educational system. This may also discourage enterprise development, further reinforcing the problem of low job opportunities and the desire to leave.

The social environment present in Sicily is associated with mixed perceptions. According to social fora²²⁷, some Sicilians view the islandness issue as being conducive to isolation (the term in Italian "isola" (island) can be closely linked to the word "isolamento" (isolation)). This can have positive and negative connotations; on the one hand isolation gives a sense of tranquillity and serenity

²²³ ROMANO Maria Luisa (2005), 'Education in Sicily', Best of Sicily Magazine; URL: <http://www.bestofsicily.com/mag/art181.htm>

²²⁴ Legge 15 luglio 2009, n. 94 "Disposizioni in materia di sicurezza pubblica", pubblicata nella *Gazzetta Ufficiale* n. 170 del 24 luglio 2009 - Supplemento ordinario n. 128; URL: <http://www.parlamento.it/parlam/leggi/09094l.htm>

²²⁵ HUFFINGTON POST (2009). *Italy Illegal Immigration Crackdown Draws Fire*. Article on Huffingtonpost.com of 08/15/09. URL: http://www.huffingtonpost.com/2009/07/15/italy-illegal-immigration_n_233331.html

CROSBIE, J. (2009). *Commission questions Italy's immigration policy*. Article on EuropeanVoice.com of 23.07.2009. URL: <http://www.europeanvoice.com/article/imported/commission-questions-italy-s-immigration-policy/65570.aspx>

²²⁶ GEOSPECS field research

²²⁷ <http://it.answers.yahoo.com/question/index?qid=20101027055800AAtWCGq>

but on the other hand it can be linked to solitude, boredom and limited possibility to build new social networks. However, the Sicilian population is considered to be very open and welcoming which adds to the attractiveness of Sicily for locals and foreigners alike.

Other aspects that are considered to add to Sicily's attractiveness for residential purposes include the beautiful and very varied environmental culture, including mountains as well as sea-side resorts, and a very rich history and culture. However on the negative side, institutional capital is very poor. The judicial process is considered to be very slow, inefficient and ineffective and is often influenced by corruption²²⁸. In addition, the inefficient transport system and problems related to migration are further highlighted by residents of the smaller islands (particularly Pantelleria and Lampedusa). Transport is very dependent on weather conditions; a number of tourist and residents forums have attributed the suspension of services to strong winds in the winter months²²⁹, and, as a result, migratory inflows are more prominent in the summer months when the conditions at sea are calmer. Both these aspects limit the attractiveness of the smaller islands for residential purpose.

As a result of these factors, migration of Italians to the island is very low. However as mentioned earlier, this factor is true of most southern regions since workers tend to head north to take advantage of better job opportunities. However, net migration (which also includes foreigners) is positive although this reflects the huge influx of illegal migrants particularly from northern African shores. Locals have attributed the unattractiveness of the region to a lack of vision and resultant uncertainty, particularly with respect to job opportunities, as well as the amount of bureaucracy that is considered to be hindering this process.

Identity

Territorial identity reflects the ability to retain cultural elements constant and fixed through the passing of time. Sicily's geographical characteristic (that of being an island) and its geographic position (in the centre of the Mediterranean) has made it a crossroads of cultures and peoples, as well as a strategic theatre of conflict for political powers²³⁰. This has resulted in the Sicilian identity becoming a mix of different identities making it, perhaps, unique in the history of the Western experience. In addition, prior to Italy's unification in 1861, its history took a different turn to that of a large part of mainland Italy, which led to its culture and traditions being particularly distinct. In fact, this trait makes it very different to the stereotype attributed to cultural identities in other islands, which is expected to preserve to a greater extent the traits and customs of the nation as a whole.

This distinctiveness has led to a number of movements, such as the Movement for Autonomy (MPA) founded by the Regional President and Catania-born citizen

²²⁸ GEOSPECS field research

²²⁹ <http://hwupgrade.it/forum/archive/index.php/t-1516966.html>

²³⁰ CALLACI G. (2007), 'Sicily's rich heritage'; URL:
<http://www.interreligiousinsight.org/April2007/April07Callaci.pdf>

Raffaele Lombardo in 2005, to request greater autonomy for Italy's regions, including Sicily, and in particular to "restore" to Sicily and the South their "guiding role" for the Mediterranean countries²³¹.

Notwithstanding this, however, a survey carried out by the Institute of National Research Demopolis on behalf of the Sabir Foundation²³² reveals that the Sicilian identity is very strong within the context, of modern day trends brought about through globalisation, even though Sicilians tend to be self-critical of all the components of their social life. Of those surveyed, in fact, 77% revealed to be proud of their identity – more than two-thirds of whom being very proud. Notwithstanding the fact that most Sicilians recognise the great economic drawbacks and the low quality of the services offered, particularly with regard to transport and health services, 61% of Sicilian respondents would choose not to leave the island if given the choice to do so. In addition, the absolute majority of Sicilians surveyed declare a complete sense of belonging to Sicily, with 54% of these considering themselves to be Sicilian even before considering themselves Italian or European. This belief and sense of belonging is stronger amongst those with lower educational achievements as well as amongst women.

Sicilians believe their identity to be based on shared values and characteristics that are typical of the entire island's population. They consider their great hospitality to be the main feature that characterises them from other localities, with 71% of respondents giving this response. Still on the positive side, 47% of respondents believe Sicilians to be friendly and pleasant, 39% believe them to be generous and united whilst 32% believe Sicilians to be creative. However, negative connotations are also attributed to the Sicilian identity, with 67% of respondents believing them to have limited respect for rules, 59% consider them to have a lack of civic duty, 38% feel that they are lazy and 37% that they are untrustworthy.

However the identity, or "Sicilianità", as it is referred to by locals, is predominantly a question of sentiment. Most respondents are particularly satisfied with their social ties – that with their family, friends and partners – and also consider this to be a feature that distinguishes them from other regions. On the other hand, the responses were substantially lower with respect to their outlook on their professional life as well as their quality of life.

In addition, like in all other regions in Italy, Sicilians enjoy their own dialect, which is a distinct Romance language, composed of at least 250,000 words²³³. Some of the words are loan words from Greek, Catalan, French, Arabic, Spanish, reflecting the several rulers over time. The Sicilian language is also spoken to some extent in Calabria and Apulia and has had a significant influence on the Maltese language. In the modern age, as Italian is taught in schools and is the

²³¹ <http://richardbrenneman.wordpress.com/2011/01/13/wikicable-sicilians-fight-back-against-the-mafia/>

²³² DEMOPOLIS (n.d.). *Orgogliosi di essere siciliani ma insoddisfatti dei servizi e della qualità della vita nell'Isola*. Website of Demopolis. URL: http://www.demopolis.it/newsfocussicilia.php?subaction=showfull&id=1257953167&archive=&start_from=&ucat=13,23&template=News&category=23&sortby=5&PHP_SELF=newsfocussicilia.php

²³³ CRISCIONE L. (2007), 'The Sicilian Language'; URL: "[The Sicilian Language](#)".

language of the media, Sicilian is now a secondary language amongst much of the youth, especially in some of the urban areas.

Sicily's cultural and religious heritage remains a unique fusion of European, African and Asian influences.²³⁴ Although this is true, it is difficult to draw out general conclusions concerning the impact of insularity on the Sicilian identity. While insularity surely helps to preserve certain traditions, it is hard to determine whether these are better safeguarded in Sicily than in the rest of Italy for a number of reasons: (i) Sicily's history has been somewhat diverse to that of the rest of Italy for a long part of its existence; (ii) the island's unique language is not uncommon in other regions in Italy and it is hard to determine whether this has experienced less manipulations from its original format than other regions in Italy have experienced; (iii) in this day and age, although insularity makes it harder for the population to mingle, modern technology and media have still allowed Sicilians to be exposed to changes happening outside its territory.

Policy has been implemented to better preserve the distinct identity and cultural heritage of the Sicilian region. Sicilian regional policy initiatives 2007-2013 in this regard are listed under the heading of 'cultural, natural and tourism attractors' (Attrattori culturali, naturali e turismo (FESR)) which include among others the initiatives to protect and reinforce cultural goods, to diversify and de-seasonalise the tourism sector, and to value cultural goods and activities in order to augment the attractiveness of Sicily as a tourism destination and improve the quality of life of residents.²³⁵ Therefore, policy aims to invest further in enhancing the Sicilian cultural heritage and ensure that the tourism industry becomes more sustainable by moving away from promoting Sicily merely as a "sun and sea" destination but by showing what more the island has to offer to visiting tourists. In addition, this would create business opportunities for entrepreneurs that would be willing to engage in traditional activities.

The cultural cooperation programme "Culture 2000" with approximately 34% of its budget is earmarked for the purpose of preserving and enhancing Europe's cultural heritage. Unlike funds spent on many other areas in Sicily, cultural funds have had some success in improving the island's museums and historical monuments.²³⁶

While these policies are supporting the regional tourism and cultural sector, they were not conceived or implemented with a special sensitivity to the islandness

²³⁴ CALLACI G. (2007), 'Sicily's rich heritage'; URL:
<http://www.interreligiousinsight.org/April2007/April07Callaci.pdf>

²³⁵ PRESIDENZA DELLA REGIONE SICILIA, DIPARTIMENTO REGIONALE DELLA PROGRAMMAZIONE, 'Documento Unitario di Programmazione della Politica Regionale 2007-2013'; URL:
http://194.243.81.173/Portals/0/Altri%20documenti/DUP_Sicilia_2007_2013_Delibera_n_206_2010.pdf

²³⁶ ANELLO, L. (2010). *Sicily, gobbler of EU funds*. Article on presseurop of 8 October 2010. URL:
<http://www.presseurop.eu/en/content/article/356171-sicily-gobbler-eu-funds>

dimension. Furthermore these initiatives are among the most vulnerable in this time of fiscal austerity in Italy.²³⁷

2.3 Environment

Protected areas

The development lag that exists in Sicily has served to preserve other parts of the territory from development that paid little attention to the identity of location in delays in the architectural and spatial planning interventions but it has also resulted in considerable damage in relation to the phenomena of illegal building²³⁸. To date, there are four Parks and 76 Nature Reserves covering a total area of 270,988 hectares, or 10.5% of the islands. Adding the 218 Sites of Community Importance (SIC) and the 29 Special Protection Areas (SPAs), the total area under protection is 502,618 hectares.²³⁹ This area includes mountain, hilly, coastal and marine areas, and variety of flora and fauna. One such protected area is the Torre Salsa area which was established in 2000 and is currently managed by the WWF. It covers 761 hectares of land and houses a visitor centre and a 4km nature trail. Another protected area is Isola bella, north of the coast of Taormina, one of the most popular touristic resorts in Sicily. The island is connected to the mainland by a narrow strip of sand, which makes it accessible most of the year. The whole island is protected, totalling 10.49 hectares of land. This area was managed by WWF, then by the Province of Messina and finally by the University of Catania. This is a protected area that is highly vulnerable to the influences of development, especially those linked to the tourism industry.

There are a number of activities that conflict with protected areas, mainly tourism and over development. In addition the lack of understanding of the residents for the need of such protection and restrictions leads to a number of conflicts. The conflicts existing in the Torre Salsa reserve can be evidenced by the suspected arson attack on the premises in 2008^{240,241}. There also seems to be pressure on the reserve by individuals, likely to be poachers, who illegally use the area for their activities. Conflicts in Isola bella have arisen due to abuses in construction in the reserve, with private residences within the reserve

²³⁷ https://docs.google.com/viewer?a=v&q=cache:w0Tog36RI_oj:www.adam-europe.eu/prj/7007/prj/Stage%25201_The%2520situation%2520in%2520preservation%2520of%2520monuments%2520and%2520assets_Sicily.doc+preserving+Sicily's+cultural+heritage&hl=mt&gl=mt&pid=bl&rcid=ADGEEsG07AMJ6G_5AQU6zWmSblhwk_WrvfExOa5li8xTIFSjO-c6akgUn91ZatjUVYE5UsIA9CWTwW_CgtdbRzyQviMZ8UoDiMtKX5SnOu0uhcvBcdNRUIrLEbEzAq1GmpS6lYeNSQc&sig=AHIEtbTTI8nm0N_6Mwss0p_q1LRISUzegw&pli=1

²³⁸ SicilianeCuore.net (n.d.): Aree protette. Article on SicilianeCuore.net. URL: <http://www.sicilianeCuore.net/aree-protette/>

²³⁹ <http://old.sicilianatura.org/step2/pages/progetto.html>

²⁴⁰ WWF (2008). Incendio a Torre Salsa. Notizia inserita in data: set 18, 2008. URL: <http://www.wwftorresalsa.com/index.php?mact=News,cntnt01,detail,0&cntnt01articleid=6&cntnt01origid=62&cntnt01returnid=62>

²⁴¹ <http://www.ilcorrieredisicilia.it/cronaca/cronaca/intimidazione-al-corpo-forestale-a-vizzini-solidarieta-di-lombardo-e-sparma-a-berto>

developing pools and other unsanctioned development. Other conflicts include fences delineating the protected area being removed, signs explaining the protected status vandalised and bulky refuse disposed of on site. The bureaucratic and administrative conflicts that exist also create problems, due to clashes between regional bodies, mainly the Regional Department of Land and Environment and the Department of Cultural and Public Education. A final category are tourism related conflicts, with trees along the shore being cut down to be used as winches for sailing boats, umbrellas and deckchairs being spread on the protected beach, aggressive fishing in the area and the use of motor boats in shallow areas which damages the sea flora and fauna has also been noted.²⁴²

A number of state and regional programmes for environmental protection were introduced in Italy in the 70's. Since the mid-'70s, environmental policy has been declared a community task. EU directives have had an increasingly important role, limiting the autonomy of local government. The weight of international environmental conventions is also increasing. The first protected area in Sicily was established in 1981. This regional framework remained for the most part unchanged until 2001, when an overhaul of the entire system was undertaken. In the past, there was an absence of a system of general principles which Sicily could refer to in the establishment and management of protected natural areas. The fact that the matter of protecting the environment has moved to the exclusive jurisdiction of the state instigated the changes to the existing regional systems.²⁴³ The extent of regional power now lies within the systems used to achieve laws established at national level. The changes saw the streamlining of administrative procedures as well as the reduction in the budgets for managing protected parks.

A number of initiatives have been recently launched to improve the protection given to these areas. A list of projects that are currently being undertaken can be found in Annex A.

Renewable Energies

Due to the existence of a high number of power plants, Sicily is a net exporter of energy produced from fossil fuels even though Italy as a whole is a net purchaser of energy. In 2007 Sicily 'exported' 6.5% of locally produced energy to mainland Italy. Renewable energy accounted for 7% of total energy production in 2007 in Sicily and comes mainly from hydro power plants and wind farms, with a very small presence of photovoltaic plants.²⁴⁴

The main issues on renewable energy sources are connected to environment protection, especially close to wildlife restricted areas. Often, the most economically convenient locations for wind farms are very close to wildlife reserves and usually into wild landscapes. Although generally there is a strong

²⁴² SICILIAPARCHI (2009). *Isolabella, esposto Wwf*. Notizia - 09 Ottobre 2009. URL: http://www.siciliaparchi.com/_newsArchivio.asp?idnews=4173

²⁴³ http://www.siciliaparchi.com/_specialePoliticaAreeProtette.asp?voce=A

²⁴⁴ http://www.regione.sicilia.it/industria/use/Documenti%20ufficiali%20energia/Internazionali/Development_renewable_energy_Sicily.pdf

support to renewable energy, there is an even stronger concern on whether wind farms might damage landscape or endanger fauna, especially migrating species that find in Sicily an important stage. There is fear that landscape damage could impact tourism negatively. The uncontrolled development of the early wind power plants has caused some social conflicts in the island, mainly due to localisation of these power plants close to, or even inside, beautiful landscapes or wildlife protected areas²⁴⁵.

The view of the regional Sicilian government is that since Sicily is a net exporter of energy, any additional energy production coming from renewable energy will not reduce the emissions being produced by Sicilian oil refineries and power stations but merely increase the energy 'exported' to mainland Italy. Regional government therefore concludes that there is no environmental or economic benefit for the island from its production of renewable energy. It prefers to encourage decentralised power plants that presently supply energy to industry, isolated communities and islands to turn to renewables instead of fossil fuels, thereby reducing the polluting industry²⁴⁶. This view might be further strengthened by reports, such as those made by Kroll, an international corporate security firm, and the Financial Times²⁴⁷, that the Sicilian mafia has become involved in large wind energy contracts and that both regional and European funding is being funnelled, through renewable energy projects, to organised crime.²⁴⁸ While Sicily is not the only place where such abuse is believed to take place, in Sicily this further amplifies the discontent of citizens with the construction of new renewable energy plants.

In addition, any further increase in the amount of energy produced from renewable energy sources is strongly constrained by the limited transport capacity of the actual grid on the island, as well as its weak structure. Energy storage is applied during off-peak with pumped hydro power plant but it is not possible to increase the storage capacity due to landscape issues.²⁴⁹ Energy storage capability is furthermore limited across the entire national grid but particularly in Sicily where landscape issues pose special constraints to the development of the necessary infrastructure. With respect to the electric network, further investment is being

²⁴⁵

http://www.regione.sicilia.it/industria/use/Documenti%20ufficiali%20energia/Internazionali/Development_renewable_energy_Sicily.pdf

²⁴⁶ http://www.regione.sicilia.it/industria/use/Documenti%20ufficiali%20energia/Internazionali/Development_renewable_energy_Sicily.pdf

²⁴⁷ <http://www.ft.com/cms/s/0/b69fdf3a-38d1-11de-8cfe-00144feabdc0.html#axzz1WVP3Q78n>

²⁴⁸ SQUIRES, N. & MEO, N. (2010). *Mafia cash in on lucrative EU wind farm handouts - especially in Sicily*. Article on the Telegraph on 05 Sep 2010. URL: <http://www.telegraph.co.uk/earth/energy/renewableenergy/7981737/Mafia-cash-in-on-lucrative-EU-wind-farm-handouts-especially-in-Sicily.html>

²⁴⁹ http://www.regione.sicilia.it/industria/use/Documenti%20ufficiali%20energia/Internazionali/Development_renewable_energy_Sicily.pdf

considered. A 380kV ring will be completed around the island as well as a second connection linking Sicily to mainland Italy to ensure supply security in case of interruption. The second link to mainland Italy is also crucial for the expansion in the renewable energy field as the current structure limits the transport of energy out of the island.²⁵⁰

The publication of the Sicily Regional Energy Master Plan (Piano Energetico Ambientale Regionale Sicilia – PEARS) in 2001 laid down the roadmap for achieving the region’s renewable energy targets, simplifying bureaucratic processes to encourage investment in renewables. This was revised in 2009, giving preference to local companies for the establishment of renewables, companies that focus projects in areas such as closed quarries or landfills.²⁵¹

A Mediterranean industrial centre for research, development and production of technologies for harnessing solar energy (photovoltaics, concentrating solar power) was also launched in 2009 with the mandate to additionally produce research on the use of biofuels. The regional government has contributed (€2.2m) to the realisation of the new “Centre for Energy Technology Innovation and Transfer” of the CNR-ITAE, in partnership with the CNR (National Research Council, €2.6m), the Ministry of Environment (€2.4m) and the Naval District (€2.6m). The main activities of the centre will be the testing and benchmarking of the most promising and next-to-market energy technologies.

In order to facilitate the proliferation of wind power plants, the local government has identified three area typologies: (1) areas where wind farms are not accepted; (2) areas where restrictions apply after a severe evaluation; (3) areas without particular restrictions.²⁵²

Access to key resources: water

The sources of freshwater are mainly the underground aquifers; this has been supplemented since 1974 by desalination plants. Traditional water sources are very modest: a few small springs and little surface water collected in dams. The use of desalination in Sicily is not only limited to the large plants on the main island, but it also extends to several other smaller plants, which have been

²⁵⁰ http://www.regione.sicilia.it/industria/use/Documenti%20ufficiali%20energia/Internazionali/Developement_renewable_energy_Sicily.pdf

²⁵¹ REGIONE SICILIANA. *Piano Energetico Ambientale Regione Siciliana (P.E.A.R.S.)*.

URL:

http://pti.regione.sicilia.it/portal/page/portal/PIR_PORTALE/PIR_LaNuovaStrutturaRegionale/PIR_AssEnergia/PIR_DipEnergia/PIR_PianoEnergeticoAmbientaledellaRegioneSicilianaPEARS

²⁵² BASSO, C. & MATERA, F.V. *Development of Renewable Energy in Sicily*. Regione Sicilia. URL: http://www.regione.sicilia.it/industria/use/Documenti%20ufficiali%20energia/Internazionali/Developement_renewable_energy_Sicily.pdf

installed and are operating in the minor Sicilian islands of Pantelleria, Lampedusa, Linosa, Lipari, and Ustica. In all these cases, the use of desalination has solved the significant problem of water supply in small islands, which was traditionally faced by water transport in ship, with an estimated cost of €10-€12 per cubic meter, and a very poor quality of the shipped water.²⁵³

Sicily suffers from the typical Mediterranean characteristic of water scarcity. Southern Sicily, in particular, is one of the zones with lowest rainfall in Italy, with values of only 400mm of rain per year (similar to that of North African regions). Rainfall is concentrated in the autumn and winter months (75-80%) and often occurs in short periods of large flows which result in a low amount of water retention. This results in severe water shortages in the summer months that can have serious repercussions on the social and economic performance of the island.²⁵⁴ ²⁵⁵ Whole towns grind to a halt when severe water shortages occur, with businesses unable to operate, farmers losing crops and livestock owners finding it hard to keep their animals alive. The population affected by water scarcity can be estimated in as much as 500,000 inhabitants, distributed along the southern and western coast in the districts of Caltanissetta, Agrigento, Palermo and Trapani.²⁵⁶

The problem of water scarcity in Sicily has been made worse by significant leakages through the distribution networks, due to the ageing of the aqueducts, bad maintenance and abuse of the water system.²⁵⁷ A Water Management Plan was published in 2006 with two objectives, to fulfil the requirements of the European Directive n.60/2000 to construct an instrument of analysis and a strategy for improving aquifers and to bring together experts in the field to produce updates and propose contributions and suggest solutions for the quantitative and qualitative improvement of water bodies in Sicily²⁵⁸.

A pan-European organisation, EurAqua, has been formed in order to influence the formulation and development of European freshwater research programmes and policy development. This is done both through position papers and through inputs on specific issues. Recently EurAqua's paper "Recommendations and

²⁵³ PRODES - Promotion of Renewable Energies for Water Production through Desalination. *Example of project development opportunities in Greece, Italy, Spain and Portugal.* URL: http://www.prodes-project.org/fileadmin/Files/D5_2_Developemtn_Opportunities.pdf

²⁵⁴ http://www.prodes-project.org/fileadmin/Files/D5_2_Developemtn_Opportunities.pdf

²⁵⁵ http://www.icid.org/v_italy.pdf

²⁵⁶ http://www.prodes-project.org/fileadmin/Files/D5_2_Developemtn_Opportunities.pdf

²⁵⁷ http://www.prodes-project.org/fileadmin/Files/D5_2_Developemtn_Opportunities.pdf

²⁵⁸ Commissario Delegato per l'Emergenza Bonifiche e la Tutela delle Acque in Sicilia, (2006) 'Piano di Tutela delle Acque della Sicilia'

views on the FP7 Working Paper” included recommendations that were presented to the European Commission in April 2006²⁵⁹. In their 2004 document on European Drought Policy, they make a number of recommendations that could be beneficial for improved water management at a European level. The integration of such a policy with national and regional objectives would possibly serve as a tool to reassess the current status quo of water management.

Climate change

The analysis of climatic information reveals a complex framework characterised by a fairly large local variability that exhibits a general drift towards desertification-favourable conditions (increasing annual average temperatures, decreasing number of rainy days, higher frequency of extreme events). Such conditions are further enhanced by human activities, such as agriculture due to groundwater over-exploitation.²⁶⁰

Sicily is the Italian region with the largest arid area, approximately 45% according to data from 1961 to 1990, a portion that has certainly increased over the past decade because of the many heat waves. From the analysis of climatic conditions in Sicily, these researchers report an increase in extreme-weather events and a trend towards a lower volume of rainfall that is compressed in a shorter time-period. The high propensity for erosion of many landmasses and the quantity of rain that often falls suddenly and concentrated in short periods of time, washes away the surface soil which is a layer rich in humic acids (favourable for the growth of vegetation) and that results in a high vulnerability to desertification in large tracts of land.²⁶¹

The approach to develop some “climate change adaptation answers” at local level is being tackled at both political and technical levels by municipalities. On the political level, different politicians-representatives of the municipalities are participating in the development of the project actions. The expectation is that political decisions will change laws and regulations that are related to climate change adaptation/environmental problems such as summarised as tax incentives, greenhouse gas emissions limits or establishing a regulatory framework within which carbon trading markets can operate. Political actions have served to draw media and public attention to climate change adaptation plans. On the other hand, the technical contribution made by experts examining how projected changes in climate could interact with other environmental changes (e.g. biodiversity loss, land degradation, desertification, management of

²⁵⁹ EURAQUA (2008). Euraqua homepage. URL: <http://www.euraqua.org/content/whatiseuraqua.4.4a4d22a41128e56161b800012068.html>

²⁶⁰ Remote Sensing Analysis of Desertification trend in Eastern Sicily; Filippo Catani & Minja Kukavacic; 2009.

²⁶¹ Sicilia: Verso una Perenne Siccita? Antonio Di Cristofalo & Luigi Barba, ITCGS Palermo

energy and water) and social trends (e.g. population growth, economic development, technological progress). The assessment in which the Province of Catania is working on indicates that additional research is of course very important and needs to be linked to national and regional environmental issues.²⁶²

On a more coherent level Sicily is obliged to follow EU policy making on the matter of climate change which itself is bound by the international commitments of the Kyoto Protocol. The EU is focussing on both prevention as well as mitigation. The 15 pre-2004 countries have a joint emission reduction target of 8% below 1990 levels by 2012, which encourages Italy to attempt to reduce its national emissions. Various policies and measures have also been adopted at the EU level through the European Climate Change Programme, such as increased use of renewable energy (wind, solar, biomass) and combined heat and power installations; improvements in energy efficiency in e.g. buildings, industry, household appliances; reduction of carbon dioxide emissions from new passenger cars; abatement measures in manufacturing industry; measures to reduce emissions from landfills. The EU encourages countries to draft national climate change adaptation strategies. However, Italy has not yet prepared such a strategy.²⁶³

3. Synthesis

The research into Sicily as a case study has resulted in five nexus models being developed. The historical legacies inherited by the Sicilians due to insularity characteristics have resulted in a number of development opportunities and challenges which interact with each other to influence the social and economic realities of the islands. The models can be found in Annex B.

1. *Detached Governance*

Sicily has been exposed to a turbulent history which is characterised by the domination of different empires and a struggle for self-governance. This colonial dependency may be mirrored in the inclusion of the islands into Italy as a whole country. These realities have resulted in Sicily experiencing a significant physical distance from the centre of governance. The importance of the physical distance to this centre is superseded by the peripherality and dependence that Sicilians perceive in the governance structure. The effect of this situation is a diminished sense of ownership of the islands that is felt by the islanders. The perceived

²⁶² Climate Change Adaptation Action Plan in the Province of Catania and in the Municipality of Biancavilla; Mariagiovanna Laudani, Provincia Regionale di Catania

²⁶³ EEA (2011).

ineffectiveness of local government on the islands has contributed to the underground governance structures that have emerged as an alternative and more effective way of organising the region. The ineffectiveness of regional government to adequately invest in sufficient infrastructural projects has led to problems with the rail and road networks. These two elements combined have led to high costs of doing business which has led to high and volatile levels of unemployment. Detached governance can also bring about low levels of interest in environmental preservation and low incentives to invest in projects with a long-term benefit to the region. "External" initiatives are also viewed with great suspicion due to the insular mind-set cultivated by this peripherality and dependence, and which has been amplified by schemes such as the "Fund for the South". Within this, there may be the opportunity to cultivate increased ownership through fiscal federalism.

2. Idyllic Image

The fact that islands are surrounded by the sea and therefore detached from the landmass seems to translate in a mental detachment from everyday life. Sicily has strong associations with an idyllic image of peace, tranquillity and a more old-fashioned way of life. Its location in the Mediterranean Sea and climatic conditions further contribute to this 'paradise on earth' image. This image has been well exploited by Sicily in terms of the tourism industry, where sun and sea tourism plays a central part. It has also served as an attraction to residents to remain on the islands and for new residents to migrate to Sicily. This image has also served to attract individuals with an artistic flair; writers, poets and artists have found the islands an ideal place to allow their creative minds to wander. This image can, however, serve as a barrier to island development. The image of paradise often hides the underlying suffering that islanders may have to bear, inhibiting the understanding of the true development challenges of islands by policy makers. The reality that visitors encounter during their holidays on the islands does not mirror everyday life for residents. The opportunities that are yet to be fully exploited in this regards are refocusing the image to include centres for creativity on the islands through rebranding exercises, development of niche industries and the establishment of scholarships in the arts.

3. Migration Crossroads

Sicily, like other Mediterranean islands, has been at the crossroads of many civilisations due to their insularity and the inability to remain autonomous. Net migration to Sicily is positive; however this disguises the large amounts of young male Sicilians leaving the islands to seek employment on the Italian mainland. This is due to the large influx of immigrants from Eastern Europe and North Africa. While trickles of migrants pose little pressure on social structures and have been able to integrate in the past, large numbers such as those registered in recent years, can be overwhelming as they instigate an unwelcome speed of change. The opportunities brought about by this historic legacy are that, apart from amplifying the labour force, migrants may enhance the thought process on

the islands. Often, great innovation is instigated by fusing traditional experience and knowledge with new ideas and attitudes. If exploited correctly this brings with it substantial innovation opportunities, including in governance approaches, particularly if a selective approach is adopted to attract human capital. This can contribute to an effective renewal and enhancement of the social fabric.

4. Coastal Settlements

As a result of being an island community with strong ties to the sea, as well as the mountainous characteristics of the islands, Sicily is largely characterised by coastal settlements. The limitations that such a legacy imposes include the strong environmental pressure on sensitive coastal areas, which risk being ruined forever in the absence of appropriate intervention. In addition, the mountains themselves may act as a barrier to social and economic interaction between different localities in Sicily, actively dividing areas of land from each other. The sea acts, in a similar way, as a barrier to further development outwards. These characteristics can be better exploited, and their limitations better managed, with stronger and better-focused governance which aims more directly at concrete sustainable development goals.

5. Legacy of Dependence and Exploitation

Historically, Sicily has been viewed as a suitable area for exploitation and use. This can still be seen today with the location of a high proportion of power plants on the island that service economic activity on the mainland. Since the companies are owned by national enterprises, there is no real revenue benefit from locating the plants in Sicily, except for an impact on jobs which is mitigated (in whole or in part) by the environmental repercussions. This feeds into the low sense of ownership of the islands, where Sicilians feel that their destiny is not really in their hands and their land is not theirs to administer. This fuels the low level of entrepreneurship as people are unwilling to risk capital without a sense of security. This lack of ownership also leads to a low level of respect for natural and cultural assets. This is out of sync with the strong sense of identity that the Sicilians feel as a region, which seems stemmed in the dependence cycle.

4. Generalisation from Case Study

Sicily is a particular case study for islands, being the largest island in the Mediterranean and having its own mass of economic and social activity, which pushes it to the very end of the spectrum of insularity. However, from the analysis above we can still see that Sicily faces some challenges arising from its insularity.

The physical detachment from mainland is a characteristic that all islands share, with this detachment often being reflected in the psychological make-up of islanders. The separation of 'us' and 'them' is very strong for islanders, including Sicilians, and consequently the resistance to change brought about by "external" sources is subject to scepticism.

Another strong issue that arose from this study which is shared by many islands that are not island states, is the feeling of peripherality to the centre of governance. Feeling detached from the main decision-making body leaves islanders feeling powerless to influence their own future and often results in a lack of ownership of the official system of governance. Sicily is an extreme case in point where this led to the creation of a large underground system of governance. While this is one of the observations that are specific to the area, the process which contributed to this is by no means unique to Sicily.

The sensitivity of environmental assets on islands is highlighted in this case study, but it is a problem shared by many islands. The limited natural resources usually lead to heavy exploitation of the few assets that islands do have – often in order to boost their tourism industry. The triumph of economic needs over environmental ones is clear in Sicily, although efforts are being made to reverse the trend. The constant battle for finding a sustainable route to development is tricky for islands and is amplified by the delicate ecosystems that are generally nurtured by the detachment from the mainland.

The case of Sicily in particular shows the implications of a mountainous central territory with a consequent pressure for economic activity concentrating on the environmentally vulnerable coastal areas. This issue detracts from the benefits which a relatively large landmass can convey to an island.

The large emigration outflow of the native population is also a challenge that many islands face. The restrictions in employment opportunities, and the inability to commute to a substantial area on mainland on a daily basis due to the unavailability of reliable and swift links, means that islanders often need to move away from their towns of origin in order to pursue their careers. This problem is present to some degree on all islands.

The inward looking mentality of the Sicilians is an issue that many islanders will recognise as their own. While the thirst for improvement is strong on islands,

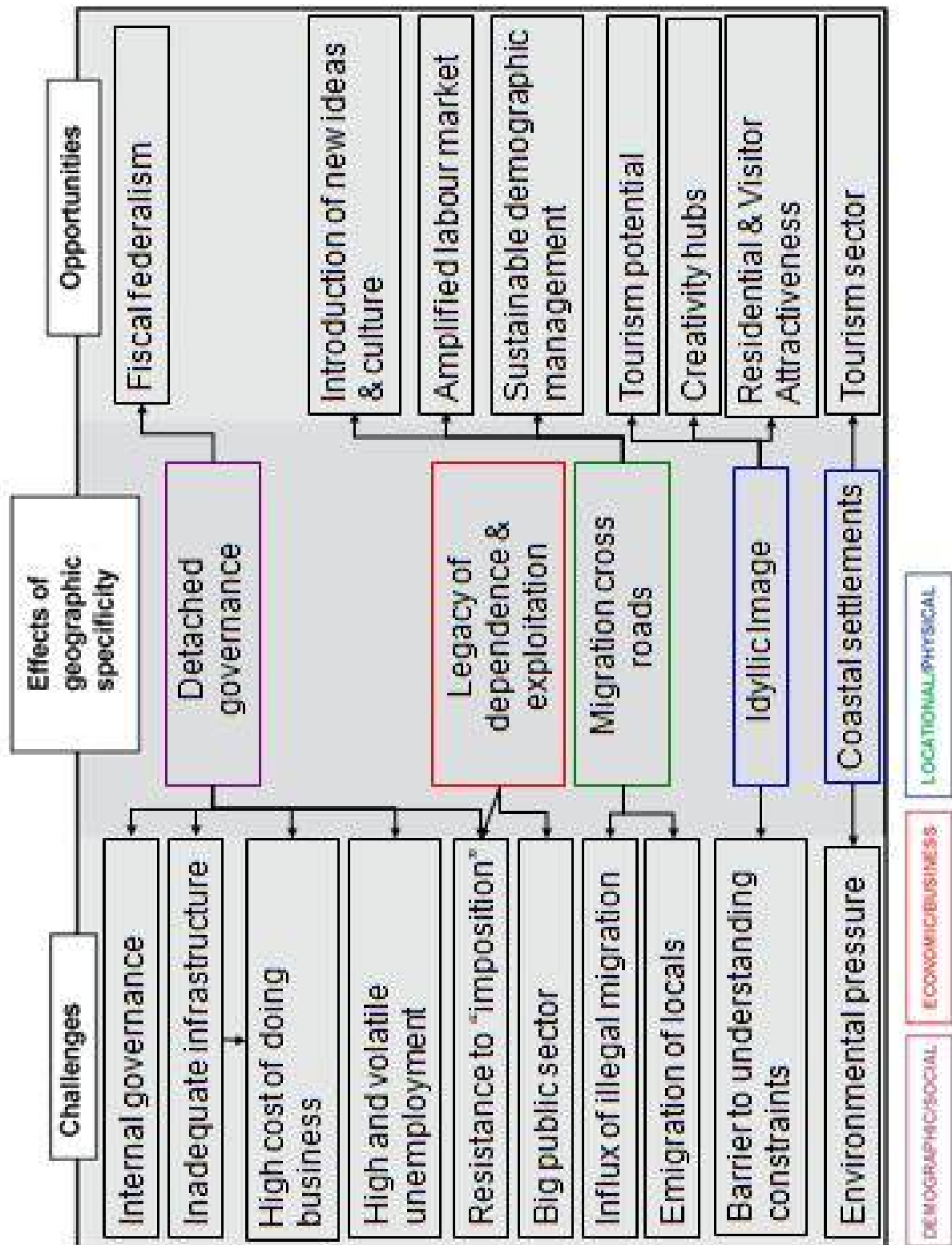
there is a sense of 'we know best' about the optimal development paths.²⁶⁴ There are also stronger barriers to change on islands as the inherited characteristics are seen almost as a scar to be worn with pride. This is one of the reasons why changes, such as the introduction of a fixed link to the mainland, are sometimes met with rejection by islanders, who are torn between the wish to reduce connection time and improve economic prospects on the islands and the longing to retain their separation.

There are a number of complex collective psychological and cultural issues which can be viewed to generally characterise island populations. These result in an inward-looking mentality, which often lead to a sense of dependence on an outside core of power, and a degree of risk aversion. They are in certain ways amplified and in others counterbalanced by a mentality which feels that the local population is best fit to determine development paths for islands and a consequent resistance to change imposed from outside. This idea is reiterated by Sociology Professor Manuel Castells who describes this phenomenon as a 'resistance-based' identity.²⁶⁵

²⁶⁴ RASMUSSEN J., 'Islands: Centres hubs, spheres and ... - metaphysical islandscapes in social theory'; URL: http://www.keg.lu.se/IGUislands/J_Rasmussen_paper_draft.pdf

²⁶⁵ CASTELLS M. (2006), 'Globalisation and Identity: A Comparative Perspective', Barcelona; URL: http://www.llull.cat/rec_transfer/webt1/transfer01_foc01.pdf

Nexus Models

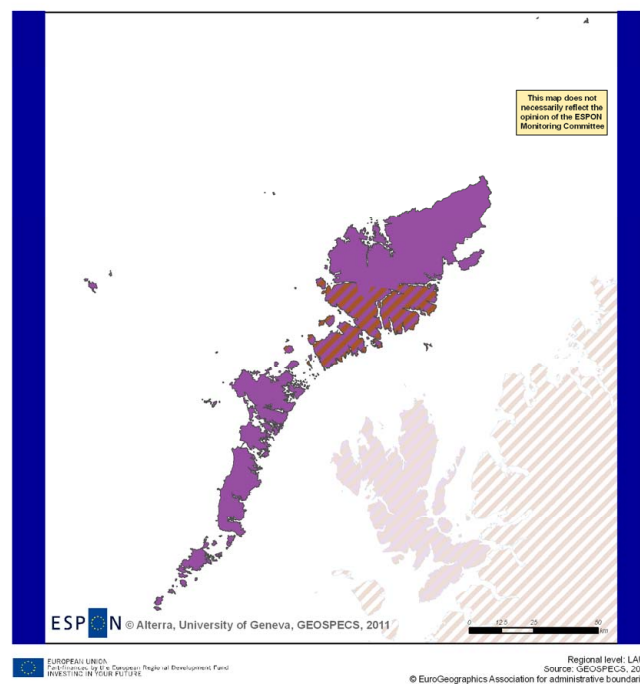


Annex 27: Case Study Outer Hebrides




1. Description of the case study area and its geographical specificity

GEOSPECS Case Studies

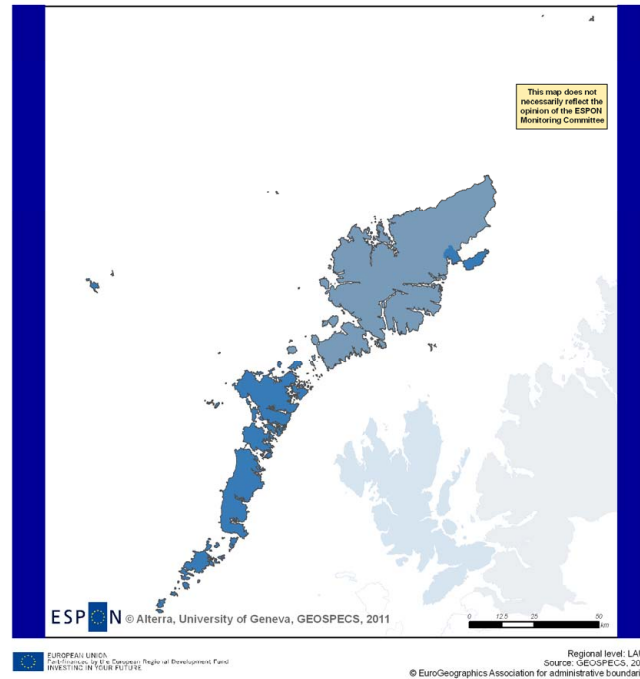
Outer Hebrides (1)



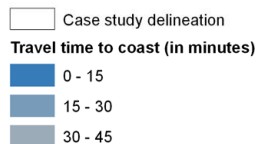
GEOSPECS specificities areas

-  Case study delineation
- Mountain areas**
-  Mountain areas
- GEOSPECS islands**
-  Island

Outer Hebrides (2)



GEOSPECS specificities areas



The Outer Hebrides are found at the westernmost periphery of Scotland and Europe. They overlook the Atlantic Ocean and stretch for 130 miles. The Outer Hebrides comprise a chain of more than 100 islands and small skerries located about 70 kilometres west of mainland Scotland. There are 15 inhabited islands in this archipelago. The main islands include Barra, Benbecula, Berneray, Harris, Lewis, North Uist, South Uist, and St Kilda. In total, the Outer Hebrides have an area of approximately 3000 square kilometres and a population of approximately 26,500. The Hebrides have a cool temperate climate that is remarkably mild and steady for such a northerly latitude, due to the influence of the Gulf Stream, with temperatures averaging 6°C in winter and 14°C in summer. The average

annual rainfall in Lewis is 1,100 millimetres and sunshine hours range from 1,100 - 1,200 per annum.²⁶⁶

Islands, such as the Outer Hebrides, constitute one type of geographic specificity that is understood to create both challenges and opportunities for economic and social development. Although the geographic characteristic, i.e. it being surrounded by sea, is one feature that distinguishes an island from other territories, it is too restrictive to consider this as the sole defining characteristic of an island region. In fact, several behavioural traits also add to the uniqueness of these areas with the term "*insularity*" encompassing these more fully.

As a result, for the purpose of this case study, "*insularity*" is used to define the broader and more encompassing characteristics of "*islandness*". The term "*insularity*" is understood to imply that the following three conditions are met:

- In the main part surrounded by the sea;
- Dependent on centres of economic, social and cultural activity outside the territory;
- Peripheral in relation to the main centre of economic, social and cultural activity.

It is, therefore, the interaction of these three conditions that will be considered when analysing how the economic, social and environmental structure and trends of the Outer Hebrides have been affected by the Islands' insularity. The distance from and dependence on centres of economic, social and cultural activities outside the islands' territory amplifies the problems that emerge merely as a result of regions being physically cut off from mainland. These difficulties are even greater for the smaller islands within an archipelago that are faced with "double insularity".

Desk research was supplemented by field work in the preparation of this case study with a questionnaire being sent out to a number of stakeholders.

The dependence of the Outer Hebrides on centres of economic activity outside its territory and its peripherality from these centres, implies that economic activity is limited with a large proportion of locals employed in the public sector. Those employed in the private sector work in very small enterprises with a great incidence of people employed in their family business. In addition, the peripherality of the Outer Hebrides results in a lot of activity being characterised by sporadic demand and seasonality of employment. This results in the need for people to invest in their education and skills in order for them to be employable all year round.

The desire to invest in one's education is the main cause reported for today's outward migration particularly in the younger age cohort.²⁶⁷ A number of these remain on mainland in search for better paid and more varied job opportunities. Some of those who migrate choose to return to the Outer Hebrides in their older

²⁶⁶ <http://en.wikipedia.org/wiki/Hebrides>; http://en.wikipedia.org/wiki/History_of_the_Outer_Hebrides

²⁶⁷ HALL AITKEN (2007) *Outer Hebrides migration study*, for Comhairle nan Eilean Siar, Western Isles Enterprise and Communities Scotland; URL: <http://www.cne-siar.gov.uk/factfile/population/documents/OHMSStudy.pdf>

age as a result of the strong sense of identity and belonging to the islands. This strong community spirit, a perceived safe environment, and preserved traditions are all benefits attributable to the first characteristic of insularity, i.e. surrounded by the sea. The limited influence from the “outside world” has allowed this region to retain traditions that are considered to be a heritage to locals including the widespread use of Gaelic.

This migration outflow has taken place throughout the late 19th century and for much of the 20th century, and has led to the dwindling of the archipelago's population. The persistence of this emigration in recent years led to the Outer Hebrides experiencing the biggest population decline of any Scottish local area over the last decade. This decline is inextricably linked to the area's geographic challenges²⁶⁸, in terms of its remote islands status, limited educational and employment opportunities on the islands as well as the predominantly rural nature of its communities. This legacy has led to the Outer Hebrides having one of the lowest population densities, at 8.5 persons/km², of all Scottish health boards while the Scottish average is 65.2 persons/km².²⁶⁹ In addition, approximately 78.9% of the Outer Hebrides population live in areas classified as very remote-rural compared to 3.0% in Scotland as a whole. Such remoteness and sparsity factors present challenges for community development.

As a result, problems of inadequacy of goods and services provision exist. In fact, more than three quarters of the population of the Outer Hebrides are classed as living in ‘access deprived’ areas compared to 15% in Scotland as a whole, as measured by the SIMD geographic accessibility domain. This problem has been further exacerbated by the recent migratory patterns that lead to increases in costs per capita. The cost of health, for instance, is substantially higher than on mainland Scotland. Certain segments of the population need to travel long distances to be given adequate care and in many cases need to be taken to a hospital on the mainland since the number of interventions offered are limited. In addition, outward migration has led to a number of schools closing down since smaller numbers are enrolled each year. ICT has been used to reduce this dependence by providing tele-health as well as distance learning courses. Although this is a positive initiative, broadband connectivity is still relatively weak in certain areas. ICT also seems to be creating a social divide with people that are not computer literate feeling marginalised. Transport infrastructure within the island is also considered inadequate, entailing a greater use of private transportation. This again results in social exclusion, particularly with respect to the elderly and disabled people, who may have no other means of mobility.

The current trend in international oil prices is raising costs further for the Outer Hebrides particularly since they are highly dependent on imported oil for their energy source.²⁷⁰ This has led them to investigate alternative avenues of investment in renewable energy sources although the strong sense of environmental preservation may limit this potential. The Outer Hebrides is home

²⁶⁸ http://www.ohcpp.org.uk/Single_Outcome_Agreement.pdf

²⁶⁹ THE OUTER HEBRIDES COMMUNITY PLANNING PARTNERSHIP (2009) *Forward Together, Single Outcome Agreement 2009-2010*; URL: http://www.ohcpp.org.uk/Single_Outcome_Agreement.pdf

²⁷⁰ Economic and Community Benefit Study – Scottish Government/ Halcrow Group Limited – January 2009

to a vast number of protected areas although locals believe this not to be necessary given the culture of Hebrideans that favour environmental protection without necessitating regulation. In fact the feeling of imposition from external sources is expressed by most locals.²⁷¹

2. Economic, Social and Environmental processes related to the geographic specificity

2.1 Economy

Economic vulnerability/robustness facing globalisation

Activity Structure

The Outer Hebrides experiences a range of economic challenges due to its peripherality, insularity and the sparsity of its population. The area economy is characterised by a large number of small enterprises; a small number of key private sector employers; distinct areas of comparative sectoral advantage - principally natural resource-based - and a dominant public sector employment base²⁷². Public administration, particularly education and health, is the largest employment sector accounting for over 40% of jobs in 2008. The central role taken on by the public sector in employment has, however, repercussions on resource availability and quality for the private sector. In addition, due to the smallness of the market, public sector services are often restricted in their efficiency as compared to the same provision in more densely populated areas and mainland areas.

The majority of workers employed in the private sector in the Outer Hebrides were employed by companies with fewer than 50 employees in 2008, which demonstrates the dominance of employment within small businesses. At 3.1 new start-ups per 1,000 of the population in 2008, business start-ups in the Outer Hebrides have been lower than in the Highlands and Islands overall that averaged 4.0 per 1,000 of the population in the same year. Agriculture, fishing and construction account for a higher proportion of employees than in the Highlands and Islands and opportunities in the services industry, particularly in tourism-related activities have reportedly increased.²⁷³

However, employment is often seasonal and of a part-time nature with average weekly income being significantly lower than that of the Scottish average. Locals believe there to be limited employment opportunities in the Outer Hebrides in part related to their insularity. As a result, unemployment in Outer Hebrides has been higher than in the Highlands and Islands.²⁷⁴ Having said this, however, there have been times where the skills on the island have been in short supply and non-locals had to be recruited. Employment is found to be more stable on the larger islands of Lewis and Harris that have easier access to the main town of Stornoway, which is the largest settlement on the Western Isles. The

²⁷¹ GEOSPECS field research

²⁷² Outer Hebrides Area Team Business Plan 2010-2013; Highlands and Islands Enterprise

²⁷³ Gayle Findlay – Outer Hebrides Community Planning Partnership

²⁷⁴ <http://www.scotland.gov.uk/Resource/Doc/187960/0052049.pdf>

remaining islands in the archipelago experience the effects of double insularity, being doubly dependent on the islands of Lewis and Harris as well as the mainland. It is also interesting to note that islands to the south generally show a stronger link between parental skills and those of their offspring, who typically follow in their parents' footsteps.²⁷⁵

Despite the limited job opportunities in the Outer Hebrides, the educational attainment level in secondary schools was well above the Scottish average in 2008/09. This reflects the importance that the Outer Hebrides places on human capital and partly explains, as will be discussed in greater detail throughout the case study, the migration outflow that occurs in the younger age cohorts.

The peripherality of the region results in it having to take on a reactive role in policy making and economic development. This has a strong effect on employment in the Outer Hebrides, which is typically characterised by sporadic short high demands followed by lows. There are few diverse sectors operating and as the mean age increases the variety of skills decreases. Many people end up learning two or three skills in order to keep themselves in employment all year round to cope with the seasonality effect.²⁷⁶ A substantial premium is paid for goods or labour brought onto the islands compared to mainland Scotland. There is also an increased incidence of inclement weather, the handling of which ties up a significant amount of time and effort of the locals.²⁷⁷

The peripherality of the islands has led to other economic problems. The returns on investment, for instance, are relatively low in the Outer Hebrides. For example, one local councillor stated that "*road building serves less users but costs more per mile to build*".²⁷⁸ Due to this, investment is often not undertaken. There are however examples of ways in which the population of the islands have been successful, mainly when they developed specialised niches such as the world-renowned Harris Tweed, local food specialities, tourism, fishing and more recently the development of renewable energy sources.²⁷⁹

Accessibility, connectivity and SGI

Specific transport infrastructure issues related to geographic specificity

Transportation is a key factor limiting the region's economic development both in terms of accessibility as well as cost. Although accessibility has vastly improved, the regions' geographical characteristics continue to constrain potential economic development opportunities.²⁸⁰ This problem is further aggravated given the wide dispersion of both producers and consumers. Distances are also greater for residents to travel to their place of work/study. In the Outer Hebrides

²⁷⁵ Neil Campbell – Outer Hebrides Councillor

²⁷⁶ Neil Campbell – Outer Hebrides Councillor

²⁷⁷ Neil Campbell – Outer Hebrides Councillor

²⁷⁸ Neil Campbell – Outer Hebrides Councillor

²⁷⁹ Gayle Findlay – Outer Hebrides Community Planning Partnership

²⁸⁰ Sources of Structural Change in Peripheral Rural Areas: The Case of the Western Isles; 2000 Roberts D & Thomson K.J.

this was estimated to be 25.81 km in 2001 while the Scottish average was 12.58 km.²⁸¹

Accessibility is one of the four main challenges to the Highlands and Islands outlined in the Operational Programme for 2007 – 2013. The Small Business Survey reports that 20% of businesses in the Highlands & Islands view transport issues as a one of the main obstacles to business success (as opposed to 10% in Scotland as a whole). Feedback from islanders highlighted cheaper travel to the mainland and integrated and reliable transport as two of the nine most important changes they wish to see addressed. Transport is perceived as a barrier to social integration to overcoming divisions in society.²⁸²

The following two quotes from feedback received by stakeholders also reinforces this idea.

*"Most of the smaller islands and some larger ones are not served by local ferries that face a dependence culture as they cannot use personal transport to move around ... This is normally satisfied on the mainland by free access to public and private transport, and through democracy in government. On a small island neither of these elements is present, as transport is sporadic and subject to mainland control, and democratic representation is generally shared with other neighbouring communities."*²⁸³

*"The transport in winter is weather dependent, and in summer capacity dependent due to tourism use."*²⁸⁴

Scotland's Transport Strategy, which considers the promotion of social inclusion as a key objective, identified three issues facing people in rural areas, namely (i) for drivers - a higher dependence on driving and a high proportion of their income spent on driving costs since fuel prices are typically higher in the Highlands & Islands; (ii) for non-drivers - the higher levels of car use mean there is less demand for public transport – those without a car, such as older people, disabled people, women and young people, become more socially excluded; and (iii) poor access to key services.

The logistics and supply of products is an issue for the Outer Hebrides. The rising cost of fuel, the costs of the ferry service from the mainland, as well as the tolls on the Skye bridge have increased the cost of insularity. This problem impacts most heavily on the large volume low margin products such as agricultural products.²⁸⁵

With respect to the operation of air/sea links, locals feel that the management structure of these links does not significantly affect the islands' development.

²⁸¹ <http://www.cne-siar.gov.uk/planningservice/documents/SEA-%20Env%20Report%20LDP.pdf>

²⁸² Building capacity for a Sustainable Population in the Outer Hebrides; November 2008. Outer Hebrides Partnership

²⁸³ Peter Brown – Outer Hebrides Tourism Industry Association

²⁸⁴ Neil Campbell – Outer Hebrides Councillor

²⁸⁵ Strategic Alternatives for Small Retail Businesses in Rural Areas: Evidence from the Southern Western Isles of Scotland., Byrom J, Medway D & Warnaby G. March 2001.

What appears to make a greater difference is whether the control of the links is local or distant. Distant organisation and management from a large mainland organisation are equally pernicious whether public or private.²⁸⁶ One of the stakeholders consulted also believes that the nationalisation of a number of transport companies, such as Caledonian MacBrayne Ferries, has resulted in loss of flexibility, competitiveness and innovation. Rather than an issue of ownership, however, the effective monopoly position given to the Highlands and Islands Airports Ltd (HIAL) over the area's airports is believed to have stunted development.²⁸⁷²⁸⁸ This point illustrates that in the specific contexts of smallness and peripherality characterising the Islands, the pursuit of an effective model for business development becomes more elusive. The lack of critical mass of the market inhibits the process of creative destruction which endogenously identifies efficient business setups. The specific example described here illustrates that there is no clear indication as to whether external ownership or the existence of small local monopolies would be more beneficial to the islands' development.

The Scottish Government has introduced policy to try to mitigate the difficulties of accessibility arising from the islands' insularity. In this respect, the Scottish Government has the authority to designate particular routes as Public Service Obligations (PSO). This is used for scheduled air service on routes serving peripheral regions. The rationale for imposing a PSO should be based on the fact that the maintenance of regular air services is considered vital for the economic development of the region where the airport is located. Furthermore, a PSO should be imposed where adequate provision of air services in terms of continuity, capacity and pricing could not be possible if the service operators were solely taking into consideration their own commercial interests. The Scottish Government eases the cost of transport for islanders using these Public Service Orders for life line air services and road-equivalent tariff for ferry crossings.²⁸⁹ A local Comhairle policy has also subsidised business travel on inter-island ferries. This has seen a positive effect on business allowing this to expand across the island chain. In addition, the national policy of Resources, Energy and Tourism (RET) on the islands ferries to the mainland has seen a huge increase in traffic, particularly tourism-related.²⁹⁰

In addition, the Scottish Government operates an air discount scheme for residents of remote rural areas. This scheme offers eligible people discounted air fares on routes between certain highland and island airports. The Air Discount Scheme (ADS) was launched in 2006 in order to support residents to reduce the cost of lifeline air links to and from the Highlands and Islands of which the Outer Hebrides is part. Residents get discounted air tickets to the main Scottish hubs.²⁹¹ In April 2011²⁹², however, the government removed the ability to travel

²⁸⁶ Peter Brown – Outer Hebrides Tourism Industry Association

²⁸⁷ Peter Brown – Outer Hebrides Tourism Industry Association

²⁸⁸ HIAL, a company owned entirely by the Scottish Government, owns and manages eleven airports throughout the Highlands and Islands of Scotland

²⁸⁹ Neil Campbell – Outer Hebrides Councillor

²⁹⁰ Gayle Findlay – Outer Hebrides Community Planning Partnership

²⁹¹ <http://www.airdiscountscheme.com/airds/9.2.7.html#objectives>

with ADS if on business for fear that it may be in conflict with EU rules²⁹³, adding further to the costs of doing business for the private sector as well as to the local public sector and voluntary associations.²⁹⁴ In addition, local authorities feel that there is a real risk that the number of passengers travelling by air will fall, leading to a corresponding reduction in the level of the air service in the future.²⁹⁵

Fixed links to mainland have often been contemplated. Whilst individuals probably see this as advantageous, there are opposing views in terms of economic and social stability and development since this development may lead to increased centralisation of services (shops, schools etc).²⁹⁶ Residents also seem to feel that the costs per head of such an investment project would never make it feasible.²⁹⁷

Services of General Interest

Within the Outer Hebrides the provision of infrastructure such as public transport, health care and education is focused and coordinated from Stornoway. Recent developments have been focused on new multi-purpose community schools, which combine the provision of a range of social infrastructure, such as leisure facilities, educational opportunities (for children and adults) and health within one building or a cluster of buildings on the same site.

The residents of the islands have access to hospitals with varying levels of service availability. There are three hospitals based in the Outer Hebrides, with the Western Isles Hospital in Stornoway being the largest and most comprehensive albeit still limited in number of interventions. The main hospital on the Isle of Lewis in fact has only 17 full time equivalent doctors. These hospitals are complemented with a number of smaller clinics, most of which based on the isle of Lewis.²⁹⁸ For islanders outside Lewis and Harris, access to these services are affected by distance and costs of attending hospital or a consultant appointment. Appointments will not only include travel but also

²⁹² ORKNEY ISLANDS COUNCIL (2011). *Councils Team Up On Air Discount Scheme Concerns*. Website of Orkney Islands Council. URL: <http://www.orkney.gov.uk/Default.aspx.LocID-0cznew0ol.RefLocID-0cz00d.Lang-EN.htm>

²⁹³ MCARTHUR, L. (2011). *Minister's Answer Undermines Justification For The Air Discount Scheme Cut*. Press Release of Liam McArthur, MSP for Orkney, of 15.06.2011. URL: <http://www.liammcarthursmp.org.uk/press-releases.php?detail=y&id=876>

²⁹⁴ Gayle Findlay – Outer Hebrides Community Planning Partnership

²⁹⁵ <http://www.orkney.gov.uk/Default.aspx.LocID-0cznew0ol.RefLocID-0cz00d.Lang-EN.htm>

²⁹⁶ Peter Brown – Outer Hebrides Tourism Industry Association

²⁹⁷ Neil Campbell – Outer Hebrides Councillor

²⁹⁸ COMHAIRLE NAN EILEAN SIAR (2010). *Outer Hebrides Fact Card*. URL: <http://www.cne-siar.gov.uk/factfile/documents/OHFactCards2010.pdf>

overnight stays either in hospital or in other accommodation. Given that hospitals in the Outer Hebrides do not cover all interventions required by locals, some patients need to be treated on the mainland. This entails large costs to the Health Board where patients are often flown by emergency "air ambulance".²⁹⁹ Greater pressure is also being put on health services in the Outer Hebrides as a result of the economic vulnerability and social isolation that Hebrideans face, which is reportedly affecting their health and well-being.³⁰⁰ This is reflected by the large proportion of alcohol-related admissions that is far greater in the Outer Hebrides than on a national level with alcohol dependency accounting for over a third of the total admissions in the Outer Hebrides compared to just over 10% across the whole of Scotland.³⁰¹

With respect to education, the number of schools, both at primary and secondary level, is on the decline with a total of 35 primary schools and 11 secondary schools in 2009, down from 43 and 13 in 1999. This reflects the decreasing number of students in the Outer Hebrides as a result of the migration outflow that has been taking place.³⁰² It also reflects the limited number of teachers who are able and willing to commute from the mainland regularly.³⁰³

The current measure of deprivation across government departments is the area based Scottish Index of Multiple Deprivation which is not sensitive to the dispersed nature of rural deprivation. Alternative and innovative methods will need to be devised within the Outer Hebrides for identifying rural deprivation and its impacts in various areas including health inequalities. Health inequalities, for instance, are a key government priority that need to be addressed, but present a challenge for rural areas in view of the difficulty in measuring and targeting the problem. This is because the Outer Hebrides has no area within the 15% most deprived data-zones as measured by the Scottish Index of Multiple Deprivation.³⁰⁴

Local accessibility of quality public services, better transport links, Road Equivalent Tariff/Air Discount Scheme, universal digital broadband coverage and availability of affordable fuel and energy are a few of the priorities for partners in ensuring that the Outer Hebrides, and in particular its more remote communities, are not disadvantaged.³⁰⁵

Well North Outer Hebrides (WNOH) Project was introduced in May 2008 to provide universal health checks to people aged between 40 and 69 with success stories visible in cardiovascular health checks and instantaneous access

²⁹⁹ Gayle Findlay – Outer Hebrides Community Planning Partnership

³⁰⁰ http://www.ohcpp.org.uk/Single_Outcome_Agreement.pdf

³⁰¹ <http://www.outerhebadp.co.uk/wp-content/uploads/2011/02/Outer-Hebrides-ADP-Strategy-2011-2015.pdf>

³⁰² <http://www.cne-siar.gov.uk/factfile/documents/OHFactCards2010.pdf>

³⁰³ Neil Campbell – Outer Hebrides Councillor

³⁰⁴ http://www.ohcpp.org.uk/Single_Outcome_Agreement.pdf

³⁰⁵ http://www.ohcpp.org.uk/Single_Outcome_Agreement.pdf

to CVD and Diabetes screening test results. The fact that Well North clinics are effectively 'mobile' and held in a variety of community venues to suit different individuals is thought to have been a key factor in the success of the project.³⁰⁶ In addition, the development of e-health and tele-health initiatives is seen as useful to help reduce the impact of insularity, namely the limited access to services and their relatively high costs.³⁰⁷

The Single Outcome Agreement, a partnership between the Scottish Government and the Outer Hebrides Community Planning Partnership, has a priority to tackle the issue of long-term population decline and demographic change, and what it means for future service provision such as social care and health care. There are particular priority health areas which especially benefit from partnership approaches. These include areas such as alcohol misuse, mental well-being, the rising prevalence of long term conditions (particularly for heart related conditions including coronary heart disease, heart failure, hypertension, etc.) in ageing communities and opportunities for health gain such as through greater physical activity. The impacts of these priorities together with an ageing population and the policy direction towards shifting the balance of care for health and social care are key areas for partners.³⁰⁸

Role of information and Communication Technologies

Impacts of ICT

Promotion of ICT is a main priority for the LEADER programme in the Outer Hebrides as well as being one of the seven OHCPP priorities. ICT has been used in the health sector, to provide online diagnosis and advice, in work environments for video conferencing and interaction, as well as for education to provide online classrooms for remote homes. 309

The Outer Hebrides has pioneered the concept of 'Live Local-Work Global', and has been at the forefront of promoting remote and flexible working for over 10 years, initially through the 'Western Isles ICT Advisory Service' and subsequently through the 'Work Global' project. Promoting the lifestyle and business benefits of an island location has brought or enabled the creation of over 400 new jobs, attracted at least five ICT companies to locate in the area and encouraged the establishment of eight local ICT companies.

Teleworking has been a notable area of achievement, enabling highly skilled, home-based work opportunities to be created in areas as diverse as scientific publishing and legal secretarial work, and uncovering a remarkable pool of skills and talent across the islands. In 1999, the Western Isles ICT Advisory Service won the European Telework Award as one of the top telework enterprises in

³⁰⁶ HEBRIDES NEWS TODAY (2011). *Well North Outer Hebrides leads the way in Scotland*. Article of June 30, 2011. URL: <http://hebridestoday.com/2011/06/well-north-outer-hebrides-leads-the-way-in-scotland/>

/

³⁰⁷ Gayle Findlay – Outer Hebrides Community Planning Partnership

³⁰⁸ http://www.ohcpp.org.uk/Single_Outcome_Agreement.pdf

³⁰⁹ Neil Campbell – Outer Hebrides Councillor

Europe.³¹⁰ The public and voluntary sectors also regularly use video conferencing to conduct business to the island chain as well as to mainland.³¹¹

However, as the ICT sector developed, lack of broadband connectivity emerged as the single biggest challenge to the growth of the knowledge economy in the Outer Hebrides. It became clear that broadband was essential to attracting inward investment, teleworking and job dispersal opportunities, and in supporting the development of indigenous businesses. A project designed through public sector partnership called 'Connected Communities' was developed to address this challenge that aimed to deliver high performance broadband wireless network across the Outer Hebrides. The network pilot is funded by the DTI UKOnline, Scottish Executive, Western Isles Enterprise and Comhairle nan Eilean Siar. Because of the wide distribution of the population across a number of islands, traditional methods of providing broadband proved to be impractical. The solution was to use a wireless network to provide a widely distributed broadband service across the islands. Schools, health centres and council offices were the first to be connected. Through this same infrastructure, the rest of the community has gained access as the network develops.

Various other success stories can be outlined for the use of ICT to address the challenges brought about by insularity. For instance "Telework Facilitation Service for the Western Isles of Scotland" carried out by work-global.com, won the category "Best Example in SMEs" at the European Telework Week 1999. As a result, a Research & Development Centre working on new Internet & telephony solutions was opened as well as a remote learning centre in partnership with a new Virtual University.³¹² Education in fact benefitted substantially from ICT advancement. Lews Castle College, for instance, has used ICT to provide the courses it offers throughout the Outer Hebrides. The MyUHI remote desktop service available for students provides a virtual desktop on any internet connected computer giving Lews Castle College students secure remote access to their college files and applications from anywhere using a standard web browser. ICT has also been used by residents for tele-health that has enabled quicker and easier access to a range of services and professionals.

Public opinion on the effectiveness of ICT promotion and use in the Outer Hebrides is mixed. On the one hand, locals feel that although tele-working is useful, it is generally only available to those who move to the Outer Hebrides and retain a previous job rather than being available to existing residents.³¹³ In addition, the funding stream offered by the Scottish Rural Development

³¹⁰ PS PUBLIC SERVICE (2005). *Creating Communities of the Future*. Devolved Government Issue 10. Article on PublicService.co.uk on 13 December 2005. URL: http://m.publicservice.co.uk/article.asp?publication=Devolved%20Government&id=202&content_name=ICT&article=5215

³¹¹ Gayle Findlay – Outer Hebrides Community Planning Partnership

³¹² WORK GLOBAL (1999). *An example of ICT from the Outer Hebrides*. Website of the Work Global Project. URL: <http://www.work-global.com/news/index.php?id=11>

³¹³ Peter Brown – Outer Hebrides Tourism Industry Association

Programme is totally internet based, which has the effect of excluding those without a good broadband connection, as well as those who are less comfortable with computers or indeed form filling.³¹⁴ The exclusion of those without internet access or without the skills to use the internet is a possible side-effect of moving towards increased internet reliance for essential services. This problem is aggravated by the fact that, although broadband connections are improving, problems with internet service still persist particularly outside Stornoway.³¹⁵ However a positive aspect highlighted by locals on ICT usage is that "island communities [are now able] to see what other islands are doing ... blogs are also a useful outlet for those with a suggestion or complaint to give vent to their thoughts in an anonymous context. Anybody who has actually lived on an island or in a small community for any length of time will appreciate that sometimes honesty is only possible where there is anonymity."³¹⁶

2.2 Social Demographic structures and trends

Demographic processes

The Outer Hebrides have seen the biggest proportional population decline of any Scottish Local Authority Area between 1995 and 2005. During this decade, the overall population dropped by 8.5%. This migration outflow is mainly true for the younger age brackets (16-24 years of age) who do well at school and often leave the Islands to study at University and College. In some cases, after completing their studies, young people move back to their parental home driven by financial reasons, and in particular the burden of student debt.³¹⁷ However, many are encouraged to remain on mainland to access a wider range of economic and social opportunities.³¹⁸ The number of women that emigrate exceeds that of men, due to an even greater lack of job opportunities for the former, leading to gender imbalance.

The key drivers of population change are therefore said to be the limited job opportunities available in the Outer Hebrides, particularly the lack of skilled jobs with progression opportunities, and the limited range of training and education opportunities. Insularity is considered to have accentuated these challenges with locals finding it very hard to commute to and from the place of employment/education. In some cases, it was

³¹⁴ Peter Brown – Outer Hebrides Tourism Industry Association

³¹⁵ Gayle Findlay – Outer Hebrides Community Planning Partnership

³¹⁶ Peter Brown – Outer Hebrides Tourism Industry Association

³¹⁷ Pavis, S, Platt, S, Hubbard, G (2000) 'Social Exclusion and Young People In Rural Scotland' Joseph Rowntree Foundation, York.

³¹⁸ Hall Aitken and Ionad Nàiseantanah-Imrich (2007), *Outer Hebrides Migration Study Final Report*

reported that travelling back home from mainland could take an entire day due to the long distances and connection difficulties.

The unique nature of the Outer Hebrides housing market also makes it difficult for young people to access affordable housing, with house prices having risen fairly rapidly in recent years.³¹⁹ This may be another contributing factor in the population decline as young people leave to become independent. The strong sense of community that attracts many people to the Outer Hebrides can also be viewed as 'suffocating and excluding' by some, particularly by the younger generations.³²⁰

The main implications of this outward migration are seen in low levels of production and innovation, given that the younger and more vibrant members of the community tend to leave the Islands, whilst generally the older age groups choose to remain in the Outer Hebrides and retire there.³²¹ Consequently employers increasingly turn to overseas migrant workers to address labour shortages whilst the area has an increasingly ageing population profile with the highest proportion of elderly people in Scotland.³²² This results in pressure on public finances given that people emigrate during working age and return in retirement.

Although employment and education are the main reasons put forward for the existent outward migration, there appears to be a two-way causal relationship. Outward migration allegedly occurs due to a lack of education and employment opportunities on the islands but this very migration is resulting in difficulties for the provision of goods and services since the supply of labour is often hard to find and the demand for the output produced is also limited.³²³

As a result, projected demographic changes predict that the decline in the labour market will further hamper the economy's competitiveness, productivity and the spending power of the workforce. This in turn will have an impact on the economy overall and will also bring about social impacts through new approaches to meeting the needs of the labour market. There will also be direct social impacts from population movements in and out of the Isles. All of these changes will have an effect on the demand for services, the cost of providing services and the

³¹⁹ HIGHLANDS AND ISLANDS ENTERPRISE (2011). *Area profile for Innse Gall*. Website of Highlands and Islands Enterprise. URL: <http://www.hie.co.uk/highlands-and-islands/area-information/outer-hebrides/economic-profile.html>

³²⁰ <http://www.cne-siar.gov.uk/factfile/population/documents/OHMSSStudy.pdf>

³²¹ Peter Brown – Outer Hebrides Tourism Industry Association

³²² Hall Aitken and Ionad Nàiseantanah-Imrich (2007), *Outer Hebrides Migration Study Final Report*

³²³ Hall Aitken and Ionad Nàiseantanah-Imrich (2007), *Outer Hebrides Migration Study Final Report*

way services are delivered.³²⁴ It is widely reported in the literature that rural services may be under threat due to reduced population levels.³²⁵

Educational provision, for instance, is no longer available at the very local level of previous generations. As a result, children now have to travel further for both their primary and secondary education needs. On the other hand, services available for older people have increased given the influx of return migrants at a relatively old age. In fact, the number of home care hours in the Outer Hebrides is estimated to be one of the highest in Scotland³²⁶. Having said this, however, the elderly are generally more negatively affected by certain changes, for instance in the reduction of public transport accessibility.³²⁷ With respect to retail shopping, provision is limited in range and quality although the internet has reportedly made life much easier. However, trips to the mainland are still considered by locals as necessary for a 'proper shopping' experience. In addition, services are generally more expensive than on mainland Scotland which adds to the difficulties faced by locals.³²⁸

As islands, the Outer Hebrides face problems that exceed those faced by other sparsely populated regions. The cost of servicing locals, for instance, is a lot greater given the Islands' insularity, which results in locals either having to pay exorbitant prices for goods and services or doing without them altogether since the lack of critical mass may make their provision not worthwhile. In addition, job opportunities are limited since large private enterprises have difficulties in setting up shop on the Outer Hebrides due to the high costs of doing business. As a result, locals are encouraged to migrate in search of better job opportunities as well as cheaper and better goods and services provision.

Numerous policies have been designed to attempt to ensure that the Outer Hebrides remain economically viable by addressing the need to create opportunities for residents and firms that wish to do business

³²⁴ Hall Aitken and Ionad Nàiseantanah-Imrich (2007), *Outer Hebrides Migration Study Final Report*

³²⁵ Stockdale, E, (2004) '*Rural Out-Migration: Community Consequences and Individual Migrant Experiences*', *Sociologia Ruralis* vol.44 no.2, Blackwell Publishing, Oxford; and

Alston, M (2000) 'Rural Policy in Australia- Time for a Rethink' presented at 'European Rural Policy at the Crossroads', 3 -7 July 2000, University of Aberdeen, Aberdeen; and

Bevan, M, Rhodes, D (2005) '*The Impact of Second and Holiday Homes on Rural Communities in Scotland*' *Communities Scotland*, Edinburgh

³²⁶ Gayle Findlay – Outer Hebrides Community Planning Partnership

³²⁷ Shucksmith and Philip (2000) '*Social Exclusion in Rural Areas: A Literature Review and Conceptual Framework*' Scottish Executive, Edinburgh.

³²⁸ Neil Campbell – Outer Hebrides Councillor; and Peter Brown – Outer Hebrides Tourism Industry Association

there.³²⁹ The concern, across Scotland, about rural migration puts pressure on the need to address the issue through policy intervention. This concern led to the commissioning of two reports drafted by the Outer Hebrides Community Planning Partners (OHCPP)³³⁰ to further understand the motives and dynamics of migration on and off the Islands.

The first study, which was published in February 2007, provides detailed information on the population decline and migration affecting the Outer Hebrides and makes an assessment of what would constitute a sustainable population for the Islands. A smaller, follow-up study was subsequently commissioned to identify appropriate methods for building and strengthening confidence and capacity for integration in the Western Isles.

The 2007 migration study of the Outer Hebrides suggests that the most important policies to implement, so as to limit outward migration and achieve a sustainable population, are the following³³¹:

- Build a strong and dynamic University that plays a wider role in the Outer Hebrides community than simply providing education;
- Widen employment opportunities for skilled workers, and particularly for women;
- Create an integrated and affordable transport network between and to the Islands which maximises opportunities and minimises barriers to economic growth;
- Provide a greater number and range of vocational training opportunities and apprenticeships that will allow more young people to stay in the Outer Hebrides;
- Provide housing options that are desirable, accessible and affordable to people in the early stages of their careers; and
- Ensure a quality range of social and leisure facilities that are attractive to women and younger children.

In 2008, the Outer Hebrides Community Planning Partnership formed an inter-agency entitled "Sustainable Population Project Team" to jointly tackle these demographic challenges and make progress on the recommendations derived from the mentioned reports. In December 2009 the group became the Population Outcome Group and it was decided in 2010 that the outcome was to be the responsibility of all the partners and would be overseen by the Executive Group.³³²

³²⁹ Gayle Findlay – Outer Hebrides Community Planning Partnership

³³⁰ This brings together the public, private, voluntary sector partners as well as community to agree priorities on the planning and provision of services (OUTER HEBRIDES COMMUNITY PLANNING PARTNERSHIP (n.d.). *Community Planning in the Outer Hebrides*. URL: http://www.ohcpp.org.uk/index.php?option=com_content&view=article&id=74&Itemid=199

).

³³¹ Hall Aitken and Ionad Nàiseantanah-Imrich (2007), *Outer Hebrides Migration Study Final Report*

³³² <http://www.cne-siar.gov.uk/factfile/population/migration.asp>

Regional identity and cultural heritage as factors of development

Identity

The Outer Hebrides has an identity that can be characterised as both strong and unique. The Gaelic heritage and crofting way of life, combined with a strong religious adherence, have contributed to shaping this identity. Research³³³ shows that a number of issues affect the cultural identity of the Outer Hebrides population, including:

- A unique culture linking people more closely to a shared history;
- A stronger role for religion in civil society;
- A slower pace of life;
- A high quality of environment; and
- A strong sense of community.

There is a general acceptance that life in the Outer Hebrides is more strongly rooted in the past than elsewhere. While this provides a uniqueness and essential qualities that people value, it also frustrates people who would like to see a quicker pace of change. The culture of politeness and respect perhaps limits debate about some of the more divisive issues facing the islands. In addition, religion plays a large role in civic life, particularly in Lewis and Harris. The strong religious observance of many islanders has also influenced economic activity with shops not allowed to open on Sundays. These preserved traditions are considered to be stronger in the Outer Hebrides than on mainland that face less intrusion from the 'outside' world³³⁴. While most accept this situation, several people feel that this stifles their personal choices and restricts necessary changes while some others feel that those not sharing these beliefs are somewhat victimised.³³⁵

Community spirit is also frequently identified as a positive attraction in the Outer Hebrides, as well as the low crime rate of the area.³³⁶ Close-knit rural communities have been observed as having the advantages of 'social capital', in the form of networks and bonds of trust between individuals³³⁷ with these communities being considered as welcoming, friendly and supportive, often in perceived contrast to cities.³³⁸ Community spirit is relatively strong and rooted in the community's shared history and the strong inter-dependence linked to the crofting way of life. However many people noted a sharp decline in many of the

³³³ Hall Aitken (2008), *Building Capacity for a sustainable population in the Outer Hebrides* (<http://www.cne-siar.gov.uk/factfile/population/documents/Building%20Capacity%20Study.pdf>)

³³⁴ Gayle Findlay – Outer Hebrides Community Planning Partnership

³³⁵ Hall Aitken (2008), *Building Capacity for a sustainable population in the Outer Hebrides*

³³⁶ Hall Aitken (2008), *Building Capacity for a sustainable population in the Outer Hebrides*

³³⁷ Stockdale, E, (2004) 'Rural Out-Migration: Community Consequences and Individual Migrant Experiences', *Sociologia Ruralis* vol.44 no.2, Blackwell Publishing, Oxford

³³⁸ Jones, G, Jamieson, L (1997) 'Young People in Rural Scotland: Getting Out and Staying On', Joseph Rowntree Foundation, York; and

Jones, G. (1999) 'The Same People in the Same Places' *Sociology* vol. 33(1) pp1-22

community activities that underpin this; such as cutting peats, gathering sheep and making hay. Where these activities still went on this was often done within families rather than by the community as a whole. Others thought that traditional community activities were threatened by the changing demographics.³³⁹

However, the very intimacy of these communities gives rise to certain challenges. Research shows that some individuals can find it difficult to secure private rented accommodation or even employment in rural communities because they, or in some cases a member of their family, have a 'bad reputation'.³⁴⁰ The qualities of a community may also be interpreted differently on an individual basis; what is to one person 'comforting and friendly' is to another 'suffocating and excluding'.³⁴¹ A number of female leavers from North Lewis have in fact cited the 'claustrophobic' and 'judgemental' nature of rural community life as a factor in their decision to leave.³⁴² In addition, the strong bonding capital that characterises the Outer Hebrides region is viewed by some as a barrier to inclusion, particularly among groups or individuals who do not belong to established groupings. Research shows that there is no overall resentment to people coming from elsewhere to live in the Outer Hebrides although locals feel that those who do not choose to engage with the community or lack respect can quickly become marginalised. In addition, the extensive use of the Gaelic language creates a social bond within the Outer Hebrides that may be greater than in other Scottish community. Non Gaelic speakers, in fact, can also feel excluded from certain community activities.³⁴³

The Outer Hebrides have historically been a very strong Scottish Gaelic (Gàidhlig) speaking area. In fact, the use of the Gaelic language is a very clear symbol of the distinctiveness of the island culture, with Hebrideans seen as the custodians of the language. With 59.3% of Gaelic speakers or a total of 15,723 speakers, this makes the Outer Hebrides the most strongly coherent Gaelic speaking area in Scotland. This Gaelic culture is also considered to be a unique selling point in attracting more tourists to the Western Isles³⁴⁴ as well as a development opportunity with much of the Gaelic media considering the Outer Hebrides as a valuable resource.³⁴⁵

The Outer Hebrides are frequently portrayed by the local media in a negative and stereotypical way particularly as backwards, closed-minded and lacking the necessary infrastructure to conduct business. Locals believe that although

³³⁹ Hall Aitken (2008), *Building Capacity for a sustainable population in the Outer Hebrides*

³⁴⁰ Pavis, S, Platt, S, Hubbard, G (2000) '*Social Exclusion and Young People In Rural Scotland*' Joseph Rowntree Foundation, York

³⁴¹ Jones, G. (1999) '*The Same People in the Same Places*' *Sociology* vol. 33(1) pp1-22

³⁴² Stockdale, E, (2004) '*Rural Out-Migration: Community Consequences and Individual Migrant Experiences*', *Sociologia Ruralis* vol.44 no.2, Blackwell Publishing, Oxford

³⁴³ Hall Aitken (2008), *Building Capacity for a sustainable population in the Outer Hebrides*

³⁴⁴ <http://www.cne-siar.gov.uk/factfile/economy/tourism.asp>

³⁴⁵ Gayle Findlay – Outer Hebrides Community Planning Partnership

challenges exist to conducting business, the image depicted is too strong and often distorted. One particularly strong stereotype is explained by a journalist as follows: "I think in general a huge proportion of journalism is about stereotypes and the Outer Hebrides are very obvious victims of that. I think there is actually a degree of internal racism about it. You stick labels on places, they're 'wee free', they're hard drinking, and everything is a kind of parody of the Whisky Galore isle."³⁴⁶ To some extent this may result in a self-perpetuating image that damages community confidence.³⁴⁷ Notwithstanding this, certain images in the media do portray the beauty of the landscape and tranquility of the islands that has beneficial effects on tourism. In addition Harris Tweed, one of the islands' most successfully marketed products, also benefits from positive media coverage and advertisement.³⁴⁸

Despite all these contrasting arguments, most people agree that life on the islands is great, particularly resulting from the quality of the environment, the slower pace of life, strong community spirit and safety. Insularity is considered to help strengthen the territorial identity and cultural heritage of the Outer Hebrides with very strong ties identified, including through the extensive use of the Gaelic language. These strong ties result in Hebrideans feeling more connected to the region and possibly being encouraged to return (if they would have left) at retirement age, and in some cases sooner. Clearly, those who choose to move to, or remain in, the islands have balanced up these factors and concluded that the positive factors outweigh the negative ones. Naturally those seeking a quicker pace of life, more opportunities or a more progressive attitude to change will decide to leave. However this process tends to reinforce the resistance to change in communities.

Geographic specificity as factor in the Protected Designations of Origin

The Outer Hebrides appear to account for two PDO/PGI designations. These are:

*The Stornoway Black Pudding*³⁴⁹

Stornoway Black Pudding is a black pudding unique to Stornoway, the capital of the Isle of Lewis in the Outer Hebrides of Scotland. Its origins stem from crofting, which is a form of tenant small holding unique in Scotland, that has been – until a few decades ago – the mainstay of island life on Lewis for hundreds of years. Crofting is very much based on a subsistence type of economy. Stornoway crofters kept a small number of sheep and/or pigs and cows and had to ensure that every part of those animals was utilised to the full. When it came to killing the animal, crofters shared the task and, in a time of no refrigeration, the meat with neighbours who in turn would return the favour at a later date, thus ensuring a meat supply during the long winter. Hence the product

³⁴⁶ Hall Aitken (2008), *Building Capacity for a sustainable population in the Outer Hebrides* (<http://www.cne-siar.gov.uk/factfile/population/documents/Building%20Capacity%20Study.pdf>)

³⁴⁷ Hall Aitken (2008), *Building Capacity for a sustainable population in the Outer Hebrides* (<http://www.cne-siar.gov.uk/factfile/population/documents/Building%20Capacity%20Study.pdf>)

³⁴⁸ Gayle Findlay – Outer Hebrides Community Planning Partnership

³⁴⁹ SCOTTISH GOVERNMENT (2010). *Specification - Council Regulation (EC) No 510/2006 on protected geographical indications and protected designations of origin "Stornoway Black Pudding"*. URL: <http://www.scotland.gov.uk/Publications/2010/12/08144650/2>

originates from an activity that was typical of a small tight-knit community that depended on each other for survival.

*Harris Tweed*³⁵⁰

Harris Tweed, based at Shawbost on the west coast of the Isle of Lewis, has been described as “the Champagne of fabrics”. More than 90% of its production is made in its headquarters in Shawbost on the west coast of the Isle of Lewis. Its great success over the past century has led to imitations and, as a result, legal protection being sought for this article. The Harris Tweed Association was formed in 1909 and a year later the world-famous Orb trade mark, which authenticates genuine Harris Tweed, was adopted. This provided common law protection as a certification trademark and granted the basis for the Act of Parliament, which was passed in 1993, thus making it the only fabric in the world governed by its own Act of Parliament.

The cloth originates from the inhabitants of the Outer Hebrides themselves with all processes done by hand and each member of the household having his or her part to play. It was originally made from the wool of their sheep and turned into garments to protect them from the cold and damp. Over the decades, the process has evolved while always remaining true to the basic principles. Today, Harris Tweed is the only hand-woven fabric produced in commercial quantities.

Although the two products with a PDO/PGI designation in the Outer Hebrides could be linked to the agricultural activities that are/were typical of this region, literature, as well as survey responses, do not seem to suggest that the very nature and strength of these products can be attributed to the region’s insularity although the skills required by these industries may have been retained as a result of the region’s insularity³⁵¹. Respondents believe that PDO status provides the greatest benefits to the region in strengthening its regional identity, as opposed to increasing sales, attracting more visitors and overcoming other insularity problems.

2.3 Environment

Protected areas and biodiversity as factors of development

Protected areas

*The unspoilt environment of the Western Isles is increasingly perceived as a major economic asset, and the real potential of a high quality of life is now acknowledged both within and beyond the Outer Hebrides.*³⁵²

There seems to be significant division between individuals who believe a balance between protection and development is being achieved and those who think that

³⁵⁰ HARRIS TWEED HEBRIDES (2011). *About Harris Tweed*. Website of Harris Tweed Hebrides. URL: <http://www.harristweedhebrides.com/about-harris-tweed/>

/

³⁵¹ Gayle Findlay – Outer Hebrides Community Planning Partnership

³⁵² Western Isles Transitional Programme Strategy 2000-2006

there is over legislation which is stifling development. This can be seen in the two comments from stakeholders as reproduced below.

*Protected areas can produce an income from otherwise unproductive land, but sometimes it can create a perception that development is no longer possible. Sometimes indeed it is no longer possible, but many of the designations still admit of certain development.*³⁵³

*Protected status stifles development after designation. All quangos³⁵⁴ set up ridicule local values and hide behind central dictates to remove people and livelihoods and demand protection of government to expand their sterility in areas affected*³⁵⁵

Potential for conflict exists between competing interests using the marine environment; for example navigation by work boats, fishing boats and leisure craft in areas where salmon farm sites are concentrated, and wild salmonoid species passing through sealochs used for fish farming when migrating to and from their natal waters. Conflict can also occur within the fishing sector between creel boats using static gear and mobile gear users such as trawlers and dredgers. Also, navigation interests could be affected as offshore renewable energy generation infrastructure is developed. The Outer Hebrides Inshore Fisheries Group and the Outer Hebrides Coastal Marine Partnership have a role to play in the resolution of local conflict issues.³⁵⁶

The conflicts have more to do with control than designations per se. Most islanders are inherently conservation-minded and respect their environment. They may well even support the aims of the designation but they object to having it imposed by outsiders, to the detriment of the local community.³⁵⁷ This feeling is shared by another stakeholder who states that [...] *locals see themselves as extremely respectful of their natural environment and unlikely to cause the damage that the designations are set up to prevent. Fishermen in particular have been using fishing methods that are not harmful to the areas but also ensure they are not harmful to fishing stocks locally so their business might be sustained.*³⁵⁸

A local example of good practice in the management of the marine environment can be found through the Loch nam Madadh SAC Management Plan. This Management Plan was produced by a Steering Group comprised of a wide range of agencies and organisations representing public agencies, businesses and community groups. This is a voluntary partnership. The Steering Group meets annually to review activity within the marine SAC and holds a public forum to

³⁵³ Peter Brown – Outer Hebrides Tourism Industry Association

³⁵⁴ quasi-autonomous non-governmental organisation

³⁵⁵ Neil Campbell – Outer Hebrides Councillor

³⁵⁶ <http://www.scottish.parliament.uk/business/committees/environment/inquiries/marine/env-marine-CnES.pdf>

³⁵⁷ Peter Brown – Outer Hebrides Tourism Industry Association

³⁵⁸ Gayle Findlay – Outer Hebrides Community Planning Partnership

discuss current issues that might affect the integrity of the SAC, for example the development of marine leisure facilities in the bay.³⁵⁹ A number of Area Management Agreements have been used in the Outer Hebrides to set out best practice for the use of marine spaces. The Outer Hebrides Coastal Marine Partnership was also set up to monitor development through Integrated Coastal Zone Management.

National Parks have the potential to address this. However, Harris has voted very strongly for National Park status and the Council and the Government has not supported them.³⁶⁰

The purpose of the Western Isles Transitional Programme Strategy is to provide a framework which will assist agencies and organisations in the Western Isles to submit quality and focused proposals to the Highlands and Islands Special Transitional Programme 2000-2006.³⁶¹

Natural resource exploitation

Renewable Energy resources

Given the rising price of fossil fuels, fuel poverty is now a real issue for many of the islands' inhabitants. While surrounded by some of the best natural resources in Europe, the residents in the Outer Hebrides are faced with some of the highest fuel costs anywhere in the UK.³⁶² The Western Isles have a natural comparative advantage in the generation of electricity from wind and marine energy, and the islands provide the ideal environment to develop renewable hydrogen and storage technologies as well as marine based bio-energy. However, the islands also have the most extensive coverage of environmental designations of any region of Scotland, which places a constraint on the nature and scale of permitted development.³⁶³

Insularity causes obstacles to cheaper energy provisions due to the costs involved in providing electricity at a distance from the generation source. This extra cost may act as an incentive to encourage the creation of local energy production using renewable energy.

³⁵⁹ <http://www.scottish.parliament.uk/business/committees/environment/inquiries/marine/env-marine-CnES.pdf>

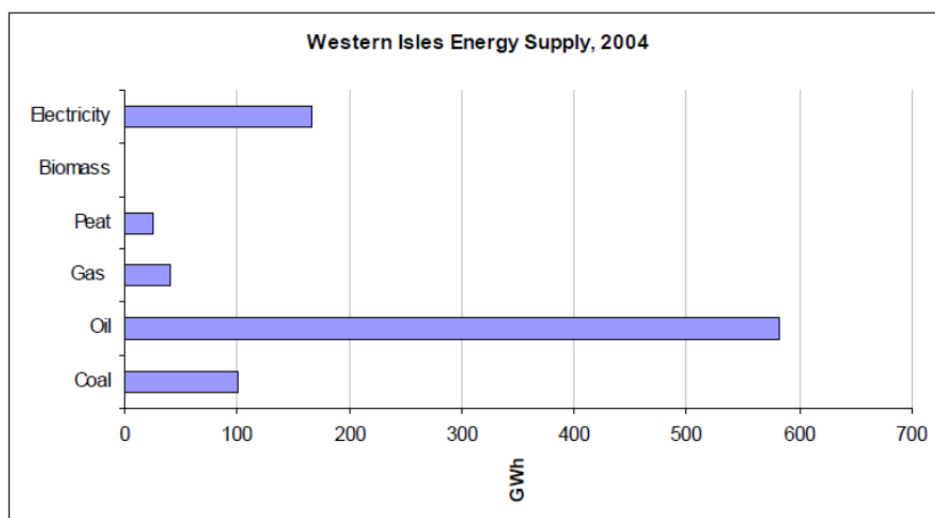
³⁶⁰ Peter Brown – Outer Hebrides Tourism Industry Association

³⁶¹ Western Isles Transitional Programme Strategy 2000-2006

³⁶² HI ENERGY (2010). *Hebridean Hydrogen Park*. Website of HI Energy. URL: <http://www.hi-energy.org.uk/Research-Development/Hebridean-Hydrogen-Park.htm>

³⁶³ Economic and Community Benefit Study – Scottish Government/ Halcrow Group Limited – January 2009

Chart 1: Western Isles Energy Sources 2004³⁶⁴



Onshore wind is currently the technology with the greatest capacity to maximise economic and community benefit in the Western Isles as a long term investment. The development of a local wind energy control centre is considered to be of critical importance, which could be developed as a shared resource to be used by all of the wind farms developed on the Western Isles. Scottish Government is encouraging all wind farms to procure direct drive turbines which would position the Western Isles at the forefront of this technology, and which is also likely to provide a more robust and efficient solution compared to hydraulics or gearboxes for marine technologies.³⁶⁵

The development of the renewable energy resources available in the Outer Hebrides is a major theme of the Comhairle's economic development strategy *Creating Communities of the Future*. If an onshore renewable industry is to be established in the Outer Hebrides it will require a network to move power south. The potential of doing this via subsea cable is presently being investigated. There is also great potential in the waters around the Outer Hebrides for the creation of a wave and tidal renewables industry. Such an industry will require the placing of significantly scaled machines and related infrastructure into the seas. The type and scale of development is presently unknown. However the Comhairle would not wish to support any move that might constrain the ability to harvest and export such resources.³⁶⁶

The path towards the production of wind energy in the Outer Hebrides has been a long one. An initial proposal put forward in 2004 for a 53 turbine wind farm close to Stornoway was initially rejected following an objection by the Scottish Natural Heritage (SNH) organisation due to its proximity to peat land which is protected under the EC Habitats Directive.³⁶⁷ Following a report on the potential

³⁶⁴ Economic and Community Benefit Study – Scottish Government/ Halcrow Group Limited – January 2009

³⁶⁵ Economic and Community Benefit Study – Scottish Government/ Halcrow Group Limited – January 2009

³⁶⁶ <http://www.scottish.parliament.uk/business/committees/environment/inquiries/marine/env-marine-CnES.pdf>

³⁶⁷ <http://www.swt.org.uk/campaigns/lewis-windfarm/>

for renewables in the Outer Hebrides commissioned by the Scottish Government, an amended version of the plant was proposed again in 2009 which, following some amendments, was finally approved in 2010. A 33 turbine, 118 MW plant has now been commissioned. The investment is being undertaken by a private company that has placed clauses in its agreement to contribute a share of profits to local development initiatives.³⁶⁸

Wave energy is also being used, in North West Lewis, with a 4MW capacity. Further resource exists for future development, with 30MW estimated in this location and a further 75MW estimated to be available in the Sound of Harris.³⁶⁹

*Table 1: Real and potential capacity for renewables*³⁷⁰

	Current capacity MW			Proposed future renewable capacity MW			Total
	Small scale	Non renewable	Renewable	Community led	Market led	Total	
North Lewis	0.34	25.60	4.15	13.50	24.00	37.50	67.59
South Lewis	0.05		1.82		252.00	252.00	253.87
Harris	0.09			2.50		2.50	2.59
Uists	0.29	12.00		4.20		4.20	16.49
Barra	0.01	2.00		0.90		0.90	2.91
Western Isles	0.77	39.60	5.97	21.10	276.00	297.10	343.44
North Lewis					150*	447.10	493.44
Western Isles					105**	552.10	598.44

The Lews Castle College specialises in engineering (with specialisms in renewable technologies).³⁷¹ Availability of the resource itself has to be weighed against the considerable difficulties in getting it off the island to market. However, as a means to reduce dependency on the mainland it is to be strongly encouraged, albeit not for export.³⁷²

³⁶⁸ SCOTTISH GOVERNMENT (2010). *Lewis wind farm*. News Release of 14/01/2010. URL: <http://www.scotland.gov.uk/News/Releases/2010/01/14095411>

³⁶⁹ Economic and Community Benefit Study – Scottish Government/ Halcrow Group Limited – January 2009

³⁷⁰ Economic and Community Benefit Study – Scottish Government/ Halcrow Group Limited – January 2009

³⁷¹ LEWS CASTLE COLLEGE (2012). *About Lews Castle College*. Website of the University of the Highlands and Islands. URL: <http://www.lews.uhi.ac.uk/about>

³⁷² Peter Brown – Outer Hebrides Tourism Industry Association

There are obstacles, mainly to do with distribution/collection of energy. The main power companies still regard the national grid as a distribution network, when they should start thinking in terms of a collection network.

While funding is available for communities to develop wind turbines in their community, the belief is that the processes to be gone through take years of hard slog, with most projects taking in excess of five years from concept to construction, and this acts as a disincentive to locals to proactively join the mainland Scots in investing in renewable technology.³⁷³ The support for renewable energy seems to be stronger on the main islands than it is on the most rural areas in the Outer Hebrides.³⁷⁴ There seems to be an implicit discrimination on distant communities which bear increased transmission charged for energy provision.³⁷⁵

However, support is varied with some sections of the communities being very supportive of larger wind farm developments, thereby sighting the economic benefit to the islands, but some others being proactively against this development due to the potential negative impact on the natural environment and wildlife as well as the belief that the benefit to the local economy would be limited.³⁷⁶

Particular Resources

The coastline of the Outer Hebrides is over 2,000km in length and forms the predominant landscape feature of the islands. The main uses of the coast and inshore waters in the Outer Hebrides are:

- economic activities which exploit the biological productivity of the sea such as fishing and aquaculture;
- uses of the coastal and marine areas for harbours, shipping, recreation and renewable energy generation;
- the management and use of natural and built heritage assets, i.e. tourism and recreation, agriculture, conservation, archaeology;
- by the military for training;
- physical management of the coastline itself (e.g. control erosion or flooding) and management of water quality.

The high water quality in the Outer Hebrides has encouraged a number of commercial operations to establish in the area.³⁷⁷

The highest levels of employment and value added in the Outer Hebrides comes from the Distribution sector, Other Public Services, Education, Health and Other Private Services sectors. The contribution of the fishing industry to total economic activity and employment is not as high, and although it contributes strongly to the trade balance, with exports being 6 times greater than imports, it

³⁷³ Peter Brown – Outer Hebrides Tourism Industry Association

³⁷⁴ Economic and Community Benefit Study – Scottish Government/ Halcrow Group Limited – January 2009

³⁷⁵ Neil Campbell – Outer Hebrides Councillor

³⁷⁶ Gayle Findlay – Outer Hebrides Community Planning Partnership

³⁷⁷ Neil Campbell – Outer Hebrides Councillor

has been declining both in absolute and percentage terms since the late nineties. Sea fishing saw the largest percentage drop in real terms in the value of exports.³⁷⁸ This may be strongly linked to the severe decrease in fish stocks in recent years, most notably salmon³⁷⁹ and trout stocks.³⁸⁰ The main reason may be attributed to climate change which affects water temperatures and currents, obstructions to fish movement, introduction of alien species, unhealthy conditions linked with the presence of fish farms, chemical pollution and over-exploitation.

The fishing industry in the Outer Hebrides is estimated to account for approximately 320 vessels, mostly under 10 metres, with the remainder being a mix of nephrops trawlers, scallop dredgers and larger static gear boats. They support around 400 full-time jobs plus another 250 jobs in processing and other directly related activities onshore.³⁸¹ In total the agriculture and fishery sector accounts for 8% of the total employed. Most of the fish that gets caught is exported. Less than an estimated 10% is kept in the home market.³⁸²

The fishing sector is still being promoted in spite of the associated ecological sustainability concerns. Over £1.5m has been invested in the local economy through the European Union Financial Instrument for Fisheries Guidance (FIFG) funds. This has enabled development in port infrastructure, fishing vessel modernisation and processing and marketing in co-operation with Comhairle nan Eilean Siar, Western Isles Enterprise and SEERAD. Specific local developments include fishing boats signing up to the Youngs Bluecrest Traceability Scheme allowing the tracing of every langoustine catch thereby generating quality improvements and environmental benefits. Another significant initiative is the Seafish Responsible Fishing Scheme aimed at responsible catching and handling of seafood.³⁸³ A number of local area fishery management boards and joint committees of fishermen, processors and government bodies including Local Authority Members exist to manage this resource. One of the respondents of feedback questionnaires, Mr. Campbell, is the Chair of the Western Isles Fishermen's Joint Members & Officer working committee that is responsible to make recommendations on all aspects facing the fishing industry to The Western Isles Council Sustainability Communities Committee.³⁸⁴

³⁷⁸ <http://www.cne-siar.gov.uk/factfile/socioeconomicoverview.asp>

³⁷⁹ FISHERIES RESEARCH SERVICES (2003). *The Changing Abundance of Spring Salmon*. FRS Freshwater Laboratory, Faskally. URL: <http://www.riverdee.org.uk/FileLibrary/Content/Publications/CS2.pdf>

³⁸⁰ <http://ohft.reefnet.co.uk/wp-content/uploads/2010/02/OHFT-FMP.pdf>

³⁸¹ <http://www.scottish.parliament.uk/business/committees/environment/inquiries/marine/env-marine-CnES.pdf>

³⁸² Neil Campbell – Outer Hebrides Councillor

³⁸³ <http://www.scottish.parliament.uk/business/committees/environment/inquiries/marine/env-marine-CnES.pdf>

³⁸⁴ Neil Campbell – Outer Hebrides Councillor

The marine and coastal planning framework is awash with statutory and voluntary initiatives, plans, codes and designations. These include ICZM, Aquaculture Framework Plans, Regulating Orders, the future scope of Development Plans, River Basin Management Plans, Oil Spill Contingency Plans, Marine Designations and Protected Areas. There are many areas of overlap that make policy planning confusing and potentially contradictory.

There is some sentiment expressed that the local community is not as actively involved in designing strategies for sustainable management as some locals would like. The impression that all the control and strategy comes from off the island has been expressed in the feedback received.³⁸⁵

³⁸⁵ Peter Brown – Outer Hebrides Tourism Industry Association

3. Synthesis

Five nexus models, delineating both limitations and opportunities stemming from the insularity of the Outer Hebrides, have emerged from this case study. Most limitations stem from historical legacies with an economic dimension whereas the social and environmental sections, albeit pointing out certain challenges, also brought out a number of opportunities for island development. These models will be discussed individually below, with their graphical representation shown in Annex A.

1. *High cost of doing business*

The geographical distance from customers, certain material inputs, as well as employment and knowledge hubs all explain this inherent disadvantage. The high cost of doing business mainly reflects greater transport costs, problems concerning transport reliability, low access to resources, as well as a small market size which limits the possibility to generate economic activity solely to service the local economy and that necessarily implies the need to incur further costs to export a substantial part of the produce. The limitations to economic development that stem from this historical legacy include a relatively higher rate of unemployment on the Outer Hebrides when compared to the national and regional average³⁸⁶³⁸⁷, a relatively larger number of people working in the public sector as a result of low private sector activity that relies strongly on local services and small scale tourism³⁸⁸, a duplication of public sector activities due to its distance from the centre of governance and service provision, insufficient diversification of the economic base that makes the Islands more vulnerable to economic shocks, as well as one reason explaining the current migration outflow in search for better job opportunities.

2. *Small tight-knit communities*

A social historical legacy that is assigned to the Outer Hebrides, but which may well be attributable to other islands, is the sense of a small tight-knit community. With respect to the smallness of the community and population size, the absence of critical mass may increase the likelihood of atypical employment opportunities, such as the preservation of traditional crafts and goods and service provision that on the mainland would have been absorbed by companies performing larger functions³⁸⁹. In addition, small tight-knit communities tend to be inward-looking, which can result in a loss of development opportunities due to limited interaction with mainland. This may also stimulate migration outflow which, in the case of women, would limit the possibility for regeneration. Social

³⁸⁶ SCOTTISH GOVERNMENT (2007). *Energising the Outer Hebrides*. National Planning Framework 2008-12. Outer Hebrides Submission. URL: <http://www.scotland.gov.uk/Resource/Doc/187960/0052049.pdf>

³⁸⁷ <http://www.cne-siar.gov.uk/factfile/labourmarket/unemployment.asp>

³⁸⁸ Hall Aitken and Ionad Nàiseantanah-Imrich (2007), *Outer Hebrides Migration Study Final Report*

³⁸⁹ This may include part-time employment, fixed-term contracts, temp agency workers, self employed and persons in flexible jobs

problems, including drinking problems, have also been assigned to islands mainly for two reasons (i) the perception that islands can lead to isolation, (ii) tight-knit communities may lead to intrusion and social claustrophobia – a phenomenon mainly raised by the younger generations.

Traditional economic activities, such as crofting, have proven to be successful due to a sharing culture that existed, and still exists today. This allowed residents to build a strong social support system that is also conducive to return migration. The small workforce has led to residents becoming more flexible so as to engage in different employment opportunities. ICT has helped locals “escape” from the small communities that they are faced with in order to express themselves with relative anonymity. This “dependence” on ICT for economic and social activities provides great avenues for further development although it is important for authorities to ensure that people who are not able to make use of this technology do not feel or effectively become marginalised.

3. *Emphasis on nurturing human capital*

The Outer Hebrides places great emphasis on its human capital, particularly with respect to health and education. This results in a large number of residents, particularly in the younger age bracket, migrating in order to better their education and employment prospects. Policy should, therefore, be enacted to address this imbalance. Migration occurs both from the islands to mainland, as well as from the extremities to the larger core islands. ICT, which is being used in the Outer Hebrides as a tool to improve education through distance-learning programmes, and health through online consultations, is also creating a social divide since residents have unequal access and know-how. The opportunities stemming from this historical legacy relate to the desire for migrants to return to their land of origin as a result of this nurturing environment. Residents who migrated for education purposes may return with improved skills that could spill-over to the rest of the community. In addition, specialist migration also occurs in order to fill skills gaps that are said to exist. The challenge for policy makers is to identify the factors that draw these migrants towards the Outer Hebrides, as development of personal and work networks on the mainland may prevent such a return.

With respect to structural development constraints, the recent increase in house prices particularly when compared to the salaries offered on the Islands, has also been highlighted as a reason for the outflow of migration of young couples. On the other hand, development opportunities are seen in the possibility of attracting back to the islands people that left for education or work reasons with the knowledge and/or expertise gained off their shores. The negative quality of life effects of this historical legacy can be attributable to two aspects, namely (i) the higher proportion of female emigrants that contributes to population imbalance and an ageing population, (ii) the importance given to ICT that is also leading to an increased outflow of migration since locals are more aware of the opportunities available outside the Outer Hebrides. The latter, however, is also serving to improve locals’ quality of life since it allows locals to benefit from improved specialist healthcare and the possibility to further their education online rather than by migrating.

4. *Strong identity*

The strong identity witnessed in the Outer Hebrides is reflected in the preservation of a number of traditions, including the use of the Gaelic language,

as well as relatively strong religious ties. This has given rise to a number of development opportunities, particularly for the tourism industry to exploit this almost intact traditional heritage. In addition, the potential to exploit niche educational opportunities, given the widespread use of Gaelic, exists. The strong religious influence on the Hebridean community may have led to the good social ethic present to date, which in turn may have resulted in the quality of life assets that are said to exist, including a strong environmental preservation as well as low crime levels and drug use. However, locals as well as immigrants often complain that the strong community identity creates barriers to integration for those who choose to act differently from the mass – both in terms of religious adherence, as well as other traditional activities and traits.

The limitations posed by a strong community identity, which may result in an inward-looking society that is less susceptible to embracing change, has led to the creation of media stereotypes depicting a society with sociological problems and that are extremely close-minded as a result of their strong protestant adherence. This damaged the community's confidence which in turn has led to a fear of failure, particularly in the take-up of entrepreneurial activities. As a result, activity rates are relatively low although the Hebridean authorities have created a number of programmes aimed at encouraging entrepreneurial activity, particularly in the younger age cohort.

5. *Geographical location*

The geographical location of the Outer Hebrides, at the far western end of Europe, is in itself a historical legacy that is characterised by particular climatic conditions, low development pressures as a result of its distance from mainland, as well as well-preserved natural areas and fish reserves. The main opportunities stem from the islands' environmental assets. The Outer Hebrides possess a well-preserved landscape as a result of the large number of protected areas as well as the high environmental awareness and respect for the environment that the Hebrideans possess. The Outer Hebrides are also optimally located to take advantage of wind, wave and tidal energy. However, the feeling of exploitation in the development of alternative energy sources has resulted in locals opposing such development projects. In addition, the large number of protected areas gives rise to development restrictions with possible negative consequences on housing prices. The Outer Hebrides are also faced with limitations stemming from accessibility problems. This reflects difficulties in accessing energy networks that result in added costs to business and households alike. This accessibility problem is amplified for smaller islands that are faced with the problem of double insularity.

The case study has also highlighted a number of structural development constraints and opportunities. The former mainly relates to a feeling of "powerlessness" expressed by a number of Hebrideans with limited possibility to influence national and EU policy due to the Islands' peripherality to the centre of governance. In addition, conflict appears to exist between environmental preservation and the possibility of developing renewable energy plants. The development opportunities outlined in this nexus model, on the other hand, firstly relate to the opportunity to improve communication links to central government and to increase locals' ownership of environmental initiatives, and secondly points to the development potential for environmental research.

4. Generalisation from the case study

The extent to which islands are affected by their geographic specificity depends on their degree of insularity since islands are heterogeneous. As a result, only some of the findings that emerge from this case study can be applied to all islands.

Given the dependence of islands on centres of economic activity outside their territory as well as their peripherality from these centres, one can conclude that islands are, in most part, highly dependent on the public sector with a large proportion of their citizens employed in the civil service, including the military. Those employed in the private sector generally work in very small enterprises with a great incidence of people employed in their own family business. In addition, the peripherality of the Outer Hebrides results in a considerable amount of activity characterised by sporadic demand and seasonality of employment. This is also true for tourism, a sector that employs a substantial number of people on most islands. This seasonality and sporadic demand encourages people to become multi-skilled so as to be employable all year round. With respect to development potential, most islands are perceived to be optimal locations for the development of renewable energy sources.

Accessibility problems are in most part common to all islands with strong dependence on a ferry service in the absence of fixed links. For islands in northern Europe, this service may prove to be unreliable in the winter months due to inclement weather. In addition, inter-island public transportation is generally of sub-standard level given the low density of populated areas on most islands raising the difficulty and cost of servicing remote towns. This results in islanders being more dependent on their personal means of transportation which results in two additional problems, namely (i) social exclusion of citizens that have no private vehicle or are not able to drive, for instance in the case of disability, old or young age; (ii) high costs of transportation since fuel tends to be costlier on islands. Problems of inaccessibility, as well as a lack of critical mass, also result in islands facing higher costs for goods and services. Health provision, for instance, is often inadequate with most people having to be transported to mainland for most procedures. The same is true of education with a limited number of courses offered to citizens.

These reasons, among others, often result in a number of people choosing to leave the islands. This creates problems of an ageing population given that people often choose to emigrate during working age and return in their old age for retirement purposes with obvious repercussions on the sustainability of pensions and health systems. The most attractive attributes of residing on islands, and those most likely to attract locals back to their hometown, is reported to be a strong tight-knit community, preserved traditions, as well as a safe environment and beautiful landscape. Having said this, however, the closeness of the community may also be a factor driving locals away from the island given a feeling of intrusion and claustrophobia expressed by the younger cohorts.

Some conclusions that emerge from the case study are, however, difficult to attribute to all islands given their heterogeneity. For instance, Hebrideans appear to attribute great importance to education with a substantial proportion of youths considering this to be a reason worth migrating for. In order to reduce

the problems of accessibility, ICT has often been used by locals. Success stories most prominently relate to e-health services whereby Hebrideans are able to consult GPs and specialists over the internet. The same was done in the case of distance learning where a number of courses are now available by correspondence. However, broadband connectivity is still relatively weak in some localities thereby creating a social divide with those communities having limited access, or those people with little know-how, feeling marginalised. With regard to environmental considerations, the Outer Hebrides is home to a large number of protected areas giving rise to long stretches of intact landscape. These development restrictions could be one reason why housing is considered to be relatively costly on the Outer Hebrides.

The case study brought to light the fact that islanders often feel that decisions taken at the core are too distant from their reality and that their opinion is often disregarded. This policy "imposition" has often led to locals rejecting policy determined at the level of central government. In fact the feeling of imposition was expressed by all locals contacted for the purpose of this analysis. This may reflect a history of impositions brought about by the various colonial rulers of the time and a desire by locals to be able to decide what is best for their own economic, social and environmental welfare. Regional policy would allow islanders to feel "ownership" of the policy designed that may therefore lead to their more successful implementation. In addition, policy should be more directed at reducing the islands' dependence on the core rather than attempting to mitigate the "islandness" problem through accessibility concerns.

Annex 28: Case Study Torne Valley

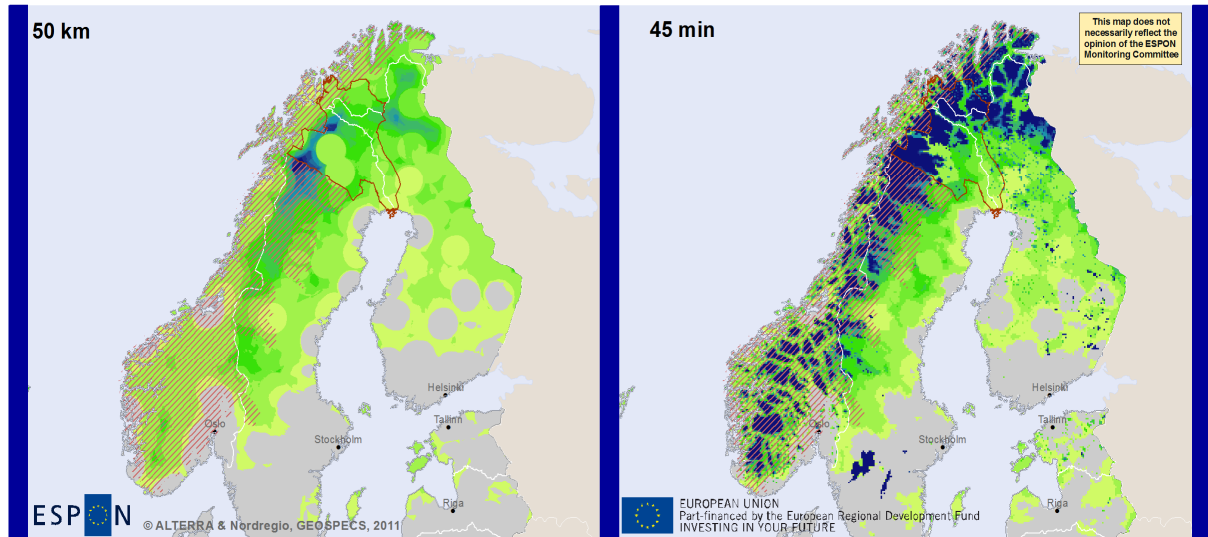
Description of the case study area and its geographic specificity

The Torne Valley (Finnish: Tornionlaakso, Norwegian/Swedish: Tornedalen) is a cross border region in one of the most sparsely populated areas of Northern Europe. It is named after the Torne River flowing from the Scandes, Scandinavian Mountains, through the river valley and into the Gulf of Bothnia. Geographically the municipalities/LAU2s of (from south to north) Haparanda, Övertorneå, Pajala and Kiruna in Sweden, and Tornio, Ylitornio, Pello, Kolari, Muonio and Enontekiö in Finland are the core region. Culturally and historically the region can anyhow be expanded with four Norwegian municipalities of Storfjord, Kåfjord, Kautokeino and Nordreisa. In cultural context also the Swedish municipality of Gällivare with a remarkable share of Meänkieli and Sámi speaking population can be included to the region. In this case study we will use this expanded 15 municipalities' delineation and term *Torne Valley* will refer to these 15 municipalities.

The Torne Valley is characterised by geographic specifics of sparsity, mountains, coastal, municipalities with a significant island component and borders areas (pictures 1 and 2). The population in the region is living in small settlements mostly located near the national boundaries with long distances to larger cities. Thus sparsity is the main fact that has contributed to shaping the case study region's socio-economic development. Especially due to the fact that the population amounts to about 114 000 inhabitants living on a land area of 78 000 km² - on average 1.5 inh/km² compared to European Union average of 116. The region is sparse also from a Nordic point of view as the average population density for the Nordic Countries is 16.3 inh/km².

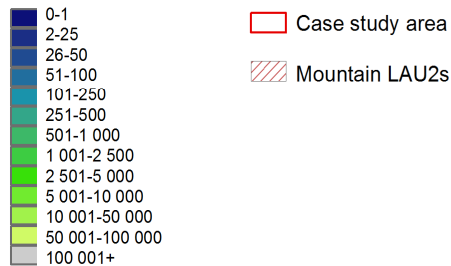
The regional context of the Torne Valley has also institutional grounds. The 14 Torne valley municipalities (excluding Gällivare) form the border region of *Tordendalsrådet/ Tornionlaakson neuvosto*. Tornedalsrådet is one of the Nordic Cross-Border Co-operation Committees, I.e. one of the eleven committees that received financial subsidy from the Nordic Committee of Senior Officials for Regional Policy (EK-R) under the Nordic Council of Ministers. Tornedalsrådet was established in 1987 – as a merger of the Swedish Torne valley municipality cooperation (*Tornedalskommunernas Förbund*) and the Finnish *Tornionlaakson kuntain toimikunta* and it still holds this inter-municipal character as an institutional cooperation of 14 cross-border municipalities. The secretariat is located in Haparanda, Sweden. The secretariat is rather small but with a relatively large project portfolio as it is also involved in a number of Interreg

projects, which enables them to initiate activities that reach beyond the scope of funding from the Nordic Council of Ministers (Nordic Cross-border... 2010).



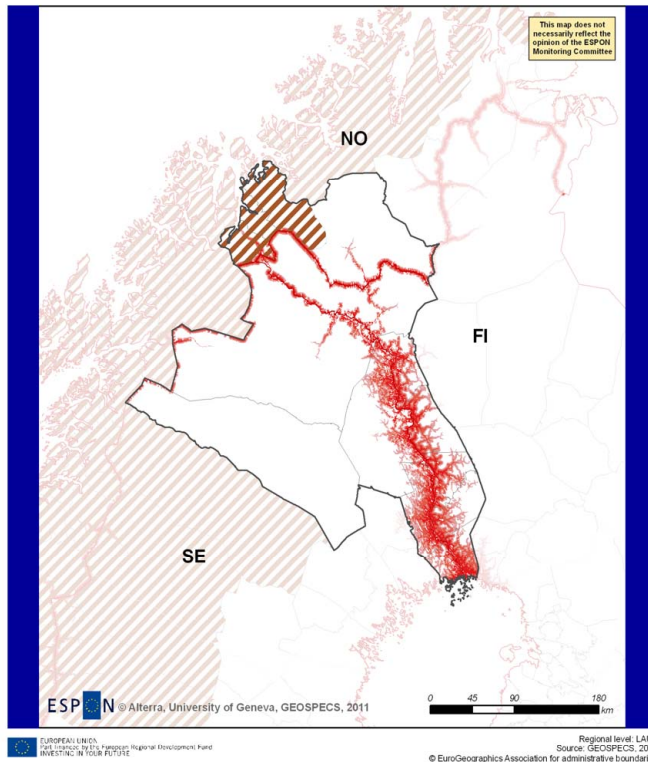
Areas with Low Population Potential in Northernmost Europe

Population Potential in Persons i Areas below 100 000
Inhabitants after 50km and 45 min Delineations











Regional level: GRID
Source: ESPON Database 2013
Origin of data: ALTERRA 2011
© EuroGeographics Association for administrative boundaries

Picture 1: The Sparsely populated areas in the Northernmost Europe



GEOSPECS specificities areas

-  Case study delineation
-  NUTS0 boundary
-  NUTS3 boundary
-  LAU2 boundary
- Mountain areas**
-  Mountain areas
- Travel time to the border (in minutes)**
-  0 - 15
-  15 - 30
-  30 - 45

Picture 2: Mountain areas and travel time to the national border in the Torne Valley

Economic, Social and Environmental processes related to the geographic specificity

2.1. Economy

Economic vulnerability / robustness facing globalisation

Employment and development levels

As a sparsely populated region the employment situation in Torne Valley is facing the realities of limited size of the local markets, long distances to other areas and the some level of dependency of the natural resource extraction as a starting point. Previous studies have highlighted the importance played by primary production and exploitation of raw material in the development of NSPA (Gløersen et al 2009: 52). This is especially true in the case of the Torne Valley as the area holds an important part of the mining reserves of Northern Europe, as in Swedish Kiruna and Pajala. Yet, if this predominance of primary production has enabled to 'deliver' economic growth for the region, outside more mainstream development models based on the production of advanced and knowledge-based producer services, this industrial profile has also increased the vulnerability of the local economy as it is strongly dependent, for its development, on the availability of external resources and demand (Gløersen et al 2009): "They are particularly exposed to fluctuations in the domestic and international markets, especially due to the reliance of individual local communities on a given type of resource". There are a certain over-representation of activities with high production values compared to the number of employees, particularly within mining, steel production, pulp and paper production and Fisheries. This confirms the idea that these are regions where wealth production is partly related to a number of capital intensive activities with relatively few employment opportunities. (Gløersen et al 2009: 52).

For decades the development of those industries have been tightly connected to the development of the welfare in the region (and to the rest of the Nordic countries at large), as it provided an important number of relatively unskilled jobs that could benefit the local societies. Since the 1980s and 1990s, primary production has become increasingly opened to competitive behaviours not only in terms of sales markets, with customers potentially located worldwide, but also from an operational point of view as many international actors, both Nordic and international, are managing the mining operations onsite. This has led to an important process of rationalisation in those industries that has led to more efficient production processes. The downside of this process was its impact on local employment: from now on, fewer and more skilled jobs were necessary. Consequently, those industries offer less opportunities for 'fixating' local labour force than before.

Seen from the European point of view the regional employment and unemployment rates for Torne Valley are around the average rate, but as Finland and Sweden and especially Norway are the European countries with lower unemployment rates on this economically turbulent time, the municipalities in the Torne Valley are among the worst performers in their national contexts. In the Nordic perspective the highest unemployment figures in 2010 can be found in both Finnish and Swedish sides of Torne Valley with around 16 % rate in the worst municipalities (NSIs 2011). Also the participation to different types of labour market measures is high across the Torne Valley. During the crisis, unemployment in the region increased less than compared to the national average, but that was more or less related to the already high starting point and to high share of employment in public sector. Thus the impacts of the crisis were mostly related to the decrease in export industries and construction. On contrast compared to the situation during the last economic crisis in the 1990s the employment rate in the Torne Valley has increased a lot. In 2010, economic development in Torne Valley was relatively good and especially the increase in company turnover was faster than in many

other regions in the countries and the situation in 2011 continued positively as both the economic situation and employment increased in Torne Valley.

As introduced earlier, the main sectors of employment in Torne Valley are well linked to local assets, both on and under the ground. The natural resources on ground provide opportunities for agricultural activities (especially herding), forestry activities and energy production (esp. hydro-electricity). The employment within these activities is relatively important in the region as the sectorial share of employment is twice as high as the national averages (NSIs 2011). In that respect, forestry is the main industry in terms of employment and economy whereas reindeer herding has a major role in overall resource management. The development of agricultural activities is anyhow limited due to the harsh climatic conditions found in the area.

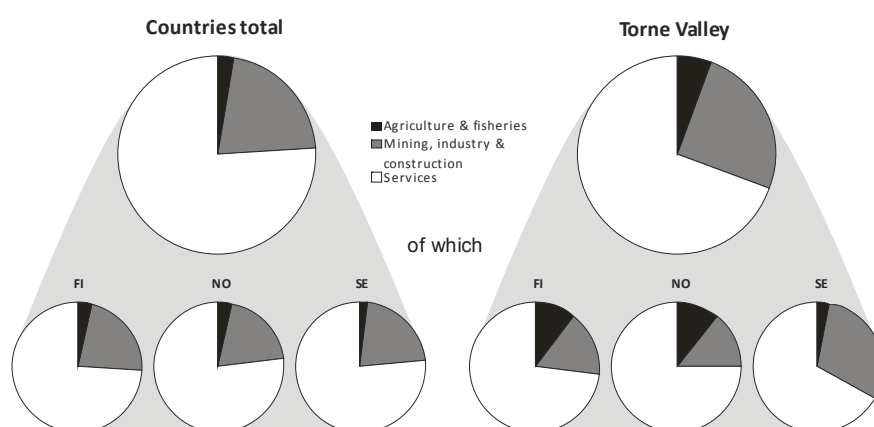


Figure 1: Main sectors of employment on countries in average and in the Torne Valley in 2009 (Data source NSIs).

The underground assets, namely metals and minerals, together with synergies and employment effects to other sectors, are the main building blocks of the on-going and expected development in employment and economy in the region. Increase, both in terms of turnover and employment, in mining industry has been remarkable and if everything goes like planned, the employment of the mining sector will double to 2015, especially due to new mine openings, as for example in Pajala. The impacts of mining to other sectors are of importance as it is estimated that for one new job in mining there will generate two new jobs in other sectors. Increasing mining industry will also create investments in infrastructure and logistics and construction activities of private houses and offices (Ministry of employment... 2011). This is also visible on business registration as compared to national averages there are many new companies both on the Finnish and Swedish sides of the river. On the other hand the mining activities are dependent on external financing and foreign investors and thus heavily dependent on the international markets and economic situation. Also the environmental impacts of the mining activities and possible resource management conflicts especially of primary production and tourism and thus the final end employment and economy effects are not that easy to estimate.

The main challenges to labour-market development consist of the relative geographical isolation/segmentation of the local labour-markets, high long-term unemployment rate, lack of “female jobs” (see chapter 2.2), labour mismatch and high seasonality of activities especially within tourism whereas the cross-border dimension can be seen as an advantage. The job distribution in Torne valley follows the scattered nature of the settlement pattern. The main nodes of employment are also the main settlement nodes and the location of jobs outside these is very limited and mostly related to primary production, and especially herding or forestry. The distance between the settlements can be seen as the main challenge and not i.e. the state boundaries as the limitations in

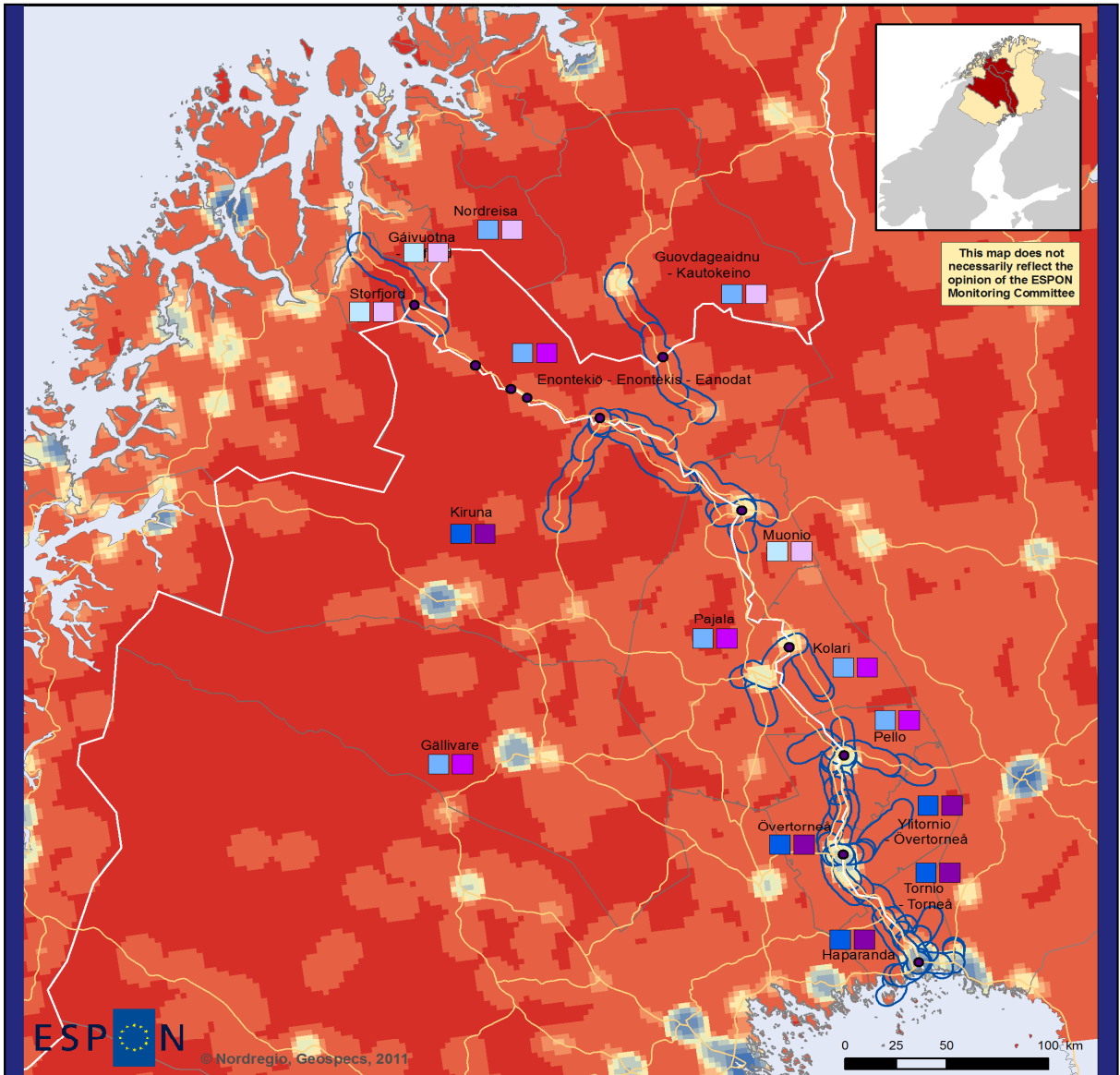
infrastructure are not that much related to administrative divisions and that there are long traditions for integrated cross-border labour markets.

One policy initiative that targeted the improvement of the cross-border labour market is a cross-border project under the EURES (European Employment Services) network, a subordinate body of the DGV, the department of Employment and Social affairs of the European Union, that has been running for the last ten years. *Cross-border Tornedalen* is one of the 21 European cross-border projects and areas where cross-border area labour market partnerships is organized between labour market parties and the public employment services as joint partners. In addition, other parties relevant for the regional labour market functionality, such as municipalities, are able to participate. The initiative coordinates www.crossbordertornedalen.net homepage for Eures Crossborder Tornedalen and employment authorities in the North Calotte area that combines information about working in the area and contact information for the necessary authorities. The objective of these pages is to improve the mobility of the workforce across the North Calotte area (Crossborder Tornedalen 2011). As a source of information – both for employees and employers – the page is an operational platform, but due to lack of statistics the impacts of the site are hard to estimate. It is anyhow estimated that a bit over 1000 persons or some 3% of the regional labour force are cross-border commuting (see picture 3) and half of those are commuting between Haparanda and Tornio (Kaarlela 2009).

Labour market mismatch relates to ageing population and structural unemployment on the one hand and has led in some sectors to labour shortage. The labour demand in the region nowadays is higher than in a long time due to the development of new economic activities (e.g. new mine openings) and an important share of the labour force being close to retirement age (baby boomers from the late 40s and early 50s) thus soon leaving the labour market. On the other hand there is a lack of *qualified* labour force that is a threat for the successful realization of the planned megaprojects, like in metal industry and mining related expert tasks, but also basic services like education and health services. The lack of qualified labour is also related to the lack of regional education possibilities in these sectors. Also the internationalization of such industrial activities sets more requirements for language skills. This labour demand cannot be solved locally and the distance related lack of commuting possibilities is making the situation even harder (Ministry of employment... 2011). To solve this shortage, it is likely that the development of future mining operations will need *inflows* of qualified labour force from other places, and especially from abroad.

The planned larger development projects and investment plans, like mine, bio energy production sites and tourism related activities represent both an opportunity and a challenge for the regional development, as it is unclear the extent to which this will benefit local communities, especially when it comes to increased job opportunities and welfare. These industries are expected to boost also many other sectors, although all the priority areas are strongly tied to the global economy and its fluctuations. European and global economic uncertainties make it difficult to assess the short term development as many of the existing plans and ongoing activities are heavily dependent either on international financing or export industry or both (Ministry of employment... 2011).

Picture 3 highlights the spatial structure of the employment in the Torne Valley and the cross-border dimension of it. Its spatial configuration shows that it is at the same time highly concentrated and very diffused. On the one hand, there are a handful of settlements that concentrates many jobs and thus acts as local job centres. This is the case of Kiruna, Haparanda-Tornio, Gällivare or Övertorneå. On the other hand, there are many jobs that are located 'in-between' those centres. There is a diffuse structure of scattered employment (with fewer than 5 jobs per grid cell) that constitutes the largest part, in terms of land-area, of the region's employment.

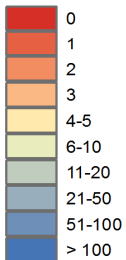


EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Local level: LAU2
Source: ESPON Database 2013
Origin of data: NSIs 2011
© EuroGeographics Association for administrative boundaries

Jobs and Commuting in Torne Valley

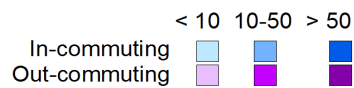
Total number of jobs on grid cell level



Existing and potential cross-border commuting

- Permanent border crossing point
- roads
- ⬭ Potential commuting area (<45min travel distance between cross-border settlements)

Cross-Border commuters in 2006, in persons



Picture 3: Location of the jobs and potential cross-border commuting areas in Torne Valley

Services of General Interest

The employment in the tertiary sector in the Torne municipalities is lower than in the respective national averages but there are remarkable differences within the sectors. The employment in public administration, education and social services is over-represented and employment in transport, hotels and restaurants are around the national levels (NSIs 2011). All the other service sectors in the area are under-represented.

Since the provision of services of general interest (SGIs) is believed to play an important role in shaping territorial attractiveness, the existing lack of services in SPAs becomes an unfavourable factor for local attractiveness, and is believed to affect therefore negatively to demographic trends. "The combination of falling population, extremely low densities and high levels of inhabitant dispersion has always provided obstacles for economic activity and provision of public services" (Gløersen, 2006). In Torne Valley large land area, long distances, sparse population, population concentration on few settlements and lack of human resources is rather challenging starting point for providing services equally and profitably, not to mention high share of dependent population. There are anyhow important differences between municipalities – both in relation to differences between the countries as between more or less urbanized municipalities.

Torne Valley is an out-migration region, but the internal migration within the municipalities is also affecting to service production as both people and services keep concentrating in local centres or in few other settlements. The SGI provision becomes thus even more challenging in the outskirts. The distances between the municipal centres is also affecting as cooperation possibilities between municipalities are limited (Lapin aluehallintovirasto 2011). Also the administrative level of responsibility is affecting the way the service is organized and provided to the population. In Norway and Sweden the health care services are coordinated by the regions whereas in Finland by municipal groups (kuntayhtymä).

At national level, in Finland, the provision of SGIs is related to local government reform. The new Government Programme from April 2011 goals that in 2017 as many Finnish municipalities as possible will be so called *strong municipalities that can ensure the provision of welfare services and can create prerequisites for increased vitality and implementation of democracy within the municipality* (The Association... 2011). The reform will undertake a marked decrease in the number of municipalities by taking the functional entities (commuter areas) as a starting point. In the sparsely populated areas this goal might anyhow not be feasible due to long distances and low population potential, even within a single municipality.

The decreasing number of population is anyhow not affecting to the need of health care services as the population in the region is becoming older and thus their needs for health care and other services are increasing. The increasing share of elderly people is setting also new needs for service production as the accessibility to services is also related to i.e. person's capacity to drive a car of their own due to limited access to public transport services between the settlements and especially outside the settlements.

There are initiatives to provide better health care services via cross-border cooperation. i.e. Interreg-project Gränslös vård ("Borderless health care") aims to increase and deepen health centre

cooperation in Finnish and Swedish Torne Valley municipalities. The goal is to create better health services that are not bound on the place of living or working via more effective use of existing resources, deepening cooperation and information exchange between the countries; like the freedom to whether to visit health care centre in Finland or Sweden, co-use of ambulances, possibilities to see patient register data cross border and co-operation in emergency cases. In addition a shared language and cultural affinity are important factors promoting cross-border patient mobility. Also, cooperation on primary healthcare has been gaining more significance because hospital care is increasingly centralised to regional centres outside Torne Valley. This project has been used i.e. as a pilot example/best practice also in wider European context (Interreg Nord 2011).

When it comes to education, the differences between regional centres and other municipalities are also felt not only in terms of infrastructure (i.e. presence of a school or education centre) but also in terms of breadth of education choices they provide. In that regard, the higher the level of education sought, the worse the accessibility. A Finnish study, recent highlighted that a remarkable share of the municipalities do not have any secondary or higher education institutions and in most of the municipalities the secondary education possibilities are limited to only one or two branches (Lapin aluehallintovirasto 2011). Clearly, this restricted choice may push some youth to depart for larger centres, being in the region (Umeå, Rovaniemi) or further away. Clearly the local centres in the Torne Valley do not provide such a wide array of educational choices. Utbildning Nord in Övertorneå is anyhow a positive, prime example of how to establish a well-functioning institution for further education in a very sparsely populated region. The starting point for Utbildning Nord is on the basis of cross-border cooperation and by capitalising on the mobility of people in Northern Finland, Norway and Sweden. The foundation is organizing education on a wide spectrum with the focus on the needs of the local labour markets (Utbildning Nord 2012).

For elementary education the main challenge is the decreasing number of pupils in many schools and the trend to merge small schools on the outskirts of local centres in order to gather a certain 'mass' of pupils. So far the situation is still relatively good in Torne Valley. For example in the Finnish side of Torne Valley some 25% of the pupils have right to organized transport to school as the distance between home and school is over 5 km (according to law; also shorter distances for younger pupils and for special reasons) but for almost 80% of those pupils the distance is still less than 20km.

Another issue for service provision is related to lack of competition and that most of the SGIs are organized by municipalities, municipal groups or regions. This high share of employment in public sector has its effects on municipal economics – especially when the number of tax payers has been decreasing faster than total population --- Anyhow, the jobs in public sector are important for female employment.

There is a challenge to get qualified labour force for operating SGIs, especially within the health care and education sector but also to other social services (Virtanen 2011). Consequently, the issue of service provision in SPA is not only a question of low demand, but also of limited supply possibilities due to service personnel shortage.

The limited size of the economy of the Torne Valley act as a centrifugal force for establishing interactions with other businesses for transaction or collaboration purposes. In a recent study, it has

been highlighted that many organizations in the SPA are supporting small firms in their endeavors to find new business partners, both regionally and internationally (Dubois and Hedström, 2011). Yet, as mentioned earlier in this case study, the opening of new mining operations in the Torne Valley may benefit some of the local businesses in terms of sub-contracting activities. However, this sector of activity being highly competitive (both in the Nordic countries and globally), those businesses will need to compete with other local and international businesses to be involved in this production chain. According to Knoblock and Petterson (2010) "Restructuring in mining generates new business opportunities in subcontracting, consultancy and equipment production, but also creates new challenges", thus advocating the paradox that the predominance of mining activities in the local economy may increase its overall welfare, as well as its vulnerability.

In that respect, institutional settings and cross-border organizations can have an active role as network facilitators in the region to increase the needed cooperation between the firms. For example the Council of the Torne Valley (Tornedalsrådet) openly promotes one of its activities as 'International match-making', i.e. helping local companies to widen their business networks to other companies in the extended cross-border region (including Norwegian and Russian firms) (Tornedalen.org, 2012).

Tourism

Nature in the Torne Valley provides unique geographic and cultural assets for tourism. The unspoiled natural environment and preserved regional culture is a very important asset for a tourism industry that has its main potentials on adventure and experience activities. The Arctic elements of harsh climate, Arctic Circle, the northern lights, snow, midnight sun, and also cultural elements like Sámi culture and festivals, are seen rather 'exotic' from European and Global point of view. Long winter offers good skiing possibilities and in the summer time the wilderness is locking explorers. Winter sports and activities in large skiing resorts of Ylläs (Kolari), Levi (Kittilä), Björkliden and Riksgränsen (Kiruna) and a number of smaller ones are attracting both domestic and international tourists whereas the Ice Hotel in Jukkasjärvi can be seen as an example of successful branding, being one of the most famous destination in Sweden. Also Christmas tourism to Rovaniemi have boosted tourism development and given a certain image of the region abroad.

Tourism is the one of the main sectors of employment and economic activities. The tourism related job opportunities are especially important for women and young people. The interests towards Northernmost Europe are still increasing in other part of Europe and Globally, and many of the existing tourism destinations have plans for expanding the activities. The main challenges in tourism and for the possible expanding in activities are seasonal character of employment and lower attractivity of summer activities. The summer activities are mostly related to various outdoor activities like hiking, fishing holidays, gold panning courses, farmhouse holidays and so on that do not as such have large scale economic or employment effect for the local people. Thus the investments to attract visitors year round are important in order to achieve sustainable economic conditions for tourism industry (Lähteenmäki 2006; ÅF-Infrastructure AB, 2010). A remarkable share of tourism related activities and especially outside the major resorts are not just seasonal but can

also be seen as a supplementary for other economic activities that gives some extra income for local people mostly in combination to primary production.

On the other hand the potential for a sector like tourism may be derived from the existence of mines and of attractive natural resources such as natural parks or natural environment assets in general (Damsgaard et al. 2009).

Interesting initiatives have been undertaken recently in order to develop the tourism potential of the Torne Valley. For instance, the Northern Lights Route (<http://www.northernlightsroute.com/>) propose a hiking route from Haparanda-Tornio to Tromsø (Norway) that also combines practicalities, such as an online link to plan your trip.

Specific transport infrastructure issues

All the Torne Valley settlements have relatively good road connections but due to long distances to main markets, low population potential, lack of public transport and harsh winter conditions there are major challenges in terms of mobility and accessibility. The people are dependent on private cars as the public transport services are limited especially on cross-border context, and due to long distances also the high transport costs have their impacts. The main transport related challenges are anyhow commercial.

The general situation for industries and firms is that the markets are far away and that long distances result in high transport costs. These conditions are amplified by the fact that the Torne Valley is a cross-border region at the margin of the respective national transport systems (Sweden, Finland, and to a lesser extent Norway). The freight transport is on the one hand dependent on the good connections to foreign markets due to the strongly export-oriented regional economies, both in relation to the raw material, like ore and forestry, and to industrial goods that have been processed in the region and on the other hand on consumer goods imported to region, including the smaller settlements. In that respect, the main freight flows from the Torne Valley follow a North-South axis on each side of the Valley, i.e. from the Swedish side (Kiruna, Haparanda, Pajala...) to the south of Sweden and from the Finnish side (Tornio, Pello...) to the south of Finland). Yet, new alternative routes have been developed rather recently.

The rail connections in the region have rather different starting point for passenger and freight transport. A well-functioning railway system is crucial for the export intensive industries of ores, timber, paper, pulp and metal & engineering industries in the region. In Finland the main line provides a connection from Kolari to major ports in the Bothnia Sea or a rail connection further south. In Sweden the main lines are the industrial connection lines of Malmbanan between Luleå and Narvik and a connection between Gällivare and Skelleftehamn. The main use is to transport iron ore pellets i.e. from Kiruna to Narvik port and from Malmberget (Gällivare) to Luleå. Northernmost Norway lacks continuous railway. For the passenger transport in Finland the same rail line has a great importance for personal transport and for tourism with night train possibilities to South Finland. In the Swedish side there are ongoing projects and plans to better the lacking coastal rail

connections but so far the main passenger flows are limited to inland night train services (ÅF-Infrastructure AB, 2010).

Even if the importance of rail services are highlighted both in Finland and Sweden the existing rail network capacity has reached in many places in its upper limits. The high capacity utilization leads to a high sensitivity to disturbances. Taking into account the planned expansions and reinforcements of the railway, some capacity problems will be overcome, while others might occur, the expanding of the mining activities being the current critical issue. With four-five (and possibly more) new mines in Pajala and Kolari the importance and development needs of the Kolari line and Malmbanan will increase substantially (ÅF-Infrastructure AB, 2010). Bottlenecks in the rail system require considerable measures to improve reliability and reduce lead times for the transportation of goods and people. This is particularly important for the continuous supply of raw material and to increase general accessibility between the sparse and more densely populated areas. From the Torne Valley point of view the new Haparanda-Tornio line could be an important track for border crossing flows. So far only few freight cars with limited capacity operate on the railway across the Swedish-Finnish border. The main reason is linked to the infrastructure itself as the railway gauge is 1.520 mm in Finland, but 1.435 mm in Sweden. This obstacle has to be overcome by new techniques that can also cope with the harsh climate. (ÅF-Infrastructure AB, 2010)

Good maritime transport connections are important for the local industries as sea connections offer a cost-efficient and environmentally sound alternative, especially for large freight volumes and reaching faraway markets. The Bothnian Bay is maritime logistic centre in the region, but the importance of all-year open deep sea harbour in Norway will probably increase even more together with mining activities. The Atlantic connections from the Norwegian ports, especially from Narvik, are important gateways with deep-sea and ice-free conditions. Those ports have also a strategic position for access to the North American and Asian markets. The Gulf of Bothnia offers good sea transport connections to central European Markets. During the average winters the gulf, or parts of it, is covered with ice almost half a year and thus efficient ice-breaking services are required to ensure accessibility to the ports. Even the year-around accessibility to the ports in Bothnian bay is of interest not only to local industries but also for all countries in the EU, the ice conditions have a certain impact on trade and on the competitiveness of the industries in the region with i.e. higher transport costs and longer delivery times (ÅF-Infrastructure AB, 2010).

Long distances make the air transport a crucial infrastructure for passenger mobility, both externally and domestically. The existing passenger flights connect local airports fairly well to national hubs, mostly capitals, but transversal, intra-regional connections are more or less lacking, especially across national borders. Those connections generally ensure a high accessibility to main cities, making physical meetings with relevant institutional, economic or financial actors easier than it is in many rural areas of continental Europe (Gløersen 2009). Scheduled and charter flights play an important role as well for the tourism industry.

While higher transportation costs are identified for some export industries, these are only partly due to the long distances to main European markets, but furthermore to the lack of logistics centres and the small potential for economies of scale (Gløersen 2009). Thus major investments to infrastructure would not only support to general accessibility but would also make it easier for new companies to

establish themselves. Efficient passenger transport and freight on rail and by sea also enhances the businesses cluster interaction and increases competitiveness.

A number of initiatives have also been proposed to develop transport connection both to/from and within the region in order to support the industries better. This includes north-south connections as well as east-west and transversal transportation networks. From European point of view most resources has put on the so called Northern Transport Axis / Barents Link that runs from Narvik to St. Petersburg. The corridor is part of the Northern Dimension Partnership on Transport and Logistics. It has a global dimension described by Northern East West freight Corridor project (NEW), whose objective is to develop an intermodal transport corridor between North America, northern Europe and China (North America-Narvik-Haparanda/Tornea - Vartius- St. Petersburg-China (Gløersen 2009). Other EU prioritized transport corridor is the motorways of the seas, including both ports in the Gulf of Bothnia and on the Norwegian coast.

For the Torne Valley, an important transport project would be the further development of the Bothnian corridor that binds together the Swedish and Finnish sides of the Bothnian Gulf, and connects the east-west and north-south trans-national axes in Sweden, Finland, Norway and Russia. In that sense, the Torne Valley may play a crucial role as a crossroads for freight transport from the European Arctic regions. The corridor connects NEW within the Northern Axis with the Nordic Triangle that is connection the tree Nordic capitals. This infrastructure, today suffering from lack of capacity and bottlenecks, has domestic importance, as well as for transit transports to and from the Eastern markets. With increased capacity, there is a great potential for modal shift from road to rail/sea freight transports (Gløersen 2009).

Other important transport related issue in the near future is the transport of ores from the mines as the existing railroads are already at the upper edge of their capacity. Initiatives like Ishavsbanen from Kolari/Pajala to Skibotn and other solutions to connect Kolari to Narvik, Kolari to Kemijärvi and further to Kirkenes are interesting debates with varying reality levels. New connections would create a whole set of new possibilities for the region, even if they are not the most economical ways of satisfying the needs of the mines. The question is therefore whether the mining companies or/and public authorities are prepared to identify win-win solutions for balanced regional development and industrial development, and provide the additional funding need, or if they let industrial interest determine how the infrastructure shall be organised. So far Norway has preliminary promised investments for Kilpisjärvi-Skibotn rail if the Ishavsbanen will be build although Northland Resource that is the largest mining company in Kolari-Pajala region might be most interested to expand the capacity of Malmbanan and continue that further (NRK 2011; Tornedalsrådet 2009; YLE 2011).

In addition, further development of passenger transport, in particular by rail, is needed to better integrate the labour markets of the region and improve the access of industry and citizens to facilities for research and higher education. This would also be a great improvement for tourism (ÅF-Infrastructure AB, 2010).

Role of Information and Communication Technologies

The possibilities to provide SGIs equally and economically in a changing demographic and economic situation are related to the character of the services as well. For example within numerous local government services like employment and economic development offices, police stations, tax offices, magistrate, security and social insurance institutions the role of *e-services* is crucial. In education and health care services the possibilities to e-services are more limited. The development of e-services limits, but does not eliminate, the need for travels in the sparsely populated areas.

The use of e-services cannot be debated without the provision of ICT – what is the accessibility, costs and use possibilities. Finland a broadband 2015 project has been launched by the Government in 2008 and aims to provide 99% of the population with fast fibre-optic or cable network by the end of 2015. The ambitious objective is that nearly all permanent places of residence and places of business and public administration are no further than two kilometres from a 100Mbit/s fibre-optic or cable network. Consumers may, at their own cost, obtain the connection from a telecom operator providing subscriptions. The surveys of the Ministry of Transport and Communications estimate that 95% coverage will be achieved on market terms and the remaining uncommercial coverage on sparsely populated areas will be constructed partly on public financial support. The state has budgeted 66 million euros for the support over the period of 2009-2015. In addition, MEUR 24.6 has been targeted to the project via EU's Rural Development Fund (Finnish Communications Regulatory Authority 2011). After the Swedish broadband strategy (Regeringskansliet 2011) the goal is that in 2015 should 40% of all households and companies have access to at least 100Mbit/s broadband and in 2020 the share should be 90%. In Norway similar national strategy does not exist but in December 2011, the broadband connection coverage was in Nordreisa 57.7%, Storfjord 62.3%, Kautokeino 64.4% and in Kåfjord 69.5% (NyttBredbånd.no 2011). These national goals have a great importance in Torne Valley as the sparse population structure would not otherwise enable commercial connections, especially outside the major centres in the region.

Social

Demographic structures and trends

Settlement patterns

The Torne Valley is one of the most sparsely populated areas in Europe. Long distances and scattered small settlements characterise the human landscape of Torne Valley. As the land area of the municipalities is generally large, including the geographically largest LAU2 units in the ESPON space, the better picture of the division of population in this area can be given on settlement level. In total 72 % of the Tornedalian population is living in the build-up areas with more than 200 inhabitants (see picture 4) that is the definition of a statistical settlement in Finland, Norway and Sweden. Thus the settlement pattern is characterized with relatively dense populated inner cities and other settlements and almost unpopulated hinterlands, leading to high degree of centralization. This pattern of low population densities but high degree of centralization is even more visible on regional context.

The location of the settlements is related to the settlement history and to the exploitation (harvesting, extraction...) of natural resources. All the old settlements in the Torne Valley are located on coast or along the main waterways having their roots on pioneer settlements including the old parish of Tornio. Typical for these settlements was that those were built on the both sides of the

river, and some of those were thus split in two when the state boundaries changed. There are still several villages that have the same name on the Finnish and Swedish sides of the river, like Juoksenki-Juoksengi or Kaaresuvanto – Karesuando. Some small settlements were also developing around the church and market places but had long rather seasonal character after the cycles of reindeer herding. Followed by the industrial development the new settlement era started. The “new” settlements developed around ore and mineral mines or paper-mills (Lähteenmäki 2006). In the latest years also tourism has shaped the settlement pattern of the region, like the mostly winter sport resort of Ylläs in Kolari. Today the main center of Torne Valley is the cross border twin-city of Tornio/Haparanda and the mining towns of Kiruna and Gällivare, both located in Sweden.

*Demographic processes & migratory movements*³⁹⁰

During the last ten years the population in Finland, Norway and Sweden experienced an annual growth rate of 0.6%. At the same time the total population in the Torne Valley has decreased -0.7 % per annum or with some 8000 inhabitants. This describes well the fact that at the regional and sub-regional level the national populations polarized spatially rather heavily, both from north to south and especially towards larger urban settlements and regional centres. In the municipal level only Storfjord experienced a minor population increase during the last ten years whereas 1/3 of the municipalities had a population decrease more than 1.0% annually. Anyhow, during the last five years, in period 2006-2011, the population decrease in the Torne Valley has smoothed a bit – in most of the municipalities the population decrease has been more rapid in 2001-2005 than in 2006-2011.

On average the natural population change and migration affected almost as much to the population change in the Torne Valley during the last ten years but there are remarkable differences between the municipalities and countries. It should also be stressed that due to small number births, deaths and net migration balance, the values between the years can change rather rapidly. The natural population change in the Torne Valley has a minor decrease, but on the municipal level there is a rather large spectrum mostly between the city municipalities with natural increase or stable natural change and the more rural municipalities in Finland and Sweden with natural decrease. In the Norwegian municipalities the relatively younger population is explaining the higher natural increase.

In terms of migration almost all the municipalities in the Torne Valley had a negative average net migration balance during the last ten years. The effect of small population size is anyhow remarkable as the annual figures can change between positive and negative net change. As some 10% of the regional population change their place of living over the municipal boundaries over a year, the average annual net migration rate of -0.5% in Torne Valley is describing only a small part of the mobility. The high mobility is i.e. related to large share of seasonal jobs within tourism, forestry and mining activities, but also to the lack of higher education possibilities. This is special the case in the Finnish side of the region where a large number of tourism related seasonal jobs are shaping the regional migration dynamics. Also the differences between the domestic and international migration balances are of importance for the regional development as most of the Torne Valley municipalities gained on international migration. The role of international migration was especially of importance in Swedish Torne Valley.

390

Population figures in the chapter comes from NSIs

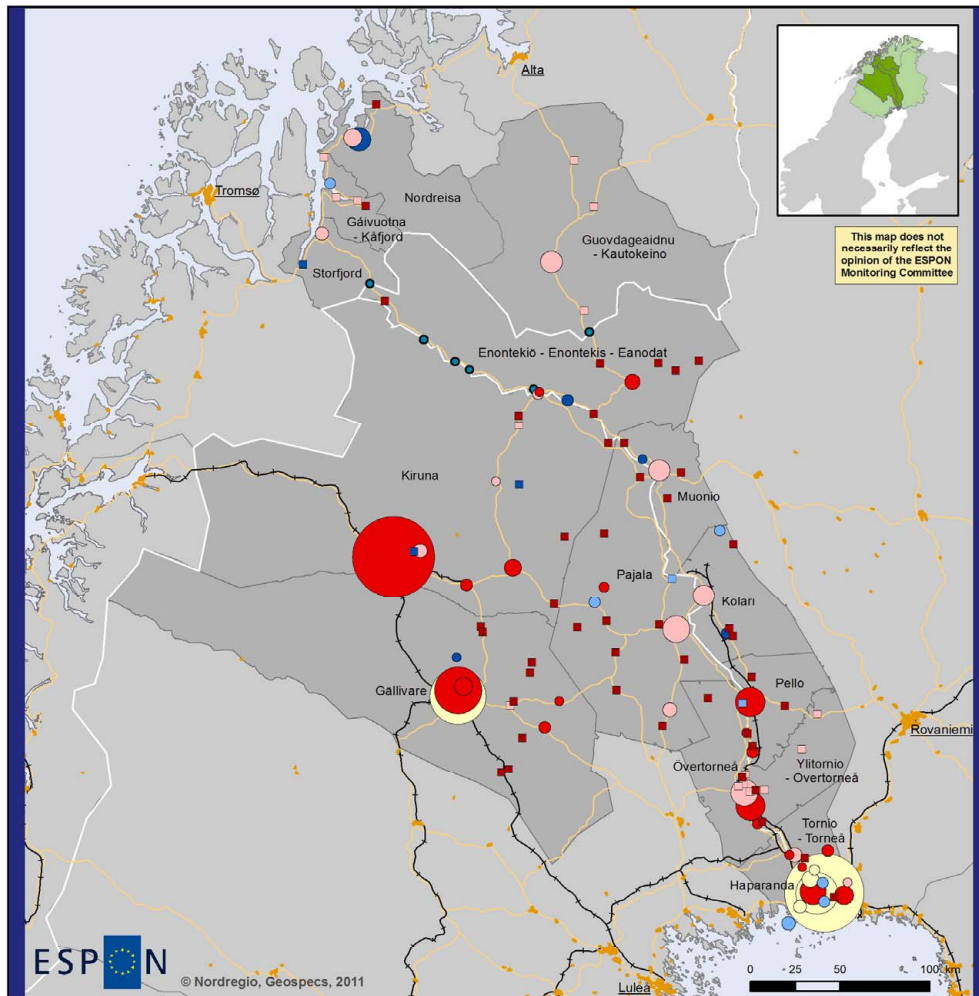
The long lasting outmigration reflects the population's response to a changing economic context and overall global trends related to attractiveness of larger cities, education and job possibilities. Thus this outmigration for the region is selective both in terms of gender and age groups. The age structure in the Finnish and Swedish sides of the Torne Valley is rather similar. Compared to national averages, the municipalities are characterized by low share of children and main labour force aged population whereas the share for elderly labour force aged population and elderly population is high. Thus aging is a challenge for these municipalities; i.e. the municipality of Pajala is even having the Swedish top value of 30.7% and almost as high values can be found also in some other municipalities. The aging of the population in terms of fast growing groups in retirement ages will also hit the region rather heavily during the coming years. Compared to European (EU27) average, the age group 55-64 years is remarkable larger in Finland and Sweden, and especially in Torne Valley. In addition the share of children and young is low especially outside the main cities. In the Norwegian side of Torne Valley the population structure is following the same pattern compared to national average but due to generally younger population in Norway the picture is rather different. Compared to Finnish and Swedes Torne, the Norwegian side is relatively young with large share of children and not yet that many elderly people.

The gender balance in Finland, Norway and Sweden is almost equal. On average there are 101 female per 100 male in the Nordic countries. However, there are considerable regional variations especially between cities and sparsely populated areas. The Torne Valley is male dense region with average value of 95 female per 100 male. It should anyhow be taken into account that females on average tend to live between 4 (Sweden) to 6 (Finland) years longer than males, depending on the country of living. When looking at the labour force aged population of 15-64 year - the years when people decide independently where they want to live and differences on life expectancy are not yet affecting to figures – the overrepresentation of male population is clearer with only 89 female per 100 male. The lack of females can i.e. be explained with lack of both education possibilities and employment possibilities outside primary production and public services. The existing development scenarios for mining related jobs do not make the situation easier, especially if issues related to gender equality are not seriously included to development plans (NSD 2012).

An important asset for the Nordic labour market in general is its highly skilled labour force. On national level the countries have higher share of tertiary educated persons than in EU on average (22 %), referring to persons with semi-long (bachelor level) and long (master's and PhD-level) higher education. On regional level Torne Valley has anyhow relatively low share of tertiary educated persons and gender differences on the level of education are rather high as much more female than male have a higher education degree.

Old age structure, lack of especially working-age women and out-migration are the main demographic challenges for the Torne Valley. The reasons behind are mostly related to lack of education possibilities, low share of qualified jobs and high share of seasonal jobs. Also the fact that the region does not have any centres with regional importance as such is effecting as even the regional centres of Luleå, Rovaniemi and Tromsø/Alta are located behind long distances.

Picture 4: Settlement structure and population change in Torne Valley

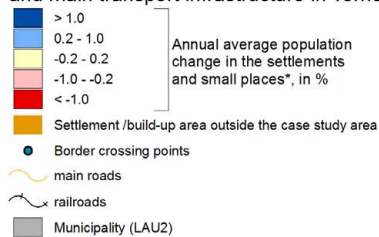


EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

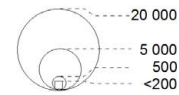
Local level: LAU2
Source: ESPON Database 2013
Origin of data: NISs 2011
© EuroGeographics Association for administrative boundaries

Settlement Structure and Population Change

Settlements with population change 2000-2005
and main transport infrastructure in Torne Valley



Size of the circle is relative to the total number of people living in the settlements in 2005



* Population change in the small places refers to population change outside the settlements - thus the population change in small places within the same municipality are the same ones

Identity and social cohesion

Torne Valley is often cited as a region of its own, even if it crosses national boundaries. This delineation is highlighting the cultural cohesiveness of the region where especially language, family relations and historical background have a major role. In the old days the Torne River and its tributaries were the main transport corridors in the region and thus combining – not separating the different parts of the Torne Valley or the villages on both sides of the river. The local *meänkieli* language name of the river of Torne *Tornionväylä* or just *Väylä* (=way, road)“ is describing. The family ties goes over the state boundaries and even today the cross-border marriages are rather common. Also some common issues like old building style and local delights can be seen as a sign of unity. These traditional and cultural spaces correspond only partly the current administrative divisions. Thus the geographic context that the local people and local stakeholders identify as their region should not be dealt or developed without a cross-border and cross-cultural starting point.

At the same time Torne Valley is multicultural region. Even though the share of foreign population is relatively low, the Finnish speaking minorities in Norway and Sweden and the Sámi people in all the three countries are in some areas majority compared to main population. The Sámis are the only indigenous peoples of European Union. The traditional living area of the Sámi people goes from Mid-Norway and –Sweden over the Finnish Lapland to Kola peninsula in Russia. This region is called Sápmi, Saameland. It is estimated that there are approximately 65 000 - 75 000 Sámis in these four countries. The Sámis have their own languages (or dialects that are rather distinct), culture and organizations. Traditionally the main economic activities were reindeer herding, fishing, hunting and handicraft production. Today tourism has also become a significant source of income. Even reindeer herding has always included just a part of Sámi people it's still seen as a main Sámi livelihood and in Norway and Sweden the Sámis have the exclusive privilege of herding.

The state boundaries and a status as a cross-border region are rather recent phenomena in Torne Valley. Until mid-18th century there were no state boundaries in Torne Valley as the region was a part of so called *fellesdistrikt* – common area where the state boundaries were not defined. In 1751 the Strömstad Treaty settled the boundary between the then Danish territory of Norway and Sweden. In the treaty's addendum a specific Lapp Codicil was defined. This special codicil formalised the rights of the Sámi to continue with their migratory reindeer herding across the border. Thus this change in the boundaries did not change the interaction of the people in the Torne Valley that much. The situation changed anyhow rapidly in the 19th century when Finland first in 1809 became a part of Russian imperium, in 1852 the boundary between the Grand Duchy of Finland and Norway was closed and in 1889 also the border to Sweden was closed. The Finnish independency in 1917 didn't change the boundaries even it became easier to cross those (Lehtola 1997:36). Once these borders between the countries were established, each side of the Torne Valley has become influenced by the majority culture in its respective country.

In linguistics terms, Torne Valley was long a multilingual region. Finnish was the majority language in the both sides of the valley until the 20th century, and a minority language on Norwegian side. Sámi was a minority language all over the region and Norwegian and Swedish were mostly used as administrative language and among a low number of pioneer settlers from other parts of Norway or Sweden. These old language areas can still be seen i.e. in the place names as most of the Norwegian

and Swedish settlements in Torne Valley have a Finnish and/or Sámi name. During the last two centuries the languages situation changed drastically. The development of Finnish speaking linguistic minorities to Tornedalians in Sweden and Kvens in Norway is related to development of the national states. In the Swedish side of the river, the local Finnish dialect, Torne Valley Finnish – or Meänkieli – started to develop in 1809 when Finland became a part of Russian Empire. The new state boundary did not follow the linguistic boundary and thus part of the Finnish speaking area became a part of Sweden. The Finnish speaking minority in Norway is decedents of the Finnish immigrants from Northern Finland and Torne Valley who moved to river basins and fjord-ends in the counties of Troms and Finnmark starting from early 1800th century. This group of people, also known as Kvens, experienced more or less the same history than the linguistic minority in Sweden with national assimilation policy. In addition the new wave of settlers from southern parts of the countries arrived to region after major investments to use natural resources especially after the war. Also societal pressure against the minorities was hard. Many people lost their language and people in the younger generations mostly learned Norwegian or Swedish as their mother tongue.

During the latest decades the linguistic rights and cultural attitudes have changed and both Finnish speaking minority and especially Sámi people have experienced a cultural and also linguistic revitalization. The minority rights of Finnish speaking population and Sámi people are also included to national laws³⁹¹. In all the three countries the official status means that the language can be used in official context although few employees in the public sector have sufficient language skills.

Together with language rights the cultural revitalization was even a bit more important for the local identity of the younger generation. The minorities of Torne Valley have a rather different character. The Sámi people are recognized as indigenous people in all the three countries with specific rights, i.e. cultural self-governance, and their own national Sámi Parliaments elected by and amongst the Sámis. The cultural and national revitalization of the Sámis has its root on international indigenous peoples movements from the 1970s.

When the Sámis are one nation, the Finnish speaking population in Torne Valley has developed in three distinct directions, as Finnish nationals, as Kvens in Norway and Tornedalians in Sweden. Regarding the languages, Kven is understood politically as a language of its own in Norway and Meänkieli in Sweden whereas in Finland those languages are seen as dialects. In cultural terms revitalization and cooperation within and between these groups have increased during the last decades. Both Kven and Meänkieli have got their written languages and can now be studied even on university level.

The linguistic and cultural unity on the Finnish and Swedish side of the River Torne has been in the last years called also as Meänmaa (=our land). Meänmaa do not have that strict geographical focus

391

In Finland the first Sámi language right became in 1995 including the municipality of Enontekiö. In Norway the linguistic rights of the Sámi were included to Sámi law from 1987 including the municipalities of Kautokeino and Kåfjord from Torne Valley. Parts of Storfjord municipality are also included to Sámi Parliament subsidy schemes for business development giving some rights. In Swedish side the local Finnish dialect, Torne Valley Finnish – also known as Meänkieli – and Sámi became two of the five nationally recognized minority languages of Sweden in 2000. Finnish or Meänkieli have official status in all the five Torne Valley municipalities whereas Sámi can be used in Gällivare and Kiruna municipalities.

as i.e. word Torne Valley and the movement is also more popular on the Swedish side of the river as it is highlighting Tornedalians as linguistic minority and the cultural unity over across the river. Anyhow, this cooperation has its own symbol, flag of Meänmaa from July 15th 2007 that is also cited as unofficial national day. An organization with the same name organizes also own national meetings and is publishing a cross border newspaper (Meänmaa 2011).

As mentioned earlier, there is a rather high level of cross-border social capital in the Torne Valley region. This social capital is a result of the historical and cultural legacies of the region. But it is also maintained and developed through joint initiatives and projects. For instance, the focus on the strengthening of local development through the emergence of the Haparanda-Tornio twin-towns as a regional centre symbolises well this vision.

The numerous cross-border organizations initiatives focusing on entrepreneurship and business intend as well to use the tight social capital in the region as an asset to integrate its various local economies. This is the case for instance of the Council of Tornedalen, the Cross-border Chamber of Commerce, whose main objective is to build a new joint cross-border chamber of commerce in Tornio-Haparanda (Turku School of Economics and Business Administration, 2008). Yet, the fact that fiscal integration is rather low (Turku School of Economics and Business Administration, 2008) may become a weakness in the long run for the economic integration of Haparanda-Tornio, and the Torne Valley at large.

Environment

Torne Valley has rich natural resources from large mineral deposits, forests and renewable energy sources of water and wind to natural landscapes characterized by river valleys, forests and mountains. These nature elements are a major asset for the regional economic, employment and residential attractiveness.

Natural resource exploitation

There is a mutual dependency between the Northern Finland and Sweden and the rest of Europe what regards supply of goods and natural resources. Newly discovered mineral resources will drastically increase the iron and other ore production, create new jobs and regional growth. In Northern Norway also the expanding oil and gas activities are affecting to the regional development. The countries are also among the world leaders in exports of paper, timber and other forest-based products, Central Europe being the main markets. The importance of renewable energy sources is highlighted both on national and European agendas. Tourism flows to Northernmost Europe keep increasing. A critical prerequisite for this is a functional infrastructure such as port infrastructure and railway hinterland connections (Gløersen 2009). Thus the use of natural resources and transport infrastructure development needs to be planned together.

Mining and quarrying

In recent decades the global demand for minerals and metals has grown significantly together with world market prices. Rising world market prices and the liberalisation of the market for prospecting rights has made investment in the prospecting for and production of minerals much more interesting

even with risk capital. From European point of view the so called Fennoscandian Shield to what also Torne Valley belongs to is one of the most potential areas for new mining now and in the future (Damsgaard et al. 2009).

At the moment almost 90 % of the European need of iron ore comes from Northern Sweden, LKAB in Kiruna and Malmberget in Gällivare being the largest sites. Northern Sweden and Finland contribute also to significant parts of the EU's production of gold, silver, zinc and copper (Aitik). Furthermore, chrome production in Kemi in northern Finland has great significance for the production of stainless steel.

The future plans in the Torne Valley and surrounding regions include both expanding the production in existing mines, like in Kiruna, and also opening completely new ones. Thus in the next few years the importance to the Torne Valley will increase even more as some of the new mining projects are already in the construction phase. The main development will take place on Pajala-Kolari axis on both sides of the Torne Valley. At the moment there are five development projects, Tapuli, Sahavaara and Pellivuoma on the Swedish side and Hannukainen and Kuervitikko on the Finnish side on different stages. The mining of iron ore in the deposits in Pajala/Kolari is planned to start in 2013. (Northland 2011).. In addition there are over twenty concrete exploration projects in the same area and vast land areas are under exploration holdings, like a remarkable share of Kautokeino municipality As in the Norwegian side the mining interests in the region are mostly related to gold and silver. At the beginning of 2012 Canadian company Dalradian Resources Inc. (2012) bought prospecting rights for a vast area in Northern Norway corresponding app 5% of the Norwegian land area.

The main mining related challenges are related to infrastructure, labour force and environmental impacts. So far there are competing rail transport plans from the Pajala/Kolari mines; connections to Kemi are rather cheap to build but the port is not that deep and frozen in winter connections whereas connections to Narvik would mean more traffic on already heavily transported Malmbanan. One option would also be to continue the railway from Kolari all the way to Skibotn.

The new and planned mines are competing of the same limited cross-border labour force. At the moment some 1000 persons are employed in Kaunisvaara and when the mining activities will start next year, some 450 inhabitants will be employed. In the Swedish side there is a need for 3000 employees during the next four years. In the Finnish side the viability assessment of Hannukainen iron ore mine is soon done, and there are three additional on-going mine building projects in other parts of Lapland region (Talouselämä 2011). Even the opening of new mines and expanding the existing ones will increase the number of available jobs in Torne Valley the focusing on just rather "masculine" jobs is not enough for the more sustainable demographic and societal development in the region. In order to attract labour force to the region there needs to be jobs of interest for both males and females (NSD 2012).

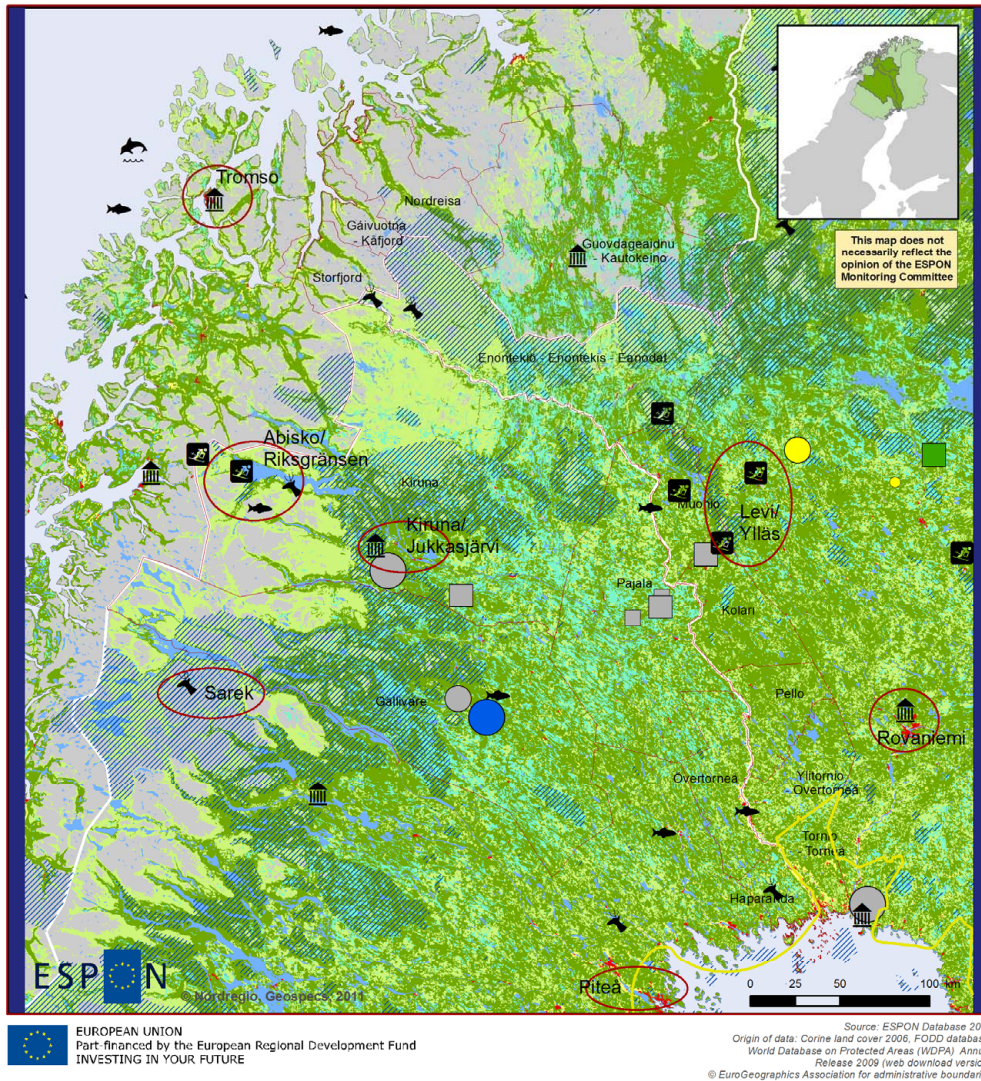
The new mine openings will likely have a sizeable impact on the local economies. In a recently published study, it has been suggested that "an average employment multiplier of about 2–2.5 during the maximum production phase, indicating that for every 100 jobs in mining about 100–150 jobs are supported elsewhere in the local economy" (Ejdemo and Söderholm, 2011). Thus meaning

may have a considerable leverage effect for the medium-term development of the Torne Valley, and the NSPA at large.

The existence of mineral resources may be a challenge in relation to other natural resource related potentials such as forestry or tourism, and also natural protection. In many municipalities in Torne Valley the forest areas have first and foremost generated jobs and incomes for generations (Damsgaard et al. 2009). Potential conflict can also be found between the search for ore, new mine projects and the Sámi rights as the environmental impacts of the mines can be conflicting with ILO convention no 169³⁹² principles and Sámi people rights for their own land and their way of living. The rights for reindeer herding and salmon fishing are at risk. The environmental impacts of the mines can have remarkable effects for the nature surrounding the mine and thus the environmental impact assessment is a crucial part when planning the new mines.

The general challenge is to organize the extraction of these mineral resources so that the local and regional benefits are maximized. The inflow of funds stemming from new employment opportunities and additional tax income needs to be channelled so as to generate the basis for a long term sustainability of the local economies.

³⁹² So far only Norway has ratified the ILO convention no 169 about the rights of Indigenous and Tribal Peoples in Independent Countries (ILO 1989) although it's in the agenda also in Finland and Sweden.



Picture 5: Land use, mining activities and main tourism resorts

The importance of the mining industries for the development of the Torne Valley has also had practical implications for physical planning. Indeed, the need for developing further the mine has led to the project of relocating parts of the city of Kiruna. The reason for this move is the fact that “The

iron ore body runs under the central parts of the town and continued mining will cause that area to collapse.” (Nilsson, 2010). According to Nilsson (2010), this highlights the strong influence of the mining company (LKAB) on the municipal authorities. Furthermore, Nilsson's main argument is that “the relocation plans are part of an ideological fantasy rooted in the social structure, of which the mining company has historically been a creator.”, meaning that the mining company has a strong social mandate for driving local economic development.

Renewable Energies

As a part of Europe 2020 targets, the countries should cut their greenhouse gas emissions with 20% compared to 1990 level and at least 20% of energy should come from renewable sources. Torne Valley region is a significant producer of renewable energy. So far the hydro power is the dominating energy source, but wind power potential is of importance especially in the mountain areas and the bio energy production from the forests and other sources could be better utilized even the sector is undergoing rapid development already. The main obstacle for the larger use of potential electricity produced from local energy sources is the limited capacity of the existing power grid (ÅF-Infrastructure AB, 2010).

Hydro power accounts for almost all electricity produced in the region. As only few rivers, including the Torne River itself, remain unexploited and they are therefore protected because of their value to the environment, the expansion potentials are limited. A great advantage of hydro power is the ability to regulate production. Therefore hydro power can complement other renewable energy sources which are more difficult to regulate, in particular wind power (ÅF-Infrastructure AB, 2010).

It is recognized that there is a great wind power potential in Torne Valley but so far the production level is low. In the Finnish side there are 10 wind turbines on area, one in Lamasoivi (Enontekiö), one in Olos (Kolari) and 8 in Röyttä (Tornio) with a total capacity of 30 MW (Tuulivoimayhdistys 2011). In Swedish side there are plans to build a wind park of 30 turbines in Sjisjka (Kiruna). This project has been time consuming and criticized due to nature values in area. In 2008 it was decided that the park can be build

Bioenergy is renewable energy produced from biomass. Biomass represents the main renewable resource for heating in Finland, Norway and Sweden. The share of bioenergy gross heat production by 2002 was 48% in Sweden, 15% in Finland and 7.6% in Norway. Sweden is leading in the use of biomass for heat generation whereas Finland shows the fastest growth in heat generation from bioenergy (Lindblom & Rasmussen 2008: 27). The used biomass comes mostly from wood fuels, black liquor (the spent cooking liquor from the kraft process when digesting pulpwood into paper pulp) being the most important single source. The combined use of industrial wood residues and by-products and domestic use of wood fuels is on the same level. In Finland these uses cover over 90% of exploited biomass whereas in Sweden the picture is a bit more diversified (ECON PÖYRY 2007)

In Finland and Sweden peat is classified as slowly renewing biomass fuel as opposed to the stance of the European Union and Intergovernmental Panel on Climate Change which classify peat strictly as a fossil fuel (ÅF-Infrastructure AB, 2010). The peat bogs cover some 15% of the land area.

From renewable energy potential point of view, the establishment of electricity-intensive industry in the region is an interesting option as the location near the energy sources both reduces the need for new investment in transmission lines for long transfers and transmission losses between electricity production and end consumer providing thus a more environmentally friendly option (ÅF-

Infrastructure AB, 2010). But due to other costs mostly related to transport and long distances these initiatives are not seriously debated.

In the future there are good potentials for bioenergy production. There are i.e. plans to build a large biodiesel plant in Kemi that can have also larger regional impacts as the raw material production could take place all over the region.

Exploitation of other natural resources

There are vast forest resources in northern Europe. Sweden and Finland together account for 34% of the EU27 countries' forest land and 33% of the forest available for wood supply. Based on land cover almost 80% of the land area was covered by forests, mostly coniferous forest. The annual increment in the region is higher than annual logging, which entails that forest resources, especially in the northernmost parts of Finland and Sweden are growing. Even forestry is an important industry in the Torne Valley, the harsh climatic conditions have anyhow its effects. The forestry industry has opportunities to increase wood production significantly by the use of fertilization (Corine 2006; ÅF-Infrastructure AB, 2010).

The employment effect and export value of fishing and fish farming in Norway is among the highest in the world, and a remarkable economy also in the coastal Tornedalian municipalities in Norway. Outside the Norwegian coast the value of fishing is mostly related on recreational activities and tourism. The River Torne is the largest river in the Baltic Sea region with natural salmon and sea trout stocks and a remarkable spawning river for Atlantic salmon also from global point of view. Thus, even the catches are heavily regulated, the River Torne is a well-known destination for sport fishing (RKTL 2011).

Torne Valley is reindeer herding area. Reindeer herding as such has rather low economic importance in the region, but the cultural heritage values and the impacts for other industries like tourism are of importance. Reindeer herding is regarded as central for the viability and maintenance of the Sámi culture in many Sámi areas. In Norway and Sweden the Sámi's have the exclusive privilege of herding whereas in Finland everybody has the right. For the Swedish reindeer herding the Torne Valley is anyhow an exception as on the basis of a special permit from the County Administrative Board, reindeer husbandry is practiced in eight so called Concessional herding villages. Reindeer herding is very different in those from the other Swedish Sámi reindeer herding villages as also non-Sámi people have rights for herding there and the stock sizes are smaller (Kulonen et al 2005).

Two main external challenges for reindeer herding are resource management and climate change. According to the Finnish ministry of Agriculture and Forestry (2003) there are four distinct dimensions to the conflicts surrounding resource management and reindeer herding: Firstly, the question of land ownership between the Sámis and state and other actors has given rise to numerous legal disputes. Secondly, nature conservation dimension of reindeer herding is often mentioned, as most of reindeer pastures are defined as conservation areas. Thirdly, the economic viability of reindeer herding is questioned, considering the low market value of the meat and the rising production costs. Finally, the possibility of combining reindeer herding with other types of land use is being considered as the overall human impact on the area is increasing.

The co-use and pasture losses are challenging questions especially in forestry, mining and energy production as in most cases that means changes in pasture areas, herding times and fragmentizing; issues that may have negative impact for meat and calving. By sector there are additional challenges. In forestry one issue is that commercial forests lack slow growing horsehair lichen, which is crucial for reindeers in the winter time. New mines and the expanding of existing ones make changes in pasture areas and the use of pastures bordering the mines decreases. The co-use of wind farms and reindeer herding is not that well studied but the reindeers seem to avoid those due to sound. Possible conflict is also identified between herding and peat production. In addition the Sámi reindeer husbandry is based on the family as a social and economic unit. The development during the last 30 years has reduced the family members' rights and, as a consequence, their involvement in the industry (Jernsletten, & Klokov 2002; Kulonen et al 2005).

Sámi reindeer herders enjoy the right to compensation for the loss of rights to use or own certain land areas due to expropriation to the same extent as other possessors of rights to land areas. This means that the right to compensation for expropriation exists whether or not the land is expropriated to benefit agriculture, forestry or other interests, but in which cases the herders have rights for compensation is not always clear (Kulonen et al 2005).

Protected areas and biodiversity as factors of development

Large areas are under different types of protection, like national parks (of Perämeri, Muddus, Pallas-Yllästunturi, Reisa, Stora Sjöfallet, øvre Anarjohka), nature reserves (of Aptasvare, Alajaure, Stubba, Granlandet, Lina, Pessinki, Kaitum, Sjaunja, Torneträsk –Soppero), wilderness areas (of Käsivarsi, Pulju, Pöyrisjärvi, Tarvantovaara) and protected mires (of Lätäseno-Hietajoki, Saaravuomakuoskisenvuoma). Laponia Area has been included to UNESCO World heritage list both due to natural, like the national parks of Stora Sjöfallet, Padjelanta, Sarek and Muddus, and cultural values, like Sámi villages. This spectrum of various types of protected areas is on the one hand telling about the environmental values of the regions but also giving some guidelines for the development plans as different types and levels of protection allow different types of other resource uses in the area.

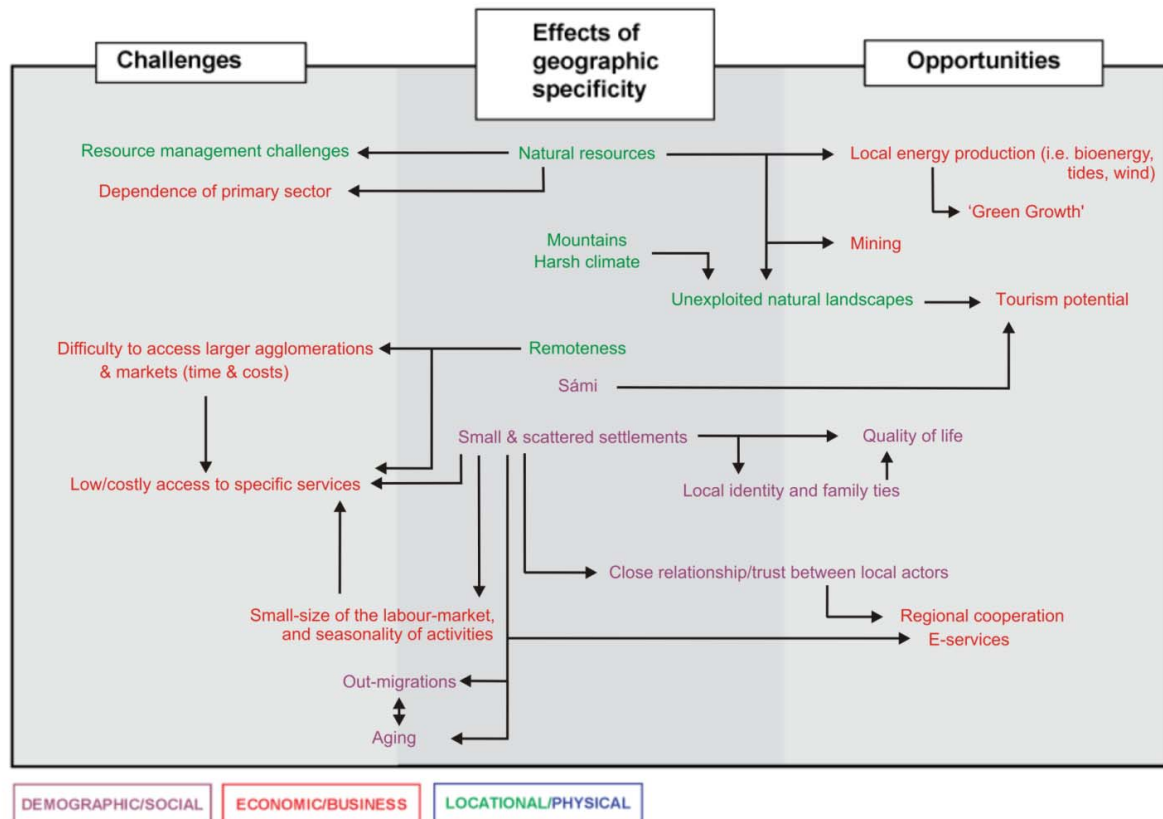
Of the economic activities only reindeer herding is allowed on all of different types of protected areas and thus also people involved to that livelihood can have more rights to use the land. For example only reindeer herders have rights (without an additional permission) to move outside the marked paths on Finnish nature parks (of those Malla located on Torne Valley).

Protected nature areas also play a part in the continuous growth of forest resources. These protected areas are particularly large in northern Finland and northern Sweden (ÅF-Infrastructure AB, 2010). Also the tourism potential and regional attractiveness of the protected areas is of importance as the total number of tourist is increasing.

As already sited there is a potential conflict between the nature protection, existing use of resources and the expanding mining industry. A remarkable share of the planned mines and mineral rights reservation areas are located in areas with essential water resources (for the most important wild salmon rivers of Tana and Torne), culturally and economically important reindeer herding areas and

not least to protected land areas due to those ecological value. On the one hand if the mining activities start on the new areas there is a high risk for spread of toxic waste by dirt downstream that eventually destroy parts not only the important ecosystems but also making the livelihoods related to resource harvesting impossible. On the other hand if the area of protected nature areas will be expanded and mining plans stopped, millions of euros can be lost, having thus an impact to local and regional economics (NRK 2010). This balancing between natural values and economic profits is at the moment rather unstable and problematized by different regional and national actors.

Synthesis



Generalisation from case study

The Torne Valley is located in the middle of the largest sparsely populated 'massif' of Europe. In that respect, it bears all the 'regular' natural attributes of SPA: harsh climate, role played by topography (mountain and Torne river) in the settlement process, role played by natural resources in local economic development and imbalances in demographic situation both related to gender and age balances. As in most SPA, the present case study has emphasized the challenges related to the provision of services, especially in the parts in-between the local centres. In that respect, new forms of governance, such as inter-municipal partnerships, public-private partnerships, cross-border service areas or better use of e-services, may provide a ground for making service provision less costly for the providers and more efficient and accessible for the customers. The availability of large areas of unspoilt nature may act as a driver for developing adventure or experience tourism. The ongoing development projects, mostly related to mining activities, can be seen both as a potential and challenge for the region as the sparse regions are in a need of economic boost to turn the demographic and socio-economic trends positive but the needed investments with external capital are heavily depended on the global fluctuations.

Despite being located at the margin of their respective countries (Sweden and Finland), the cross-border nature of the Torne Valley changes radically its development prospects compared to other 'regular' sparsely populated areas. The development of cross-border relations acts as a driver for local economic development, and especially by forcing actors to think 'outside the box', as they need to integrate two (at least) different economic systems. As a matter of consequence, and, again, contrary to most other SPA, the Torne Valley can position itself as an interface region for a wider transnational area extending above the Arctic circle, the Barents region. Although the cross-border dimension opens up for the development of new types of business and personal services, the region has also new prospects concerning the exploitation of natural assets. The Torne Valley concentrates most of future development in that field, as the upcoming openings of mines in Pajala and Kolari show it. Consequently, it is likely that the extraction of underground assets will play an important role in the medium- and long-term development of the region. The long, even historic, traditions for the cooperation have created a rather similar working and social cultures and thus the linguistic or currency related obstacles are not seen as strict as in many other cross-border region.

Annex 29: Case Study SPA in Spain

Description of the case study area and its geographic specificity

The issue of *sparsity* represent an important issue in the context of Spanish regional policy. 9.5% of the land area of Spain can be classified as *sparsely populated* on LAU2 level based on the delineation used in the GeoSpecs project³⁹³. In addition, 7.7% of the land area can be characterised as *poorly connected*. At the national level, the coverage of Sparsely Populated Areas in Spain is the fifth largest of the ESPON space, after the Nordic Countries. At the same time, based on the European Commission's definition in the Green Paper on Territorial Cohesion there were 29 sparsely populated NUTS3 regions in the ESPON space on 2005, three of those – namely Cuenca, Soria and Teruel - located in Spain. Looking at the geographical distribution of Sparsely Populated Localities (SPL) in Spain, the governance challenges that it unfolds become more visible, as most of these localities are located at the borders of NUTS3 regions. In terms of delineation, it means that the geographical coverage of SPA made by the Green Paper at NUTS3 level appears much more limited than the one developed by Geospecs at LAU2 level.

In spite of its importance for Spanish territories, sparsity has never been approached in a direct way in Spanish regional policy. In the national context the terms that have been used traditionally are *Less favoured Areas*, or more recently *depopulating areas*. It needs to be mentioned that these issues are mostly linked to *rural* development issues, and much less to *regional* development ones. Consequently, since there is not an existing framework around Sparsely Populated Areas in Spain and the delimitation and identification has not been used or identified, there are no existing studies related with the whole case study area. The majority of the existing studies deal with *depopulation and services in rural areas*.

In this paper we are focusing on a case study region that includes the provinces of Cuenca, Soria and Teruel. Those are later cited as the sparsely populated regions or SPAs in this paper. There are both administrative and demographic challenges related to this area. First of all, it is important to state that the provinces included in this study belong to three different NUTS2 regions (*Comunidad Autonoma*, Autonomous Community) that is the main regional administrative level in Spain. Cuenca belongs to Castilla-La Mancha, Soria to Castilla y León and Teruel belongs to Aragon. They have their own competences and responsibilities in several aspects, like transport services and infrastructures. Thus, there can be identified different strategies and also different political framework depending on the region that the province belongs to. Therefore even if these three sparsely populated regions share more or less a continuous land area, those are never been called/identified/determined as a unified territorial unit in Spanish regional policy context.

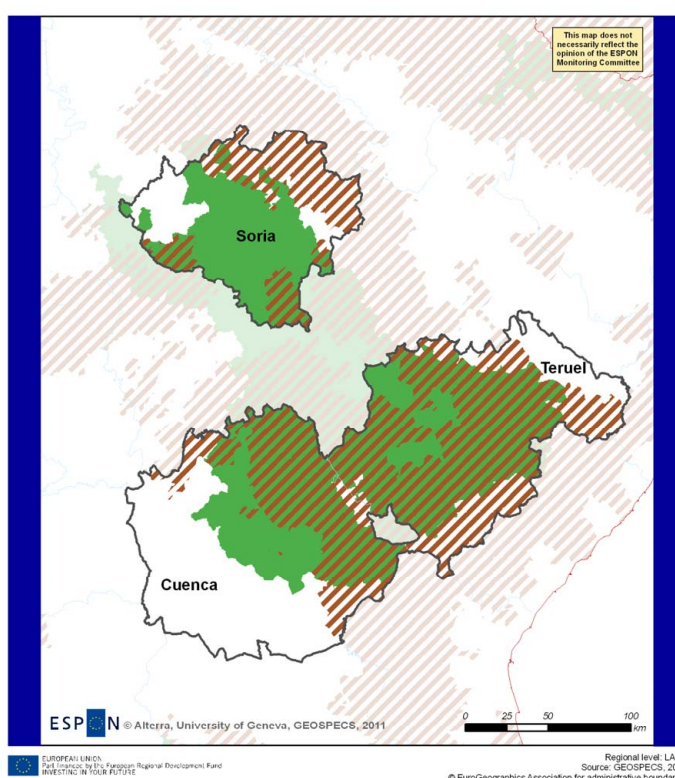
³⁹³ The sparsely populated areas represent the grid cells in Europe that have a population potential lower than 100 000 persons after the euclidean distance of up to 50 km delineation and after the 45 minutes travel time delineation. LAU2 unit is defined as sparse if over 90% of its area is covered by sparse grid cells. Poorly connected corresponds to areas that have low population potential according to the 45 minutes directed measurement only and sparsity is thus a result of lacking infrastructure.

Even if the provinces belong to different NUTS2 regions, all of the provinces belong to same 'sparse territorial ensemble' or 'Sparsity Massif'. This territorial ensemble covers these three provinces and also some parts of the provinces of Guadalajara and Zaragoza and separate Soria geographically from Cuenca and Teruel. This 'massif' is overlapping rather well with the Sistema Ibérico or Iberian System that is one of the main mountain ranges in Spain. Thus all the provinces have their double specificity both as sparsely populated and mountainous areas.

Figure 1. Sparsely populated areas in Central Spain;

GEOSPECS Case Studies

Sparsely Populated Areas in Spain (1)



GEOSPECS specificities areas

- Case study delineation
- NUTS0 boundary
- NUTS3 boundary
- Mountain areas**
- Mountain areas
- Sparsely populated areas**
- Sparsely populated areas

Cuenca, Soria and Teruel have traditionally been lacking regions with remarkable population decrease in Spanish context. During the latest years, all the provinces have witnessed an increase of total population, and since 2009 Cuenca is above the Green Paper population

density threshold of of 12.5 inh./km2 defining sparsely populated regions. Yet, this population increase is concentrated in the regional centres and other cities.

Sparsely populated regions need also to be analysed in relation to the national territorial context and its urban system. SPAs in Spain are surrounded by some of the largest national cities in terms of population (Barcelona, Madrid, Valencia and Zaragoza). Thus, their location in the middle of the most important pole of attraction - in terms of economy activity, services provided and socio-economic development generally speaking - is one of biggest challenges, but also the main opportunity, of the SPAs.

Economic, Social and Environmental processes related to the geographic specificity

Economy

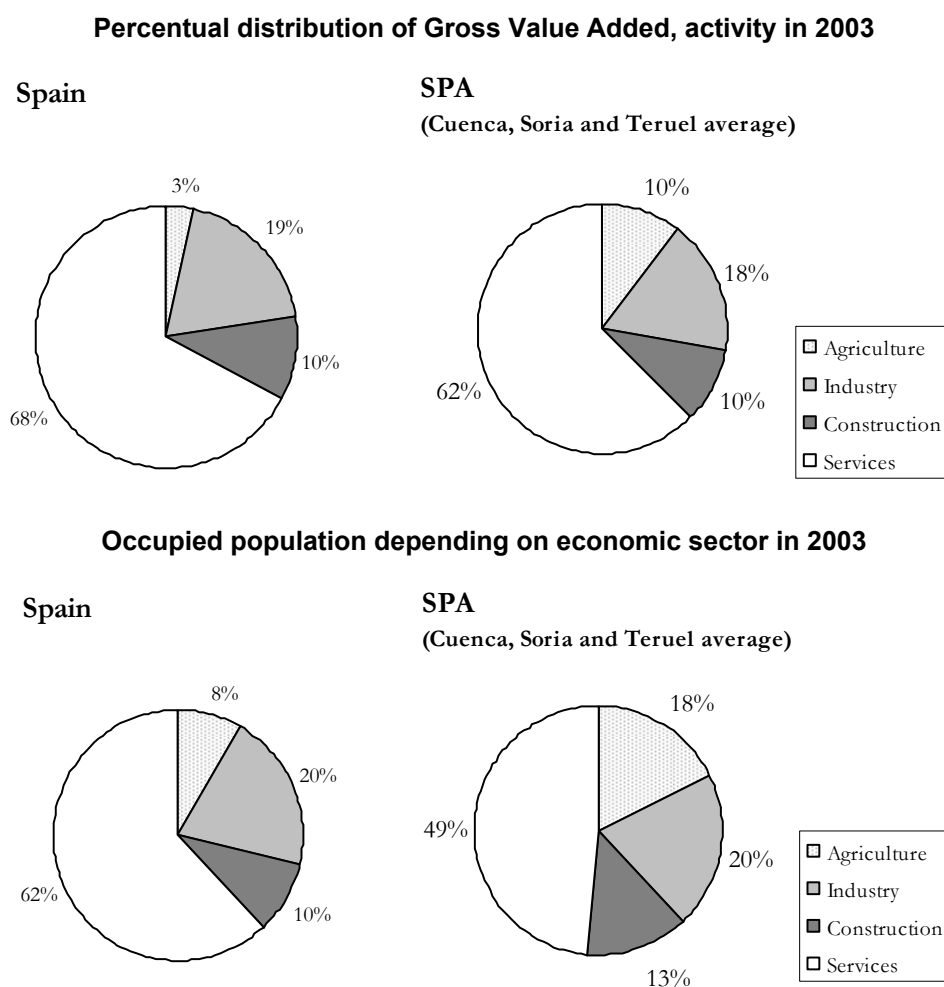
Economic vulnerability / robustness facing globalisation

Employment and development levels

The economic and financial crises of the past years on the one hand and the ongoing debt crisis on the other hand have hit Spain rather heavily. In July 2011 the unemployment rate in Spain (21.2%) was highest in the European Union with the average rate of 10.0%. Even these rates as such are high; the situation among young persons aged 25 or below is even worse. Spain is topping also that statistics with 46.2% youth unemployment rate, more than two times higher than the European average rate (Eurostat 2011). Interestingly, it seems that the SPAs have been hit much less heavily than the rest of the national economy in these successive crises. Teruel and Soria are having one of the lowest unemployment rates in Spain, both before and after the crisis. The unemployment rate in Cuenca is also below the national average. Also the youth unemployment rate in these regions is lower than in Spain on average. The economic structure of the regions is the main reason behind. The main sectors of employment - agriculture and public services are not that dependent on the economic turbulences. Also the level of construction activities in the regions has been low over the years; especially what comes to private housing starts that is one of the hardest hit sectors in Spain.

At the same time the sparsely populated provinces of Spain are relatively well-off in national comparison. The production output in Spain is concentrated on the Northern half of the country. Measured as gross value added per capita, the provinces of Teruel and Soria belong to the better-off half of all Spanish provinces.

Figure 4. GVA (above) and employment (below) in 2003 in Spain and SPAs.



Data source: Instituto Nacional de Estadística, *Indicadores Sociales de España y Panorámica Social de España 2005*.

Agriculture still bears a significant importance in the Spanish sparsely populated areas both in terms of economic output and employment. In these provinces the gross value added and jobs in agriculture sector are of great importance compared to the Spanish average, and the role of service sector is more reduced, even though amounting for more than half of the overall sectoral division. The importance of agriculture is also visible in the landscape of these regions as agriculture is covering 40% of the land area in Teruel, (IAEST, 2010) and 35% of Soria (I-ES, 2010). The main products of the regions, namely olives, grapes (wine) or crops, are season-related and thus the seasonality of the economic activities is typical for economic activities in the SPAs.

The use of CAP (common agricultural policy) subsidies in the SPAs during the latest and current programme periods shows a rather interesting picture. The use of Pillar 1 spending per hectare of farmland indicates that the SPAs – like rest of Spain – receive relatively low level of subsidies, but the use of Pillar 2 spending per inhabitant shows a totally different picture. The SPAs are the Spanish regions receiving most subsidies. The level of subsidies per capita is even remarkable compared to the rest of Western Europe. This feature confirms the understanding that agricultural activities bear limited potential for driving rural

development opportunities in Spanish SPAs. The relative importance of pillar II suggests indeed that efforts need to be made in terms of supporting the rural communities to diversify to other type of activities, either in terms of other land-activities (e.g. Forestry) or activities with potentially greater value-added (e.g. Processing of agricultural goods or tourism).

The mining sector has been historically an economical engine for the provinces of Soria (Castilla y León) and Teruel (Aragón). After the Civil War mining activities actually played a crucial role for the economic recovery of these regions. Since the beginning of the 1970s mining activities have been reduced steadily, and by the same token, most of those areas suffered depopulation trends. A number of mines have been closed or are expected to be in operations only until 2018 after the recent decision of the EU industry ministers to cut coal mining state subsidies (Diario Aragonés 2011).

Important effects in employment have been registered as a consequence of the reduction of state support to mining activities. Prior to the decision of cutting funds to coal mining subsidies, authorities, labour unions and companies in Aragón and Castilla y León expressed in late 2010 their concern for the lack of cash flow necessary to pay salaries during 2011 and in general for the future of the sector in the later years. A few months later the main labour union of Castilla y León declared that around 5,000 mining workers were 'suspended temporarily' from their jobs and that about 80 were fired, and pointed out as well its concern about the imminent bankruptcy of the main mining actors in the region in the coming years (ABS 2011; El Mundo 2011; El Norte de Castilla (2011).

The service sector in the SPAs is dominated by traditional activities, mainly related to public services and the employment in more advanced services, like in sector *Housing, renting, and enterprises services* ("*Actividades inmobiliarias y de alquiler; servicios empresariales*", is less than half of the national average. The lack of qualified service jobs can be related to the fact that none of the SPA provinces has its own university. There are anyhow associated campuses. Education given in these campuses is mainly related with labor and entrepreneurship, education, social work and nursery. Solely the campus in Soria has agrarian technical studies (websites of Universities). Even the share of tertiary educated persons in the regions has been improved, the general level and the speed of improvement is lower than in Spain on average.

Clearly, the exploitation of natural resources in its different forms (e.g. agriculture and mining) constitute the ground of the regional economies of our case study region. Although less directly hit by recent crises, this 'specialisation' has shown its drawbacks, especially as it was heavily dependent on public investments. The actual or potential reduction of public commitment to these activities may lead to shortcomings in terms of financial resources, which are enormous, especially in the case of the mining industries.

Services of General Interest

Since the adequate provision of services of general interest plays a vital role in territorial attractiveness, the existing lack of services in SPAs is a disadvantage when it comes to attract newcomers, as well as 'fixating' the existing population. What was identified in the case of the Nordic countries seems to hold true in the context of Spanish SPA: "*The combination of falling population, extremely low densities and high levels of inhabitant*

dispersion has always provided obstacles for economic activity and provision of public services” (Gloersen, 2006). But also the changes in demographic structure is *shifting territorially* the demand for specific services, especially among the dependent people.

On the one hand aging of the population leads to an increasing need of for health and caring services. The combination of changes in family patterns and the lack of middle aged female in the regions, who traditionally used to have this 'take-carer' role, and the overall change to modern lifestyle makes the situation more acute. The aging of population adds also challenges in terms of accessibility. Policy makers and planners assume that most local travelling is done by car, and thus the mobility problems of people who cannot drive – anymore - are not addressed (Escalona, 2007). On the other hand the decreasing amount of children is worrying particularly in the most remote places of the case study region. Despite the existence of a minimum threshold of four pupils to run a rural school (Gobierno de Aragon, JCCM), the service is not always provided due to the high investments in human and material resources that it requires. The closing of schools has large impacts for the settlement development that the transports of pupils to the closest settlement can't solve.

One potential solution to address the issues of service provision is related to structure and administrative reforms in Spain. A new intermediate level, *comarca*, between the municipalities (LAU2) and provinces (NUTS3) ones has been established in order to deal more appropriately with those issues. The process of implementing this new level has required a long time to delimitate these new areas in the most sensible manner and to restructure the administrative organizations. This process called *comarcalización* has been only completed in Aragon (Teruel). The formation of *comarcas* is part of a voluntary process by the municipalities or association of municipalities to manage certain services jointly. The process has also succeeded in achieving a unanimous position from all political groups. The creation of *comarcas* is a response to the special features of the region with low population densities, a large number of small towns and a large agglomeration in Zaragoza (capital of Aragón). The aim is to 'fill up' the gaps in the most remote municipalities when it comes to an adequate provision of services. The responsibilities transferred to *comarcas* in provision of services include municipal waste services, civil protection services, tourism, sports, youth activities, cultural heritage management and cultural services in general. In the regional governments of Castilla-La Mancha and Castilla y León, which are containing parts of our case study area, the process of *comarcalización* has been just mentioned. Instead of *comarcas* these regions have come up with *mancomunidades* or association of municipalities, that is aggregations of municipality governments that share costs of public jobs and some public services (mostly wastes, water and transport management) (Silva 2007; Portal de las Comarcas de Aragón 2011).

Also new forms of public-private partnership can help in maintaining access to SGI, since they can be more flexible than public providers when dealing with small demand services. Issues as transport service or health care, which have a specific need but no broad population to cover, could be a suitable solution. There are e.g. some examples from the Spanish SPAs where private enterprises have received subsidies to provide transport specific services - like school bus or health transportation - in remote localities. In services that require high investment, PPP might not be the best solution, since the demand/critical mass do not attract or is not economic profitable for private providers to carry.

As such the services of general interest together with appropriate accessibility are considered essential for achieving socially sustainable areas and avoid social exclusion that population in SPA might be suffering (Farrington and Farrington, 2005). In a study on access to health services in the province of Teruel, Escalona-Orcao and Díez-Cornago (2007) have shown that the *overall* level of access to services has improved recently, but they also point out to the risk of a two-speed process, with the growing local centres being better off while the situation in the depopulating rural parts becomes more critical.

“In the province of Teruel, ongoing depopulation with the spatial redistribution of the remaining residents has had contrary effects on accessibility to basic services: there has been an improvement in accessibility for the majority of the population as a result of population concentration in higher order settlements and there has been deterioration in accessibility for the territory as a whole, due to the progressive reduction of demand thresholds in most settlements. Consequently, the risk of social exclusion and situations of injustice brought about by poor accessibility only appear to affect a small percentage of inhabitants living in small and isolated settlements. However, the fact that these settlements are distributed throughout an extensive territory gives it a very low level of accessibility and highlights the magnitude of the problem.”

Escalona-Orcao and Díez-Cornago (2007)

The case study shows that the challenges related to the provision of services in SPA requires, to some extent, innovative ways of governance, as the example of comarcas shows it. In that respect, the municipalities play an important role, but their relative small size do not leave them much room for manoeuvre. In the case study, more or less formalized inter-municipal cooperation seem to be the favoured track for dealing with these issues. What is interesting is that such a governance form is developed for both addressing the challenges (e.g. waste management) but also for better taking advantage of development opportunities (e.g. tourism or cultural heritage management).

Tourism

In addition of the landscape, the civil, military and religious heritage of the regions are seen as assets for attracting visitors. Well preserved and significant cultural and monumental legacy of the old medieval city of Cuenca and the Mudéjar architecture in the city of Teruel has lifted these cities to UNESCOs World Heritage Site list. The route of Don Quixote in the footsteps of Cervantes, one of the cultural routes of the Council of Europe, combines the urban and rural cultural interests and a wide range of natural spots. The Route goes through 148 towns throughout its 2 500 km. Also the regional celebrations in the SPAs are known at least across the country.

The tourism in the SPAs is dependent on domestic tourism and the seasonal variations are important. Compared to surrounding regions, the SPAs have a low number of visitors. In 2009 the provinces of Cuenca and Teruel attracted some 300 000 visitors each, and the number of visitor in Soria was only 200 000. The share of domestic tourism is dominant. For example in Teruel the visitors come primarily from Valencia, Madrid and Catalunya. Only 9% of the visitors came from abroad (Gomez, Horna 2006; INE 2011; *Encuesta de ocupación hotelera 2009*). The tourism to the SPAs is primarily concentrated during summer-time,

august being the most intensive month. Only some winter sport activities in Teruel attract tourists during other times of the year (Gomez, Horna 2006).

Municipal tourism index a combination of tourism incomes and the number and occupation rate of different accommodation services. The major cities and coastal areas are characterized with high index ratios, but also the provincial capitals of Cuenca, Soria and Teruel are coping relatively well. It should also be noted that due to small size of the municipalities, data is not available from various rural settlements in the SPAs.

Tourism activities in SPAs should be seen as a complement rather than a completely alternative to other industries. Especially possibilities to link tourism and agricultural activities should be examined more as landscape can be seen as the main attractive point in these regions. The multi-functional character of the spaces needs to be maintained to keep their viability.

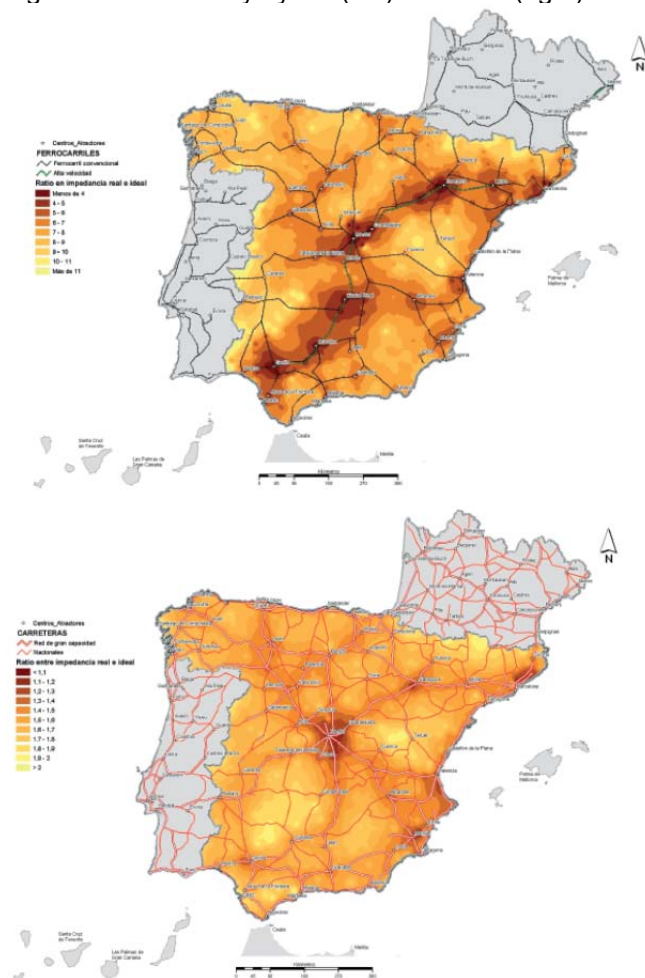
The case study shows that the region as a whole has a high potential for developing tourism activities. Yet, so far, the economic returns of the tourism sector linked to accommodation and restaurant, is benefitting its most urban parts as they have the best infrastructure for hosting the mainly domestic visitors. A clearly challenge in order to increase the tourism potential is linked with the capacity to offer services in the more rural parts that will generate economic returns, and not just 'visits', on a yearly basis.

Specific transport infrastructure issues

The Spanish road and rail transport infrastructures is highly polarized towards the main agglomerations and creating dense transport corridors between those. Traditionally the transport system was planned with a starting idea that the provinces should be connected to the capital region and thus the intermediate regions were relegated and became more isolated (Martinez Sanchez-Mateo, 2010). This has led to situation where the areas in-between have a low access to these main communication infrastructures, even if they seem to be close by in purely geographical terms. Hence, most rural regions (including our case study areas) are mostly 'run through' by such high-speed infrastructure. As the National Government Transport Infrastructure Plan (PEIT) from 2005 sites: *...there is an increasing high speed infrastructures providing, and at the same time a highly centralized network with accessibility problems outside the access nodes and a lack of services; this is aggravating the differences and disparities between the territories, obstructing the process to turn into a hierarchical and functional urban system (Ministerio de Fomento, PEIT, 2005.Chapter 2)*. But in the same document there is also possible to find reflections that there is a need to ensure an adequate supply of training across the regional geography with special attention to the problems generated in this regard the vast distances of the territory.

The road transport is the main form of mobility in Spain, capable to supply all kinds of demand; it ensures 86% of freight transport and 88% of passenger transport, while the main part of it is carried with private actors. This dominance is also supported with the transport accessibility maps, where the level of road accessibility is higher and more homogenous than for rails (Figure 4) (PEIT, 2005.Chapter 2).

Figure 4 Accessibility by rail (left) and road (right)



Source: *Ministerio de Fomento*, 2005

Rail infrastructure tend to polarise more the accessibility structure in Spain, thus benefiting mainly to a limited number of cores and corridors. However, compared to road transportation, its speed enable to connect more efficiently places that are distant from each other, in the Spanish context. Consequently, they bring different advantages in terms of what economic activities they best support: road transport is necessary for agricultural and manufacturing goods, while high-speed is more appropriate for business trips linked to the service sector (Garmendia *et al.*, 2011).

However, for both road and rail accessibility, it appears that the case study area, as other main Spanish rural areas, enjoy a relatively low level of accessibility, despite the geographic proximity to three of Spain's main metropolises (Madrid, Barcelona and Valencia). Even if the travel distances from the SPAs to these major Spanish cities are beyond the daily commuting possibilities (45 minutes), it should be noted that the inadequacy of the transport infrastructure is making these time-distances longer, especially when travelling by train or with other forms of public transport. In addition there are no commercial passenger airports in the case study area.

	Distance (km) (1)	Travel time by road (2)	Travel time by rail (3)
Cuenca-Madrid	166	2h 08'	53'*/2h 43' - 3h 17'
Cuenca-Valencia	199	2h 32'	58' */2h 58' - 3h 09'
Cuenca-Zaragoza	290	4h 03'	2h 34'-3h 19'
Soria-Zaragoza	157	2h 06'	-- (5h 24')
Soria-Madrid	229	2h 50'	2h 45'
Soria-Barcelona	461	4h 45'	-- (6h 6')
Teruel-Valencia	145	1h 46'	2h 30'
Teruel-Zaragoza	174	1h 58'	2h 30'
Teruel-Madrid	303	3h 48'	-- (3h 36'**)
Teruel - Barcelona	456	4h 19'	--(3h 58'**)
Cuenca-Teruel	148	2h 17'	-- (4h 14')

(1) Road distance (googlemaps)
(2) High speed ways (quickest option calculated by googlemaps)
(3) Travel time with different options and trains: high speed and regular train.
www.renfe.es
(-- there is the possibility, but no a direct connection, more than 60' of transit (time to wait).
*High speed train
**Once a day. The other options are over 4h 30'.

Table 1. Travel time and distances between the cities in SPA and in the mainstream regions nearby. At the end, also the distance between Cuenca and Teruel is added in order to show the challenges to travel within the SPAs.

Physical restrictions, like geographical location and topography, combined with loose settlement pattern are the main challenges identified related to transport infrastructure and its development in the SPAs. Nevertheless, especially in this case study, it is very important to include the comparative situation of surrounding regions, considering the significant role of the existing infrastructure networks. The difference in costs (economic, social and environmental) and investment required between building a new infrastructure and maintaining and improving ones already exist are a determinant factor. Therefore, the current network in SPAs is worse both in qualitative and quantitative terms and the nearby regions are much more competitive, acting as an attractive pole. Teruel was the last provincial capital being connected to a high speed motorway, and is one of the few provincial capital in Spain without direct train connection to Madrid (Martinez Sanchez-Mateo, 2010). Yet, some improvements have taken place in the SPAs recently. In December 2010, a new high-speed rail link was established between the cities of Madrid and Cuenca. This new link reduced the travel time from three hours to only 50 minutes. It should anyhow be noted that this new high-speed connection do not stop in that many stations, and therefore the smaller places are actually now having less daily connections to provincial and national capital than before. As a matter of consequence, Cuenca becomes the primary hub of the case study region for reaching out to the national capital. Also the recently completed motorway via Tarancon connects Cuenca and Madrid. Also Teruel region has had improvements to its

road infrastructure in recent years, making the drive through the region as an option when driving between northern and southern Spain. This road makes it possible to avoid travelling via Madrid.

The impact that transport infrastructure development has on local economic development is dependent on the nature of the infrastructure (rail or road) and on the economic basis of the local labour-market. In a study on the impact of transport infrastructure in another sparsely populated region of Spain (south of Madrid), Garmendia and her colleagues conjectures that “HSR effects and contributions tend to focus on tertiary developments and high-tech activities, whereas motorways facilitate mainly the development of primary and industrial activities” (Garmendia *et al.*, 2011). Localities with a strong manufacturing presence are less sensitive to a fast access to the neighbouring metropolitan area (i.e. Madrid), as fast access is especially needed for the sectors that necessitate frequent face-to-face interactions, like in the tertiary one. Consequently, in our case study, it would be expected that the new HSR infrastructure will strongly support the development of Cuenca, and its adjacent municipalities, as a growth centres, while having less impact on the rest of the case study area.

The pronounced, marked topography in some parts of the region is one of the causes that increases the costs of building the infrastructures, and also determines their route. These areas have a high average terrain altitude, that origin one of the most important thermal amplitude in Spain (Gloersen, et al 2006). This is an important factor also for maintenance. Climatological issues like regular snow periods and fog represent a handicap for operating because of increasing risks that prolongs the travel times. Despite the rainfall in the regions is low, the level of erosion is notable (Martinez Sanchez-Mateo, 2010).

The scattered pattern of small localities with decreasing population is aggravating the situation. On the one hand, the low population density levels implies a high investment per habitant ratio for required the infrastructure. Thus, the critical mass or the threshold of population to make it a reasonable option it is not reached. On the other hand, the pattern of spread settlements all over the terrain makes it costly to provide access to all the population with public transport infrastructures.

In that sense, the main issue for the region concerning the development of transport infrastructure is related to the 'management' of the locational advantage that the region ought to have by being so close to large agglomerations. In the actual state of things, the rural parts of the case study do not provide a credible alternative for the development of new types of businesses, in the regional centres and to a even greater extent in the remote, rural areas. In that respect, the development of transport infrastructure alone cannot address these issues, as it touches upon labour-market and local economic development strategies.

In Spain, the issues related to transport services and infrastructure issues are the prerogative of the autonomous communities, there are different strategies and different political framework at play depending on the region (=NUTS2) the provinces (=NUTS3) belong to. The large chunk of the regional transport strategies address the gaps of the road infrastructure. The National Strategic Plan for Transport Infrastructures 2020 shows some

positive development for the SPAs and more specifically for the provincial capitals. A special National Fund plan for Teruel and Soria exists. These plans have the intention to promote development and compensate less favoured areas in Spain as the province of Soria and Teruel, and providing transport infrastructure to these regions is one of the focus areas. With regards to the physical limitations, there are no specific measures mentioned in the plans but the regional and local government are asked to take care of the infrastructure especially in winter conditions. A new motorway is planned in Teruel and Soria capital cities, which improves their access to Madrid and other important cities like Burgos, Zaragoza and Valencia. Some rail transport will be improved. The line between Zaragoza and Valencia via Teruel will be developed and a new track from Soria to Madrid-Zaragoza line is planned to build.

The review of scientific and policy documents touching upon the issue of accessibility and transport infrastructure in relation to Spanish SPA highlights the fact that development strategies are specifically targeting the improvement of the situation for the local centres (Cuenca, Teruel and Soria), and very few address the needs of their rural hinterland. In that respect, the issue of improved accessibility is systematically addressed through the upgrading of infrastructure connecting those local centres with the surrounding agglomerations, and especially Madrid and Zaragoza. For surrounding rural areas, it is expected that a spillover effect of growth in the local centres will positively affect them in return, despite the recent evidence of a local urban concentration.

The current investments are primarily focused on high speed infrastructure that is creating a so called *tunnel effect*. While the main cities are connected by high speed infrastructures (either road or rail), the connections to intermediate region are not improved at all with the new infrastructure. Thus the relative accessibility of the sparsely populated areas is worsened (Gutierrez Puebla, 2004).

Transport infrastructure plays a key role in structuring the exchanges across territories. The construction of modern transportation systems in Spain (but also in all EU countries) has structurally weakened the position of the regional centres and remote rural areas of our case study region. More recent strategies tend to fill up the gaps, especially by connecting the regional centres (e.g. Cuenca, Teruel and Soria) to the modern transport system. Yet, one can wonder if this could be too late to provide a New Deal for local economic development in SPA, as decades of isolation have damaged the economic structure of the local economies.

Role of Information and Communication Technologies

The information society and use of new technologies has expanded considerably in Spain during the recent years. There is a strong increase in the proportion of companies and households connected to the internet via broadband. ICT is a strategic priority for the modernisation of production, participation and social cohesion in rural areas and therefore it needs a boost in rural areas in order to move towards regional stability as the connections are not in the same level than in urban areas. Good broadband access in rural areas mean less dependence on physical transport infrastructures to guarantee sustainable development

of the rural regions. Therefore good ICT possibilities might also have some advantages for the demographic situation (Sustainability... 2009).

Few documents actually deal with the issue of 'digital divide', i.e. the disparities in terms of access to ICT especially between urban and rural areas in Spain, to our knowledge. Yet, this seems to be a major issue for regional development in Spain. In a recent statistical study on comparative "Trends in densely and thinly populated areas", Eurostat (2011) identifies that the gap in access to Broadband Internet Connection between densely and thinly populated³⁹⁴ areas in Spain is between 20 and 25 percentage points. Consequently, actors in Spanish rural areas cannot use electronic services to alleviate some of the constraints related to geographical remoteness.

Yet, despite these limitations, ICT can be a source of growth for local small firms. In this sense, the experience of the use of internet, sketched by Hernandez and her colleagues (2009), of a small knife-retailer company in Teruel is informative. The firm started its retailing activities in 1999 and is now selling its products to more than 80 countries, with a global reputation due to it being the principal of iconic films such as *The Lord of the Rings* or *Braveheart* (Hernandez et al. 2009). The setting up of the company is very interesting as it embodies the potential positive combination of local development policy initiatives and new media like the internet:

The story begins when one of the brothers who founded the company attended a free course organized by the Teruel Entrepreneurs' Association, aimed at teaching small and medium-sized businesses to use e-mail and browse-web pages. Despite their lack of experience in the electronic market, the brothers decided to start their own e-business. Taking advantage of the opportunities presented by Internet, they succeeded in creating a venture which, given its product characteristics and its geographical location, would have had difficulty in surviving using exclusively offline sales channels.

Hernandez et al. (2009), p365

Consequently, being online enabled the entrepreneurial brotherhood to develop their activities *in spite of* their remote geographical location. The authors go even further in their argumentation as they acknowledge that "The Internet has permitted the creation of many businesses which would not have been viable with a bricks-and-mortar structure. E-business lacks face-to-face contact, so only retailers who design websites based on meeting customer needs and who manage to create value will survive and prosper." (Hernandez et al., 2009). Moreover, they emphasize the need for successful rural online entrepreneurship of "exploiting the internet to gain access to niche markets at a world-wide level" (Hernandez et al., 2009). As a matter of consequence, being in the online market has made it possible for the company to develop and prosper.

The experience of the retailing company portrayed above cannot serve, as such, as a blueprint for firm development throughout our case study region. Yet, it shows in a concrete manner how access to ICT can help development opportunities to materialize and engender actual growth.

³⁹⁴ Thinly populated areas consist of the areas that lie outside the metropolitan areas of Europe. As such, this notion cannot be compared with the Geospecs definition of 'Sparsely Populated Areas', which is more targeted and restrictive. Yet, we use this source in order to portray to general trend within Spain.

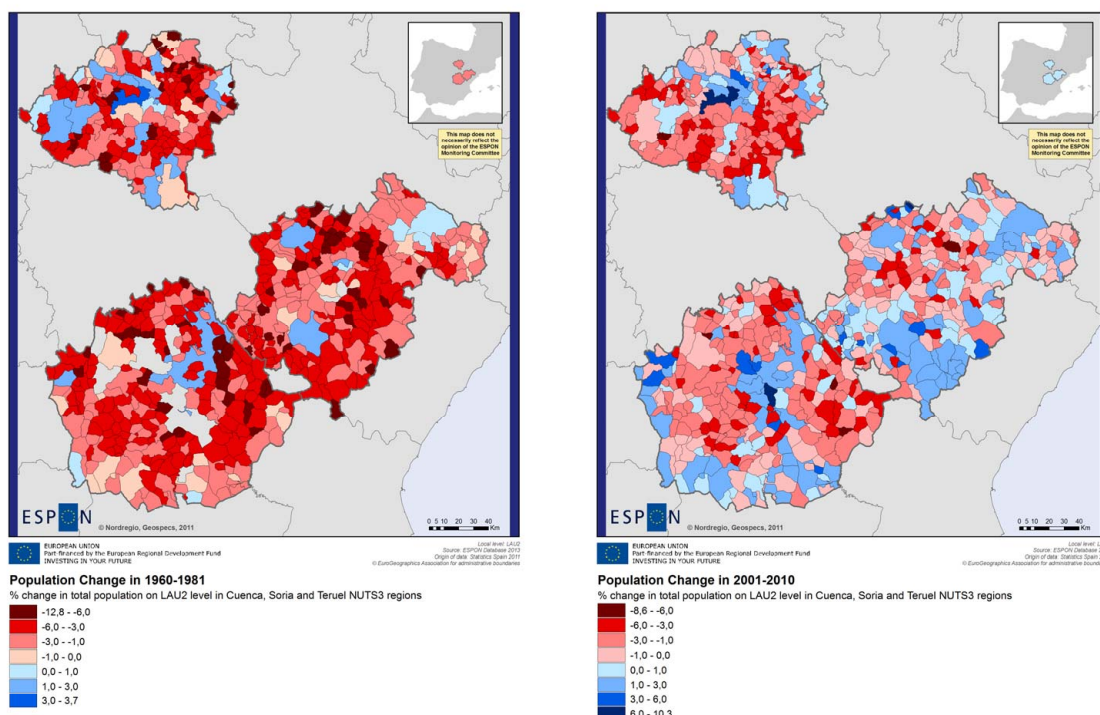
2.2 Social development

There has been a significant change in the population dynamics in Spain and in the Spanish SPAs. The negative population trend during the earlier decades has shifted to growth as the result of immigration which now, due to the economic crisis, are showing signs of stagnating. In the country the population keeps moving and concentrating on larger cities, their labour market areas and the Mediterranean coastal regions while the inland is emptying. At the same time aging and increasing social dependency are challenging the regions. Also gender unbalance in the SPAs is a challenge for the future

Demographic structures and trends

In general the population increase in Spain during the last decade has been rapid. In 2000-2010 the population increased annually 1.4% - a rate that was 3.5 times higher than in the European Union on average, with 0.4% annual growth. Nevertheless, it remained below the level of population increase in Ireland, Cyprus and Luxembourg. This growth is mainly a result of extensive immigration. Even if the main population growth has occurred on the coastal areas of Andalucía, Catalonia, Valencia and in the Spanish islands, the Spanish SPA regions have also gained from immigration. This means that all the case study regions, Cuenca, Soria and Teruel, have, overall, actually experienced a population increase during the last decade (INE, 2011). But in order to understand the demographic situation in these regions, a longer term population change figures need to be examined because every person who is moving is directly affecting to the number of people living in the region, but in a longer run these movements have effects on the age and gender structure of the population.

Figure 5 Population change rates 1961-1981 and 2001-2010.



(Data source, INE, 2011)

In order to understand the demographic trends in the case study region, both an historical and more-detailed picture need to be presented.

The exodus from the rural mountainous areas rose after General Franco's Plan de Estabilización in 1959. Since then and until the 80s, an intensive out-migration, so called rural exodus, took place in the Spanish countryside and small localities, being most intensive during the 60s and 70s (Collantes et al, 2010). The population declined steeply as people emigrated towards the industrial areas of the large cities and the coastal towns where tourism grew exponentially, leaving behind their small villages. As a consequence there are a number of ghost towns in different parts of the provinces. During these four decades, the SPAs lost almost 40% of the total population. Meanwhile the larger cities and city regions - like Madrid, Barcelona and Valencia - were having a significant growth of population, keeping the total population increasing on national level.

A remarkable share of the population who left the SPAs during exodus were young people who moved toward major cities and other regions looking for better socio-economic conditions and job opportunities. The result of this exodus was an emptying of young people in SPAs (Camarero, 2009), especially combined to the fact that many young people who left the regions didn't return compared to the earlier decades (Recaño, 2004). The out-migratory process seemed to slow down during the 90's. It is anyhow notable that part of the slowing down was a result of so called "retirement migration" - old people, generally men, who had emigrated during the rural exodus were coming back (Gomez, Rico, 2003). This increase in

elderly people in the SPAs accentuates even more the already unbalanced demographic structure.

Out-migrations had also a significant effect on gender balance in the case study region. During the rural exodus, the out-migration was clearly dominated by female. On the one hand a typical social model of the sixties and seventies in the Spanish rural areas indicated that the best, and almost only, possible 'career' for a woman was to get married and raise children. A solution to overcome this gender disadvantage was so called "skilled exodus" (*huida ilustrada*), to emigrate from rural areas in order to participate in skilled education programmes, reach higher educational levels compared to men and finally enter the labour market as a skilled worker. Men on the other hand stayed working as usual in the villages and rural areas following the family business and/or other tasks. On the other hand this gendered migration was also related to the industrial changes and increase of jobs in service sector. Cities offered more job opportunities to women. Especially young women left the rural localities in a research of better and more qualified job (Camarero and Sampedro, 2008; Camarero, 2009).

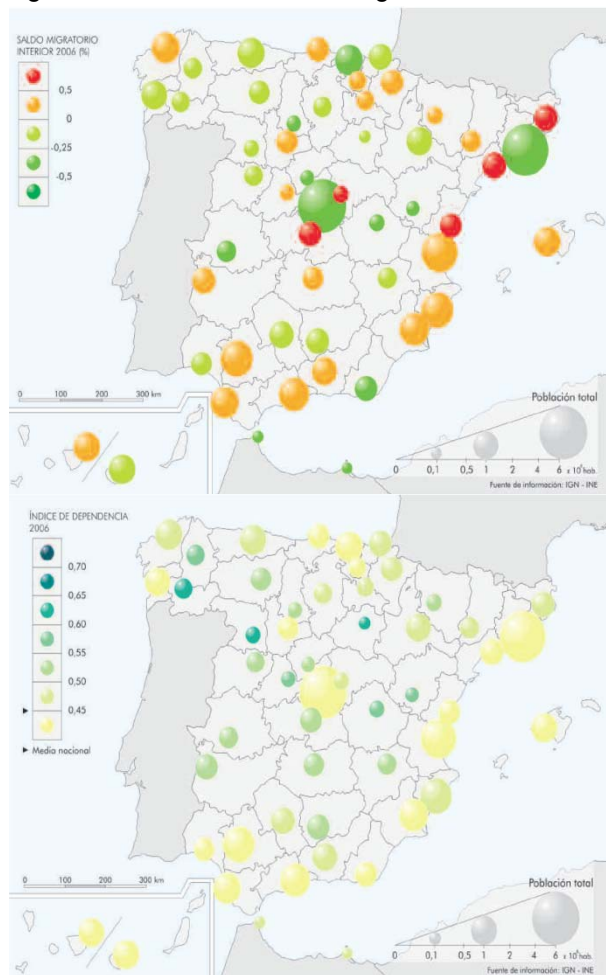
A remarkable decrease in fertility in Spain started in the 80's and in mid- 90's Spain was one of the countries with the lowest levels of fertility rates in Europe. Even the fertility pattern is rather similar between the Spanish regions - between 1-1.5 child per women since the 90 decade – there are remarkable differences in crude birth rates (INE, 2011). The crude birth rate in the SPAs is lower than in the other parts of the country, as a result of the unbalanced demographic structure of SPAs, especially the relative lack of women in fertile age. The low birth rate basically indicates about a relatively low proportion of the population in the most fertile age groups, both as a result of a general age structure in a region and decrease of population in the fertile age group and especially among female. Anyhow, during the last years, both fertility and crude birth rates have slightly improved, probably due to immigration of younger population to the regions.

Even though the total population in the SPA regions as such has been increasing during the last years, the imbalance between urban and rural municipalities is reinforced. The main increase in population has taken place in the largest settlements in the regions and in their close surroundings. At the same time a majority of small settlements kept losing their population (Pinilla and Saez, 2009). Also a remarkable number of smaller settlements in the regions have large seasonal variations in their total population as city-dwellers spend their holidays there, and as such the localities function more only for residual population.

The increase in total population in the SPAs is essentially a result of increasing immigration as both domestic net migration balance and natural population change are negative in all the SPAs. The domestic net migration rate in the SPAs is among the lowest ones in the country. In Spain, out of a total population of 46.5 million inhabitants, there are now 6.5 million residents who were born abroad, almost 20% of those having a Spanish nationality. The foreign population is mostly concentrating on the main cities in general and on the Mediterranean coastal areas. The absolute and relative numbers of foreign citizens seem to correlate with the size of the region. Therefore it is notable that the small inland regions of Cuenca and Teruel and in lesser scale Soria, have remarkable share of foreigners.

Interestingly enough, our case study regions seem to be used as transitory regions by newcomers to Spain. This can be due to the relative importance of the primary and secondary sectors in the Spanish SPA which provides opportunities for low-skilled jobs, for which the competition with 'born Spaniards' is lesser than in the service sector in metropolitan regions.

Figure 6: Domestic net migration in 2006 (left) and Dependency ratio in 2006 (right).



Source: OSE 2009, p. 196, 200.

Urbanization processes, combined together with selective age and gender migration, has led to situation where the Spanish SPA regions are characterized by a high presence of elderly people and low proportion of children. On the sub-regional level the situation looks even darker. In small and spread localities the percentage of elderly people, the lack of children and male overrepresentation is higher than in larger localities and in their labour markets.

The share of elderly population aged 65 years and more in the SPAs is 23.5% (INE, 2011). Compared to the Spanish average of 16.9%, the sparse regions are clearly 'older'. The share of elderly people in the SPAs is also higher than in Germany (20.7%), the most aged country in Europe in 2010. An additional challenge for the SPAs is that the regions have a combination of smallest settlements with oldest inhabitants. This is a remarkable challenge for service production.

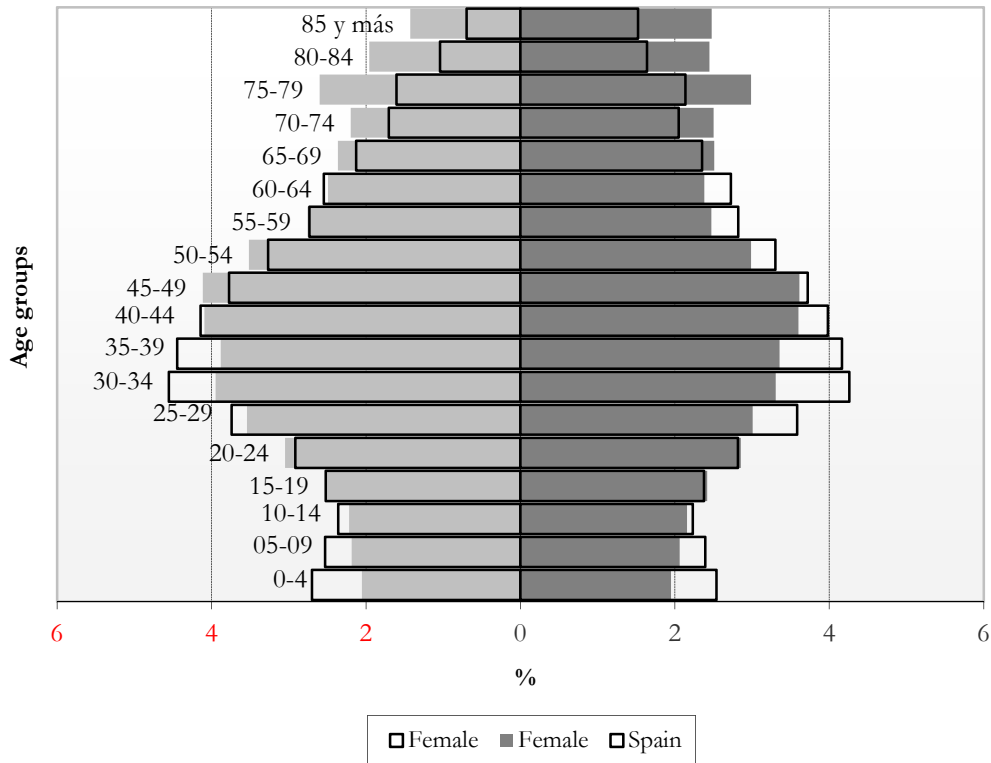
A common classification regarding age structure is the grouping in three major classes based on dependency. Age-dependency ratios relate the number “dependent” individuals—youths and the elderly – to the number of those individuals who are capable of providing such support. In general the comparison is done among persons aged 0-14 and 65 years and over, related to population aged 15-64. The total dependence ratio in Spain decreased in 5 points during the 90s and continued rather stable during the last decade. In SPA region, in contrast, we can see an increase during the nineties, which reached the maximum in 2000, and a decrease after that. The overall level is still much higher than national one and the SPAs are among the provinces with highest dependency ratios in Spain. When looking at only old age dependency ratio, the SPAs and Spanish average curves present a total different pattern. In the SPAs the starting point is much higher and the rising is steeper, meanwhile the old age dependency ratio in the other regions was maintained or was even decreasing (INE, 2011).

On the other hand the male-female balance varies also in different age categories. The life expectancy at birth for Spanish women is 84.9, the second highest in the world after Japan. As Spanish male in average tend to live over 6 years less, female overrepresentation in elderly age is thus not surprising. Nevertheless, the lack of woman in the working age population and especially in fertile ages is striking in SPAs. This masculinization of working age population has been of great importance over all the territory but particularly in small and spread localities. In fact, it has been such a concern that rural masculinization has been described as “endemic” process, becoming one of the most important handicaps in rural areas in Spain (Camarero, Sampedro, 2008). In addition the lack of working aged female is also affecting negatively to the possibilities of family building. The overall lack of female has also social impacts regarding emotional and social wealth (Camarero et al., 2009).

The aging of the regions has socio-economic impacts. Providing services to these regions is related to increasing needs in health care and other elderly people targeted services. In addition, low levels of replacement rate due to aging decrease viability of economic activity in the future. Some analysts also advocate that ageing has a direct impact on the (perceived) vitality of the territory itself: ageing is thus portrayed as a “decadence of society, reducing the part of active population, (...) bringing a cultural change about the valorisation of these territories” (Camarero et al., 2009).

Figure X. Demographic structure for Cuenca, Soria y Teruel, comparing with Spain.

Demographic structure in Spanish SPAs in 2010



(Data source: INE, 2011. Municipal register)

There are 96 female per 100 male in the SPAs. This overrepresentation of the male population is not surprising taking the above described migration flows into account. On the one hand there are considerable regional variations, mainly between cities and sparsely populated areas. Generally speaking, the larger the locality is the larger is the share of female population, but there are also few smaller localities with female overrepresentation.

In conclusion, the most important demographic processes in SPA are aging, gender imbalance and detrimental internal migrations which have increased disparities *within* SP regions; this processes have been occurring more significantly in small and spread localities, although the main cities have experienced reverse trends. Thus, SPA are struggling both with demographic thinning out processes in most rural parts, and with growth in the largest settlements.

Several policies have attempted to address the issue of demographic decline in those Autonomous Communities SPAs belong (Agenda para la Población de Castilla y León 2010-2020, Junta de Castilla y León; Plan Integral de Política Integral de Demográfica, Gobierno de Aragon) but it seems that no important or significant impacts have been identified.

The main effects for the SPAs can be found under rural development plans. Following the national law on “Sustainable Rural Development” the autonomous community of Castilla-La Mancha was the first one to implement this plan. For the period 2008-2013 'Strategic Plan

for Sustainable Rural Development of Castilla-La Mancha 2008-2013' is launched. The aim of this instrument is "the ceasing of depopulation of rural areas, especially affecting women and young people, improving the living conditions of its people through the widespread development of services to the population, and socio-economic development of all endogenous potential of the territory". The plan is intended to complement existing EU funds of ERDF and CF, proposing measures and specific actions to suit the needs of rural areas (Study... 2011)

Settlement patterns

Cuenca, Soria and Teruel are home to 460.000 persons – i.e. only 1.0% of the total Spanish population. All of these regions are characterized by having *small* and, in Spanish terms, *spread* settlements. In that regards, it is not unlike what is found in the SPA of the Nordic countries. When following the existing administrative divisions, there are in total 656 LAU2 regions in the provinces and 36% of those have less than 100 inhabitants and in addition almost 90% of all the LAU2s have less than 1.000 inhabitants. In contrast only the provincial capitals have more than 35.000 inhabitants each and only two other settlements in total have more than 10.000 inhabitants. When comparing the regions to each other's, the main differences occur between Soria and the other 2 provinces. In Soria the provincial capital represents around the 42% of the population while in Teruel and Cuenca it is around 25%. Also the municipalities in Soria are in general smaller (INE, 2011).

The settlement pattern in the provinces is as such strongly linked to the urban hierarchy and its functional dimension. Besides the obvious division of the provincial capital and rest of the region, a north-east/south-west divide seems to characterize Cuenca and a north-east/rest divide in the case of Teruel. In Soria the non-capital settled population is more scattered around the province. This locality size based division reflects well the to the existing transport corridors and to the location of larger urban settlements bordering the study regions.

Even though sparsity as such is not made explicit in Spanish regional policy, the intensive depopulation of rural areas, especially in the SPAs, is a topic of concern. In the civil context a network of *Depopulation Observatory* was created in 2001 and the local governments founded the *Foundation of Municipalities against Depopulation*. This highlight the fact that 'sparsity' is a territorial context that may necessitate different types of governance models than the ones in more 'mainstream' regions.

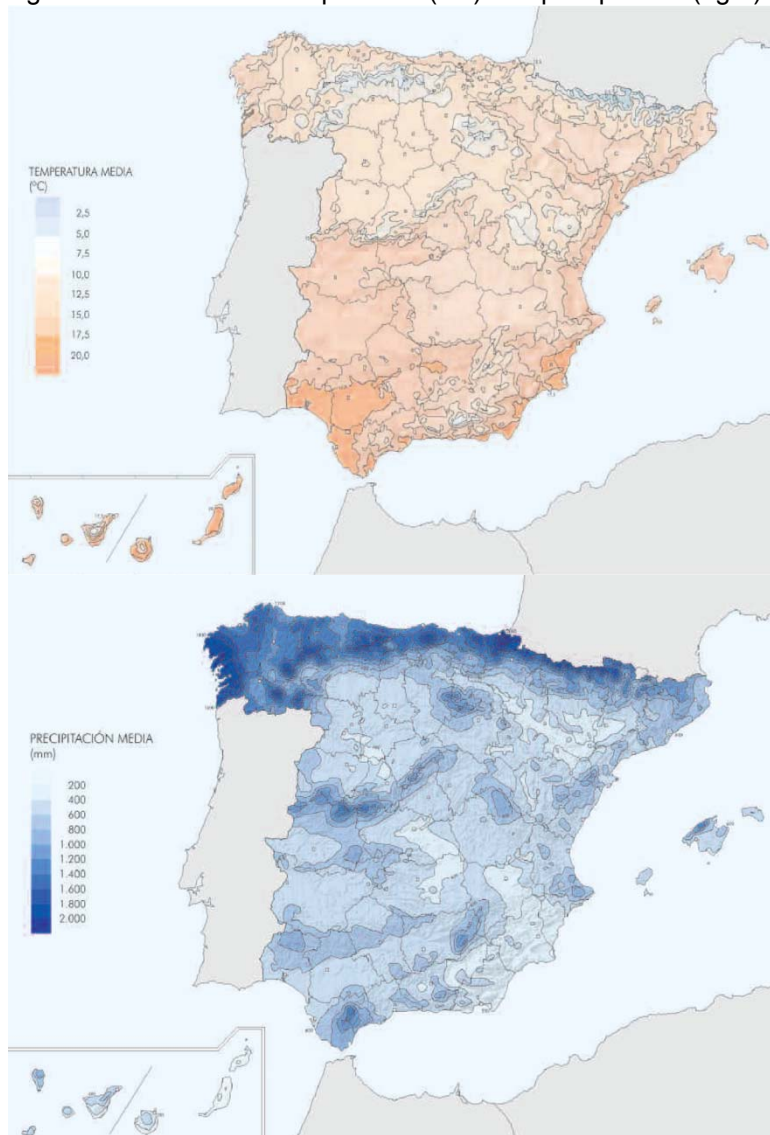
Residential attractiveness

The Spanish SPAs seem to be rather heavily affected by their geographical location with regards to residential attractiveness. In that respect, the rather close geographical to main agglomerations appears to be a disadvantage, as they are outside the commuting catchment area of those agglomerations. Consequently, the rather lower prices of the land are counter-balanced by rather high transport costs, expressed especially in time-spent. This is especially detrimental to the further development of the service sector in the SPAs. Yet,

beyond this exogenous perspective, there are some interesting assets that can play as an important attraction factor for endogenous capital.

The SPAs have a relatively unspoilt nature in the Spanish context. This mountainous and agricultural landscape can be seen as a part of environmental capital of the region even if it might take some effort to visit these areas due to the lack of transport infrastructure. Hence, the landscapes of the SPA belong to the national environmental heritage and its protection or managed exploitation is of national interest, and not only regional. The landscapes have their specific character also based on climatic conditions. The Sparsely populated regions belong to the coldest regions of Spain. The annual average temperatures are some degrees below the national averages. Related to the mountainous character of the regions, the differences in temperatures between the seasons are relatively high in the Spanish context. At the same time parts of the provinces have also so low precipitation levels that it sets some limits for the vegetation. Therefore the climatic conditions of the SPAs are not the most attracting ones in Spain.

Figure x: Mean annual temperature (left) and precipitation (right).



Source: OSE 2009, p. 19-20.

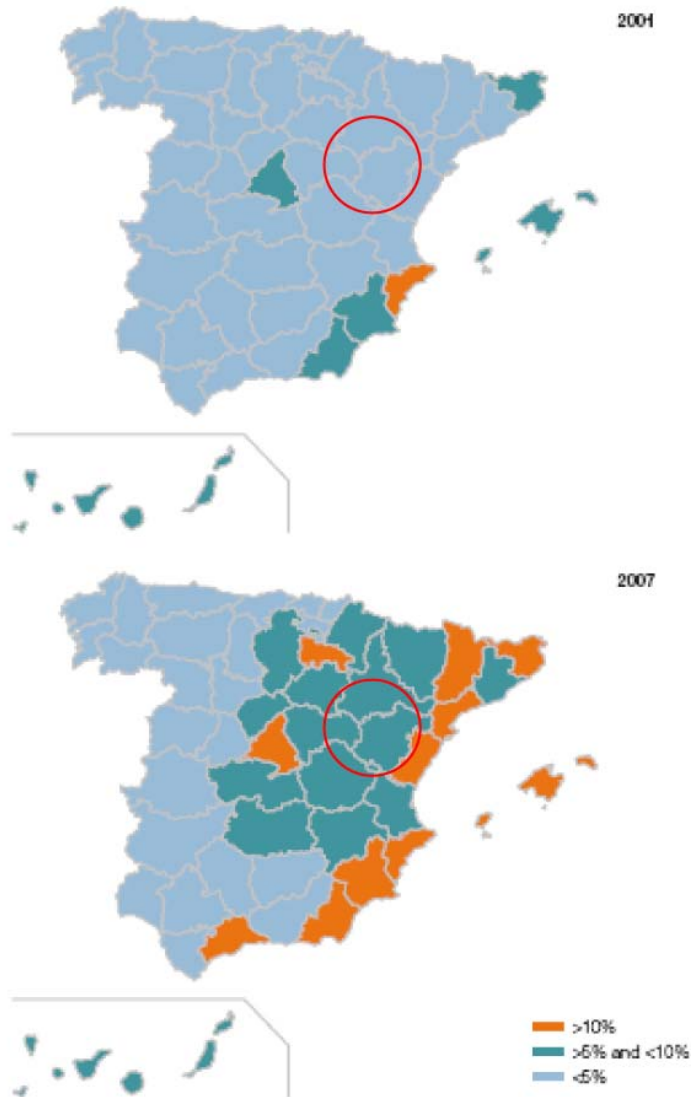
The human landscape of the regions is also reflecting the rich history of the provinces. The human constructions in the provinces are a good architectural travel through different eras, religions and military actions in the area.

According to Pinilla, Ayuda and Saez (2008), based on their case study of rural Aragon (thus including Teruel), the turnaround from rural depopulation to repopulation can be essentially understood in terms of search for better quality of life standards, and thus residential attractiveness.

Population inflows, meanwhile, comprise both foreign immigrants following the classic migratory pattern between areas with significant income and opportunity gaps and the arrival of citizens resident in other parts of Spain. Such people are attracted by new determining factors such as the positive perception of the quality of life in rural districts (amenities). These considerations basically center on the opportunity to purchase more comfortable houses, a more agreeable and less crowded environment and, in general, a lifestyle allowing the enjoyment of higher levels of social and environmental capital.

Pinilla, Ayuda and Saez (2008), p13

Weight of the immigrant population residing in rural areas,
2001 and 2007



Source: Population census of 2001 and municipal register for 2007. Author elaboration.

Source: Camero *et al.* (2009)

An important aspect of residential attractiveness can be grasped by assessing the extent to which people are willing to move to this region and settle there, i.e. make the choice to quit their region of origin to a new one. In their study on rural population in Spain, Camero and his colleagues (2009) show that the weight of foreign residents in the rural parts of our case study region has increased from below 5% in 2001 to between 5-10% in 2007. However, this phenomenon is shared by the entire North-East of Spain, thus suggesting that the phenomenon is not based solely on the specific qualities defining residential attractiveness of the region, but as well of its wider surrounding. Yet, the residential attractiveness of the rural parts of our case study region seem to benefit from this macro-phenomenon.

Identity and social cohesion

Identities in Spain are mostly related to the different regional 'nationalities'. Cuenca and Soria belong to the Castilian influence area. Teruel is a part of Aragon. While some pro-independence support exists, most of Aragon's population does not seek more a but to be gaining in autonomy within Spain. A important part of the identity is related to regional languages. An important point relates to the perception of an 'endangered' Aragonese language, which is still spoken in the Northern part of Aragon. In addition to this, a small part of Eastern Teruel has a Catalan minority and the Comarca of Matarranya has Catalan as official language.

In the region of Castilla-La Mancha, the Mancheguan Regionalism is a minoritarian political current which has its roots in 19th century. It proposes that La Mancha is a region with its own identity, in the territories of the four provinces; Albacete, Ciudad Real, Cuenca, and Toledo.

Although regional policy in Spain does not explicitly address the issue of sparsity, there are two regional 'grassroots' movements that can be linked to it, one in Teruel and other in Soria. The first one is a movement with the slogan "Teruel Existe" ("Teruel Exists") founded in 1999 to press for greater recognition and investment in the province. It is a platform for provincial authorities, institutions and sympathizers seeking to change the long-standing neglect of the province within both Spain and Aragon territorial policies. Their focus is mainly oriented to transport and infrastructure projects as well as better emergency medical transport and mental health care. As a result of the campaign, several transport projects to Teruel have been pushed and monitored, resulting in better accessibility conditions for the province. One major achievement has been the construction of a motorway between Zaragoza and Sagunto but other crucial projects such as a direct rail connection to Madrid or more appropriate rail connections to/from Teruel are still subject of long discussions.

The 'Teruel exists' movement show that bottom-up governance initiatives have the capacity to lead to major improvements for the regional actors to take better advantage of development opportunities in the future. One major focus was to reduce the isolation of the local actors by structurally connecting them to other localities and especially to the surrounding main agglomerations, such as Madrid and Zaragoza.

In parallel, the other provincial movement in Soria has been growing since 2001. "Soria Ya!" (Soria now!) was conceived by the highly concerned civil society of Soria about the emerging uncertainty for the future of the province as a consequence of -what they believe- is the incapacity of different administrations in the past when it comes to formulation of appropriate initiatives of socio-economic development. The independent movement is oriented towards the monitoring of the development and support of crucial infrastructure projects, such as transport infrastructures (motorways, railways, etc), education infrastructures and industrial infrastructures. Members include municipalities, association of municipalities, local associations, labor unions, rural associations, farmers associations among others.

Both "Teruel Existe" and "Soria Ya!" have been supporting each other as well, and working together in the last decade for the same goal, even expressing their common voice of protest against the central government in Madrid back in 2003. The lack of a similar strong

movement in Cuenca could be explained from the fact that accessibility and infrastructure conditions were not as critical as in Teruel and Soria at the end of the 90s and perhaps due to the fact that Cuenca is partly located on the influence area of Madrid.

Clearly, it seems that bottom-up approaches to governance are needed in the Spanish context in order to deal with sparsity, both in terms of overcoming structural challenges, but also to develop new opportunities for local development. The provinces constituting our case study region are, in territorial and governance terms, at the margin of the national and regional (NUTS 2) entities. Consequently, it is unlikely that the issues specific to their territory (i.e. sparsity) are taken up and appropriately addressed by those administrative levels. In that respect, new forms of governance as the examples of 'Teruel existe' and 'Soria Ya!' show it are needed.

Environment

A direct consequence of the geographic specificity of the case study region (i.e. sparsely populated) is that a relatively large 'land mass' are on natural, untouched state. In return, as most of the settlements are small and scattered, energy and food production as well as recreational activities are dominating the human landscape of the provinces.

The environment as an economic potential

Minerals and metals are unique and highly important regional resources in a European and global context. Spain has some of the most important resources in Western Europe. However, those which are of potentially global importance are not located in the Spanish SPAs. Yet, the natural resources found in the SPA are found under the ground. As the diversity and wealth of geological resources varies between the SPAs, the regional potentials are not the same. All the regions have potentials for construction materials (clays and ornamental rocks). Ornamental rocks extraction, as alabaster (used to sculpture and decoration), is being underexploited considering the abundance of the resource, and limestone has been extracted since the 90 decade in small exploitations (Rubio and Royo, 2007).

In the Teruel and Soria provinces, the exploitation of coal is still substantial. Due to the large scale of its exploitation, the activities have left their mark on the local landscape and cultural heritage (Rubio and Royo, 2007). Coal is a basic resource in national energy supply in Spain and it has a great importance to the regional economics as 10% of Teruel's production value is coming from coal. Teruel's coal, together with black jet, covers 65% of the total coal production in Spain (Bauluz and Subías, 2007). Due to its economic importance several programs to identify and evaluate coal deposits have been run in the region. More effort has also put to minimize environmental impacts, mostly to reduce sulphur emissions (Rubio and Royo, 2007). Historically iron ore has been exploited since pre-roman ages in Teruel and Cuenca, but by the late 1970s, a worldwide steel crisis and the domestic economic slump led to a severe crisis in the industry, and the mines in Teruel and Cuenca were closed (Cañizares, 2004; Biel, 2009). The increasing demand of iron in the latest years has led regional actors to be more conscious of the potential of the deposits again.

It should be added that the geological resources in the regions do not serve only as raw materials but there is also further possibilities to promote research and education. The paleontologic resources in Teruel that are excluded from commercial exploitations could be named as an example because their value relies on the possibility of *observation* (Rubio and Royo, 2007), instead of *exploitation*.

The territorial assets for primary production can be added both as regional potentials and challenges. Compared to other regions in Spain, the SPAs have relatively large share of forests and the coverage have even been increasing due to land abandonment. All the provinces have approximately 40% of their land area covered by forests (IAEST 2010, JCyL 2010, I-ES 2009). Forests and forestry resources are mostly considered in context of des-agralization and bio fuel potential (Rubio and Royo, 2007). The economic importance is anyhow mostly local. The forests and other natural and semi-natural landscapes have also natural value as such and potential for larger scale recreational and tourism activities (Rubio and Royo, 2007).

Clearly, the exploitation of natural resources in the Spanish SPA can be seen as a cornerstone of the regional and local economies. Yet one could question the relevance of this exploitation on a long-term basis, especially in the case of coal, and mainly due to environmental requirements. In the long run, Spain, which is strongly dependent on coal for energy production, will have to reduce its consumption of coal in order to reduce its CO₂-emissions. For the SPA, which are the main producers of Spanish coal, this will have a strong impact. Moreover, the environmental problems at the local level, related to the pollution due to residues, might engender the long-term attractiveness of the region for the development of other industries.

Even though the SPAs are famous for some of their agricultural products, like wine, olive oil and ham, remarkable challenges can be linked to intensive agricultural production. The major challenges are related on water availability, depth of soils and temperatures that do not permit large scale mechanisation or adapting mainstream economic models in terms of agricultural production. Also these facts in combination of relatively low number of crops and livestock sustainable in these regions make it hard to have profitable production without successful use of different regional and European aids or funds. The SPAs are the Spanish regions with the harshest climatic conditions. The amount of precipitation in these mountainous inland regions is relatively low. At the same time the temperatures can during the dry summer months reach +40 °C and drop to as low as -20°C in winter.

Clearly, the region is not suitable for developing 'mass agriculture', i.e. an agricultural production based on economies of scale (with large farms). In that sense, the development of niche agricultural product seems to be the way forward in the region, and one of these niches is *ecological agriculture*. When in Spain as total the development of ecological agriculture both quantitatively, in terms of the area involved, and qualitatively, in terms of the consumption of ecological products has been increasing there are relatively very low number of operating companies in the SPAs. At the national level in 2008 the amount of land devoted to ecological agriculture rose up by 25% on the year before and the number of operators increased with 14% (Sustainability... 2009). This ecological trend can have a positive effect on the agricultural activities in the region in future.

Clearly, the environment is an under-used economic asset in the present case study region. Yet, in order for such a strategy to be successful, it becomes obvious that this link between the exploitation of the environment and local and regional development need to be multiform in order to be sustainable in the long run. In that respect, the main challenge lies in finding the appropriate balance between its different components, such extraction of underground resources, exploitation of landscapes, recreational activities, energy production. In that respect, development opportunities may be engendered not only by trading local productions, but also by developing and promoting the local *savoir-faire* with regards to small-scale production techniques in a varied range of environment-based activities, and thus linking local production activities with education and international networking.

Renewable Energies

As such, Spain is having favourable conditions to develop Wind, Solar and Biomass energies with some regional variations. The best potential for wind energy can be found (sic) on the coastal regions and for solar energy in Southern Spain. Besides coastal areas, the SPA regions have reasonable potential for wind power compared to other inland regions in Spain. The regions are windy enough in terms of hours, speed and technical potential to utilize wind power. During the last ten years, wind energy has taken its place in Spanish energy supply. Compared to national averages, wind energy has significant share of production in SPA, but it is not as important in terms of consumption. This unbalance indicates anyhow about differences in supply and demand (*Datos Básicos Aragon, 2009*. IAEST, 2010; *Servicio Estadístico Castilla-La Mancha, 2011*; Anuario Estadístico Castilla y León. 2009; Dirección General de Estadística, 2011; *Libro de la Energía en España. Ministerio de Industria, Turismo y Comercio. INE, 2011*). In Cuenca and Soria the wind energy share of total electricity production in the region is remarkable, respectively 65% and almost 90% (I-ES 2009; JCyL 2010). In Soria wind energy has significant impacts in the economy due to installation and operation of wind parks. A survey carried in Aragon concluded that the investments in wind energy had had an impact in all the economic sectors during the construction. Also the land rent to energy companies is seen as potential income for the municipalities (Simon et al., 2009). However, the topography of the regions and lack or even inexistence of adequate infrastructures means that further development of wind power would be of high costs and high investments would be required in many parts of the regions especially in Cuenca and Teruel (Wind Atlas of Spain 2009). Finally, although SPAs are not the most irradiated regions in the country, there is still large viability harnessing solar energy (PER, 2005-2012).

Biomass potential studies carried by National Plan of Renewable Energies points out that the SPA regions are one of the priorities to implement biomass due its potential in forestry wastes, herbaceous and woody crops wastes (PER, 2005 Chapter 3. Biomass Area.). Biomass potential from forests, agricultural wastes and energy crops has been enhanced by different territorial agencies as well as by regional and local governments. Local initiatives view biomass exploitation as an opportunity, not only to develop renewable energy, but create employment and landscape and forest management. ASEMFO (National association of Forestry Entreprises) for example states that forestry biomass is the best chance to promote rural development. There are several forestry cooperatives and energetic enterprises cooperation with the regional/local government. When the use of biomass

increases, there is also a need of better and more integrated management in order to avoid or do deal in case of forests fires and other hazards.

More generally, national, regional and local authorities are currently trying to promote Renewable energies. For instance, there is a National Spanish Plan, “Plan Energías Renovables de España, 2005-2010” (PER) that addresses issues related to the renewable energies and Plan de Acción Nacional de Energías Renovables (PANER) 2010-2020) to reach national the goals included to European Energy Directive 2009/28) (IDAE www.idae.es, 2011). Besides this, all the Autonomus Communities have developed a number of programmes to support renewable energies.

In Castilla y León (Soria) there are specific plans oriented to bioenergy, solar and wind energy. The “Plan Regional de Ámbito Sectorial de la Bioenergía de Castilla y León” was approved in early 2011 from the basis that the region has an unexploited high potential for biomass resources and emphasizes on the advantages for a diversification of the regional economy as well as a source for new jobs and enterprises. On the other hand the “Plan Solar de Castilla y León” forms a strategy intended to strengthen the solar energy platform in the region. Initiatives include mainly financial aids for new facilities, enterprises, education programmes as well as legal support and dissemination of activities. And the “Plan Eólico de Castilla y León” was established to plan efficiently the implementation of wind power facilities in the region, in a joint effort to combine environmental planning with industrial, socioeconomic and energy planning. Soria is after the province of Burgos the top producer of wind energy in Castilla y León with a potential installed of around 1500 MW of a total 4780 MW in 2008 (EREN 2011).

As a conclusion, it seems that the potential for developing biofuel production in the region is underexploited. On the one hand the energy industry is not yet been developed towards more intensive use of biomass and on the other hand capital is lacking. The regions meet incapacity to recruit employees with adequate competences, mostly to evaluate and design production plants and centres. There is also a lack of economic capital as biofuel and regions are unable to compete with traditional energetic sources in financial context.

Exploitation of natural resources

The exploitation of underground resources require large financial investments both for the set up and operation of the activity. Yet, due to the small size of the local and regional economies in the SPA, it is unlikely that such large investments can be made by regional actors. Moreover, the need for a highly skilled and specialised type of work force may lead to the need to 'import' such a labour force from outside the region. Consequently, the exploitation of underground resources despite being located in the region might end up involving few local actors and have a limited impact on the local labour force. In addition to this, the complexity of the Spanish governance system, with multiple levels having varying degrees of autonomy, makes it more difficult for the small actors to start nature resource related businesses. In natural resources exploitation many issues are overlapping the responsibilities of national intervention, regional (autonomous, provinces, lower regional-) governments and sectorial departments (Tourism, Natural areas and Environment, Rural Development, Energy, Economy, Mining). There is an urgent need to increase coordination

between these actors in order to increase effectiveness and value of investments and subsidies.

Most of the companies operating in the case study region are owned by international companies, or in case of domestic companies a majority of the headquarters are located in larger agglomerations outside the SPAs with short distance to markets and the benefits for the regions itself remains small (Bauluz and Subías, 2007). Consequently, local actors have little power over the operations. As a consequence, the economic benefits have little impacts on the local economy as they are 'received' in other places. For example in Teruel 80% of the mines capital is from outside of the Province (Bauluz and Subías, 2007). Also the employment effects of natural resource exploitation in the SPAs are rather small. As an example, clays production from Teruel gives 200 jobs. The region cannot make a profit of the final product of clays extraction because of the lack of raw materials transformation companies; there is only local production of some products but with low added value. Most of the clay is transported to Valencia (Rubio and Royo, 2007).

There are anyhow both national and regional implemented strategies to ensure that the profits from the exploitation of finite natural resources exploitation also benefit local communities, but those are mainly related to mining activities. In 1997, the National Government created the Carbon Mining Restructuration Institute (*Instituto para la Reestructuración de la Minería del Carbón- INRECA*). The institute has several tasks. On the one hand it's coping with restructuration of mining sector by granting mining related permits and regulation. On the other hand it is responsible to provide infrastructure, promote employment and enhance human capital, including qualified labour force, education and training actions. There are two programmes oriented to support mining activities in the region developed under the Governments of the Autonomous Communities includes Plan MINER (2006) in Aragon and "*Programa de actuación en las comarcas mineras 2008-2012*" (2008) in Castilla y León. The idea is to promote investments projects in mining areas creating alternative economic activities with a consequent generation of new jobs. Business beneficiaries include public and private companies, cooperatives or any other form of interested association. Aragon's' Plan MINER in particular includes three different objectives: support in i) infrastructure, ii) entrepreneurship and iii) education and the main goal of the Plan is to reduce the negative socio-economic consequences of the continuous decline of mining activities derived from the parallel reduction of public support.

In parallel, an example of a non-governmental initiative in favour of mining activities is found also in Aragon. Aware of the difficulties faced by the mining sector, a group of entrepreneurs decided to join forces as a way to defend their common interests. AEMA (*Agrupación de Empresas Mineras de Aragón*) (2011) is today an association gathering 72 mining companies. AEMA represents and defends the corporate interests, coordinates communication channels, offers legal consulting and advice as well as keeps members informed of legislation and actions taken by the government in relation to mining activities.

Since mine exploitation has been an important and significant hallmark in the economic, social and cultural life of the regions - having also its impacts on the landscapes – the mining heritage (*patrimonio minero*) is a part of the regional culture and identity. In Teruel and Cuenca it is possible to find several examples where mining has been used as tourism

opportunity, like transport route of “Ojos negros”, or a number of museums (Biel, 2009; Cañizares, 2004).

A particular mega project of urban/regional development is ongoing in the municipality of Garray, just outside Soria capital: “Ciudad del Medio Ambiente de Soria (CMA)” (Environmental City of Soria), focused exclusively to become a major example in the use of renewable energies in Europe. It represents a joint effort between several actors from the regional government, provincial government, universities, renewable energy companies, urban planners and architects. Projects include the construction of a whole new development area including wind, biomass and solar power generation plants as well as industrial areas, education centres and research infrastructures on renewable energies, as well as residential, sports, cultural and recreational areas, all of them conceived on the basis of renewable energies and bioclimatic architecture. The project involves 10 different major projects that will generate 250 direct jobs and 1000 indirect jobs with a total inversion of 440 millions of euro (Ciudad...2011)

In Castilla La Mancha (Cuenca) the so called “Estrategia Marco para el Desarrollo Energético de Castilla-La Mancha” establishes the general framework of development for the energy sector in the region and focuses on 3 different axes: promotion of renewable and clean energies, promotion of energy efficiency and strengthening of the economic burden of the different energy assess in the region. This Strategy reinforces the Law 1/2007 on promotion of renewable energies, energy savings and energy efficiency and the recent “Decreto Eólico” from 2010 reinforced the importance in particular of wind energy for the region. The goal then is to increase the potential of installed wind potential sources in the coming years with an additional 2900 MWs (Junta... 2011). There is also a particular plan focused exclusively on the development of wind energy, the so called “Plan Eólico de Castilla-La Mancha Horizonte 2014”. As Castilla-La Mancha is Spain’s Autonomous community with the highest installed potential of wind energy, the objective of this plan is to strengthen even more the capacity and production by increasing the number of wind parks hand by hand with the development of new technologies with a total inversion of 3.269.225.000 Euro during the period 2009-2014 (Plan Eolico 2010).

Cuenca produced 1,136 GWh of gross energy in 2007 of which 1,071 GWh were produced only from wind energies. That makes Cuenca the top second producer province of Castilla La Mancha when it comes to wind power after the province of Albacete. Official sources from the regional government announced in late 2011 the interest of the private sector to invest around 2.000 million euro specifically in the province of Cuenca as a strategy to increase the production of wind energy with additional 1300 MW (Iberdrola... 2010). When it comes to biomass and solar energy generation in Castilla-La Mancha, the percentages of total energy production in both cases is less than 1%. Cuenca produces 10% of the total biomass energy in Castilla La Mancha and 15% of the total solar energy in 2007 (Estrategia...)

In Aragón, the “Plan Energético de Aragón 2005-2012” defines the general outline for the region on the basis of an efficient use of local resources as a strategy to decrease energy dependency from other regions. In particular the Plan is highly focused on energy efficiency and the promotion of renewable energies as it highlights the presence of appropriate natural

resources in the region as means to increase the production of renewable energies such as biomass, hydropower, wind and solar energy. Targets for wind power generation include a total of 4000 MW to be produced in 2012 and for solar energy 105 MW to be installed also by 2012 (Asensio 2008). The Plan also focuses on the development of infrastructures and a promotion of energy efficiency across the region. Specific plans for specific types of renewable energies do not exist in Aragon as they do in Castilla y León and Castilla La Mancha. However a series of laws both for wind power and solar energy have been developed in the last decade. Their objective has been to continuously regulate and facilitate the implementation of activities and facilities in general.

When it comes to wind power generation, Teruel province still presents the lowest percentage of wind energy projects in Aragón (only 8% compared to 76% in Zaragoza and 16% in Huesca) due to insufficient electrical infrastructures with few high-voltage lines and a reduced number of substations (Energías... 2008). In early 2011, in an effort to increase wind power activities in Teruel, the Department for Industry, Commerce and Tourism of Aragón, opened a call for the installation of new wind power facilities in the south of the Teruel Province. The area has a forecast potential wind power output of 305 MW and might increase the share of Teruel in a regional scale (Reculación 2011). When it comes to solar energy, eight different solar plants of 50 MW each, are being promoted for Aragón (as of 2008), of which 4 of them are planned in the province of Teruel (Las Hoyas, Planas de Castelnou, Bujaraloz and Ibersol Teruel).

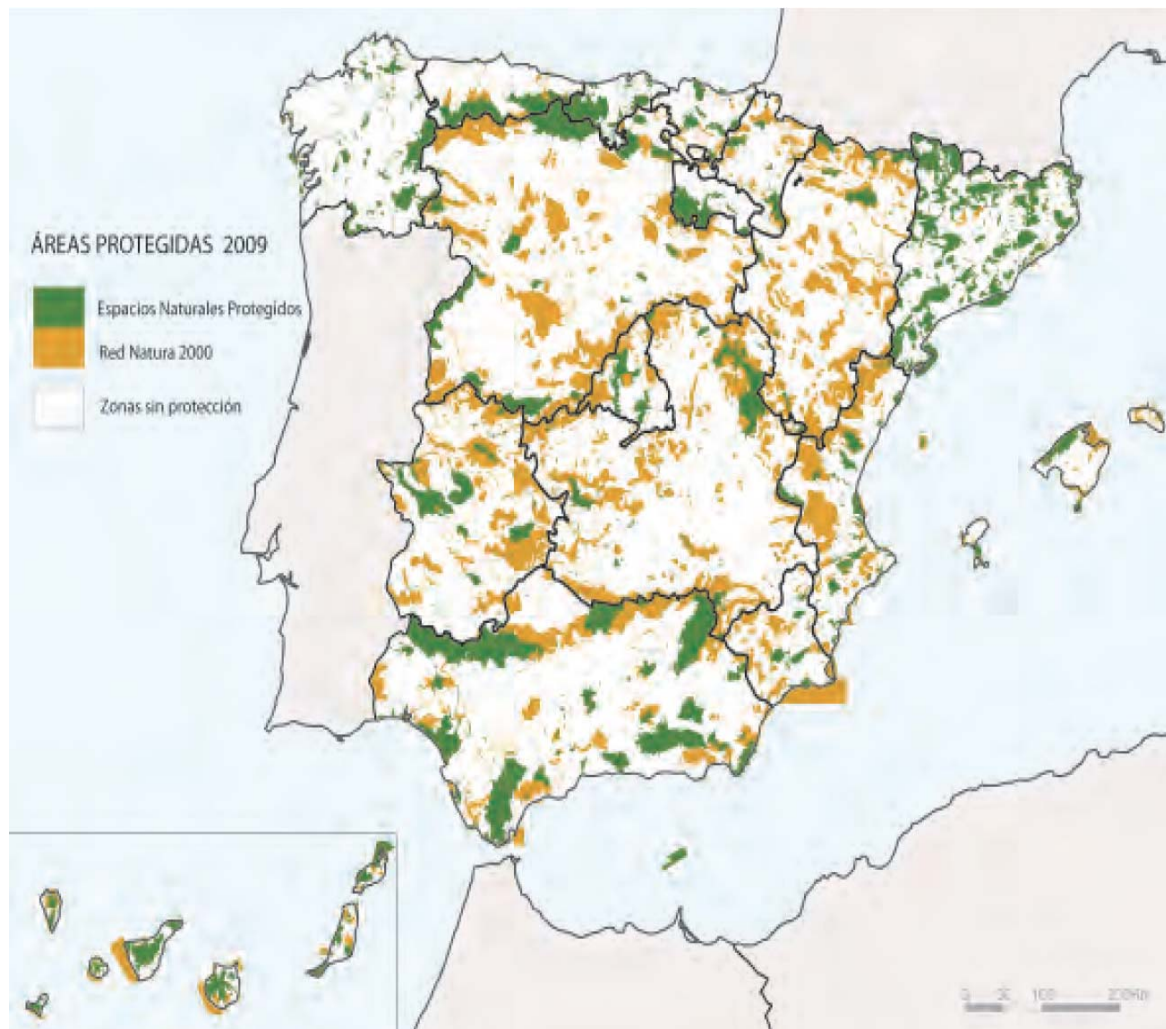
The economic weight of agriculture is declining, but its environmental impact is increasing in general. As discussed earlier, ecological agriculture and stock-breeding have expanded and solid laws and regulations are in place to promote rural sustainability. In 2008 Spain passed the Sustainable Rural Development Act, which targets to reduce the economic and social differences between urban and rural areas by boosting sustainable rural development. In the same year rural development plans were approved in the different Autonomous Communities and the National Rural Network Programme was passed. The Sustainable Rural Development Programme 2010-2014, together with its Environmental Sustainability Report (ISA), will be the main instrument for planning the actions to be taken by Spain's central government in regard to rural areas (Sustainability... 2009)

Protected areas and biodiversity as factors of development

The SPAs, due to its intrinsic characteristic of having a limited spatial extent of human activities, have relatively large share of forests and other natural areas compared to other Spanish regions. The lack of extensive industrial activities in those regions has led to the relative preservation of its natural assets. Paradoxically, the lack of production-oriented activities has benefited the territory environmentally (Rubio and Royo, 2007), and might be a solid ground for developing new economic opportunities in the future. At the same time there are only few protected land areas in the SPAs, and the lack of protected areas is not only notable in a Spanish but also in a European perspective. Even if the number and land area of formally protected areas is small, a remarkable share of SPA areas is covered with Natura2000 network sites – especially the mountain area between Cuenca and Teruel. The latter tend to suggest that 'nature' in the Spanish SPA is not perceived as particularly

threatened by human intervention, and thus does not need a legally binding protection of the environment. However, the large extent of Natura 2000 network areas in the case study region shows that its natural environment is an important part of the European ecosystem.

Figure x: Protected areas (green) and areas of the Natura 2000 network (orange) that do not overlap with the protected areas in 2009.



Source: OSE 2010

The main challenge of the protected areas in the SPAs is not related to the land area itself but to the conservation of its biodiversity and the spatial connections between natural areas because the number of endangered species has risen over the past few years. The proportion of the endangered species of birds, reptiles, amphibians, fish, invertebrates and vascular plants that are protected in Spain is very small in comparison with terrestrial mammals (Sustainability... 2009). As a consequence, one could say that isolation of natural areas might as pertinent in the case of SPAs as the relative isolation of human settlements.

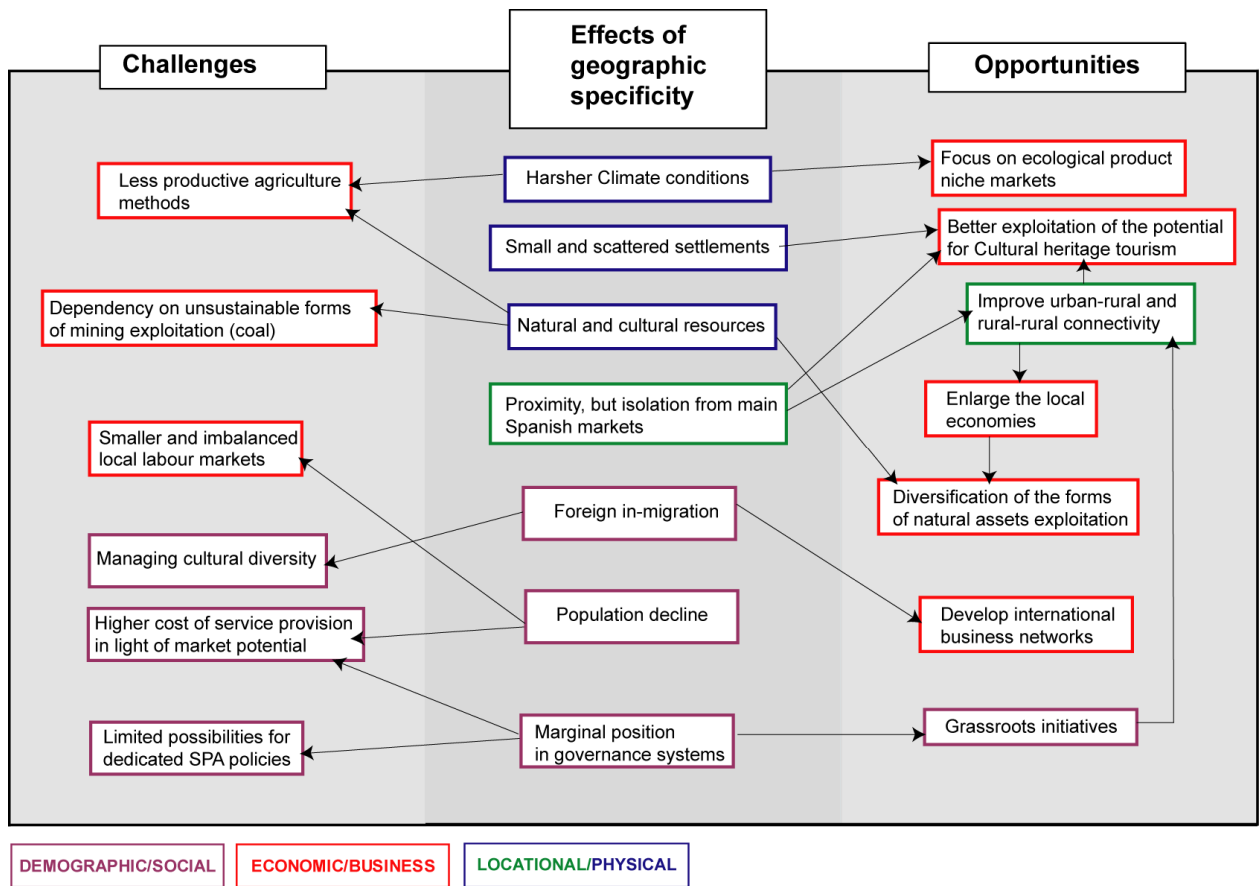
Vulnerability of human-environment systems to climate change

As such the SPAs are not the most vulnerable Spanish regions for the climate change due to the facts that the regions do not have extensive agriculture, larger importance of tourism or those are not located on the coasts. Facing up to climate change requires eco-efficient processes. In Spain the targets has been set eg. to improve energy efficiency and reducing energy consumption. So far the greenhouse gas emissions from energy processing have been increasing. Total emissions amounted to 212.4 million tonnes of CO₂ equivalent in 1990 and reached 345.4 million tonnes in 2007, a rise of 62.6%. Most of the emissions from this sector came from combustion activities, in particular in the energy industries. As a result of rising primary energy prices and economic crises, the primary energy consumption fell by 3.1% in 2008 compared with the year before. Also the energy efficiency has been improved during the last years. This progress has been influenced by policies supporting energy efficiency and the development of renewable energies (Sustainability... 2009).

The renewable energy sources are the only ones that can be considered environmentally sustainable at the moment. The production and use of renewable energies are increasing. In 2008 renewables were responsible for 19.7% of electric power production and estimates for 2009 show the value around 25%. This increase in the production of electricity from renewable sources has both environmental and security related targets, as the increase of renewables have raised the degree of Spanish energy self-sufficiency to 21.6% in 2008. The main challenges related to renewable energies are the rapid increase of demand and the possibilities to answer on it. The renewable energies should not only be produced more but also the general energy demand should be reduced. Secondly, there is the national wish to increase energy self-sufficiency, but even the energy could be locally produced the role of international energy companies is another issue. The third challenge is succeeding in becoming a viable alternative to other sources, a target which requires active policies and possible benefits (Sustainability... 2009).

Forests can be seen as a potential asset for mitigating the temperature increases. The sink effect of Spain's forest ecosystems has produced a gain of 95 Mt of carbon attributable to the growth of the forest biomass (292 million cubic metres) between 1990 and 2000 (Sustainability... 2009).. The Spanish areas with most carbon accumulation are the main mountain systems, including the areas of SPAs with main potentials such as in Cuenca and Teruel. Even tough the forest biomass has been increased, there are two main challenges for the future development. Firstly more than a third of Spain is at a significant risk of suffering from soil erosion and even desertification as a direct consequence of climate change. Secondly the number of forest fires and the coverage of influences areas have been an increasing trend. In order to strengthen and co-ordinate the measures against desertification, the Ministry of the Environment and Rural and Marine Affairs is implementing a National Action Programme against Desertification (PAND) (Sustainability... 2009).

Synthesis



Generalisation from case study

The case study results have shown that there are similar types of challenges between the Spanish SPA and other SPA in Europe (i.e. Northern Scotland and Northern Norden). Demographic decline, relative geographical and functional isolation and the small-size of the local and regional economies seem to be structural constraints for the growth potential of these areas. When it comes to development opportunities, it becomes obvious from the case study findings that natural assets ought to play an important role for local and regional development in the Spanish SPA, even if it takes different forms than in other SPA. For instance, the potential for developing ecological agricultural products seems to be high, whereas the exploitation of underground resources (coal) has more limited prospects due to environmental constraints. In the light of the current 'Green Economy' focus of EU institutions, it has been highlighted that the Spanish SPA, like many other SPA, has a strong potential as producers of green energy (especially wind power). Yet, structural investments in terms of modernisation of the power grid seem to be essential in order to draw on this potential. The limited size of the regional economy requires innovative ways for developing new added-value to existing activities. In that respect, the development of cross-sectoral activities, such as the better exploitation of the industrial legacy for tourism purposes, has good prospects. Finally, development opportunities are strongly correlated to the capacity to attract external investments. Consequently, development opportunities for the Spanish SPA are linked to the capacity of the local and regional actors to 'manage' these extra-local interdependencies.

Development opportunities and challenges in the sparsely populated regions need to be contextualised. The Spanish SPA differentiate themselves from other SPA in Europe by their close geographical proximity to main agglomerations, as it is located between the cities of Madrid, Barcelona, Valencia and Zaragoza. Historically, this 'strategic' position has turned out to be a disadvantage for the region, as main investments, especially in terms of transport ones, were made around or through them in order to connect those cities together. The recent development of grassroots movements such as "Teruel existe" and "Soria Ya!" have managed, to a certain extent, to put these regions 'back on the map' by improving the connectivity of such areas. Yet, so far it benefits mostly the regional centres, such as Teruel or Cuenca, which have shown signs of growth, at the expense of the more rural remote parts of the Spanish SPA.

Another point of distinction is the rather weak governance position of the Spanish SPA. Being located at the margin of three to four regions and provinces, it is difficult for the local actors to make their voices heard in a highly regionalised governance system. This situation is rather different from the Scottish and Nordic case for which formal authorities have prerogatives on the topic, through respectively the Council of Highlands and Islands and the NSPA Network. In that respect, the Spanish SPA have shown that some important initiatives could substitute to these formal powers, through for instance the mainstreaming of inter-municipal cooperation for the provision of SGI (through the constitution of *comarcas*) and the emergence of grassroots movements.

Annex 30: Case study Belgian Coast

Introduction

The Belgian coast lies on the southern extent of the North Sea, located in the Oslo and Paris Commission (OSPAR) Region II and ICES VIIc area. For the purpose of this case study the study area corresponds to the NUTS 3 administrative boundaries that have a border with the sea. The two ports of Zeebrugge and Ostend are the main industrial centres along the coast; however the port of Antwerp has not been included for several reasons. Firstly, Antwerp is situated at the head of the Westerschelde estuary, and though it may possess coastal qualities, in that the estuary does connect to the wider North Sea, it is very much estuarine in character. Antwerp is surrounded by sizeable tracts of 'inland' region. Secondly, the case study delineation is largely influenced by the Coordination Centre for Integrated Coastal Zone Management's Coastal Atlas of Belgium (BELPAEME et al., 2011). The Centre only considers that strip of coast on the North Sea bounded by the 12 nautical limit and the immediate administrative boundaries. Thirdly, if the port of Antwerp were included there would be an obvious physical discontinuity in the revised case study area, which would only serve to fragment the study site. The case study area is thus wholly located within the province of West Flanders, in the federation of Flanders, and is thus sometimes referred to as the 'Flemish coast'.

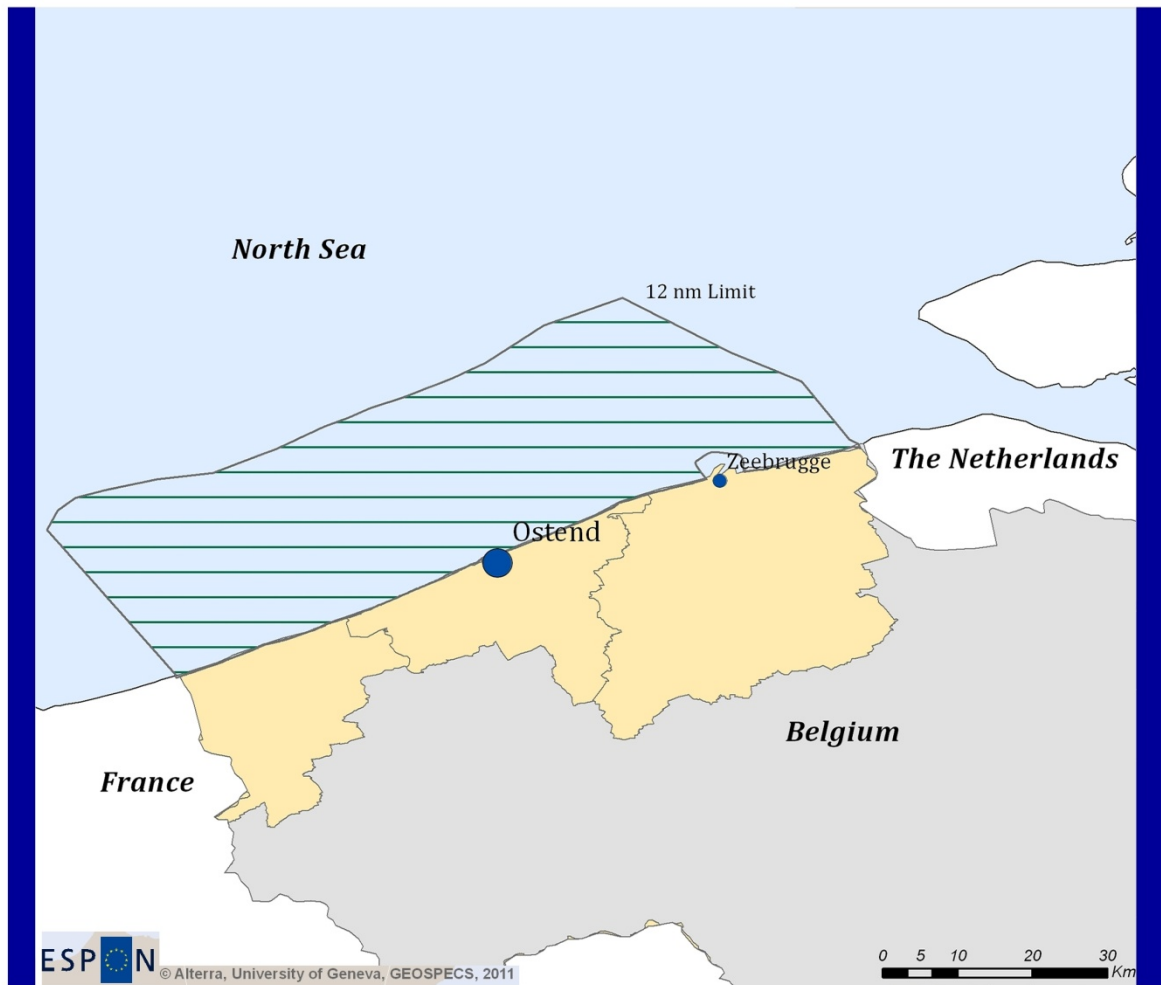
Compared to other North Sea coastal countries, the coastline of Belgium is small, extending for 67 km (BELPAEME et al., 2011) in essentially a straight southwest-northeast line. It is a meso-tidal, wind-dominated coast (LEBBE & VAN MEIR, 2000). Much of the immediate coastline comprises broad sandy beaches backed almost entirely by a narrow dune belt system. This dune system consists of two arcs: one stretching from Dunkerque in France to Wenduine; the second from Wenduine to Breskens in The Netherlands. The major estuaries on the coast are of the river IJzer in the west and the Zwin in the east. The main commercial ports are Oostende and Zeebrugge (LEBBE et al., 2008). The landward side of the coastal zone is defined by flat and vast areas of polder (reclaimed land). Belgium's territorial sea (extending 12 nautical miles from the baseline) comprises an area of 1200 km, situated in a very shallow continental shelf, consisting of sandbanks and loose sediment such as clay, loam and to a lesser extent, gravel (BELPAEME et al., 2011). The dynamic, shallow and elongated sandbanks of the Flemish Banks complex, which extend for almost the entire length of the coastline, consist of well-sorted fine to medium sands (OSPAR COMMISSION, 2000). The natural coastline of Belgium and other southern North Sea coastlines have been changed considerably due to human intervention (e.g. urban development towns, ports and harbours, land reclamation, coastal protection) (LEBBE & VAN MEIR, 2000; OSPAR COMMISSION, 2000)

The Belgian coast hosts one of the densest levels of human and industrial activity in Europe (CARLISLE et al., 2008; LE ROY et al., 2006). Approximately 0.4 million people (4% of the Belgian population) reside in the ten municipalities of the immediate Belgian coast, with an added summer influx of 0.3 million people (LEBBE et al., 2008). The Belgian part of the North Sea lies in the centre of some of the heaviest used marine spaces in the world (LE ROY et al., 2006; DOUVERE et al., 2007). Amongst the intense range of activities are merchant shipping, marine aggregates extraction, energy production, military, fishing, aquaculture and tourism (KELLENS et al., 2011; BELPAEME et al., 2011; BOGAERT et al., 2009). Belgium, despite its short coastline, has six Natura 2000 sites located in coastal areas, one of those being at sea (HERRIER et al., 2005), all of those sites provide important breeding grounds for many seabird and cetacean species (LE ROY et al., 2006). The intensive use of the coast and offshore environments has led to increased competition and

problems in relation to ecosystem health. Tourism and urban development of the coast has caused a significant decline in biodiversity (DEVOS, 2008) and hazardous substances, eutrophication and the impacts of fisheries have resulted in significant ecological degradation, particularly in sand dune and salt marsh habitats (CARLISLE et al., 2008; DE RUYCK et al., 2001; OSPAR COMMISSION, 2000).

Problems of sea level rise in the North Sea are particularly acute along the Belgian, Dutch and east England coasts (OSPAR COMMISSION, 2000). In Belgium, coastal erosion is pronounced along the east coasts of Knokke-Heist and Zeebrugge (EUROSION, 2004). The mid coast around Oostende is generally stable, while the west coast from De Panne to Middelkerke experiences net aggradation (EUROSION, 2004). Projected sea-level rise along the Belgian coast is expected to be between 40 and 70 cm by 2100 (LEBBE & VAN MEIR, 2000) resulting in potential salt-water intrusion and breaching of protective dykes which could lead to the inundation of heavy populated low-lying polders (LEBBE & VAN MEIR, 2000) and increase flood risk, affecting ecological and socio-economic systems (KELLENS et al., 2011; INGLE & DE SUTTER, 2009). Human factors such as tourism and harbour development have led to significant pressure on the coastal zone, for example the degradation of natural dune vegetation, which is an important protective barrier against sea level rise. The Flemish government does not have a climate adaptation strategy, but there are a number of bottom-up initiatives, including a federal inter-departmental climate change working group (INGLE & DE SUTTER, 2009).

Many perceive the lack of integration in coastal management policies between various government levels and municipalities as being the most serious failure in tackling coastal zone issues (DE RUYCK et al., 2001). The governmental institutions responsible for the management of the coastal zone are vertically and horizontally fragmented, and coupled with the regulatory split between land and sea management, obstacles in achieving adequate integrated coastal zone management (ICZM) are created (BOGAERT et al., 2009). However, as an EU Member state, Belgium has agreed to adopt the principles of the 2002 Recommendation on ICZM. In reality, coastal zone management in Belgium has existed since the beginning of the 1990s. The Recommendation has ensured closer consultation and stronger integration of coastal zone management. Furthermore, it has led to closer cooperation inside and between federal, regional (Flemish) and provincial administrations. Significantly, concerning the Belgium ICZM process there has been a number of important steps taken including the establishment of an ICZM 'Coordination Point' and sustainability indicators for the coast (the Coastal Barometer) and, in terms of protecting against the effects of climate change, an Integrated Master Plan for the coastal safety of Flanders.



© Alterra, University of Geneva, GEOSPECS, 2011

Regional level: LAU2 (except Turkey LAU1)
 Source: GEOSPECS, 2011
 © EuroGeographics Association for administrative boundaries
 except Western Balkans and Turkey (national sources)

- Port Towns**
- Population**
- 4500
 - 69064
- Administrative Boundary

Figure 1: Map indicating the extent of the case study area and displaying coastal population centres in close proximity to important ports.

2.1. Economy

Economic vulnerability / Robustness facing globalisation

The Belgian part of the North Sea is a region of intense activity (LE ROY et al., 2006). Relative to its size, the coastal area of Belgium hosts a wide range human and economic activity, most of which are spatially intertwined (BELPAEME et al., 2011). In 2006 Belgian maritime activities directly employed 49,000 people and a further 81,000 indirectly (NELISSEN & NEVALA, 2006). Historically, agriculture and fishing dominated the coastal economy (CARLISLE et al., 2008). The expansion of agriculture resulted in large-scale reclamation of land from the sea, while fishing led to the founding of many coastal communities, the precedents of modern-day seaside resorts (CARLISLE et al., 2008). However, in recent times these sectors have experienced rapid decline, which also reflects the situation nationally. In the coastal zone, employment levels in both agriculture and fisheries are considerably less than in inland areas of Belgium (BELPAEME et al., 2011). In recent years it has been observed that there has been a steady trend towards the dominance of the services sector, and consequently a gradual decline in the traditional economic sectors of fishing and agriculture (BELPAEME et al., 2011).

The continued growth of urban zones and transport infrastructure is increasingly encroaching on agricultural land. Though the Belgian part of the North Sea is an important spawning and nursery ground for several commercial fish species (e.g. sole, plaice, dab, cod and whiting) (LE ROY et al., 2006; DOUVERE, 2005), fishing activity has undergone severe downscaling as a result of stock depletion, overcapacity and poor policy measures (BELPAEME et al., 2011). Belgian fish now accounts for only 1% of the total North Sea catch (CARLISLE et al., 2008), and fishing as a sector contributes only 0.02% to GDP (DOUVERE, 2005). Thus fishing is seen as being of cultural and social importance rather than economical. Most small-scale fishing vessels are family-run businesses, and it is estimated the approximately 1,000 people are employed in the sector (DOUVERE, 2005). However, as many as eight in ten North Sea fish species are under threat from overfishing, pollution and climate change (BELPAEME et al., 2011). As a consequence, aquaculture is growing at a steady rate, in particular the cultivation of mussels.

Marine aggregates also represent a growing element of the Belgian coastal economy (VAN DEN EYNDE & NORRO, 2009; LANCKER et al., 2007). Sand, and to a lesser extent, gravel exploitation in the Belgian Continental Shelf began in 1976. Since then exploitation has quadrupled to approximately 1.9 million m³ per year (VAN DEN EYNDE & NORRO, 2009). Because of the depletion of existing terrestrial sand quarries, levels of aggregates exploitation at sea have been increasing. Aggregates are a valuable resource for the construction industry, and as materials for land reclamation and the re-nourishment of eroding beaches (VAN LANCKER et al., 2007). Added to the ecological and environmental concerns surrounding aggregates extraction (e.g. damage done to benthic habitats and wave dynamics modification), numerical simulations have shown that sand banks can not adequately recover from volume decline due to sand extraction (VAN DEN EYNDE & NORRO, 2009). As a result, there is a serious question surrounding the sustainability of marine aggregates exploitation. As a related industry, dredging is also on the rise, particularly in land reclamation projects and in the maintenance of busy shipping lanes and seaport channels (DOUVERE, 2005). Employment in the industry has experienced a growth of almost 10% between 2000 and 2004 (NELISSEN & NEVALA, 2006), and in 2004 employed approximately 3,500 people.

Two industries, however, dominate the economic landscape of the Belgian coast: tourism, and to a lesser extent, shipping. Both are discussed in detail in the following sections.

Tourism

Though it has experienced recent decline, tourism remains the largest economic sector on the Belgian coast (BELPAEME et al., 2011; FLEMISH GOVERNMENT, 2010; CARLISLE et al., 2008). On average, it is estimated that tourism generates approximately 28.3 million bed nights each year, and about 5% of the employment for the province of Flanders (FLEMISH GOVERNMENT, 2010). In 2006 an estimated 9000 people were directly employed by tourism (NELISSEN & NEVALA, 2006), indirectly a further 10,000 people (BELPAEME et al., 2011). This amounts to approximately 24% of the coastal region's employment (BELPAEME et al., 2011). In terms of the domestic market, the coast is the most popular tourism destination in Belgium by a considerable margin, with almost four out of five bed nights spent there in 2006 (FLEMISH GOVERNMENT, 2010). The neighbouring countries of France and The Netherlands are the primary markets for tourism on the coast of Belgium. The large influx generated by these cross-border tourists have led the Flemish authorities to focus sharply on promoting products such as cycling, camping, gastronomy and rural vacations (FLEMISH GOVERNMENT, 2010).

Much of the tourism activity of the coast is centred around soft recreation, i.e. cycling, walking, horse riding and pleasure cruising (BELPAEME et al., 2011). The Flemish beaches are the largest attraction along the coast (LEBBE et al., 2010). The large tract of coastline that comprises hard structure has lent itself well to the development of promenades for walkers, cyclists, skaters and catering enterprises (KELLENS et al., 2011). With increasing affluence in Belgian society, water recreation is a growing sector in the tourism sector (NELISSEN & NEVALA, 2006). Nonetheless, boat ownership remains low in Belgium compared to many other European countries, with around 1 in 324 people owning a boat. Owing to a shortage of marina capacity on the Belgian coast, many boat-owners keep their boats in neighbouring France and The Netherlands. The proximity of the French and Dutch border has, however, also worked in favour of the Belgian leisure sector. The inland waterways have experienced a rapid growth in tourists from these countries mainly because of the abundance and excellent navigability of such waterways. Various cities and tourist attraction are situated on many of these waterways, hence it is an attractive means of viewing the Flemish hinterland (FLEMISH GOVERNMENT, 2010). With an estimated 21,594 people affiliated with sailing, surfing and other water sport associations in Belgium, there is a significant opportunity for expansion in the marine leisure sector, despite the current capacity problems that exist (NELISSEN & NEVALA, 2006).

The maritime heritage of the Belgian coast also serves as a huge draw for many tourists (BELPAEME et al., 2011). The history of Flanders is intertwined with that of the sea, and this is evident in the land reclamations, the abundance of maritime architecture (e.g. lighthouses, fishermen's houses, hotels, museums), the history of maritime trade and long military heritage (BELPAEME et al., 2011). The Belgium coast has been the scene of many military battles throughout history – from the colonial wars of the 18th and 19th centuries to World War II, when the coast formed part of the Atlantic Wall defence line (BELPAEME et al., 2011). For this case study zone, Bruges is the only major city. Its rich cultural history has been maximised for tourism potential and it is listed as one of the Flemish Government's six "Art Cities" (the others being Brussels, Antwerp, Ghent, Malines and Louvain). The rationale behind creating such a multi-city tourist product is to compete with other major, and perhaps more famous, art destinations in Europe (FLEMISH GOVERNMENT, 2010).

In recent years, however, a drop of 15.9% in overnights has been registered for the coastal region of Belgium (FLEMISH GOVERNMENT, 2010). Nights spent by international visitors are a fraction of the domestic market (21.5%). This has been attributed to the Europe-wide economic downturn, an increase in day tourism, and also the considerable rise private second home accommodation, particularly amongst the older and retired population (LAMMENS et al., 2008). In some municipalities, second and holiday homes account for almost 40% of the housing stock (BELPAEME et al., 2011). This is discussed further in the Social section.

The tourism industry has had several far reaching effects on the physical environment of the Belgian coastal zone. The most immediate is the 'urbanising' of the coastal strip. Historically, small settlements dotted the coastline, but gradually these settlements became connected in a somewhat ad-hoc fashion, which lacked any clear, strategic planning. The modern Belgian coastline is essentially a large, linear conurbation (CARLISLE et al., 2008), consisting of a severe alteration of the natural environment and significant ribbon developments of apartments (BELPAEME et al., 2011; DE RUYCK et al., 2001). The vast majority of Belgians believe that the coast is overdeveloped and over commercialised (DE RUYCK et al., 2001). With intense pressure placed on the coast by tourism it is believed that as much as half of the coastal dunes have disappeared (KELLENS et al., 2011). Infrastructure designed for the transport of tourists is responsible for much of the destruction done to sand dunes (DE RUYCK et al., 2001). Such destruction is not just a recent phenomenon but started as early as 1885 with the construction of a coastal tramway through the dune system. This development was followed in 1933 by the Royal Coastal road (N34), which also encouraged the founding of many coastal towns within the dune system, which hitherto were located further back in the polder zones (DE RUYCK et al., 2001). Following the Second World War, the advent of mass tourism resulted in the aforementioned holiday home boom, and also a proliferation in camping grounds, holiday villages and parking areas within the dune fields (BELPAEME et al., 2011; DE RUYCK et al., 2001).

Much of the destruction of the natural coast, and consequentially the decline in the fishing and farming sectors, has been attributed to the development of tourism (CARLISLE et al., 2008). In the early 20th century, many of the affected fishermen and farmers turned to tourism to earn a living (BELPAEME et al., 2010). From the boom of tourism on the Belgian coast after the Second World War, right up to the 1980s, authorities focused on maximising tourist development. Since then there has been a much greater effort in the sustainable development of the tourism sector, with particular emphasis on nature protection (FLEMISH GOVERNMENT, 2010; DE RUYCK et al., 2001). In economic terms there is a trend in recent years towards a more sustainable employment profile for the Belgian coast; hence it does not appear to suffer from the problem of seasonality as experienced by many other coastal regions (NELISSEN & NEVALA, 2006). Problems in coastal policy implementation is as it is in many other European countries, i.e. not properly enforced and split across many departments and government levels (DE RUYCK et al., 2001). To date, there is no all-encompassing tourism policy (FLEMISH GOVERNMENT, 2010). Some argue that this is due to the fact that no effort was required in attracting people to the coast as it was essentially the only tourist destination for most Belgians (NELISSEN & NEVALA, 2006). Much of the legislation arising from the problems associated with tourism has been in relation to environmental and ecological protection, most noticeably the Dune Decree of 1995, designed to protect sand dunes. This is discussed further in the Environmental section. The Coordination Centre for Integrated Coastal Zone Management, which helps to implement European recommendations on integrated coastal zone management, has developed a set of sustainability indicators, known as the "Kustkompas" (the Coastal Barometer), aimed at charting observable trends and also informing coastal policy (BELPAEME et al., 2010; CARLISLE et al., 2008). Regarding the tourism sector, in 2002, a Strategic Policy Plan for tourism and recreation at the coast was drafted (TOURISM

FLANDERS, 2002). This represented the first long-term plan specifically regarding coastal tourism. The plan sets out a regional vision on tourism, but links are also made to other sectors.

Despite the fact that tourism continues to be the dominant sector in the Belgian coastal economy, it has seen a decline in recent times. There is evidence to suggest that this is due to the high density of visitors and the rapid expansion of urban development which impinges on the natural environment. In recent times there has been a renewed focus on sustainably-managed tourism, and in particular affording greater protection to areas that are ecologically fragile.

Accessibility and Connectivity

Historically, access to the North Sea trading routes had a significant effect on the economic development of many Flemish cities. The city of Bruges, for example, is connected to the North Sea via the Zwin inlet. Cycles of silting and de-silting can be linked to the city's cycle of prosperity (CHARLIER, 2011; HERRIER & LETEN, 2010). After a period of siltation, a storm re-established access to the sea in the 11th century, and Bruges experienced a rise in trade, industry and manufacturing (CHARLIER, 2011). In the 17th century another period of siltation threw the city into economic decline once more. Today siltation of the Zwin tidal inlet has effectively blocked its link with the sea once again. However, its potential as a tourism destination has offset much of the detrimental economic effects that this would have posed at one time in history (CHARLIER, 2011; HERRIER & LETEN, 2010). Due to its centrality and function as a 'crossroads' for the European core economic area, the Belgian coast derives much of its Gross National Product (GNP) as a distribution and logistics focal point (BELPAEME et al., 2010; CARLISLE et al., 2008). Extensive road, rail and canal networks provide a crucially important transport web for industry and small and medium enterprises, and together with the two ports of Zeebrugge and Ostend, are considered the backbone of Belgian secondary economic activity (CARLISLE et al., 2008). Ports play a large role in the economy of the country as a whole (LAGNEAUX, 2005). Foreign trade accounts for over two thirds of Belgium's GNP (LAGNEAUX, 2005). Ports are important for international trade, in particular for shipment across the borders of neighbouring economies (i.e. France and The Netherlands). With many of the major roads becoming heavily congested, it is widely considered that ports and river transport offer a valuable alternative for the transport of goods both internally and internationally (LAGNEAUX, 2005). In 2003 direct value-added (VA) of Belgium's maritime ports amounted to almost €11.5 billion, while total employment was approximately 239,000 full-time equivalents (LAGNEAUX, 2005). The roll-on roll-off (ro-ro) port of Zeebrugge is particularly important as a centre for European distribution. The port is the European leader in the rapid transshipment of cars. In 2008 VA was estimated to be €960 million, whilst directly employing over 11,000 people. In 2010 the total goods traffic amounted to 49 million tonnes (BELPAEME et al., 2011). The port of Ostend is a short-sea shipping port. Great Britain is its largest market for the transportation of cargo. The port provides direct employment to 5,000 people, the largest increase of all Belgian ports in recent years (NELISSEN & NEVALA, 2006). In 2008 VA amounted to approximately €478 million (BELPAEME et al., 2011). Important industry has also developed around the Belgian maritime ports. The metal-working industry, with a VA of €108.6 million, is the most significant industry in the port of Ostend. In Zeebrugge, naval activities and electronics manufacturing are the largest VA contributors (€66 million and €58 million respectively) (LAGNEAUX, 2005). However, the shipbuilding industry is one that has experienced the most dramatic decline in the last few decades, falling from over 10,000 employees in 1975 to around 900 in 2003 (NELISSEN & NEVALA, 2006).

The Belgian ports are facing challenges in terms of world trade volume. Asia is quickly becoming the market leader in cargo handling (LAGNEAUX, 2005). This has been evident in the falling numbers of direct employment and industrial activity in the ports sector in recent years. In fact, ports are the only sector of the Belgian economy that has experienced a decline in direct employment (NELISSEN & NEVALA, 2006). Belgian ports are becoming increasingly reliant on internal trading, within Belgium and the EU. Short sea shipping, which accounts for half of Belgian maritime traffic, is expanding. (LAGNEAUX, 2005). Nevertheless ports remain crucially important for the economic health of Belgium, and in particular its coastal zone.

The dense road infrastructure is an integral part of the success of Belgian ports (LAGNEAUX, 2005). A high capacity road network transports goods efficiently and quickly from the coast to the hinterland of Belgium, where the main population centres such as Brussels and Ghent are located. The port of Zeebrugge, for example, is situated close to two major motorways: the E-17, which extends from Stockholm to Lisbon, and the London to Istanbul E-40. These networks provide a comprehensive pan-European market for the distribution of Belgian exports. Ostend is connected to the European road network via the E-40.

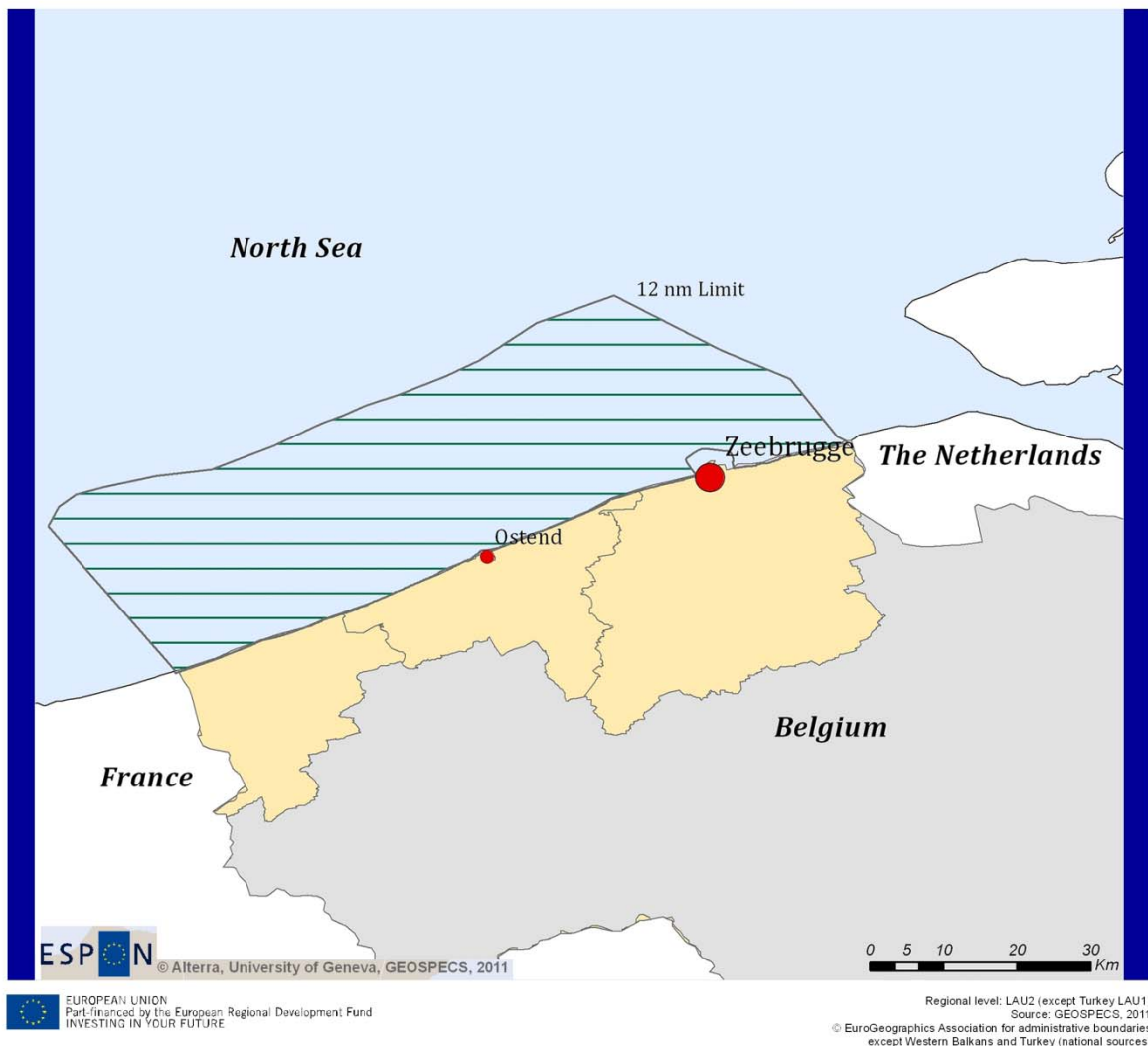
Multi-modal transport (i.e. sea, air, road and rail) of goods improves links to target inland businesses, particularly small and medium enterprises, thus increasing economic output (BELPAEME et al., 2011; LAGNEAUX, 2005). At Zeebrugge, rail transport is vital for the transportation of maritime cargo, particularly to major inland terminals such as Antwerp, Ath, Duisburg, Muizen, Bressoux, Mouscron and Genk. The port of Ostend is also connected by numerous rail links. Ostend also has the advantage of a regional airport, Ostend-Bruges, which serves almost exclusively as a freight transportation specialist. In 2007 it is estimated that 109,000 tonnes of freight passed through the airport (BELPAEME et al., 2011).

Given the importance of the ports to the overall economy of Belgium, it is crucial that they remain competitive in this time of increased global competition. The key feature of the success of Belgian ports has been their centrality in relation to wider European markets. The fringe industries in port areas also provide a significant percentage of regional employment in areas such as manufacturing, ship-building and dredging.

ICT and Services of General Interest

As a result of increasing coastal tourism activity in Belgium, rural small settlements connected to larger more urban communities. These developments further invited more permanent residents and increased urbanisation of the Belgium coast. To cater for the needs of both the seasonal influx of visitors and the permanent residents, coastal areas in Belgium contain very good facilities with regards to ICT and Services of General Interest (BELPAEME et al., 2011).

Several hospitals serve the coastal regions of Belgium e.g. Bruges, Ostend, Blankenberge, Knokke-Heist and Veurne. The hospital in Bruges also has a helicopter for medical emergencies on the coast. Certain other services are adapted to additional seasonal and demographic demands e.g. special needs facilities are increased during the summer month to provide for tourists. Private and government projects established neighbourhood committees that organise activities for senior citizens to provide for the ageing population in coastal regions and counteract social isolation. Social isolation was connected to empty homes in certain neighbourhoods outside the tourist season. Furthermore, the increasing demand for senior citizens centres and nursing homes has been met in response to changing demographics on the Belgium coast (BELPAEME et al., 2011).



Port Passengers (thousands)

2009

● 177

● 558

■ Administrative Boundary

Figure 2: Passenger numbers by port

2.2. Social

Demographic structures and trends

The coastal zone of Belgium is a very densely populated region (BELPAEME et al., 2011; KELLENS et al., 2011; CARLISLE et al., 2008). Approximately 400,000 people permanently reside along the coast and its direct hinterland (LEBBE et al., 2008). Furthermore, only 67 km of coastline is available for Belgium's 10 million population and the many Dutch, French and German tourists that come each year. Population densities on the coast vary from between 350 inhabitants per km² to over 2000 per km² (BELPAEME et al., 2011; KELLENS et al., 2011). The major population centres are the towns of Bruges, Oostende, Blankenberge, Veurne, Nieuwpoort and Knokke. Prior to the substantial rise of tourism around the mid-20th century, the coastal margin was relatively sparsely populated, the main urban areas being original fishing settlements (BELPAEME et al., 2011). Since then the coastline has transformed into an almost unbroken conurbation (CARLISLE et al., 2008). Holiday and second home accommodation account for a large proportion of visitors to the Belgian coast (FLEMISH GOVERNMENT, 2010; LAMMENS et al., 2008), and this relationship is proportional increasing recently. An increase of 16% was recorded between 1997 and 2007 (KELLENS et al., 2011). In some resorts the proportion of second residences is as much as 80% of the housing stock, but on average it is around 40% (BELPAEME et al., 2011). In 2007 the number of second residences registered on the Belgian coast was 82,700 (KELLENS et al., 2011). Tourism has resulted in a high standard of facilities and services in the coastal zone, which explains in part the attractiveness of living on the coast (BELPAEME et al., 2011). In recent times the population structure has been ageing. The fastest rate of ageing has been recorded in the municipalities on the immediate coast (i.e. Koksijde, Nieuwpoort, Middelkerke, Blankenberge and Knokke-Heist) (BELPAEME et al., 2011). In reality this trend has been found to be as a consequence of two factors: the influx of retirees and a dejuvenation process (i.e. the outflow of younger people. As a result there has been an increase in property prices. Recent government policy has attempted to realign the demographic structure with the provision of affordable housing. This has been conducted through the use of tax incentives and housing allocation rules to help retain younger people in the coastal region (BELPAEME et al., 2011). Policies such as the Land and Building Policy Decree sets aside land for the building of more modest residences such as social houses. To date, plans to make housing more affordable have been modest in their success. In Flanders, the social rented housing sector, for example, represents only 6% of the total housing stock (WINTERS & HEYLEN, 2011), which, relative to the rest of Europe, is limited (WINTERS & ELSINGA, 2008). In the Netherlands, for example the proportion is between 10% and 15% (WINTERS & HEYLEN, 2011). Though not coast-specific, the same report comments that, "although housing in Flanders is generally good, for a significant proportion of the population the right to decent and affordable housing has not been realised" (WINTERS & HEYLEN, 2011). This, in part, can be explained by the fact that social renting in Belgium has always been counter-traditional in a country that has historically encouraged private home ownership (DE DECKER, 2011).

Owing to the low-lying nature of the polders of the coastal hinterland, both the permanent and transient populations on the Belgian coast are constantly at risk of flooding and storm surges (KELLENS et al., 2011; MERTENS et al., 2010; MERTENS et al., 2008a; LEBBE et al., 2008; VERWAEST et al., 2008). Human habitation along the coast has led to radical structural changes to the natural coastline in the form of hard coastal protection, which accounts for two thirds of the coastline (VERWAEST et al., 2008). Coastal defences are discussed in more detail in the Environment section. The anthropogenic pressures, mostly from tourism and recreation, have been immense (MERTENS et al., 2008a; LEBBE & VAN MEIR, 2000). The most conspicuous negative effects on the coast have been the ecological

changes, in particular to the sand dune and salt marsh systems. The earliest major impacts on the coastal environment were recorded in the late 19th century with the construction of a coastal tramway through the dune system. Since then it is estimated that around half of the dune system along the coast have been destroyed due to the construction of roads, apartments and camping grounds (KELLENS et al., 2011).

The concentrated commerce, infrastructure and leisure facilities that make up the Belgian coastline mean that, for many, the coast is a very attractive place to live. However, there are also concerns that over-population and the consistent encroachment into the natural environment is steadily degrading the quality of life on offer at the coast. Furthermore, the dramatic ageing demographic is forcing many younger people to migrate away from the area. The Flemish authorities are now adopting a more proactive stance both in retaining young population and halting the degradation of the environment.

2.3. Environment

Protected areas and biodiversity as factors of development

The Belgian coast, though very small, comprises a diverse range of geological features that form important habitats (BOGAERT et al., 2009). The offshore environment contains a sequence of sandbanks in the shallow sea, while onshore the coast is mainly made up of sandy beaches, mudflats, salt marshes, sand dunes, fossil sand dunes and polders, many of which are Natura 2000 designated sites according to the EU Birds and Habitats Directives (HERRIER et al., 2005) (see Figure 3). However, much of these features are interrupted by artificial coastal protective structures such as dikes and seawalls, and other hard structures such as buildings and roads (HERRIER et al., 2005). 35 km of the 67 km coastline is protected by dikes (DE RUYCK, 2001).

Many human activities have had impacts on the natural environment of the Greater North Sea coasts. Most notable are the effects of fisheries and eutrophication, but changes in the environment caused by exploitation of mineral resources, shipping, chemical contamination, construction, tourism and dredging are also important (OSPAR COMMISSION, 2000). Of the terrestrial systems, salt marshes and sand dunes are most vulnerable. Only two salt marsh regions remain on the coast: the marshes of the IJzer estuary at Nieuwpoort and the Zwin tidal inlet, which is privately owned (DE RUYCK, 2001). Zwin is a Ramsar site on the Belgian/Netherlands border comprising tidal creeks, salt marshes, mud flats, dunes and coastal forest. It is currently in danger of silting up because of a number of re-nourishment projects on the beaches of Knokke-Heist (DE RUYCK, 2001). Sand dunes are also under immense pressure from human influences, particularly tourism, dune water extraction and the expansion of the Zeebrugge and Ostend ports (BOGAERT et al., 2009; DE RUYCK, 2001). As of 2001, only 3500 ha of the 6000 ha of dune fields remain undeveloped (DE RUYCK, 2001). Of the remaining unaffected dunes, 50% are privately owned. The Zwin tidal inlet is an example of an ecologically important area that is at the same time of immense economic importance. The Zwin is one of the most visited tourist attractions along the Flemish coast. It is one of the most popular birdwatching areas in Belgium, and one of only two intertidal saltmarshes in the coastal zone – the other being the eastern bank of the Yzer Estuary at Nieuwpoort. The Zwin inlet straddles two countries – Belgium and The Netherlands. Its Belgian area is approximately 125 ha (25 ha in The Netherlands) (DEVOS, 2008).

The Zwin was an important resource in the economic history of coastal settlements in both Belgium and The Netherlands. The city of Bruges owes its historical wealth to the Zwin inlet, which connected the city to the North Sea, and hence international trade (CHARLIER, 2011; HERRIER & LETEN, 2010). The reserve is home to important bird and plant species, many of which are endangered, and is listed as a Special Protected Area (SPA) and a Ramsar site of global importance with a priority international protection status (DE RUYCK, 2001). Bird species that have been protected or re-introduced are the Cindereed goose (*Anser anser*), Crested lapwing (*Vanellus vanellus*), White stork (*Ciconia ciconia*), which disappeared from Belgium by the end of the 19th century, and the Crested falcon (*Falco tinnunculus*). However, in recent years there has been a dramatic loss of biodiversity (HERRIER & LETEN, 2010). Suitable feeding areas for wading birds have been severely diminished (DEVOS, 2008). Today the Zwin is mostly silted, as sedimentation made it too shallow for navigation (CHARLIER, 2011). It is in danger of complete siltation due to past beach replenishments at Knokke-Heist in 1977 and 1986, and the construction of new container terminals in the adjacent harbour of Zeebrugge (DEVOS, 2008). The Zwin acts as a natural sediment trap (CHARLIER, 2011), and through natural coastal processes, activities adjacent areas affect the currents thus having a profound effect on the inlet. The numbers of four species have declined since the 1970s: the Common Ringed Plover, the Sanderling, the Purple Sandpiper and Eurasian Curlew (DEVOS, 2008).

The Zwin demonstrates successful cross-border management of a natural resource. The Zwin represents an important tourism amenity for both Belgian and Dutch people. Since the 1980s the International Zwin Commission has conducted scientific studies into the biodiversity of the Zwin area. The Commission is composed of representatives of all concerned Flemish and Dutch public authorities (HERRIER & LETEN, 2010). The ZTAR (Zwin Tidal Restoration Area) project³⁹⁵ is a collaboration between the Agency for Nature and Forest in Flanders and the Province of Zeeland in The Netherlands. ZTAR aims to rejuvenate the salt marshes of the Zwin tidal inlet by as well as the restoration of a tidal lagoon and expansion of the main sea-inlet. One of the main objectives is recovering the biodiversity of the area, including the restoration of opportunities for nesting and foraging coastal bird species (HERRIER & LETEN, 2010). The project, part-funded by the EU LIFE+ programme, began in 2009 and runs until 2015. Other examples of cross-border cooperation has been the REECZ (Recreation and Ecotourism in the Zwin region) project³⁹⁶, which is a partnership between a multitude of Belgian and Dutch bodies. REECZ focuses on nature and heritage tourism in the Zwin area. REECZ is funded through the EU Interreg IV program for the border region Flanders-Netherlands.

The extremely dense usage of the Belgian coast has resulted in a concerted nature conservation effort in recent times as the value of ecosystems and ecosystem services are realised (GROGNA et al., 2009; HERRIER et al., 2005). For example, one LIFE nature project, 'Salt meadows at the Flemish coast' involved the purchase of 60 ha of degraded grassland for the purpose of restoration of its original micro-topography. Central to the project was securing social and economic support for the conservation of the polder saline meadows. A major outcome of the project was the development of soft tourism products, for example walking paths and bird observation huts (HERRIER et al., 2005). Another project, ICCI (Integrated Coastal Conservation Initiative), involved the restoration of natural transitions between sea and land (i.e. beaches, salt marshes and dunes, dunes and polders). For example, in the Flemish Regional Nature Reserves of De Westhoek, De

³⁹⁵ <http://www.natuurenbos.be/nl-BE/Over-ons/Projecten/Ztar.aspx>

³⁹⁶ <http://www.west-vlaanderen.be/kwaliteit/Leefomgeving/zwin/projecten/Pages/default.aspx>

Houtsaegerduinen and Ter Yde dune slacks and grey dunes were restored by removing 30 ha of scrub and exotic tree-plantations, and by introducing grazing herbivores. Furthermore, many of the ponds were excavated to increase their suitability as reproduction habitats for amphibians such as the Crested Newt (*Triturus cristatus*) and the Natterjack toad (*Bufo calamita*) (HERRIER et al., 2005).

LIFE-funded projects have had major successes in halting the loss of coastal habitats in Belgium. Between 1996 and 2004 the number of regional Nature Reserves rose from three to twelve, while the number of private Nature Reserves rose from two to four. The projects also provided an impetus for the active management of coastal dunes and polders, and also led to further marine conservation policy on the part of the Belgian federal government (HERRIER et al., 2005). Recent governments have had much greater focus on nature protection and restoration (BELPAEME et al., 2011; DE RUYCK, 2001). Major examples of this has been the declaration of part of the Flemish offshore sandbanks as a marine reserve; the Dune Decree, ratified in 1995, which prohibits any further fragmentation of and construction in coastal sand dunes; a steering committee on integrated coastal zone management established for the protection and management of two coastal reserves, the Westhoek dune reserve at De Panne on the French border and the Zwin tidal inlet on the Dutch border.

There is no comprehensive legal framework specific to the Belgian coastal zone, yet a number of steps have been taken by the Belgian government to implement the principles of the EU's Recommendation of 2002 on Integrated Coastal Zone Management (ICZM) (CLIQUET et al., 2010). In 2003 the government appointed a federal Minister for the North Sea. The ministerial remit covered offshore wind farm development, marine protected areas delimitation, sustainable sand and gravel extraction, oil pollution management, the mapping of marine habitats, and the management of land-based activities that impact on the marine environment (DOUVERE et al., 2007). In 1994 the concept of 'integral coastal reserves' were developed as part of an overall strategy of coastal management. These reserves were designed to protect marine and coastal ecosystems, yet allowing economic activities in an ecologically-controlled fashion. (BOGAERT et al., 2009). The EU recommendations on ICZM identified Maritime Spatial Planning (MSP) as integral in achieving integrated management of the coastal area and its resources (DOUVERE et al., 2007). Increasing demand for ocean resources worldwide has led to the development of MSP as a process to help avoid user conflicts, improve the management of marine spaces by adopting an ecosystem-based management approach (MAES, 2008). Belgium was amongst the first countries in Europe to begin the process of implementing a multiple-use planning system for its territorial sea and exclusive economic zone (DOUVERE, 2008). The strategy was formulated in a "Master Plan" that has been implemented incrementally since 2003. The Master Plan aimed to reconcile all marine economic activities while at the same time protecting the ecology of the marine environment (BELPAEME et al., 2011). The first two phases of the Master Plan focus on offshore wind energy development and spatial delimitations for sand and gravel extraction. Phase two is the delimitation of marine protected areas as part of the Natura 2000 network. These phases are now operational (DOUVERE, 2008).

The Marine Environment Act of 1999 provided the legal basis for designating and managing Marine Protected Areas (MPAs). The appointment of a North Sea Minister in 2003, however, gave the impetus in achieving actual MPA designation (BOGAERT et al., 2009). Prior to this, attempts at designation were ad-hoc, top-down approaches, relying almost exclusively on expert knowledge, scientific information and strict enforcement (CLIQUET et al., 2010; DOUVERE et al., 2007). These attempts failed and no MPAs were designated. In 2003 another attempt at MPA designation involved a governance approach utilising both scientific and layman's knowledge, consultation and cooperation in the form of voluntary user agreements. As a result six MPAs were designated in the Belgian part of the North Sea - five

MPAs in 2005 and one in 2006 (CLIQUET et al., 2010). MPAs represent an important step in applying the principles of ecosystem-based management in an attempt to sustainably manage Belgium's already declining natural environment.

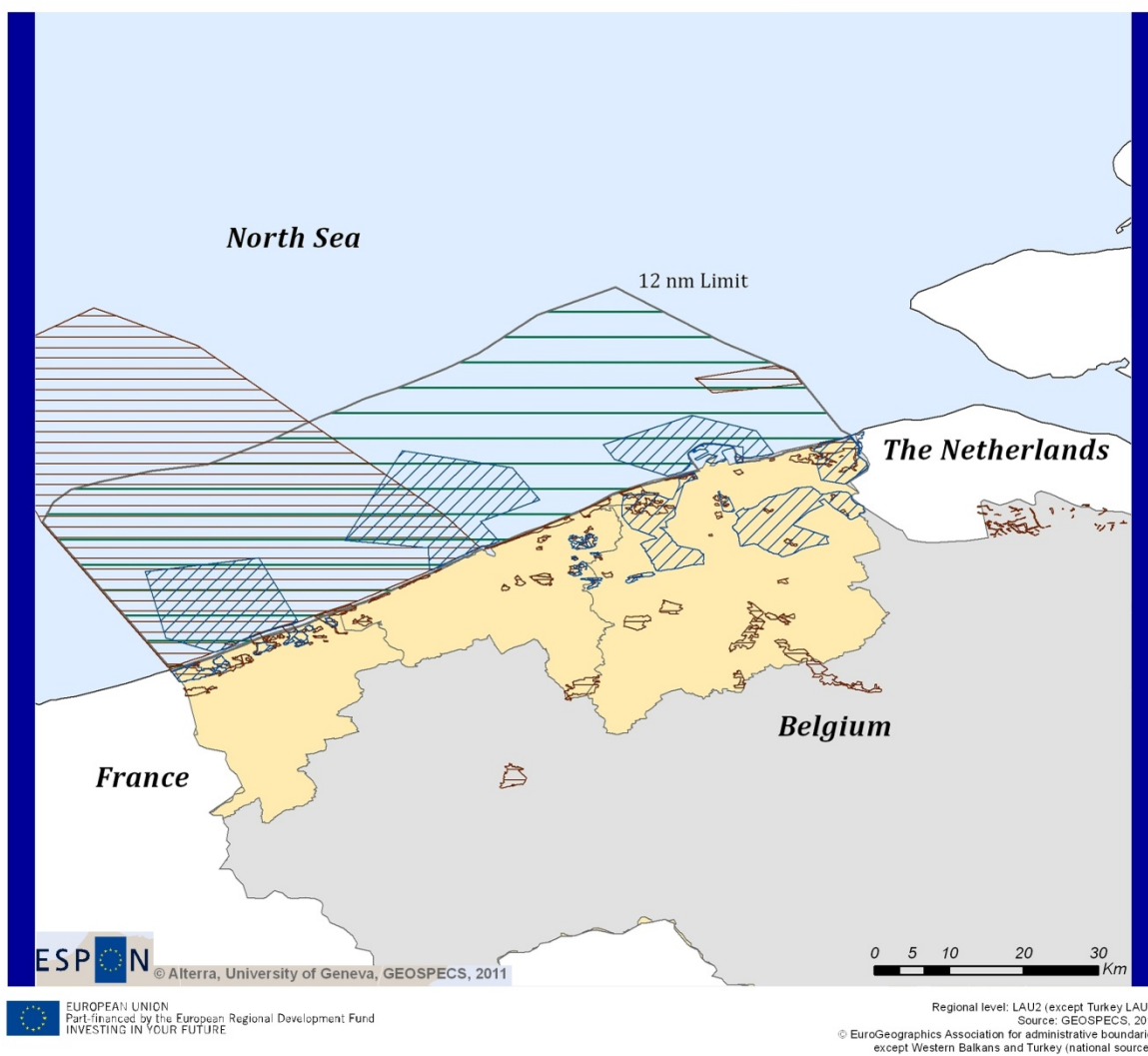


Figure 3: Map showing Natura 2000 sites

Natural resource exploitation

In the Belgian marine environment, wind energy is one of the most important economic sectors (LE ROY et al., 2006). The number of wind turbines installed in the Flanders has increased approximately five fold between 1997 and 2007 (TOLON-BECERRA et al., 2011). Belgium currently has the fourth highest installed offshore wind capacity in Europe, with a total capacity of 188 MW (LEUNG & YANG, 2012). Though the high wind speeds in the

Belgium offshore zone are conducive to electricity production, the sector is still to be fully developed (ODE VLAANDEREN, 2008). As a result of a Royal Decree in 2004 a zone measuring 263.7 km² in area was reserved for the generation of electricity in the Belgian part of the North Sea (BRABANT et al., 2011) (see Figure 4). At the end of 2008 construction began on the first offshore wind turbines in Belgium. Currently three companies have been granted a domain concession and an environmental permit to develop offshore wind farms: C-Power on the Thorntonbank (currently 30 MW with a capacity of 300 MW, located 27 kms offshore); Belwind on the Bligh Bank (currently 165 MW with a capacity of 330 MW, located 42 kms offshore); and Northwind (formerly Eldepasco) on the Bank zonder Naam (expected capacity of 216 MW, located 38 kms offshore) (BRABANT et al., 2011). Three other projects, Norther, Rentel and Seastar, have thus far been granted only a domain concession. It is expected that the number of wind turbines will continue to increase in the coming decade (VAN ROMPAEY et al., 2011). To fulfill Belgium's target as outlined by the European Commission's Climate Plan of 2008 (13% renewable energy by 2020), the Flemish government has set out the following objectives by 2020: 1500 MW in Flanders and 2800 MW in the North Sea. The development of offshore wind farms are expected to make an important contribution to achieve that goal (TOLON-BECERRA et al., 2011).

To assist in the planning and decision-making process for wind farm development, wind maps have been developed for some regions of Belgium (ODE VLAANDEREN, 2008). The first such map was developed in 2000 by the Vrije Universiteit Brussel and the Organisatie voor Duurzame Energie Vlaanderen (ODE). At a federal level the government is considered to be implementing European policy rules regarding wind energy development. In the Flemish region, the development of such large-scale energy facilities is mainly limited by the urban landscape, dense infrastructure network and high-density population (VAN ROMPAEY et al., 2011). Studies have demonstrated that the most significant obstacles relating to the installation of new wind turbines are issues of social acceptance at a local level (VAN ROMPAEY et al., 2011; TOLON-BECERRA et al., 2011). Concerns include aesthetic impact, bird mortality, noise and flicker. Such challenges provide ample opportunity for the further growth in the offshore wind farm development and to meet renewable energy targets. In order to achieve the targets set out by European and federal authorities, a number of issues have been highlighted:

- There needs to be an upgrade of the electrical distribution grid so that local and offshore wind farms can connect to the electricity network.
- The permit process for wind turbines in agricultural zones needs to be simplified.
- The green certificate system, which sets targets up to 2010, needs to be extended.
- Better communication is needed in order to break down cultural barriers and misinformation
- Greater public participation in wind energy projects.
- Binding wind energy targets should be set up to 2020.
- A framework for small and medium sized projects (from 50 kW to 3 MW) needs to be set (ODE VLAANDEREN, 2008).

Though there is considerable potential for further development in wind energy production, the Flemish authorities are careful in ensuring that development is carried out in a sustainable and ecologically non-intrusive manner. This is done through Environmental Impact Assessments. It must also be realised that increasing offshore wind turbine numbers further adds to the complexities of marine spatial planning in an area that is one of the heaviest used in the world.

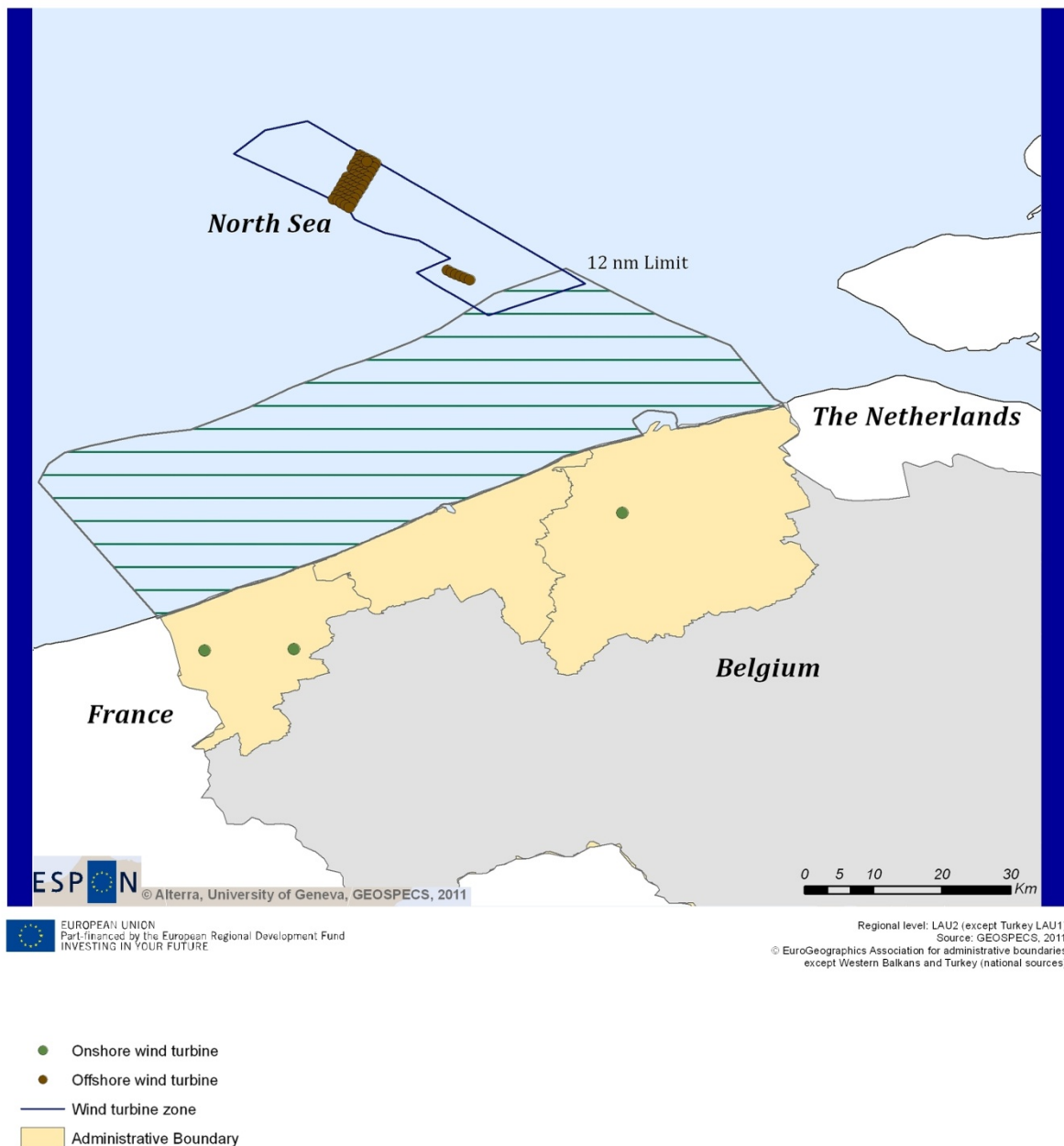


Figure 4: Map of wind energy projects in the Belgian coastal zone

Vulnerability of human-environment systems to climate change

Over 85% of Belgium's coastal zone is below 5m in elevation (VAN DER BIEST et al., 2008). Mean sea levels have been rising at an average of 15 mm per decade over the last century (LEBBE et al., 2008). Projected regional sea-level rise is thought to be of the order of 40 to 70 cm by 2100. Studies have also estimated that storm frequency could increase by about 30% and winter rainfall is expected to increase by 10% (LEBBE & VAN MEIR, 2000). Hence Belgium is considered to be one of the most vulnerable countries in Europe in terms of the potential impacts of climate change (EEA, 2006b).

Climate change is expected to increase flood risk, storminess and beach erosion along the Belgian coast (INGLE & DE SUTTER, 2009; MERTENS et al., 2008a; VAN DER BIEST et

al., 2008). Despite the natural and artificial defence structures, the polder hinterland is highly vulnerable to changes in sea level and inundation due to storms. Rising sea levels may result in salinisation of groundwater resources, and in the Belgian coastal plains this is considered a major risk (LEBBE et al., 2008). Beaches and dunes comprise much of the Belgian. These are often natural biotopes for coastal ecosystems and species (EUROPEAN COMMISSION, 2009d). Ecological effects of increased flooding risks are the loss of beach and sand dune area, as well as wetland habitats such as tidal estuaries and saltmarshes, leading to an overall loss of biodiversity (VAN DER BIEST et al., 2008). The destruction of habitats is exacerbated with the construction of hard defence structures. Natural geomorphologic processes are interrupted, which in some areas can result in 'coastal squeeze', thus preventing the landward migration of affected species. In ports the presence of hard defence structures can also cause siltation in important estuarine habitats (e.g. the siltation of the Zwin tidal inlet as a result of adjacent beach replenishment and construction at Zeebrugge port). The navigation of ships could also be affected with increased deposition in shipping channels (VAN DER BIEST et al., 2008).

The potential socio-economic effects of climate change are wide ranging. Beach erosion has been a constant threat and its impact on the general economy of Belgium has been significant. Around 25% of the Belgian coastline is estimated to be susceptible to erosion (EUROPEAN COMMISSION, 2009d). Increased coastal erosion removes beach area and thus space for leisure activities, which is crucial for the tourism industry (VAN DER BIEST et al., 2008). It is estimated that at present around 40% of the Belgian coastline is protected with hard structures such as concrete dikes (LEBBE et al., 2008) and many tourists and residents are increasingly finding the Belgian coastline less attractive (DE RUYCK et al., 2001). Climate change will also impact on industry as the demands for water and energy is expected to greatly increase as a result of more intense heat waves. Water consumption in Flanders is already very high, amounting to 745 million m³ per year (EUROPEAN COMMISSION, 2009d).

The economic costs of the effects of sea level rise are considerable. About €25 million is spent each year on maintenance of, and investment in, coastal defences along the Belgian coast (LEBBE et al., 2008). For example, between 2004 and 2007, the Belgian coast was replenished with 2.7 million m³ of sand (EUROPEAN COMMISSION, 2009d). A number of expensive projects are currently being conducted, amongst them, the improvement of the coastal protection at Ostend at a total cost of €55 million (EUROPEAN COMMISSION, 2006). In Ostend the beach is currently protected by a dike constructed to withstand a 1 in 250-year storm event. At present the dike is being upgraded to withstand a storm frequency of 4000 years, which requires substantial capital investment (LEBBE et al., 2008). Coastal protection measures such as these are carried out on an annual basis. Furthermore, with greater frequency of flood events, there may be significant damage to business properties leading to a permanent or temporary loss of jobs in the affected areas (VAN DER BIEST et al., 2008). Experts realise that to counter future impacts of climate change good spatial planning, cooperation between different governmental organisations and collaboration with neighbouring countries is required (MERTENS et al., 2008a). A number of examples already exist to demonstrate such cross-border cooperation. As part of the Integrated Master Plan for Flanders relevant information from existing coastal zone master plans in neighbouring countries was used, in particular that of the Netherlands (MERTENS et al., 2008b). The management of the Schelde estuary on the Dutch border is another pertinent example. Though the Schelde estuary is mainly situated in The Netherlands, its socio-economic importance for Belgium is crucial (LEBBE et al., 2008). It is important for the flood protection of the cities Antwerp and Ghent (EUROPEAN COMMISSION, 2009d). The estuary acts as a gateway to the city of Antwerp, which is situated in an area of low-lying polders in the upper Schelde estuary. A combination of natural and human actions (e.g. dredging, changes in channel width, and construction of river defences) has changed the morphology of the

estuary which has had repercussions for the economic viability of the area (LEBBE et al., 2008).

Adaptation to sea-level rise is necessary to protect the densely populated coastal area of Belgium (LEBBE et al., 2008). No general adaptation strategy is available for the Flemish region of Belgium, but there are a number of bottom-up approaches by various departments, including projects such as ADAPT, CLIMAR and The Integrated Master Plan for Flanders which investigate the impacts of climate change and adaptation strategies (INGLE & DE SUTTER, 2009). The main research institute currently involved in climate change research is the Management Unit of the North Sea Mathematical Models and the Scheldt estuary (MUMM). Other institutes include the Royal Meteorological Institute in Belgium (KMI) and the Coastal Division of the Agency for Maritime and Coastal Services (IVA-MDK), who operates the Flemish Banks Monitoring Network.

In 2007 the IVA-MDK started up a study to draw up an integrated master plan for the future coastal safety of Flanders in relation to climate change (MERTENS et al., 2008b). The aim of the study is to investigate protection options for the Flemish coast against erosion and flooding on both a short and long term basis. This involves studying various 'soft' coastal protection solutions in order to minimise environmental degradation on adjacent parts of the coast. Based on the principles of ICZM, the study will also investigate the potential ecological effects of different coastal protection and climate adaptation solutions. Furthermore an analysis of the socio-economic implications will be conducted, including a cost-benefit analysis of the primary and secondary effects of flooding (MERTENS et al., 2008b). These projects represent important steps in adapting to the potential effects of climate change. Given the considerable human and physical vulnerability of the Belgian coast it is crucial that, together with the substantial defensive measures already undertaken, a coherent adaptation strategy is put in place as soon as possible.

Generalisation from case study

The case study of the Belgian coastal zone is interesting in that, for a small concentrated area, it demonstrates much of the human, social and environmental pressures experienced by coasts around the world. The most immediate management concerns of the Belgian coast are relating to the competition for space, ecological destruction, pollution and pressures from tourism.

The Belgian coast is perhaps more unique in that the challenges it faces are paramount in terms of both the human dimension and the physical. It is widely believed that anthropogenic pressures, most conspicuously in the form of tourism, are acting as a catalyst for the onset of the other great challenge – that of climate change. Since the proliferation of tourism in the middle of the 20th century there has been wide scale degradation of natural coastal defence mechanisms such as sand dunes. The 'concreting' of the coastline – from residential and infrastructural expansion to protection against the sea has been cited as being of grave concern in relation to sea level rise and increased flooding due to climate change. Much of the population and commercial activities of the region are situated on the immediate coast, hence the socio-economic vulnerability to climate change is substantial. Coastal erosion and sea level rise are also major challenges for the ecology of the coast, especially in saltmarsh and sand dune areas. Tourism has traditionally been the mainstay of the Belgian coastal economy. It has greatly enhanced the prosperity of the region and continues to provide a large proportion of regional employment. However, the rise of the services sector was to the detriment of more traditional sectors such as agriculture and fishing. Fishing continues to decline due to strict European quotas and stock depletion due to overfishing and increased pollution in the North Sea. As an economic activity it is not a main contributor to the Flemish

economy, but it remains an important aspect of community cohesion on the coast. Though fishing will most likely remain suppressed, there is opportunity for the development of an aquaculture industry. There have been some feasibility projects undertaken in the area of mussel cultivation.

Unsustainable and ecologically-destructive practices dominated much of the early years of tourism. Nowadays, however, the Flemish authorities have asserted the focus towards greener tourism, with strict building controls and greater ecological protection. This is manifested in legislation such as the Dune Decree. Given the already significant pressure from tourism, there is no real opportunity to expand the sector on the coast. There is, however, an opportunity to demonstrate the power of environmental restoration through changes in attitudes. Important habitats such as saltmarshes and coastal sand dunes have steadily decline in the last century. In the Zwin tidal inlet, for example, biodiversity has been dramatically reduced. However, the Zwin is also an example of where the principles of integrated coastal zone management have been adopted to great effect. A large-scale cross-border nature restoration project, in partnership with the Dutch authorities, is presently underway. This can provide a template for other such partnerships in shifting the focus to more sustainable, nature-based tourism.

Industrial activity on the Belgian coast and in its offshore waters is one of the most intense in the world. Marine aggregate exploitation, dredging, shipping and wind energy production compete for a relatively small amount of marine space. The shipping industry is of immense importance to the Belgian economy, both in terms of trade and spin-off port activities. Belgium is located centrally to the large European markets; hence Belgian ports are prime gateways for the import and distribution of goods to Europe. Zeebrugge port, for example, is one the busiest ports in the world. In the modern globalised world, challenges exist from other markets, particularly those in Asia. Belgian ports have experienced a decline in recent activity. However, a key component of the success of Belgian ports has been the access to multi-modal transport (i.e. sea, air, road and rail). More recently non-coastal businesses have been targeted using Belgium's inland waterways and rivers to transport internally and to the wider European markets.

Offshore wind development has also surged in recent years. Three major projects are underway in the Belgian part of the North Sea, and these are expected to significantly contribute to achieving Belgium's renewable energy targets as set out by the European Union. There have been considerable challenges with wind turbines relating to spatial planning on terrestrial sites, primarily in agricultural areas. The Belgian government is proactive in optimising energy production from offshore wind sources, which is perceived as being more socially acceptable. Wind speeds in the Belgian offshore zone are highly conducive to energy production. As the industry is relatively new there is potential for expansion in the future given the ambitious renewable energy targets.

Annex 31: Case study Irish sea

Description of the case study area and its geographic specificity

Introduction

The Irish Sea area can be defined through the ICES VIIa area, which is located within the larger Celtic Seas Marine Region (CSMR) also known as Oslo and Paris Commission's (OSPAR) Region III. This partially enclosed shallow sea allows a more definite view of coastal areas as it functions like an inner sea between Ireland, Northern Ireland, Scotland, England and Wales. The shallow sea borders two international jurisdictions: the Republic of Ireland and the UK. For the purpose of this case study we have delineated the study area with the administrative boundaries corresponding to the NUTS 3 region that include the coastal zone framing the Irish Sea. The borders of that coastal zone line up closest to the Irish Sea boundaries to the north and south (see Figure 1) and therefore coincide with Scottish administrative boundaries in the north east, with Northern Irish local administrative boundaries in the north west, in the South West with the local administrative boundaries of the Republic of Ireland and in the South East with local administrative boundaries of Wales.

The Irish Sea covers an area of approximately 58,000 km² and its shallow basin varies in depth from 20 to 100m interrupted by a deeper channel in north-south direction (DCENR, 2011ab). The coast along the Irish Sea is diverse and includes for example muddy coasts, sandy and gravelly beaches as well as soft and hard rocky shores (EUROSION, 2004). Considerable stretches of the Irish Sea coasts are subject to erosion such as the mainly soft glacial coastal sediments of the Irish east coasts (DCENR, 2011ab) or the soft rocky shores of the west UK coast. Some of the hard rocky Welch coasts are considered stable while other somewhat smaller areas on the west UK coasts aggregate deposits (EUROSION, 2004). On a European scale the coast framing the Irish Sea is considered moderately exposed to coastal erosion, while a small stretch of the Scottish coast is deemed to have a lower exposure to erosion (EUROSION, 2004).

Ireland and the UK may not possess as high terrestrial biodiversity as some of its European counterparts with similar biogeography due to isolation of the islands (PENCK et al., 2009) but sitting on the edge of the European continental shelf the marine environment provides habitats for many fish, seabirds and marine mammals (FISHERIES SCIENCE SERVICE, 2005; DCENR, 2011a). The coastal areas contain a diversity of habitats such as dunes, machair, salt marches, lagoons, mudflats to tidal and sub-tidal areas that support unique plant and animal communities (HERITAGE COUNCIL, 2006).

The Irish Sea and its coastal zones are a resource which is utilised by numerous users and characterised by a variety of activities for example commercial fishing, shipping and other port related developments, offshore oil and gas exploration and exploitation, conservation of natural and heritage areas, energy generation via wind farms and recreational activities (SUTTON et al., 2008). Such a diversity of activities and users requires sound management and policy support in order to utilise this resource in a sustainable manner. However, jurisdictions and administrations in the Republic of Ireland's are strongly divided by land and sea; furthermore the management in this area is largely sectoral without any framework or policy support that could facilitate a cross-sectional integrated approach. The UK has different policy interpretations according to the various states, namely England, Wales, Scotland and Northern Ireland, which used to complicate the management of the coast, as dedicated policy support was lacking (COREPOINT, 2007). Recent progress has laid a policy foundation that supports Integrated Coastal Zone Management (ICZM) such as the

Marine and Coastal Access 2009, the Marine (Scotland) Act 2010 and the still on-going process of the Northern Ireland Marine Bill (DG ENVIRONMENT, 2011).



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Port Towns

Population

- < 7500
- 7500 - 30000
- 30000 - 85000
- 85000 - 650000
- 650000 - 1050000

Administrative Boundary

Figure 1: Map indicating the extent of the case study area and displaying coastal population centres in close proximity to important ports.

2.1. Economy

Economic vulnerability / Robustness facing globalisation

The impact of the marine and coastal economy is not very well understood neither on regional, national or international levels because such questions have not been empirically addressed (MORRISSEY & O'DONOGHUE, in press). Some studies have been undertaken for the Republic of Ireland which showed that compared to the rest of Ireland, the Irish East coast has the highest levels in maritime GVA (Gross Value Added) levels, however the marine sector, including renewables, marine biotechnology and shipping, seems more important in the West and South West of Ireland when looking at percentages of regional GVA and regional employment (MORRISSEY & O'DONOGHUE, in press).

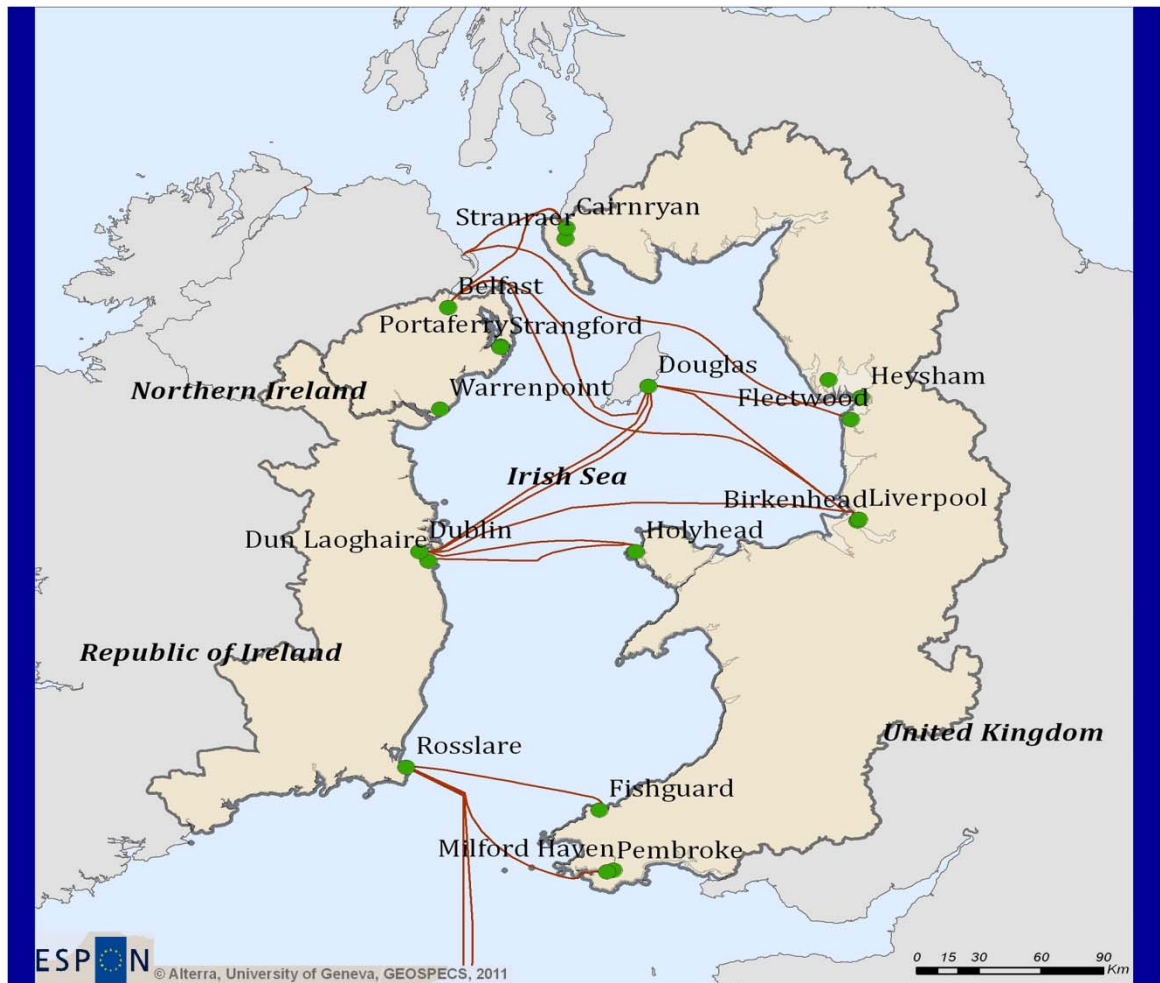
Important fisheries and aquaculture areas specifically regarding seed mussels are located in the Irish Sea (SUTTON et al., 2008). Due to recent declines in stock and quota restriction, employment in the Irish Sea fishing industry (i.e. Republic of Ireland and the UK) has dwindled to between 1,000 and 2,000 people, with a turnover of €86 million in 2002 (VINCENT et al., 2004). Owing to the pressures outlined above many fishermen have since diversified into other industries such as tourism and mariculture (DEVOY, 2008). In 2001 the mariculture industry was valued at €18.5 million to the Irish Sea regional economies (VINCENT et al., 2004). The tonnage of shellfish produced in the UK increased by approximately 50% between 1999 and 2000, mainly due to an increase in mussel cultivation (VINCENT et al., 2004), and this development is anticipated to continue in the Irish Sea region.

A number of gas interconnectors link Ireland and the UK. Compared to the North Sea, gas and oil exploration activities in the case study area are relatively low (DCENR, 2011c). While some literature suggests that several marine sectors do not depend on a location and/or are not located close to the marine resource (MORRISSEY & O'DONOGHUE, in press), port related activities (see Figure 2) such as passenger transport, berth of cruise liners, fisheries and freight shipping are located at the coast in the entire case study area. The majority of Ireland's important ports are situated along the eastern seaboard, primarily as a consequence of historical trade links with the UK. Today, the UK remains the largest importer of Irish goods and thus Irish ports are vital to the mainly exporter-led economy of the Irish Republic. In Dublin Port in 2010, for example, throughput was over 28 million tonnes, which represented a 6.1% increase on 2009. It is estimated that around 90% of Ireland's GDP is exported, with 42% of it through Dublin Port. The port also provides approximately 4,000 jobs for the region³⁹⁷. The main ports in Ireland provide oil and petrochemical facilities, power production, bulk cargo handling and roll-on, roll-off terminals. These and other major industries, although predominantly urban based, are linked to the coast via ports and port activities (DEVOY, 2008). Traditional-style, heavy-manufacturing industries in Ireland (e.g., steel, shipbuilding, and automotive manufacture) were linked to coastal and dockland sites (e.g., Belfast, Dublin and Arklow), but these have either been closed or are of much reduced significance. The development of offshore renewables across Ireland and the UK also relies heavily on ports as industrial centres for the assembly of devices and operation of wind farms (SEAI, 2011). Larger ports have the potential to become assembly sites and thus have benefits for local employment.

³⁹⁷ <http://www.dublinport.ie/about-dublin-port/facts-and-figures/>

The vast majority of Britain's trade (95%) is conducted through its ports and the value of goods passing through ports in 2006 was £340 billion (COOPER, 2009). The Irish Sea ports are of particular importance to the national economy. In the case of Northern Ireland, the importance of Belfast Port to the economy of both the North and the Republic is immense. The port handles 50% of the country's container and ferry traffic, and over 60% of its total seaborne trade (BELFAST HARBOUR, 2009). Cross-border trade with the Republic of Ireland is evident in that the port handles 20% of the freight of the entire island. The Port of Liverpool is the largest port on the UK's Irish Sea coast, and the largest in all of west UK. The port handles approximately 40% of all freight transported between Ireland and the UK. It is also strategically placed to handle the majority of road haulage between the two countries as the Dublin-Liverpool shipping route represents the shortest route for access to the larger centres of population. The Port of Liverpool also demonstrates the breadth of potential that ports may have in an increasingly globalised and competitive world economy. The concept of the 'Super Port' is being developed by The Mersey Partnership as a response to global economic challenges. Super Ports are essentially logistic, industrial and technological clusters providing multi-modal logistical infrastructure and centralised services aimed at driving regional growth (THE MERSEY PARTNERSHIP, 2008). Key to the concept is the integration of airport, port and other distribution facilities and the development of Maritime and Integrated Communication Technologies.

While Great Britain is connected to mainland Europe via the channel tunnel, the majority of goods reach the Island of Ireland by sea therefore Ireland depends economically to a large extent on its maritime transportation sector (MORRISSEY et al., 2011). In the Republic 90% of imports and exports came via maritime transport in 2006 (HYNES & FARRELLY, in press). The ports of Great Britain that fall into the case study area have the largest bulk of incoming and outgoing freight (80,625,000 tonnes) compared to numbers in Northern Ireland (13,891,000 tonnes) and the Republic of Ireland (20,951,000) (Eurostat, 2009). However, such numbers have to be seen in relation to the population size of these areas with Great Britain having a population size nearly ten times the combined number for Northern Ireland and the Republic, underlining the immense economic importance of ports in the case study area for the entire island of Ireland.



ESPON  © Alterra, University of Geneva, GEOSPECS, 2011
 EUROPEAN UNION Part-financed by the European Regional Development Fund INVESTING IN YOUR FUTURE
 Regional level: LAU2 (except Turkey LAU1) Source: GEOSPECS, 2011
 © EuroGeographics Association for administrative boundaries except Western Balkans and Turkey (national sources)




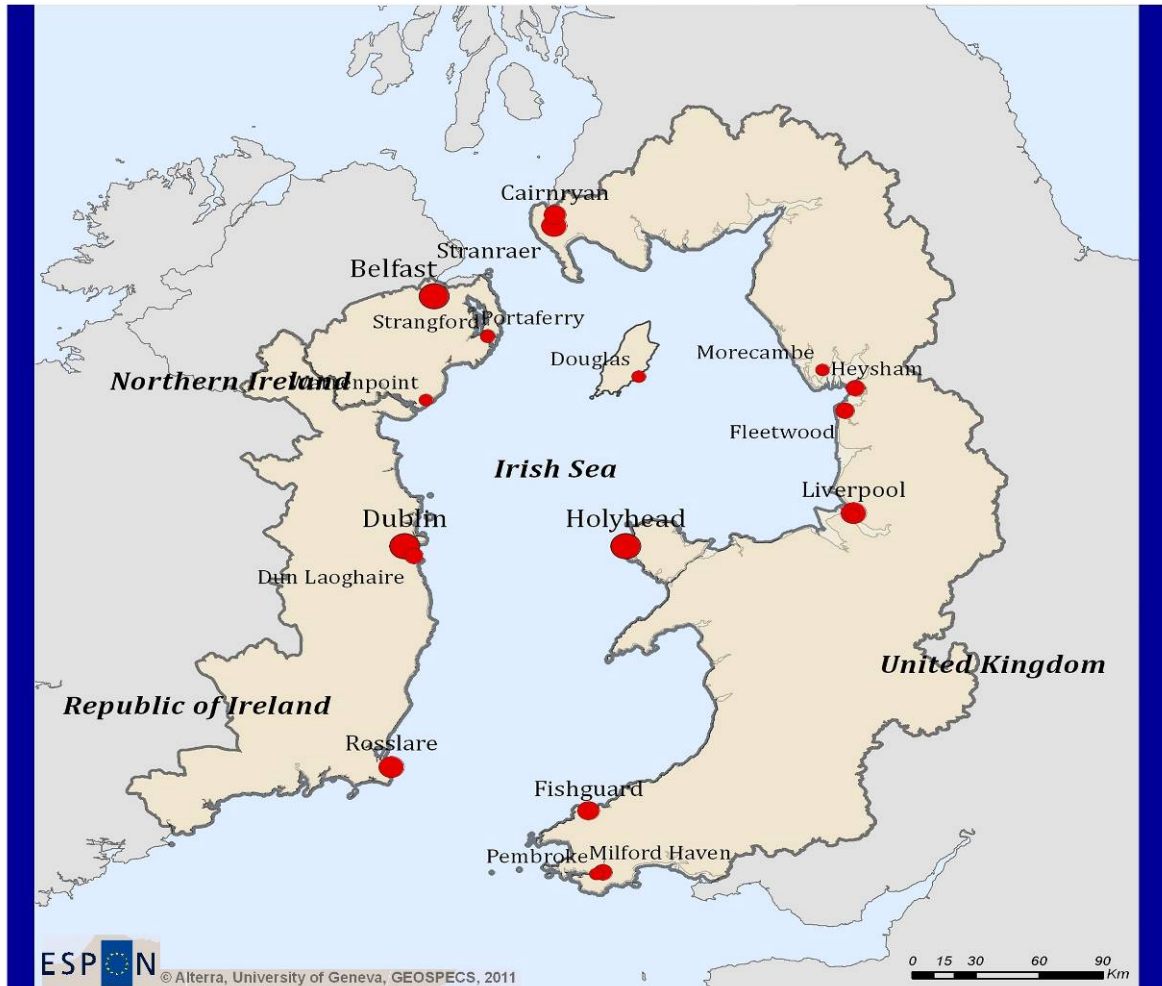
-  Port
-  Ferry routes
-  Administrative Boundary

Figure 2: Location of important ports and ferry routes of the case study area

The ferry lines across the Irish Sea forge national as well as international connections between the island of Ireland and Great Britain (see Figure 2). Such modes of transport furthers the links of the ports in the case study area (see Table 1 for numbers) on routes from Stranraer to Belfast and Larne, and Cairnryan to Larne as well as between Liverpool and Belfast via the Isle of Man or direct from Birkenhead and between Fishguard and Pembroke to Rosslare, Holyhead to Dún Laoghaire, Holyhead to Dublin.

Table 1: Summary of maritime passengers in case study area by region. Source: Eurostat 2009

Region within Case Study Area	Number Passengers
Northern Ireland	1,319,000
Republic of Ireland	2,788,000
Great Britain	5,468,000



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Port Passengers (thousands)

2009

- < 50
- 50 - 350
- 350 - 650
- 650 - 1300
- 1300 - 1950

Administrative Boundary

Figure 3: Passenger numbers by port

Tourism

In the UK seaside tourism revenue amounts to approximately £17 billion per year, underscoring the overwhelming importance of tourism and recreation at the coast. Irish marine activities follow a similar overall pattern to those of the UK, although the values are proportionally smaller. Marine tourism and leisure in Ireland, for example, was valued at €709 million per year between 1999 and 2003 (COOPER, 2009). The global economic downturn influenced the tourism industry worldwide, which has been felt severely on the Irish tourism market since November 2008 (TOURISM IRELAND, 2009b; IRISH TOURIST INDUSTRY CONFEDERATION, 2009). In England, coastal towns, in particularly industrial towns and once popular resort towns, now account for a disproportionately high percentage of England's deprived areas (BEATTY et al., 2008). On the coast of the Irish Sea the decline of Britain's onetime booming beach resorts is particularly acute. Irish Sea resorts such as Morecambe and Blackpool are being abandoned in place of sunnier destinations like the Spanish Costas, the Canary Islands and France. In Blackpool, for instance, the UK's first and largest coastal resort, the annual number of visitors has fallen to 10 million from 17 million in the past 15 years. Added to this is a multitude of local problems such as one of the lowest levels of employment in the UK (70.2%), and amongst the lowest levels of earnings in the north of England (BEATTY et al., 2008; BLACKPOOL COUNCIL, 2006). In response, the local council is preparing a strategy to tackle the decline in visitor numbers and regenerate Blackpool's attractiveness as a tourism destination (BLACKPOOL COUNCIL, 2006).

In the Republic of Ireland, tourism is one of the most important industries, generating 4% of the GNP, with much of its based on the coast (IRISH TOURIST INDUSTRY CONFEDERATION, 2009; RAI, 2007). Visiting Irish coastal areas and taking part in water-based activities are significant attractions for tourists coming to Ireland (FÁILTE IRELAND, 2007) and a survey undertaken in 2003 showed that Irish domestic water-based tourism generated nearly half (45%) of the overall domestic tourism returns (MARINE INSTITUTE, 2004). Furthermore, marine services (e.g. maritime transport) account for the largest part of the maritime GVA in Ireland, which largely concurs with other international studies, and this sector is mainly driven by water-based tourism and transport related activities (MORRISSEY et al., 2011). The Irish studies correspond to UK estimates for the case study area stating that tourism from the Irish Sea area has a high contribution to the overall UK economy.

Significant tourism opportunities lie in boating and marina activities in the Irish Sea region. The close proximity of the coastlines of Ireland and the UK makes the cruising ground accessible to a large number of cruising boats. Irish Sea cruising grounds are attractive to visiting cruising boats - 97% of visiting boats included in a Marine Institute survey indicated that they would like to return to the region again (MCDOWELL & SHIELDS, 1998). There are between approximately 200,000 leisure boats in the UK in total, approximately 9,500 of which are based in Scotland, 12,600 in North West England and 4,500 in Northern Ireland. Marina facilities in England are generally in short supply in many parts of the UK, and there are significant opportunities to attract boaters to the east coast of Ireland in particular (ANNETT et al., 2007; MCDOWELL & SHIELDS, 1998). Furthermore, marina berth costs are considerably lower in Ireland than in some parts of the UK (ANNETT et al., 2007).

The 'Celtic Wave' partnership, involving the collaboration of six Irish Sea ports aims to promote the Irish Sea as a destination for cruise liners and to attract tourism to Wales and the east coast of Ireland (<http://www.celticwave.eu/>). Funded through the European Regional Development Fund, the initiative links the ports of Anglesey, Milford Haven, Swansea, Dublin, Waterford and Cork. Sea bass angling is also a significant contributor to local economies - an estimated €17 million to the Irish economy alone (<http://www.irishbass.org/>).

Sea bass fisheries organisations suggest that recreational sea bass angling could help in the rejuvenation of some hardest hit coastal communities, with minimal investment.

In general, the economy of the Irish Sea region is dominated by shipping (passenger transport and freight trade), tourism and increasingly, so the energy sector. All of these activities rely on the medium of the sea and a coast that can facilitate a variety of economic activities in relation to industrial development, workforce and natural environment.

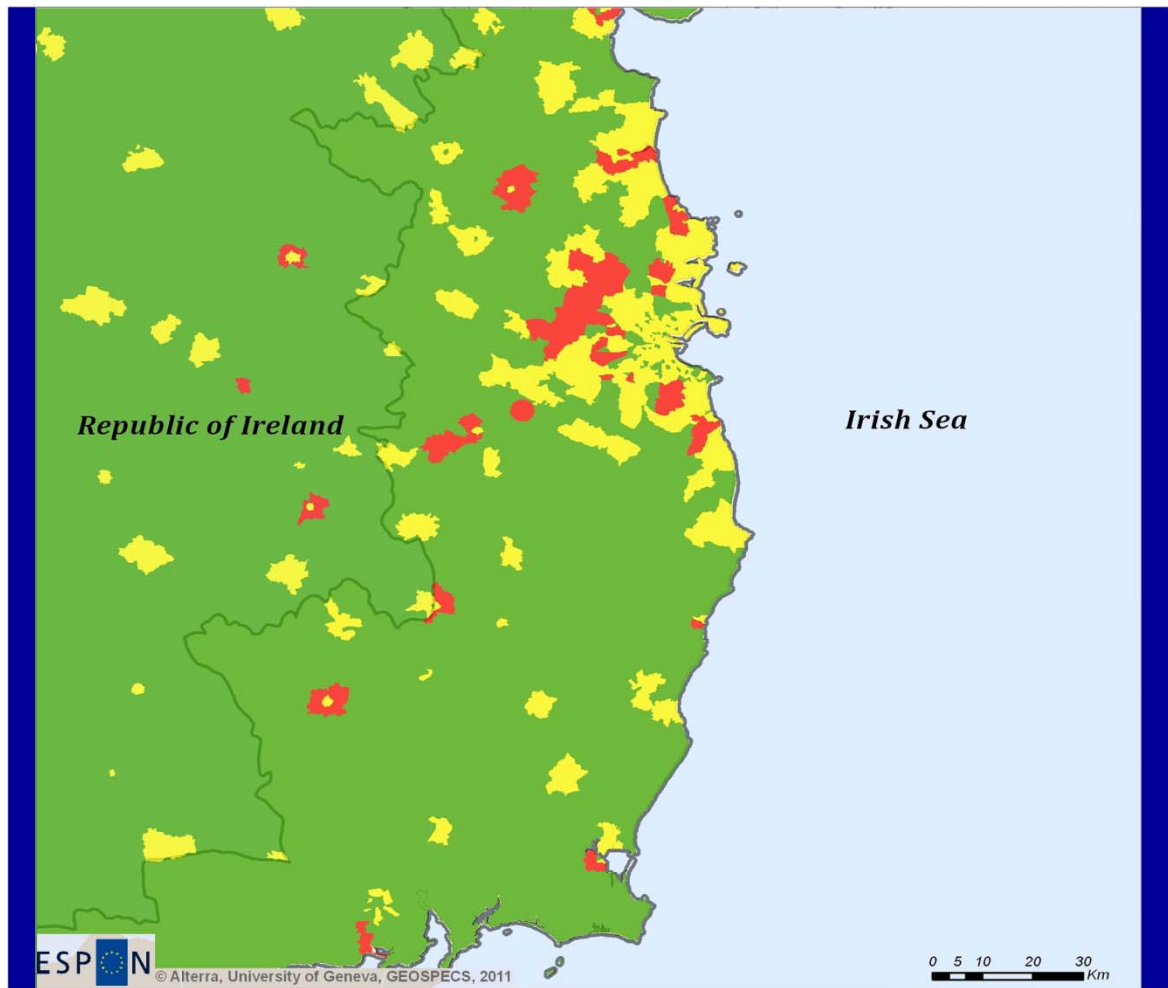
2.2. Social

Demographic structures and trends

When trying to indicate demographic trends and settlement patterns for coastal areas the importance of defining the region or zone of interest becomes an issue. Throughout history humanity has attempted to describe the coastal zone (HYNES & FARRELLY, in press) and results are varied and numerous. Some descriptions e.g. meeting point of land and sea or a transition zone between the two may be too vague (HYNES & FARRELLY, in press), while other use classification to be more accurate e.g. (i) geometrical-linear criteria, (ii) legal-administrative criteria and (iii) ecological-natural system as suggested by the EU-Demonstration Programme on Integrated Coastal Zone Management 1997–1999, but these may lack utilitarian and perception based descriptions (HYNES & FARRELLY, in press).

Historically, people settled on the indented European coasts that provided natural harbours, which can be found especially on the coasts of Great Britain and Ireland encouraging trade, fishing and water transport (HAY, 2003). Population density calculated for the Republic of Ireland changed significantly depending on the definition of the Irish coast. However socio-economic variables for the Republic of Ireland based on the Census of the population did not differ noticeably between either coastal definition used (e.g. NUTS 3 versus shoreline Electoral Division) or more interestingly to the national average, indicating that the socio-economic make-up of the Irish coastal zone is not different to the rest of the Republic (HYNES & FARRELLY, in press). However Ireland has experienced population move from west to east with increasing urbanisation towards the east coast (see Figure 4). It is difficult to ascertain if the coast is a direct factor on the attraction of such high density of population due to the fact that the principal towns and cities of eastern Ireland are also situated along the coast.

Overall the largest Irish urban centres are either a port town or are located directly on the coast (see Figure 5). Dublin Port, for example, plays a central role in the every day life of Irish people, particularly those living in the Greater Dublin Region. Almost 80% of the goods that are imported through Dublin Port are consumer products that are purchased and used every day (DUBLIN PORT COMPANY, 2007). Since the 1980s, the coastal population of Ireland has increased due mainly to urban expansion, retirement and second homes, and the tourism industry. 34% of the total population of Ireland (Republic and Northern Ireland) reside within 5 km of the coast, and 50% live within 15 km of the coast (DEVOY, 2008). In Great Britain settlement historically took place at manufacturing centres of the industrial revolution and cities developed in areas where natural resources e.g. coal and iron were exploited, which is not necessarily coastal. While port towns had huge importance in terms of trade, in the English part of the case study area larger concentrations of towns can be found much further inland (see Figure 4). In contrast port towns dominate as the main urban centres in regions that have an overall more rural character in Wales and Scotland (see Figure 5).




 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey LAU1)
 Source: GEOSPECS, 2011
 © EuroGeographics Association for administrative boundaries
 except Western Balkans and Turkey (national sources)

Population 2006

- < 2300
- 2300 - 8400
- 8400 - 32300

— Administrative Boundary

Figure 4: Map showing coastal population in Republic of Ireland part of the case study.

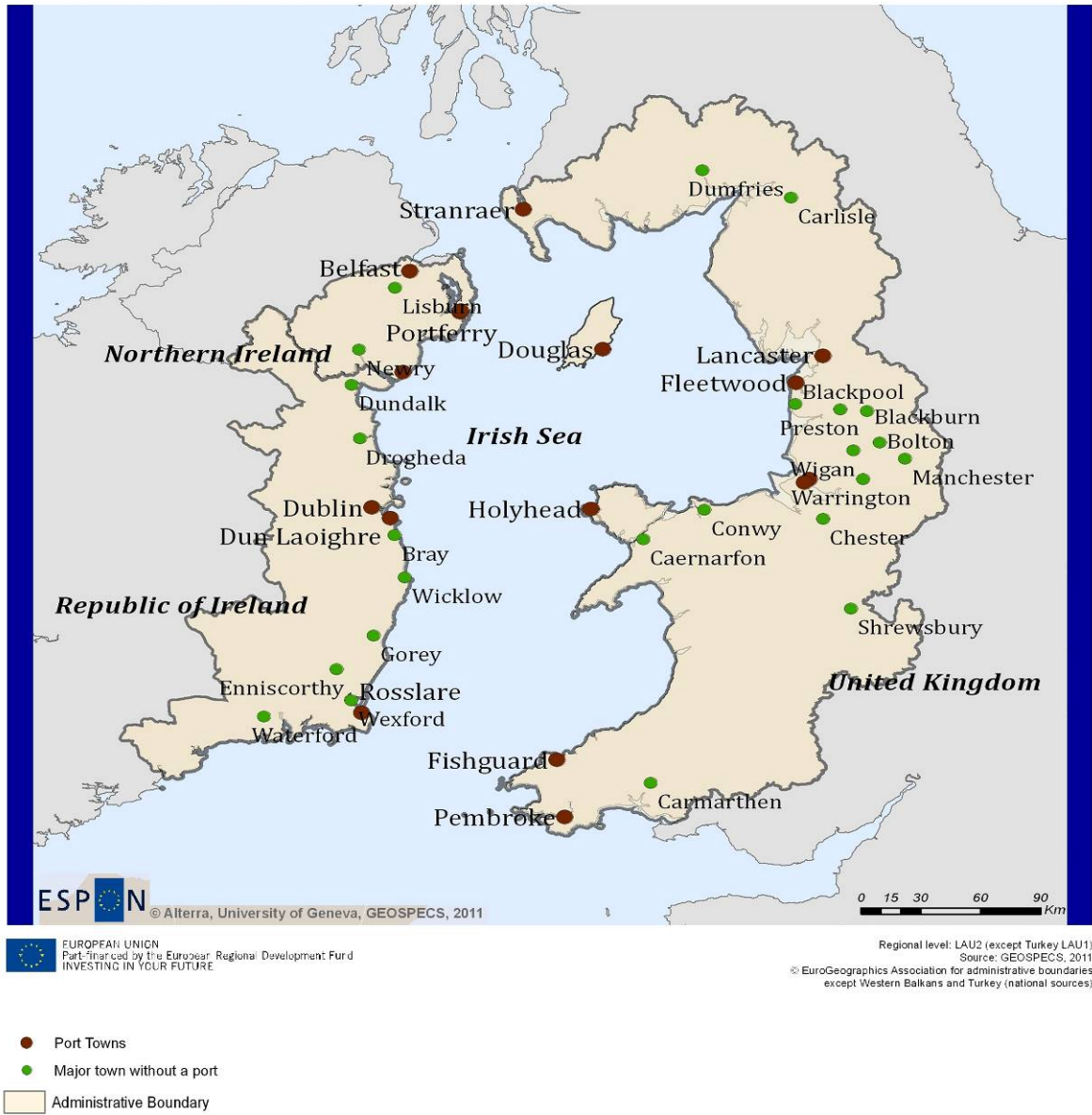


Figure 5: Map showing locations of ports that are towns and other major towns.

Residential attractiveness

While coastal settlements and urban centres in the case study area mainly developed around historic port towns of importance, holiday and second homes catering for domestic and international tourism markets have been built in places of the case study area that have been traditional holiday destinations (KEAVENEY, 2007). These destinations developed because of their proximity to the coast and the rural coastal landscapes, which are deemed attractive, e.g. in Counties Wicklow and Wexford in the Irish case study area (KEAVENEY, 2007). The majority of holiday and second homes in the Republic of Ireland are located within coastal areas; furthermore, an increase of such developments took place adjacent to existing urban centres with good connections to the national road infrastructure (KEAVENEY, 2007). Coastal areas have had continually higher housing densities than other areas. Studies suggest that this is due to the influence of a conducive natural terrain for the construction of homes, and the desire of a newly-affluent society to live in areas of high scenic value (KEAVENEY, 2007). History also has an influence, given that the coast was traditionally strong in terms of employment, in particular in fishing and port industries. The housing boom was fuelled by a combination of growing societal affluence, an ageing demographic, technological and transport advances and liberal planning arrangements and tax incentives (NORRIS et al., 2010; QUINN, 2004). Much of the in-migration to the coastal zone involved more affluent elderly people and retirees, most of who have moved from larger urban areas. Coastal town populations, particularly in the UK, are skewed towards older age groups (BEATTY et al., 2008). The share of the population over 65 years of age residing on UK coasts is 5% higher than the national average.

The general consensus is that the impacts of second and holiday home development are negative, particularly in the Republic Ireland (NORRIS et al., 2010; KEAVENEY, 2007; QUINN, 2004), resulting in a plethora of “ghost” estates impacting on socio-economic and environmental systems of the coastal zone. An example of this is Courtown, which has an Irish Sea coast and is the largest resort in north County Wexford. Under the Seaside Resort Area Scheme introduced by the Irish government in 1995 over 1,000 new houses were built for use as second homes or holiday accommodation (NORRIS et al., 2010). Courtown possesses a scenic coastline and sandy beaches, and a warmer and drier climate than elsewhere in Ireland. Its proximity to the greater Dublin urban area is a key factor in attracting visitors, however in the summertime it is estimated that between 3,000 and 4,000 tourists stay in the resort, which has a permanent population of under 400 (QUINN, 2004). As a result of the housing development, there were significant problems in the water supply and sewage treatment facilities in the Courtown area. Second and holiday home development impacts also include landscape intrusion, proliferation of septic tanks and groundwater pollution, increased car traffic, urban sprawl, and the decline of smaller coastal villages (NORRIS et al., 2010).

In the absence of such policies in Northern Ireland, which has a similar cultural support of housing development, an oversaturation did not take place (NORRIS et al., 2010). In Great Britain existing coastal resorts are regarded as being popular for second homes, which are mostly located outside the study area in the south west of the island. However, there seems to be a new demand for second and holiday homes as the economic downturn sees an increase in domestic holiday makers, which will also affect the case study area, most likely in rural, picturesque areas of Scotland and Wales (KNIGHT, 2011). There have also been examples of where economic activity has had positive benefits on the residential attractiveness of coastal areas. In Dublin Port, for example, Bull Island was created by the construction of the North Harbour wall. The changes in local coastal processes resulted in the creation of the island and adjoining wetlands, which is now home to a tourist popular beach, two golf courses and a world famous bird sanctuary³⁹⁸.

³⁹⁸ <http://www.dublinport.ie/public/amenities/>

Overall the coastal regions of the Irish Sea are popular places to live in and have been so throughout history of coastal settlement. A disproportionate number of people live on the coast which results in pressures in relation to the actual housing and provision of services and infrastructure while environmental impact is increasing. Policies such as the Irish Government's Seaside Resort Area Scheme referred to above, served to increase seasonal populations and pressures on the coast. Another scheme availed of in large numbers was the Section 23 Relief Scheme. The scheme, which entitled housing developers to claim substantial tax back through rental properties, promoted the construction of enormous numbers of holiday homes for the rental market. The most conspicuous of these were on the coastal zone.

2.3. Environment

Protected areas and biodiversity as factors of development

Various threats posed to natural environment in the case study area have been outlined: sea-level rise, coastal erosion and habitat loss resulting from human activities and uses of the area (COOPER, 2009). Ireland, for example, has many harbours and landing points (approximately 900), and each one has an environmental impact upon the coastal zone (DEVOY, 2008). Coastal and marine habitats are suffering from nutrient run off caused by farming practises that can also affect commercial aquaculture sites. Direct and indirect impacts of fishing are particular problems in marine ecosystems in the Irish Sea (ROBERTS et al., 2003). Fishing activity is the most important human pressure in terms of its spatial extent and level of impact on the UK marine environment (STELZENMÜLLER et al., 2008). Habitats in the Irish Sea are rapidly being transformed and even destroyed by fishing gear such as trawls and dredges. Industrial-scaled fisheries have largely been responsible in the reduction of larger fish species to a fraction of their previous numbers and biomass (ROBERTS et al., 2003). Models suggest that Celtic and Irish Seas cod stocks, for example, may disappear completely by 2100. Until recently, protection from fishing has been low on the conservation agenda throughout the world. However, it is becoming widely recognised that more protection must be given to habitats, particularly in intensively exploited regions like the Irish Sea. It has been argued that the tools for managing fisheries in Europe, Total Allowable Catches and national quotas as management tools have low priority for the conservation of the marine environment (ROBERTS et al., 2003).

There are many international, national and local designations of conservation in the coastal zones of Ireland and the United Kingdom (see Figure 6). The more robust legal instruments are the international designations which include the Ramsar-protected wetland sites and the Special Areas of Conservation (SACs) and Special Protected Areas (SPAs) of the EU Birds and Habitats Directives. Ramsar sites encompass a wide range of the nearshore marine habitats of the Irish Sea, and some offshore bank areas. In the UK there are a multitude of more local designations including National Parks, Areas of Outstanding Natural Beauty (AONBs), Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs). Each of these varies in its level of protection and permissible activity. In the Republic of Ireland designations are not as complex, generally consisting of Natura 2000 sites, National Parks, National Heritage Areas (NHAs) and Nature Reserves.

In the Irish Sea, fishery-dependent communities, particularly in the southwest of England, are being affected by the downward spiral of the fishing industry (PINNEGAR et al., 2010). 60% of the Welsh coastline, for example, is designated or proposed as marine SACs

(ROBERTS et al., 2003). There is an obvious dichotomy here – on one hand conservation measures are needed, yet on the other hand, livelihoods are at stake. There is no current single regional marine planning policy in Ireland or the UK (RITCHIE & ELLIS, 2010). Recently, however, the UK Government published The Marine and Coastal Access Bill ('The Marine Bill') in 2009. It marks a major milestone in environmental regulation in the UK. A key component of the Marine Bill is Marine Spatial Planning (MSP). MSP is seen as being critical to the policy agenda because it focuses on influencing the behaviour of humans and their activities over time, making conflicts and compatibilities among human uses visible (DOUVERE & EHLER, 2008). MSP is perhaps most useful as a conflict resolution tool given that the competition for space in the marine environment is accelerating.

The most recent development in marine conservation has been the UK initiative of Marine Conservation Zones (MCZs), which are a key recommendation of the the Marine and Coastal Access Bill. MCZs have evolved from the Marine Protected Area (MPA) concept, which is implemented under Natura 2000 legislation. MCZs are unique in that they include socio-economic factors along with the scientific. The combination of MCZs and European conservation designations (SAC and SPA) is intended to implement varying levels of protection, from specific restrictions on certain activities, to areas where no development or exploitation will be permitted (DAVIS, 2009). In the Irish Sea 19 coastal sites across Merseyside, Lancashire and Cumbria have been recommended to be designated as MCZs. The proposed zones are amongst 100 proposed around England and Wales. The MCZs will be protected from the effects of tourism and over-fishing, and stakeholder input is key to the process. The zones were identified after consultations with stakeholders including fishermen, sea anglers, watersports enthusiasts and tourism business owners (DAVIS, 2009).

Biodiversity on the coast often has to compete with economic development, but in certain instances the two can coexist if proper management procedures are carried out. Bull Island near Dublin Port, for example, was created as a result of the effects that harbour wall construction had on local coastal geomorphology. Bull Island is unique in Ireland because it supports both early phase and fully mature saltmarsh and sand dune systems³⁹⁹. The site has been designated as a UNESCO Biosphere reserve and also a Wetland of International importance under the Ramsar Convention. This is remarkable in that it is contained within a major capital city. Bull Island is important for numerous species of wintering waterbirds and waders, hosting internationally important numbers of Brent Geese (*Branta bernicla*) amongst others⁴⁰⁰. Belfast Port also actively contributes to the management of its environment. The authorities are key contributors to the development of River Basin Management Plans, the implementation of Integrated Coastal Zone Management and Biodiversity strategies. In terms of climate change, Belfast is the world's first port authority to be certified as carbon neutral (BELFAST HARBOUR, 2009).

³⁹⁹ <http://www.dublinport.ie/public/amenities/>

⁴⁰⁰ <http://www.npws.ie/protectedsites/specialprotectionareasspa/northbullislandspa/>

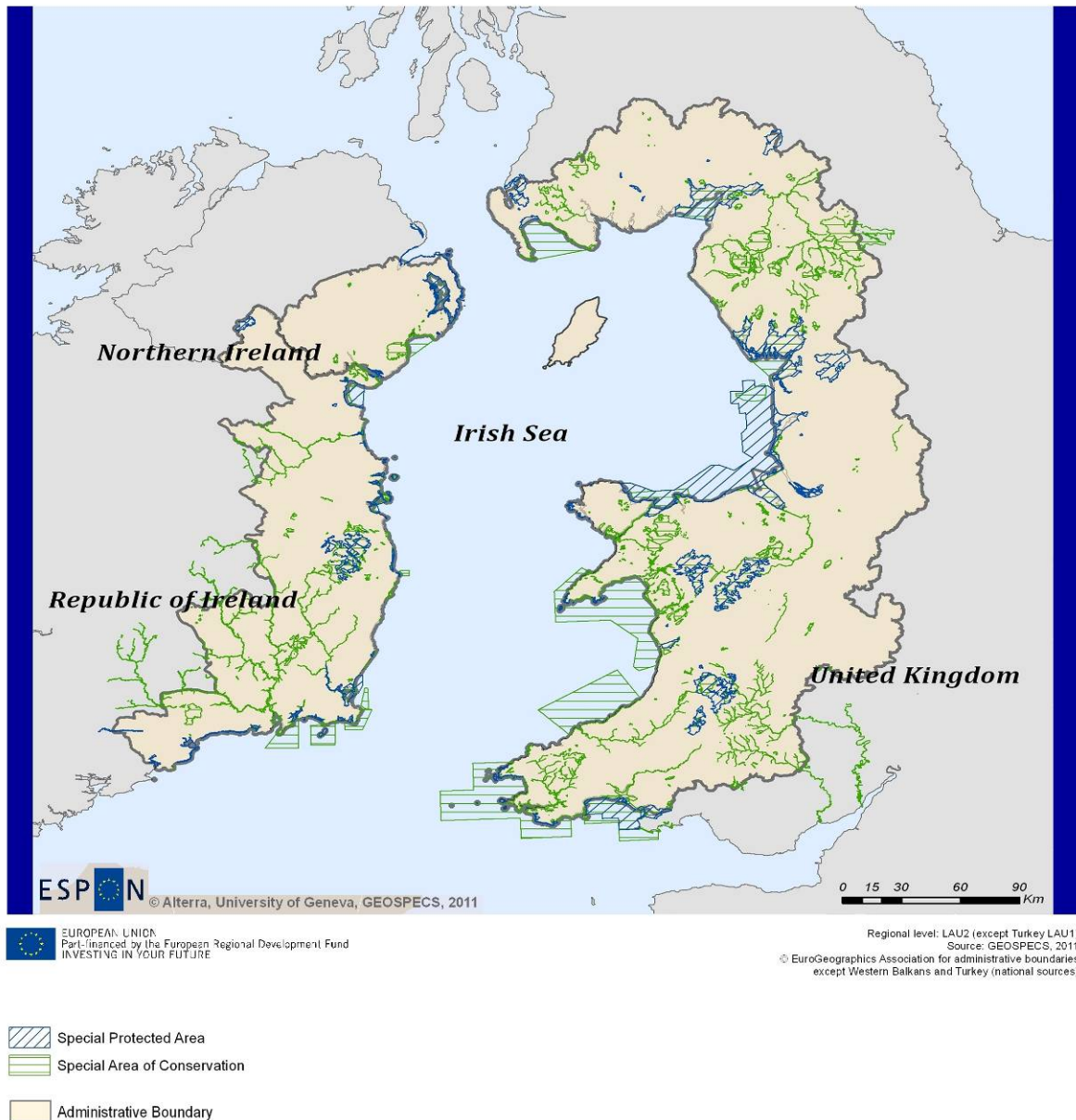


Figure 6: Map showing Natura 2000 sites

Natural resource exploitation

The importance of renewable energy is becoming more apparent as concerns of security of energy supply and climate change mount (SIMMONS & DOLMAN, 2007). Wind energy is the world's fastest-growing energy (BILGILI et al., 2011; WILSON et al., 2010), and Ireland, in particular, is readily suited to renewable energy production given its geographical location in the path of amongst the most optimum wave and wind conditions in the world (SEAI, 2010). Recently the Irish and UK governments announced huge increases in the developments of onshore and offshore wind farms. It has been estimated that windfarms will occupy an area of 254km² by 2020 in the eastern Irish Sea (VINCENT et al., 2004). In Ireland, the Arklow Bank Wind Park has been operational since 2004. Situated approximately 10 km off the coast of County Wicklow in the south Irish Sea, it is the world's

first commercial application of offshore wind turbines over 3 MW in size. Consent has been granted to erect turbines off the coast of Clogherhead (the Oriel Wind Farm), which will produce 320 MW of power. Additionally, the Codling Wind Park has been granted a lease to construct a 1100 MW wind farm on the Codling Bank. The 364 MW Dublin Array wind farm is awaiting approval (SEAI, 2011). The Irish Sea is a prime region for wind energy development in that, most importantly, there are optimum wind conditions. Furthermore the Irish Sea is close to the very large areas of electricity consumption in the region (i.e. Dublin, Belfast, Liverpool, Manchester, Glasgow), in which adequate electrical infrastructure already exists (SEAI, 2010). Though Ireland's west coast experiences greater wind strength, the cost to transport the energy to these centres of consumption would be considerable. In addition to this the Irish Sea is a relatively shallow sea, and as such is more conducive to the erection of wind turbines.

In Northern Ireland there are currently no offshore wind projects. Studies have shown that here is the potential of between 600 and 900 MW of power in Northern Ireland territorial waters (SEAI, 2011). In the UK, 41 sites were granted licenses to develop wind farms, 5 of which are situated in the Irish Sea. These include the North Hoyle site, 8 km off the North Wales coast containing thirty 2 MW turbines, the Burbo Bank site situated 10 km off the north Wirral coast, the Robin Rigg Wind Farm in the Solway Firth, and the Walney Island wind farm. According to the SEAI (2010), UK wind farms situated in the Irish Sea have the potential capacity to generate over 4GW of power. In 2008 the UK installed more wind turbines than any other country and overtook Denmark the largest offshore wind capacity (590.8 MW) (BILGILI et al., 2011).

There are also concentrated efforts underway in the development of wave and tidal energy devices, particularly along the western seaboard of Ireland and Scotland where conditions are most favourable. The Irish Sea is, in general, sheltered from the primary wave resource of the Atlantic Ocean, therefore wind energy remains the main form of renewable energy for the future. The Irish Government's Offshore Renewable Energy Development Plan (OREDPP) seeks to develop up to 4,500 MW from offshore wind energy by the year 2030 (SEAI, 2010). Opportunities for offshore grid integration with Northern Ireland and the UK are also envisaged in the plan. Ports could play a vital role as sites where the construction and maintenance of offshore devices such as wind turbines and wave and tidal energy devices can take place. In 2009, four wind turbines were erected in the Port of Liverpool, providing 10 MW of electricity to the surrounding region.

The development of renewable energy sites, however, poses hazards for nature conservation, particularly noise pollution during the construction, operation and decommissioning phases of wind farms (WILSON et al., 2010; SIMMONS & DOLMAN, 2007). Considerable study has been conducted into the effects of activities such as pile-driving, drilling and dredging on bird, marine mammal and benthic community behaviour and distribution (WILSON et al., 2010; CARTENSEN et al., 2007; DREWITT & LANGSTON, 2006; MADSEN et al., 2006). The installation of offshore wind turbines can also lead to unavoidable disturbance to the seabed in the vicinity of turbines (WILSON et al., 2010). In some instances it has been recorded that certain cetacean species have abandoned habitats during the construction of wind farms (CARTENSEN et al., 2007). There is also a high degree of collision risk with migrating bird species, however risks are being mitigated due to better wind turbine location and slower turbine speeds (WILSON et al., 2010). Other knock-on effects of wind farm development have been found to be disruptive also, e.g. increased vessel activities, increased turbidity and re-suspension of polluted sediments (SIMMONS & DOLMAN, 2007).

Renewable energy development can also have considerable benefits for local economic development across a range of sectors. Given the importance that renewable energy will have in the future there is the prospect of significant job creation from the design, construction and operation of wind farms and wind farm devices (DALTON & LEWIS, 2011; BILGILI et al., 2011). A critical requirement for the development of offshore renewables across Ireland and the UK is the adequate port capacity (SEAI, 2011). The sharp rise in renewable energy production will potentially lead to valuable opportunities in port development and expansion along with major benefits in local employment. Issues such as security of supply and climate change mitigation are also important benefits of renewable energy development (DALTON & LEWIS, 2011).

Development can have also a positive impact on conservation. Mandatory obligations to conduct Strategic Environmental Assessments (SEAs) for potential developments lead in many cases to substantial population and distribution studies of marine mammals in an affected site. Such studies have the potential to strengthen existing conservation designations, reveal new insights into the biodiversity of a given marine area and facilitate improved conservation measures and may lead to the creation of new protected areas (WILSON et al., 2010; EVANS, 2007). Wind turbines may act as artificial reefs, thereby attracting marine life. Offshore wind farm areas could also be designated as "no-take" zones, thus offering areas for marine conservation (WILSON et al., 2010).

In term of other resources, the Irish Sea possesses significant natural mineral resource in its offshore environment. These are typically to be found in the form of hydrocarbons and marine aggregates. However, exploration levels in the last decade have been relatively low (DCENR, 2011c). Ireland now imports more than 80% of its natural gas requirements, hence there is an opportunity to exploit sources of indigenous gas and/or invest in renewable energy technology (DCENR, 2011a). The UK provided the majority of Ireland's imports; however in 2005 the UK also became a net importer of gas as its own indigenous supplies of North Sea gas no longer meets the demand. Opportunities of exploiting the natural resources of the Irish Sea are outlined in The Irish Sea Marine Aggregates Initiative (IMAGIN), a collaborative project between Ireland and Wales. IMAGIN focused on the sustainable management of marine aggregate resources while posing the minimum risk of impact on marine and coastal environments (SUTTON et al., 2008). Marine aggregates such as sands and gravels sourced from the seabed are an important economic resource (SUTTON et al., 2008). They have been used primarily as infrastructure materials, e.g. buildings, roads and bridges. However due to the economic downturn affecting Ireland, the UK and much of Europe the demand for aggregates has diminished drastically. However, aggregates have also been used for beach nourishment and coastal defence purposes and the need for coastal protection has come into sharper focus considering the threats posed by rising sea levels and increased storminess due to climate change.

Ecosystem Services - Vulnerability of human-environment systems to climate change

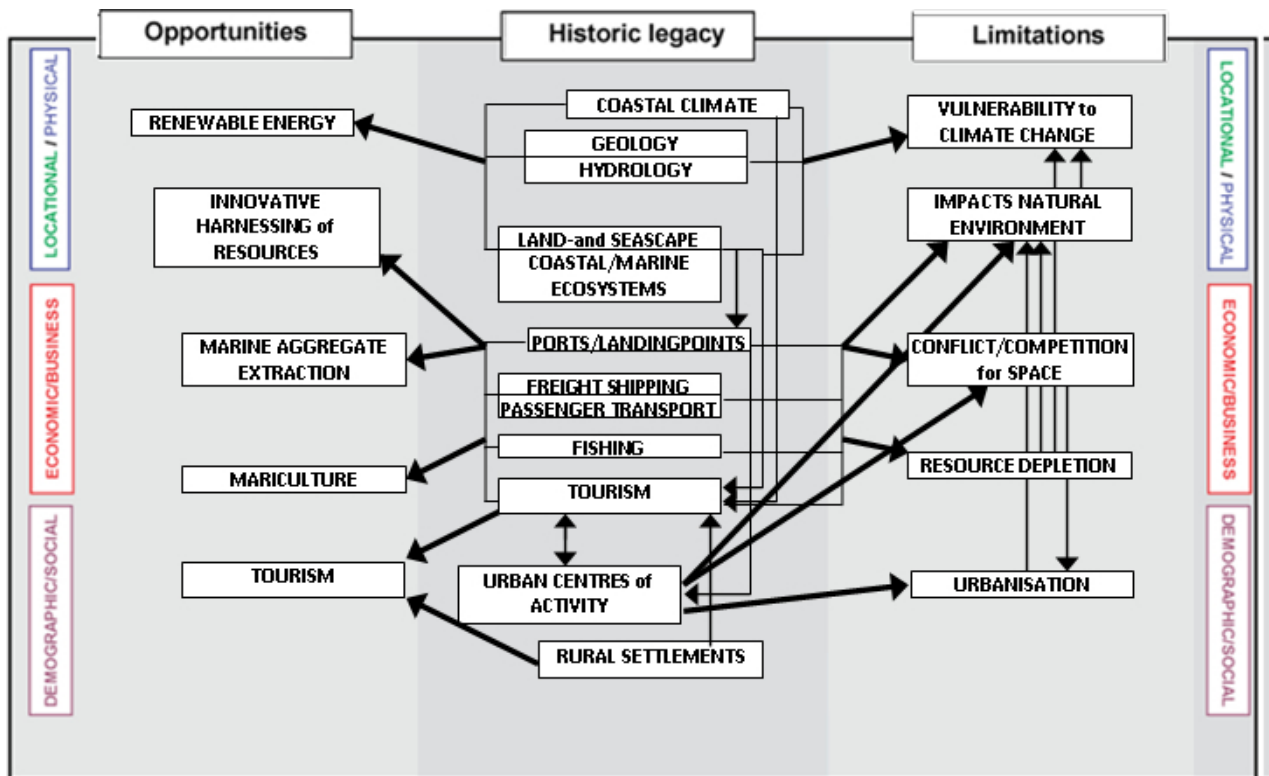
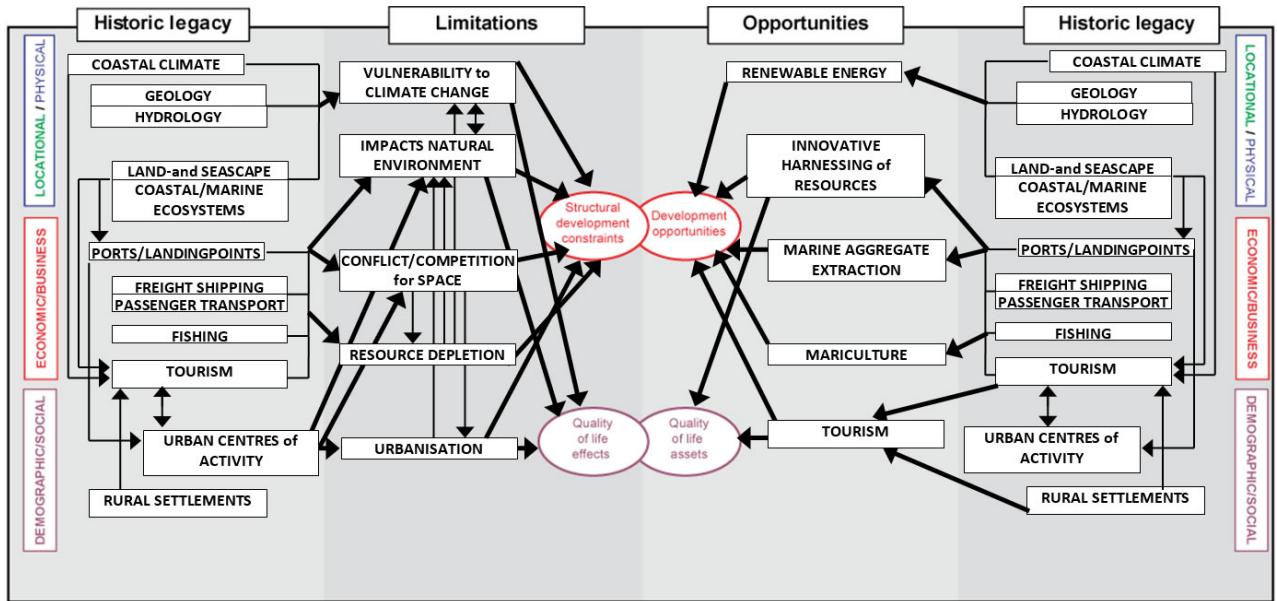
Ecosystem services are defined as value derived from the physical environment for the benefit of the people such as seafood, drinking water, energy, minerals, and also regulating services such as carbon sequestration, water purification and nutrient dispersal (COOPER, 2009). In the Irish Sea, tourism and shipping are key sectors of the economy depending directly on the medium of the sea e.g. tourism is directly linked to ecosystem system services that provide clean water and beaches (VINCENT et al., 2004). Ecosystem services are highly vulnerable to the effects of climate change, which in turn affect a range of human activities at the coast (KOPKE & O'MAHONY, 2011; COOPER, 2009), as climate change has the potential to significantly alter the coastal and marine environments in the near future (KOPKE & O'MAHONY, 2011; COOPER 2009; DEVOY, 2008).

Ireland lies in the path of the major North Atlantic storms. These storms affect all of Ireland's coasts to some extent, but in particular the western and southern coasts, which are highly susceptible to flooding and erosion (DEVOY, 2008). The east coast, which comprises much of the case study area is somewhat protected from these conditions. The UK coasts contained in the case study area are further protected again, experiencing generally much milder sea conditions. Much of the east coast of Ireland, however, is soft (i.e. sedimentary), low and susceptible to erosion and surge and storm activity (DEVOY, 2008). Under sea level rise (SLR), a positive element in the ability of Ireland's coasts to cope with these human pressures is that large areas are not heavily populated. People are concentrated in relatively few coastal locations. Outside of the main urban areas, the coastal population (living less than 5 km from the coast) is only about 10% of the total. Sea levels are predicted to rise around the coasts of the Irish Sea, in particular in the south Irish Sea.

There is increasing awareness amongst the general public of the effects of climate change on the coast (DEVOY, 2008). There has been a gradual realisation of the resource value of the marine and coastal environments, in particular in terms of renewable energy and conservation. However, at national government and EU level, the issue of climate change needs to be underpinned by coherent and strong policy measures. This is gradually taking place in the UK in the form of the Marine and Coastal Access Bill.

The impacts on human society from the changes associated with climate change prompt the need for adaptation measures to be implemented (COOPER, 2009). On a European scale, the European Commission's White Paper on adaptation to climate change provides a guiding framework for national, regional and local adaptation measures, but these measures require tailoring and implementation by local and regional authorities (KOPKE & O'MAHONY, 2011). While the general consensus is that the UK is coping well with climate change (CATOVSKY et al., 2011a), there are still significant vulnerabilities that need to be addressed, e.g. water resources, flood risk to residential areas, in particular low-lying coastal areas, and the ageing demographic which are becoming increasingly vulnerable to storm events and higher temperatures in the summer (CATOVSKY et al., 2011a). There is also a realisation that climate risks need to be incorporated further into national strategic planning and decision-making. The Climate Change Act has also been adopted in Northern Ireland, but the devolved government have set their own targets for emission reductions. The government views this as an opportunity to operate economically independent of fast-depleting carbon resources (COLLIER et al., 2011). In Scotland the Climate Change Act (Scotland) was adopted in 2009, and paves the way for a strategic and structured approach to climate change adaptation (CATOVSKY et al., 2011b). Similar vulnerabilities to those experienced in the rest of the UK were identified in the Scottish situation. Currently the government is developing a set of indicators to assess how the UK as a whole is preparing for climate change.

Synthesis



Generalisation from case study

Overall the case study area lends itself fairly well to generalise findings for other European areas characterised by the same geographic specificity. The Irish Sea area may be especially comparable to coastal areas with similar environmental and climatic conditions in terms of limitations and opportunities arising from such. Concerning national policy support or the lack of such policies to address limitations and opportunities, the case study area in itself is not consistent and therefore may not reflect the national and regional policy support in other coastal areas. The Irish Sea is host to a very large range of activities, each with varying intensity and impact on the environment resulting in considerable competition for space. With the wealth of natural, economic and cultural resources available to the users of the Irish Sea coasts, significant opportunities exist especially in the energy, tourism and industrial sectors. Such opportunities, however, are tempered by both internal (i.e. anthropogenic) and external pressures. The economic downturn, governance and climate change are perhaps the most significant external pressures. Climate change is a major challenge faced by all sectors of the coastal zone. Vulnerability to sea level rise, coastal erosion and increased storm frequency will impact on businesses, residences and areas of conservation. The ageing demographic of the region, coupled with disproportionate population concentrations on the coast increases the vulnerability of the human system to climate change. The soft, low coast of the southeast of Ireland is particularly susceptible to coastal erosion. Nevertheless, the towns and cities of the Irish Sea coast do not have the large populations of other European cities, the largest single concentration being Dublin with just over 1 million people. Many anthropogenic pressures arising from coastal activities can exacerbate the impacts on socio-economic and natural systems, and each economic opportunity that exists within the Irish Sea region must be cognisant of these pressures and limitations. The fundamental requirement of holistic governance of the coastal zone is complicated by the fact that different administrations govern the boundaries of the Irish Sea (i.e. Republic of Ireland, Northern Ireland, England, Scotland and Wales). Perhaps the greatest challenge in the region is fostering a consensus approach to managing the resources of the Irish Sea, for example in dealing with climate change, planning, conservation and natural resource exploitation. The scale of the challenge is manifest in how the European Union's White Paper on Climate Change Adaptation is being implemented in the different regions. The UK has implemented the Climate Change Act, which aims to address greenhouse gas emissions and formalise adaptation strategies. Meanwhile, the Republic of Ireland has not adopted any legal instrument in relation to climate change adaptation.

In economic terms, tourism represents a significant opportunity for regional prosperity in the Irish Sea. The leisure cruise industry is one that is expanding rapidly. Given the proximity of the Irish Sea countries, the region is well poised to attract holiday makers with initiatives such as the 'Celtic Wave' partnership between Irish and Welsh ports. Other water-based activities such as sea angling are very valuable in attracting overseas visitors. Seaside resorts such as Blackpool and Morecambe, the south Wales coast and south east coast of Ireland are traditional draws for holiday-makers. Each however suffered impacts from the popularity of foreign package holidays in terms of unsustainable overdevelopment impacting on the natural and social environment. Tourism has helped to promote in-migration to certain coastal areas, thus re-establishing an economic and social vibrancy to certain communities. However, in the past relaxed planning laws and tax incentives encouraged overdevelopment, resulting in a proliferation of holiday home construction, particularly in the Republic of Ireland. The consequence was a transforming of the physical and social landscape of many coastal communities. In this case there is an urgent requirement for governance and policy support for sustainable economic development in the region.

The need for good coastal governance and coherent spatial planning is increasingly becoming apparent in the Irish Sea as the competition for space increases. Mariculture is an example of an industry that continues to grow in the Irish Sea as increasing numbers of fishermen are looking for an alternative source of income because stricter quotas, increasing costs and depleting fish stocks are placing a strain on many fishermen's livelihoods. This industry should be developed in a sustainable manner in integration with all other activities that take place in the case study area in order to successfully utilise the opportunity it can provide. Similar issues relate to the marine aggregates industry, which currently is not further explored as the construction industry experienced a collapse. However, with sea levels predicted to rise as a consequence of climate change, there could yet be resurgence in the demand for aggregates in the form of beach nourishment and coastal defence materials. Adequate environmental impact assessments and innovative marine spatial planning across a multi-administrative region are pre-requisites if marine aggregate extraction is to become a viable and sustainable industry. Aggregates are a non-renewable mineral resource; hence governors and practitioners must be cognisant of resource depletion, in which case the opportunity will have been transformed into a situation of environmental degradation and unsustainable practice.

Ecosystem services provided by coastal and marine environments are economically and socially very important. Flood absorption, nutrient dispersal and drinking water are dependent on good environmental status. Primarily Europe-led, a growing number of conservation designations such as Marine Protected Areas (MPAs) and Marine Conservation Zones (MCZs) are being identified and implemented. Conservation represents one of the major challenges of the expanding renewable energy sector, which is set to become much more influential given the steady decline of available fossil fuels worldwide. Both Ireland and the UK are net importers of gas and the opportunity that the Irish Sea presents in terms of harnessing renewable energy is therefore very important for both countries. Several wind farms are currently in operation, including the world's first commercial offshore wind farm over 3 MW, the Arklow Bank Wind Park. Many more have been granted licence to operate in the coming years, bringing with them knock-on economic benefits, most significantly for ports and port towns. The Irish Sea coasts are populated with sizeable ports, with capacity for the construction and operational work associated with renewables devices, potentially leading to job creation and port expansion. Again, the major challenges in relation to the development of renewable energy are spatial conflict and impact to the environment (e.g. noise, turbidity, benthic disturbance). However mandatory Strategic Environmental Assessments (SEAs) to be conducted with any development can lead to increased awareness and understanding of the local natural environment and may inform and improve conservation measure

Annex 32: Case Study Green Triangle

Description of the case study area and its geographic specificity

The case study area on the Czech-German-Polish border region covers an area of approx: 34,000 sq km, and is home to some 5.7 million people. The area was designated the “Black Triangle” by the environmental ministers of the three countries in 1991, initiating a project designed to intensify cooperation in the field of environmental protection, and rapidly toward a reduction of environmental pollution in the border region. Administratively, the northern Bohemian border regions of the Czech Republic, the directorial districts⁴⁰¹ of Chemnitz and Dresden in Germany, and the south-western areas of the Polish province of Lower Silesia are considered part of the “Black Triangle” (Glöckner et al. 2010).

The “Black Triangle” is characterized by complex geography, and includes a wide variety of climatic and landscape forms of varying character. Its characteristic features are the Central Mountain ranges – the Ore Mountains (Erzgebirge/Krušné hory), running from southwest to northeast along the German-Czech border, and then the Giant Mountains (Ger.: Riesengebirge, Cz.: Krkonoše, Pol.: Karkonosze), running from northwest to southeast along the Polish-Czech border. The ridge of the Ore Mountains, of which is Keilberg/Klinovic Mountain (1244 m above sea level) is the highest point, is one of the historically most stable borders in Europe. The Giant Mountains form the major part of the Polish-Czech border in the case study area. They include heights of up to 1602 m above sea level (the Sněžka/ Schneekoppe) on the Czech side. The course of the Elbe, with the Elbe Sandstone Mountains and the Elbe Valley near Dresden, is the major feature of the German/Czech part of the case study area (Roch 2012).

The case study area is a characteristic mining and industrial region, with a long industrial history. Until the Second World War, close economic links existed, particularly between the Czech and German border areas, and there were mutual cross-border production-related ties between small and medium-sized industrial enterprises. For instance, in the Czech portion of the case study area, the border areas were considerably more thickly settled prior to the Second World War than was the interior of the country. The major changes in what is now the Czech-German-Polish Three Corners Region was caused by the Second World War, initiated by Nazi Germany, and its immediate aftermath.

The terrible political and social disruptions in the region of the Second World War period led to a concentration of each of the national economies towards its respective national area after 1945, which caused the breakdown of interregional economic and trade relationships, and of the cultural ties and infrastructures which had previously existed (Leick 2006).

In spite of the early recognition of the Oder-Neisse border by East Germany, and its designation as a “border of peace and friendship”, and in spite of the accession of all three countries of the Three Corners Region to the Warsaw Pact, hardly any socio-cultural contacts between the three border areas were able to develop during the following decades. With the introduction of cross-border traffic without visas and passports in 1972, all this changed. Now, East German citizens could travel spontaneously to Poland – at least until October 30, 1980 – and to Czechoslovakia until October 3, 1989, which also led to an intensification of cultural and economic exchange. Although personal contacts in the border area were doubtlessly strengthened, both at the official and at the personal level, this area did not develop the kind of mediating strata of the population which is typical of many European border areas. This deficit exists to this day, and one of them most important political and social challenges along this border is to stimulate and to organize cultural and social exchange (Krämer 1999; Crome & Franzke 1997).

The political transformation processes after 1989 brought changes in the economic and population structures of the regions which constitute the Czech-German-Polish Three Corners Region. The transition to conditions of a market economy forced economic actors of the Three

⁴⁰¹ NUTS-3 areas are termed “districts” in this paper. The Czech districts are used only for statistical purposes; in Germany and Poland, they have administrative functions. Note the difference between “directorial districts” (NUTS-2) and “districts” (NUTS-3) in Germany.

Corners Region not only to carry out a systemic transformation as rapidly as possible, but also to integrate themselves virtually overnight into the European and global economic structure. Most strongly affected by the people were industry and mining. A large number of jobs in these branches were lost. The result was high unemployment, lower birth rates, and a large level of out-migration (Stejskal 2005; Lintz & Schmude 2005; Okraska 2005).

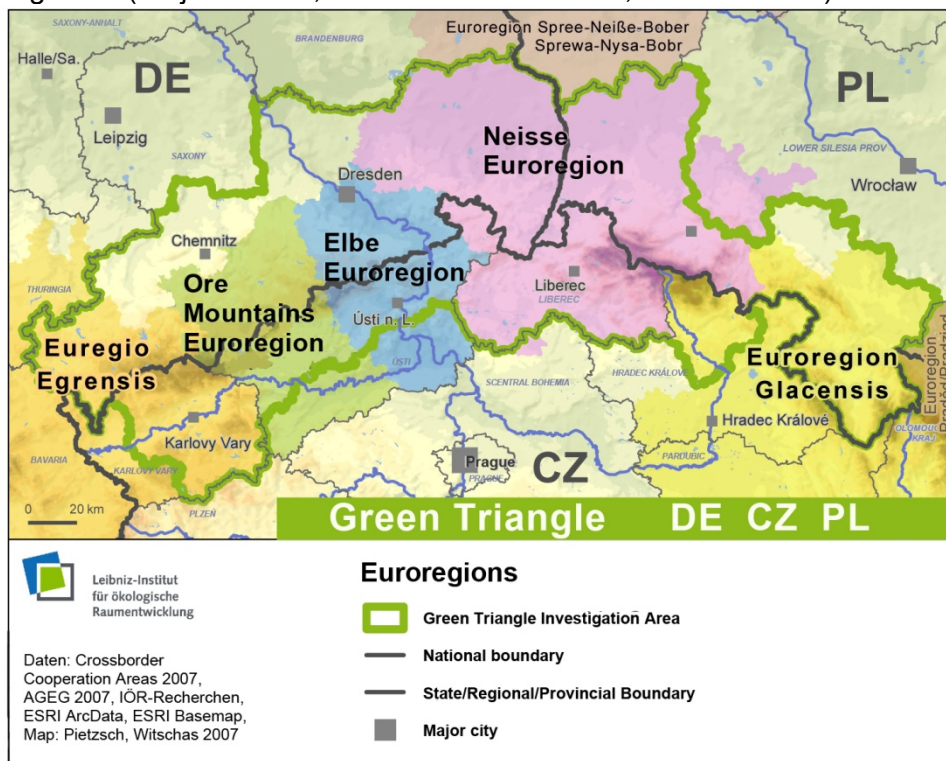


Fig. 1: Euroregions in the case study area

Particularly in Czechoslovakia and Poland, there was in the early '90s still a spatial planning vacuum (ARL 1996; Slavik 2010). A number of Euroregions were created around this time, with the participation of local governments and administrative authorities in the Three Corners Region, which formed local government interest associations with the goal of developing their regions by means of cooperative relationships, and of reducing or eliminating negative border effects. These included the Euregio Egrensis, founded in 1993 with the participation of Germany [DE] and the Czech Republic [CZ], the Ore Mountains Euroregion (1992, DE/CZ), the Elbe Euroregion (1992, DE/CZ), the Neisse Euroregion (1991, DE/CZ/PL) and the Glacensis Euroregion (1996 CZ/PL). Areas for cross-border cooperation in the Euroregions include regional planning, nature and the environment, economic promotion and tourism, disaster protection and rescue services, transport, culture, education, sports, and health and social services. To this day however, the Euroregions have been able to contribute only to a very insufficient degree to improving cross-border cooperation in the Three Corners Region (Preußcher 2006; Knippschild 2011).

European integration and support programmes in the border region, such as Phare, CBC and INTERREG, as well as the Maastricht and Schengen Treaties, caused many border barriers to be dismantled, and opened up new opportunities for the border region. In the case of East Germany, incorporation into the European Community came with the implementation of German reunification on October 3, 1990. In the case of Poland and the Czech Republic, the entry into force of the European agreements with Poland in 1994 and with the Czech Republic in 1995 were important steps on the road to entry into the European Union, which was then accomplished on May 1, 2004. Until April 30, 2004, the German-Polish border was the external border of the EU. Since then, the "hard" border in the Czech-Polish-German Three Corners Region has gradually developed into a "soft" border. Since December 21, 2007, border checkpoints with Poland and the Czech Republic have been closed. After a seven-year transition period, i.e., as of May 1, 2011, the free movement of labour, too, has been provided. The Three Corners Region has, in the

course of the accession of Poland and the Czech Republic to the EU changed from a region located on the external border of the EU to an area in the middle of an expanded EU single market.

An intensive environmental recovery has occurred in the last 20 years as result of the economic decline and restructuring in the so-called “Black Triangle” of the former mining and heavily industrialized border region. Yet, at the same time, strong socio-economic differences along the borders constitute a common challenge of preventing the social exclusion of people and reinforcing the European principle of solidarity. Moreover, remaining mental barriers due to difficult history in the German-Polish and German-Czech border regions, the lack of language skills and different institutional structures are a significant obstacle for cross-border development.

1. Economic, Social and Environmental processes related to the geographic specificity

2.1. Economy

The economic structure of the Czech-German-Polish Three Corners Region was shaken by deep processes of transformation at the time of the political change of 1989. This was carried out differently in each of the three sub-regions of the case study area; however they were all mutually comparable in the economic development till the turn of the century. A large number of jobs were lost, especially in industry and mining, and the economic situation deteriorated in the whole Three Corners Region, and in each of the three sub-regions in relation to their respective national averages.

This is particularly obvious in the dramatic rise of the unemployment rate in all sub-regions of the Three Corners Region in the years between 1989 and 2000. After the turn of the century, the unemployment rate decreased in some cases considerably, but the relative position remained less favourable than the average situation in their respective countries (Eurostat 2010).

Since 1991, various phases can be ascertained in the German sub-region of the Three Corners Region with regard to changes in employment figures. Between 1991 and 1993, restructuring of the economy led to the massive abolition of jobs. The number of employed was reduced greatly in all districts. After 1993, the number of employed in the German sub-region rose again initially, only to drop again considerably in 2009. (Banse 2012a) While the German core cities of Chemnitz and Dresden had a relatively high density of jobs, and function as suppliers for the surrounding districts, the districts with long borders with the Czech Republic have a low density of jobs. This is important due to unfavourable geographical conditions, which prevent the infrastructural linkage of the regions, especially in the border area with the Czech Republic (Moritz 2008).

The Czech sub-region also saw a decline in the number of employed during the period of observation. However, the drop in employment began somewhat later than in the German area. The number of employed dropped relatively quickly during the latter half of the 1990s, reaching 87% of the 1993 level in 2000; thereafter, it increased back to 90% in 2005 and on to 98% in 2008. The development was different in the various districts; for instance, the Elbe Euroregion saw a decline between 1991 and 2001 of 17% in Decin district, 15% in Litomerice district, and 22% in Teplice district. (Banse & Jerábek 2009; Saxony State Statistical Office 2011, Cf. Banse 2012a)

Overall, not only was the total number of employed persons in the Three Corners Region reduced during the period under consideration since 1990, but there was also a change in the industrial structure. In the German area, a clearer structural transformation has taken place since 1990, with a decline in the number of persons employed in productive sectors, and an increase in the tertiary sector of the economy. This increase was very dynamic during the 1990s, and slowed down after 2000. (Banse 2012a) Since that time however, modern micro and semiconductor technology sites have been established in and around Dresden. In the Polish and Czech parts of the Three Corners Region, there have also been changes in the industrial structure; however, they have been less dynamic, so there are still large numbers of jobs in industry and construction, along with, especially in Poland, the further development of the commercial and service sector. Clearly, the economic structural transformation is currently at different levels of the different sub-regions of the Three Corners Region, with a decline in the productive sectors and an increase in the tertiary sector of the economy; moreover, it is becoming less dynamic in the German and Czech sub-regions (Kowalke 2000; Kowalczyk 2008; Leick 2006a).

A comparison of the three sub-regions of the Three Corners Region with one another shows a big gap between the per capita GDP of the German sub-region on the one hand, and – on a much

lower level – of the Polish and Czech sub-regions on the other (Eurostat 2010). The gap in GDP along national borders within the Three Corners Region and the unfavourable economic development, in some cases, in parts of the border areas in comparison to the respective national averages can be seen as the result of a large number of different factors, in which the effects of linguistic and cultural barriers, structural peculiarities, and the transformation from centralized economic structures to a market economy, which overlapped the effects of the opening of the border.

At the beginning of the 1990s, the cross-border economic development opportunities of the different sub-regions were seen to affect particularly the regional market relationships of industry and commerce. Key issues were the improvement of site conditions for business in the different areas, information about site conditions, and information about subsidy opportunities. The Euroregions founded at the beginning of the 1990s had the task of promoting cooperation in all areas of the economy. (SMWA 1994, cf. Banse 2012a). In all parts of the Three Corners Region, legal and organizational problems and also the language barrier were seen as barriers to cross-border economic development. Overcoming them requires long periods of time, and activities both at the individual of the societal levels, in order to create better structural conditions for economic cooperation. Moreover, the challenges for economic cooperation are often seen as including the frequently poor condition of plant facilities and equipment, environmental pollution due to obsolete facilities, toxic dumps, the lack of service industries and markets appropriate to the productive structure, unclear property relations and the lack of border crossings (SMWA 1994, cf. Banse 2012a).

On the other hand, one important cross-border economic potential in the Three Corners Region can be found in sustainable tourism. Especially in the Central Mountains, which have traditionally been popular hiking, winter sports and local recreational areas, tourism has, following a local collapse after the political change, boomed once again. Dresden, Jelenia Gora and Karlovy Vary are already important tourist centres, along with many cultural sites, especially for urban tourism. A further attraction for sustainable tourism is the 1220 km long Elbe Bike Trail, leading from the Giant Mountains in northern Bohemia past the Czech-German Elbe Sandstone Mountains and all the way up to the mouth of the Elbe in the North Sea.

In the Three Corners Region, there has in recent years been an expansion of cross-border transport routes. The number of roadway crossing points increased considerably between 1990 and 2006; from ten along Germany's border with the other countries to 22 (Saxon State Chancellery 2009). Between Poland and the Czech Republic, there are eight important roadway crossings within the case study area, most of which were opened after 1989 (Polish-online.com 2011). Interregional rail traffic is important for the cross-border development of the case study area. The most important line here is that between Dresden and Prague, which continues on to such more remote goals as Budapest, Bratislava, Hamburg or Berlin, and is an important intercity rail corridor for international long distance travel. Apart from these long-distance lines however, there is a lack of good cross-border passenger rail transport connections in the case study area. Particularly along the German-Polish and Czech-Polish border, connections are few. In the Czech-Polish border region, the first rail bus line was opened in 2008, thanks to the initiative of the local administration, the EU and the private Czech rail company Viamont; however, it initially only operates on weekends. There are other initiatives to reactivate cross-border connections. However, a large part of the rail network in the Three Corners Region consists of single-track, non-electrified lines. In the Polish area moreover, the rail network has been continually dismantled in recent years, and its technical condition has deteriorated (PKP 2011; bueker.net 2011).

With regard to motorized traffic, the long-distance accessibility of the region was particularly enhanced by the expansion of the Polish A4 motorway, as the extension of the German BAB-4 in 2009, and the expansion of the Czech D-8 as the extension of the German BAB-17, which is currently in progress. The location of the Three Corners Region at the intersection of the routes between Prague, Wrocław and Berlin can be seen both as a challenge and as a potential for the future development of the case study area. The certification of transnational traffic corridors by the

EU could increase the importance of the region as a transit area for transportation toward Kiev and Istanbul. However, there is also the danger that massive intrusions into the landscape by means of road construction, and the great increase in motorized traffic, will diminish both the ecological value and the touristic attractiveness of the region.

The case study area itself is served by two international airports, Dresden International and the smaller Karlovy Vary Airport. Due to its transportation accessible position, Dresden International Airport serves an area including parts of the Czech Republic and Poland. Karlovy Vary Airport by contrast is largely important for the regional tourism and baths operation. Moreover, it provides a rapid connection to Prague Airport.

In conclusion, there is an ambivalent picture of the economic situation and development of the Three Corners Region. The economic gap at the national borders within the case study area, which is to some extent considerable, shows that the cross-border economic development of the area will in future depend on the size or degree on intergovernmental and supranational coordination processes for common European economic policy. Various studies on cross-border coordination in the case study area have referred particularly to the importance of language and cultural barriers which, if they are not addressed, will not only hamper cross-border interpersonal contacts, but could also have a negative economic impact on cross-border cooperation. If these cultural differences are however taken into consideration, they could provide a productive impulse for the progress of economic integration (Odziemczyk 2006).

2.2. Social

The development of the population in the Czech-German-Polish Three Corners Region has been very different. During the period 1995 through 2007 shows a reduction in population every year. The overall, population dropped by 131,000 people between 1995 and 1999, and by another 246,000 people between 2000 and 2007. That is a loss over total of 377,000 people, which amounts to approx. 6% of the 1995 population of 6 million in the Three Corners Region. In the German sub-region of the Three Corners Region, the loss of population has continued since the beginning of the 1990s. The German sub-region lost almost 10% of its population between 1995 and 2007, while population nationwide increased slightly by 0.5%. In the Polish sub-region, the population figures for the period 1995 through 2007 also dropped. Poland as a whole is experiencing a reduction in population. In the Polish sub-region of the Three Corners Region, Lower Silesia, this loss, amounting -3.6%, is three times as high as the national average of 1.2%. Loss of population in the peripheral rural areas and the concentration in metropolitan regions is also observable. The development of the population figures in the Czech sub-region is somewhat more favourable. During the period from 1995 through 2007, there was a slight increase in the population of the North-Western Region (+0.2%), and population stagnation in the North-Eastern Region (-0.1%). This is more or less the same population development as the national average. (Banse & Bielawska-Roepke 2010, cf. Banse 2012b)

Since the 1990s, the Czech Republic has changed to a country of immigration and transit. Emigration across the country's borders has since the 1990s become negligible. Rather, people moving within the country and the regions in order to improve their working and living situations is the factor which affects population distribution. The country as a whole, including the Czech sub-region of the Three Corners Region, experienced only minimal immigration after 1990. Labour migration is the main reason for the presence of foreigners in the Czech Republic. In the German and Polish sub-regions, the movement of people within the respective sub-regions is less significant, and immigration and emigration across the borders of the countries and of the districts is more important. In the Polish and German sub-regions, emigration especially involves young people, although the intensity of this phenomenon appeared in Poland approx. ten years later than in Germany. Labour migration is the key reason for immigration and emigration both in the German and Polish sub-regions. Commuter migration is also important in the Three Corners Region, particularly towards Germany (Focus Migration 2010; Focus Migration 2010a; cf. Banse 2012b).

According to population prognoses of the statistical agencies of the three countries, further population losses of up to 3% on balance can be expected for the areas under observation, although there will be differences in different areas. Primarily of significance are the negative developments of the population figures in the Polish region of Lower Silesia and in the German sub-region. Particularly in this area, however, the regional differences for the prognosis of population development becomes apparent. Population developments in the Czech sub-region of the Three Corners Region are expected to be particularly favourable. According to the population prognosis of the Czech Statistical Office, the Czech Republic expects a slight increase in population figures through 2020 (Czech Statistical Office 2009, cf. Banse 2012b).

In the Polish and Czech sub-regions, the proportion of people in the age groups between 15 and 64 – the working population – is at 72%. In the German sub-region, the proportion of working age people in the population remained virtually constant through 2005, at 67%, and dropped after that. One reason for this is the high rate of emigration of young people during the past 20 years. By contrast, the number of persons aged 65 or older climbed by a total of approx. 7%, to 25%, between 1995 and 2008, and is thus much higher than in the other two sub-regions. In the Czech sub-region, the share of 65-year-olds and older in 2008 was only 13.5%, and approx. 14% in the Polish sub-region. However, aging tendencies are apparent in all three sub-regions, albeit to differing degrees (Glöckner et al. 2010; Banse & Jerabek 2009, cf. Banse 2012b).

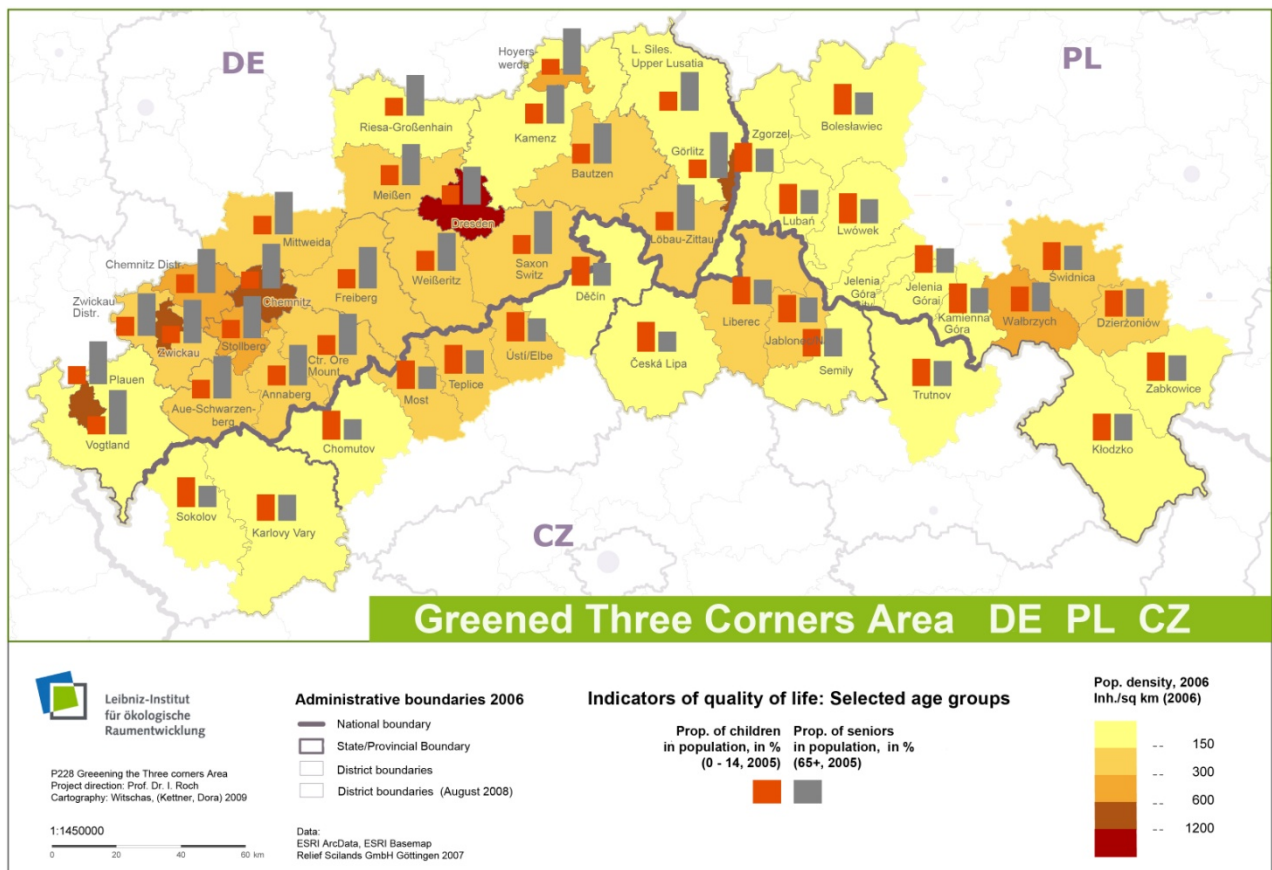


Fig. 2: Proportions of children and seniors in the districts of the Three Corners Area

Especially the Polish and Czech sub-regions, a considerably younger age structure is observable than in the German sub-region. The ratio of the proportion of children to the proportion of senior citizens is clearly the most unfavourable in the German districts, and is frequently relatively balanced in the Polish and Czech districts (Fig. 2). Just as the proportions of the age groups shifted between 1995 and 2008, similar changes are foreseen through 2020. According to current prognoses, the share of children and young people in the Czech sub-region will stagnate in future, and the productive share of the population will decline from 71% in 2002 to 66% in 2020, while the share of those 65 and older will almost double, to 19% by 2020. In Lower Silesia, calculations through 2020 show a stagnating number of children, and a strong reduction in the population of working age. The number of people 65 and older will climb by almost 40% through 2020. In the German sub-regions, the number of those 65 and older will also continue to climb through 2020. This will be especially true in the Ore Mountains and the Vogtland, particularly in the city of Plauen, the Ore Mountains district and Annaberg district. However, in the districts of Aue-Schwarzenberg und Stollberg, too, a clear increase in the number of old people can be expected. An even higher increase in the number of old people is to be expected in the districts of Weißeritz and in Lower Silesian Upper Lusatia (State Statistical Offices 2009-2011, cf. Banse 2012b).

One particularly important cross-border challenge is the prevention of poverty and social exclusion in the Three Corners Region. Both the decline in population figures and the phenomenon of aging have an effect on the future security of the livelihood of the population, especially in the areas of housing, education, health and local supply. In the context of demographic shrinkage, especially the German and Polish sub-regions faced major financial and administrative challenges in order to maintain qualitatively high-value educational and health service systems, as well as to achieve improvement in the accessibility of possibilities for supply and public transportation.

Due to a lower share of the younger population groups, the number of child care centres and elementary schools has dropped in all three sub-regions in recent years. According to expected

demographic developments, the number of children of school age will drop still further. All three school systems face a new process of adaptation of their respective school networks. But the decline in the number of school pupils and the associated shutdowns and size reductions/mergers of schools will make the maintenance and improvement of qualitatively high-value education a major challenge in all three national sub-regions. For example, an increase in funding, as has been exclusively demanded for the Polish sub-region, must be provided. Improved accessibility for public transportation and school buses into remote areas will require funding and new forms of organization. The support of smaller schools in rural areas, as is planned in the Czech Republic, will have to be met with an increase in funding (Glöckner et al. 2010).

With regard to education and training, what is particularly relevant for a cross-border perspective is the question of mutual recognition of school-leaving and training certificates, and university degrees. With the accession of Poland and the Czech Republic to the EU, the conditions for that have improved considerably. But only comparable levels of education in neighbouring countries can considerably increase the innovation capacity of border regions, and promote good approaches for competitiveness in Europe. That would however require the promotion of cooperation between universities and colleges in the study area. With regard to the demographic development, especially of the age structure in the German sub-region, a relatively high mobility of the well-trained population across national borders would be desirable and promising. Here, especially in improvement of educational opportunities for ethnic and cultural minorities, particularly for the Roma people in the Czech Republic, is of importance (Glöckner et al. 2010; Praguemonitor 2010; Druker, 2011).

The future expected higher share of older people also means adaptation pressure on the health and supply systems. With regard to the expected development of the population, the requirement of health services in each of the areas of the Three Corners Region is likely to increase by 2020. Especially in rural areas, there is a lack of physicians in many places, since there are no successors for doctors who retire, and there is thus a concentration of health services in the cities. Especially the accessibility of provision in areas which are previously been undersupplied is an urgent task for the future (Banse & Roch 2010).

The strengthening of the specific operationalization of the European social model for border regions is a precondition for better dealing with the considerable political and administrative challenges for securing the supply and the social inclusion of ethnic cultural minorities in the case study area in future.

2.3. Environment

At the beginning of the 1990s, the environmental situation in the so-called “Black Triangle” was very serious. Especially in the area of emissions, there was an acute requirement for action. The concentration of mining, power plants and other industrial sites provided the case study area with one of the highest emission densities in Europe (Mathey & Stutzriemer 2010). For a while, the “Black Triangle” was responsible for 30% of the sulphur dioxide emissions in all of Europe. The quality of life was severely reduced by such problems as smog, water pollution and landscape damage with effects on the flora and fauna. Serious forest damage as the long-term effect of air pollution led to forest death, particularly in the ridge areas of the mountains. (cf. Mathey 2012) Approx. 10 to 20% of the forest area had already been completely destroyed as a result of the massive immission of pollutants, which was having a negative effect on forestry (ESPERE 2003).

Due to these serious environmental problems, but also due to massive economic problems, leading politicians in three neighbouring countries call for rehabilitation measures and international support for these disadvantaged areas. In a joint declaration of July 1991, the environmental ministers of Germany, Poland and the Czech Republic created the basis for a cross-border framework plan for improving the environmental situation (ČHMÚ et al. 2003 cf. Mathey 2012). At the same time, cross-border development concepts were drafted specifying concrete goals, guidelines and models, and implementation strategies were agreed to, underpinned with concrete projects and measures (cf. Mathey 2012). On this basis, important successes in reducing the extreme environmental damage caused by industry and mining have been achieved in the case study area during the past 15 years, and the certification of a large number of protected areas, particularly as part of the European protected area network Natura 2000 were accomplished (Roch 2009).

In terms of natural space, the Three Corners Region is very heterogeneous and characterized by high biological diversity. It is marked by river landscapes of the Elbe, Neisse, and Eger, by hollows and basins such as the Bohemian Basin, Lower Silesia and Lower Lusatia, and by such mountainous areas such as Upper Lusatia, the Ore Mountains, the Giant Mountains and the “Saxon-Bohemian Switzerland” region (Mathey & Stutzriemer 2010). Due to the wide variety of landscape conditions, there are great differences in pollution and distribution and in the resulting landscape damage in the case study area (Mathey 2012). In the course of brown coal and uranium mining, former biotopes were in some cases subject to large-scale destruction. Especially in south-western Saxony, in the Polish area around Jelenia Gora and in the Czech Republic, around Karlovy Vary and also southwest of Liberec, uranium ore was mined (Fig. 3). After 1989, the mines were shut down, but the slag heaps remained as visible reminders. The rehabilitation of the slag heaps and the pits will in some cases take decades (Mraz et al. 2008).

In all regions of the case study area, the conservation of nature is being promoted by the legal certification of protected areas (Fig. 4). There are a number of different protected area categories which overlap. In the Czech area, there are large number of large-scale protected areas, along with small-scale “special protected areas” (Slavík et al. 2007 cf. Kochan 2012a). Poland has a network of national parks, landscape protection parks and fauna nature protection reserves (Bielawska-Roepke 2007 cf. Kochan 2012a). Protected areas of special natural spatial significance are located especially along the Polish-Czech and German-Czech borders. In the latter area, the “Saxon Switzerland National Park” was founded in 1990, which since 2000 borders to the “Bohemian Switzerland National Park” on the Czech side. Moreover, the largest number of Natura 2000 areas, including rock-ridge landscapes, mountain meadows and high bogs, are located along the Saxon-Bohemian border (Kochan 2012a). In addition, former mining areas, including ore mining pits and extensive opencast mine holes for brown coal should be considered valuable natural spaces deserving of protection (Mathey & Stutzriemer 2010; Slavík 2010).

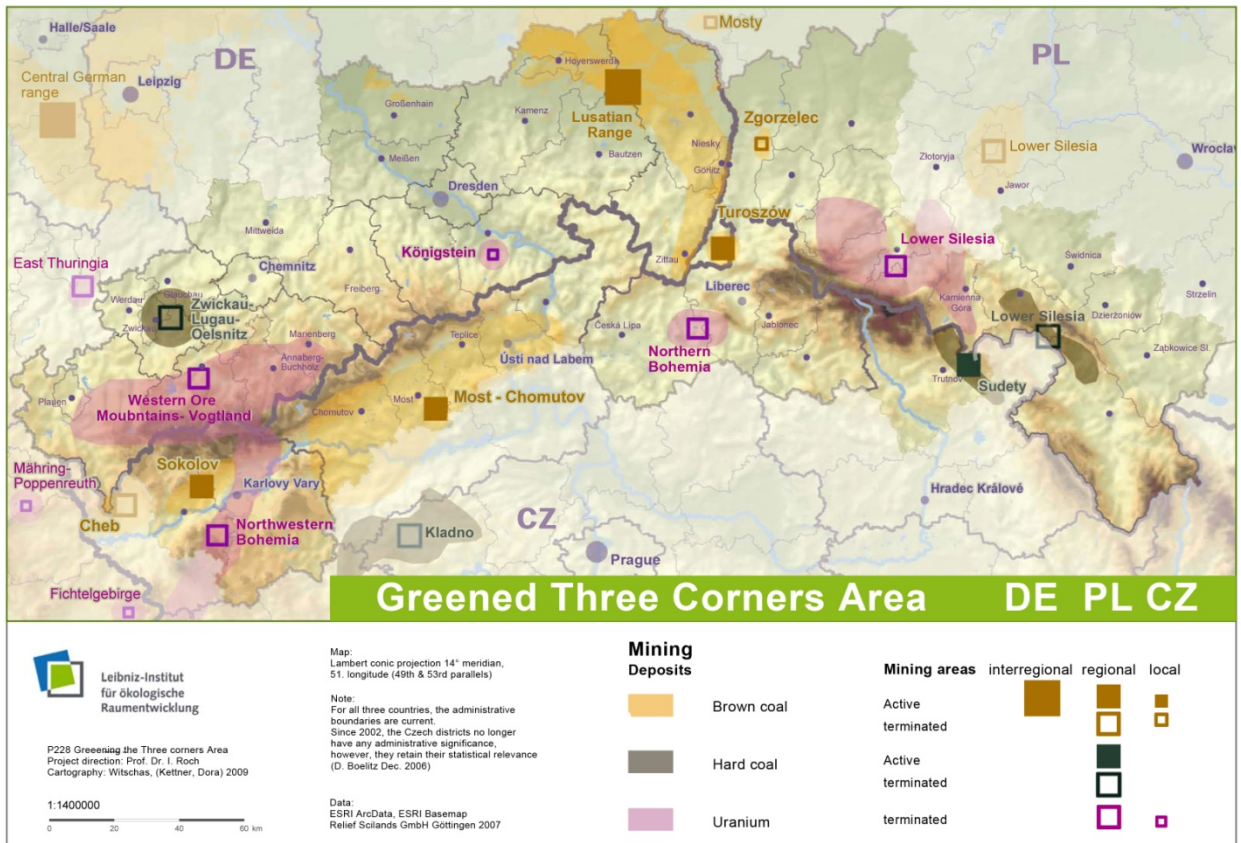


Fig. 3: Distribution of deposits in the case study area

In the Czech Republic, strategies for sustainable development by the Czech Ministry of the Environment (2006) provide development goals with priorities such as clean air, protection of nature, protection of the landscape and biodiversity. They thus enable use of natural resources protection of bodies of water and flood protection, and also improvement of environmental standards for the quality of life. In addition, an environmental program has been drafted which is to provide €5 billion to support projects for improving air water and natural quality by 2013 (Bečvár 2008, Jilková 2008 both cf. Mathey 2012). In October 2007, the Czech Environmental Report (CENIA 2007) was published, which revealed that some environmental problems are still continuing, or even worsening (Bečvár 2008 cf. Mathey 2012). In Poland, regional administrations are required under national environmental policy to draft environmental protection programmes. In the region of Lower Silesia, three programmes for environmental protection have been initiated, one of them for clean air (Błaszczów et al. 2008 cf. Mathey 2012). In Germany, environmental quality stipulations were established in 2006 in the context of the Saxon State Development Plan and the regional plans (Hegewald 2008 cf. Mathey 2012). Many of the cross-border activities in the Three Corners Region are based on EU programmes, such as the Goal Three support for improvement of environmental quality conditions (Albrecht 2008 cf. Mathey 2012).

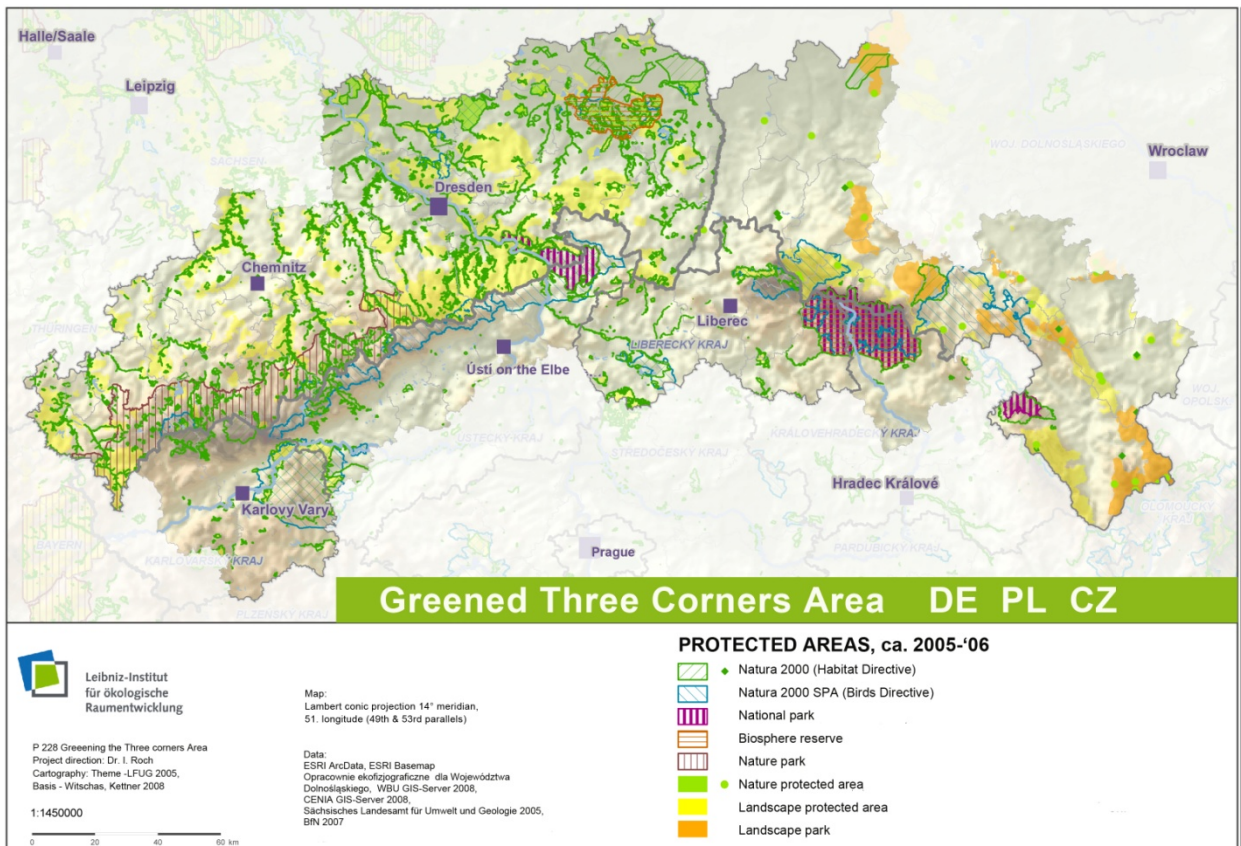


Fig. 4: Protected areas in the case study area

The future sustainability of the case study area continues to depend on an improvement of the environmental situation (Kochan 2012b). In order for the condition of the environment in the area formerly known as the “Black Triangle” to in fact deserve the name Green Triangle, significantly improved cross-border administrative coordination will be required. Here, air pollution continues to be a central challenge in the case study area. For the case study area to lose the negative image it obtained during the 1990s will require supranational political decisions to make possible a reduction particularly of the considerable greenhouse gas emissions caused by road traffic in the area formerly known as the “Black Triangle” (ČHMÚ et al. 2003; Conradt & Kuß 2000 both cf. Kochan 2012b).

The preservation of the unique and valuable natural landscape assets of the case study area according to the SWOT analysis (Pommer 2005 cf. Kochan 2012b) should be seen as an important mission for the future. In all three countries, large-scale environmental and conservation measures have been developed with the support of EU subsidy programs for agriculture and forestry, such as the programme to support organic agriculture, or to secure natural bio-diversity. In spite of growing tendencies, naturally appropriate farming and land-use still covers too small a part of the economically used area. The effects of climate change can also be expected to cause ecological problems in the case study area by drying up of some biotopes and by the risk of flooding (Pommer 2005; Rudolf 2011; UBA 2011 all cf. Kochan 2012b). Moreover, massive invasion of the landscape by engineering projects in the area of road building, flood protection (e.g. the construction of flood control basins) and renewable energy production are to be carried out in the case study area. In addition to the increasing traffic, growing fragmentation of the landscape as a result of road building and residential sprawl is a danger for the condition of the forests in the protected areas (Kochan 2012b).

Cross-border requirements for nature and landscape protected areas, as well as sustainable tourism, must receive a much greater priority than has hitherto been the case, in comparison with infrastructural measures in the areas of the economy, energy and transport. Especially sustainable tourism must be seen as an important cross-border economic and socio-cultural potential in the Three Corners Region. Especially in the Central Mountains, which have always been favourite hiking, winter sports and local recreational areas, tourism has increased in importance after having collapsed in the wake of the political change (Roch 2012). But brown coal opencast mining pits near the cities are in many cases also being turned into recreational landscapes, after extensive rehabilitation measures. Examples include the Senftenberg Lake and “Most im Grünen”. The same is true for the brown coal mines on the German Polish border at Bertsdorf near Görlitz and Turov, and in Lusatia (cf. Roch 2012). Collaboration on nature

protection generally takes the form of smaller groups focussing on particular problems. Cooperation at micro-regional level on cross-border issues is largely the work of city partnerships and networks. The exchange of information primarily takes place in the framework of workshops or other expert forums (Uhlir 2005 cf. Mathey & Stutzriemer 2010).

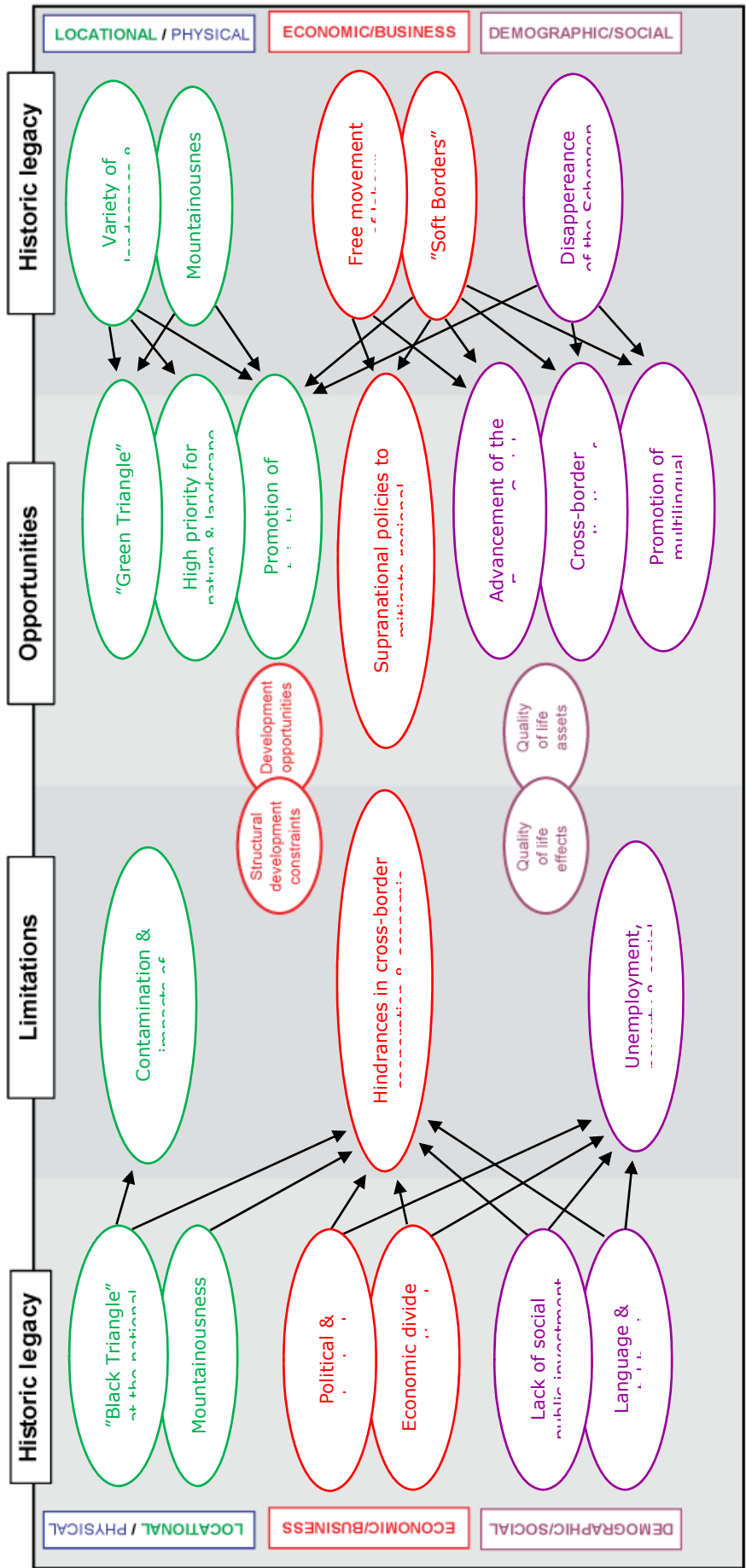
2. Synthesis

Since the Second World War, the Czech-German-Polish Three Corners Region has been lacking the kind of mediating stratum of the population which is typical of many European border areas. This deficit of cultural and social exchange exists to this day, and alleviating this problem it is one of the most prominent political and societal challenges of the border area. A number of studies on cross-border cooperation in the case study area have particularly pointed to the language and cultural barriers which, if they remain unaddressed, will not only hamper cross-border interpersonal contact, but will also negatively affect economic cross-border cooperation. If on the other hand, these cultural differences are taken into consideration, they can be expected to provide a productive impulse for the progress of economic integration. For this reason, the Three Corners Region must much more strongly expand the multilingual capacities of its population and institutionalize them through corresponding socio-cultural projects at concrete places in the border region (cf. here e.g. the socio-cultural projects in the Neisse Euroregion funded by the Micro-Project Fund (Mirwaldt 2009)).

With the fall of the Iron Curtain in 1989/1990, transformation processes involving deep changes for the economic and population structure were initiated in the areas which form the Czech-German-Polish Three Corners Region. Most strongly affected by the transformation were industry and mining. A large number of jobs in these sectors of the economy were lost. This caused a generally high level of unemployment, a reduction in the number of births, and a high rate of out-migration. In 2009, all three sub-regions of the Three Corners Region showed generally higher level of unemployment than the average for their respective countries. A comparison between the three parts of the Three Corners Region with one another continues to show a great gap in per capita GDP between the German sub-region on the one hand and the Polish and Czech sub-regions on the other. The economic gap in GDP along the national borders within the Three Corners Region, as well as the in some cases unfavourable economic development in some border areas, by comparison with their respective national averages, can be considered the result of a number of different factors, of which the effects of language and cultural barriers, structural particularities resulting from the transformation of central administrative systems to a market economy, and the results of the opening of the border overlap. At the same time, often very considerable economic gaps along the national borders in the case study area also shows clearly that cross-border economic development of the area will in future be very decisively dependent on intergovernmental and supra-national coordination processes of a common European economic policy.

The economic gap and the language and cultural barriers along the national borders moreover require regional cross-border coordinated perspectives between the national areas of the Three Corners Region for the future assurance of provision of the population, especially in the areas of housing, education, health and local supply. This is particularly relevant for the social inclusion of ethnic cultural minorities in the border area, e.g. the Roma in the Czech Republic. Under the conditions of demographic shrinkage, particularly the German and Polish areas are faced with major financial and institutional efforts to maintain qualitatively high levels of education and health systems, as well as an improvement of the accessibility of supply systems by way of public transport. Cross-border cooperation in the Three Corners Region in education and training is of especially great importance, e.g. with regard to the question of the mutual recognition of school-leaving and trading certificates, and of university degrees. The accession of Poland and the Czech Republic to the EU has greatly improved the situation in this regard. A good and comparable level of education in neighbouring countries could greatly increase the innovation capability of border regions, and promote good approaches for competitiveness in Europe. The same is true in the area of health: with the changing age structure of the population in the Three Corners Region, a growing public need for investment in health supply is foreseen as being required in all three sub-regions by 2020. Here too, intensive cross-border cooperation is needed to provide the accessibility of supply and hitherto undersupplied areas. In this context, a reinforcement and specific operationalization of the European Social Model at the European level with regard to border regions would be an essential precondition for better addressing the considerable political and administrative challenges of securing the supply of essentials for the population in the case study area in future. In the case study area, important successes have been achieved in reducing environmental damage caused by industrial and mining sources, as well as in the certification of a large number of protected areas, especially of the European network of protected areas NATURA 2000. The cross-border approach and cooperation since 1990, with a large number of measures and organizational forms has made a considerable contribution to this (Mathey & Stutzriemer 2010). The future sustainability of the region is however dependent on further improvement of the environmental situation. In order for the condition of the environment in the area previously called the "Black Triangle" to in fact deserve the designation Green Triangle, an improved cross-border political and administrative coordination, and, not

least, supra-national political decision-making will be required in such areas as the reduction of the considerable greenhouse gas emissions caused by road traffic in the border area (ČHMÚ et al. 2003; Conradt & Kuß 2000 both cf. Kochan 2012b). Particularly, cross-border requirements for nature and landscape protection, as well as sustainable tourism, must have a much higher priority than is been the case to date, compared with infrastructural projects in the areas of the economy, energy and transport. Sustainable tourism can be seen as an important cross-border economic and socio-cultural potential in the Three Corners Region. Especially in the Central Mountains, which have always been a favourite hiking, winter sports and local recreation area, tourism has been revived after its collapse at the time of the political change (Roch 2012).



3. Generalization from Case Study

A mediating stratum of the population which provides of cultural and social exchange in European border areas exists in varying degrees. Depending on how strongly a border region is marked by linguistic and cultural barriers, resulting negative economic effects may occur in cross-border cooperation. If these cultural boundaries are, on the other hand, taking into account, they can be expected to provide a productive impulse for the promotion of economic integration. The goal of every border region must therefore be to expand the multilingual skills of its population by means of investment and innovation, and institutionalize it by corresponding socio-cultural projects at concrete places in the border region.

The political transformation processes after 1989 brought changes in the economic and population structures in many border areas along the Iron Curtain. In many of these regions, this was followed by high unemployment, reduction in the birth rate and higher rates of out-migration. In recent years, especially in the transnational border regions at the new external borders of the EU, additional divisive effects, along with the existing gap in GDP, have resulted from the EU Schengen regime. While the situation in the border areas of the former EU external borders have improved as the result of EU enlargement, the border regions of the new EU external borders face considerable political and financial challenges to maintain and improve their economic and socio-cultural exchange, and also their cross-border administrative coordination.

Border regions in Europe moreover often function as national heavy industry sites on the outer periphery of their respective countries. At the same time, particularly in these regions, there are often coherent biotope communities with important ecological functions. In order to reduce environmental damage and secured improvement of ecological qualities in these border regions, close cross-border political and administrative coordination is required especially here, for instance in order to reduce the considerable greenhouse gas emissions in border areas caused by road traffic. Overall, cross-border requirements for natural landscape protection must receive a greater priority than has hitherto been the case with regard to infrastructural projects in the fields of the economy, energy and transport.

Annex 33: Polish-Ukrainian border

Description of the case study area and its geographic specificity

The border between Poland and Ukraine is a striking example of how relatively recent borders may generate complexity in terms of transnational belonging and political separation in European borderlands (Gasparini 1999). The Polish-Ukrainian borderland represents a “laboratory” in which one can observe how political changes of borderlines, visa regimes as well as economic and social changes in bordering states influence multiple forms of identity and exclusion in the neighbouring societies (Iglicka et al. 2011).

For centuries, the current border areas of Poland and Ukraine have shared a common multicultural and multilingual history. Polish-Ukrainian relations can be traced back to the 16th-17th centuries, when both countries were united in the Polish-Lithuanian Commonwealth. The Kingdom of Poland and the Ruthenian Kingdom (Western Ukraine) carried close ties even in the 13th-14th centuries. However, in the 19th century, with the rise of nationalism, the ethnicity of citizens became an issue, and national conflicts erupted. After the Polish-Ukrainian War (1918-1919) and the Polish-Soviet war (1919-1921) the Peace of Riga in 1921 adjoined Volhynia and Eastern Galicia to Poland, while the rest of contemporary Ukraine became part of the Soviet Union. At the beginning of World War II, Poland was split into two zones, one occupied by Nazi Germany while the eastern provinces fell under the control of the Soviet Union first, and in 1941 were seized by Germany as well. During this period, a systematic genocide of Jewish and Romani people took place, a huge number of the diverse local population in the area was deported or killed while references to the multicultural traditions in the area were cleansed. Thus, the Second World War resulted in homogenized national territorial spaces on both sides of a new borderline between Poland and the Soviet Union that was drawn at the war's conclusion. (Olma 2010)

The present Polish-Ukrainian borderline is the result of a series of international treaties and agreements in the post-war period. With the Yalta Conference in 1945, Poland's eastern borders were shifted westwards and forced the migration of thousands of people from the new borderland. In 1951 an agreement was signed to correct the course of the borderline and to replace sections of the state territories concerning an area of 480 km². Under this agreement the Soviet Union gave Poland a part of the circuit Drohobycz (currently, Lviv), which belonged to the Ukrainian Soviet Socialist Republic. Poland submitted to the jurisdiction of the Soviet a part of the Lublin province. After 1951 there was no more changes or adjustments to the border between the Polish People's Republic and the USSR.

The new border demarking the Ukrainian SSR and Poland was of a closed nature and a very low permeability (Scott & Matzeit 2006). Direct cross-border contacts were broken, and watch towers and barbed wire was installed in order to separate the Soviet citizens from those from the satellite states (Olma 2010). Although official propaganda after the war emphasized “fraternal” cooperation with the neighbouring Soviet republics, no free movement was allowed across the border (Kiiskinen 2009). Contacts between these two adjacent areas have also been hampered by underdeveloped transport and poor border infrastructure. As a result, the areas on both sides of the border have become provincial and peripheral. Furthermore, the administrative structure of the border areas of Poland and Ukraine was transformed after 1945 and regional centres at the border lost their political influence. (Scott & Matzeit 2006)

With the collapse of the Soviet Union in 1991, it appeared that cultural and mental barriers to

cooperation were disappearing and mutual approaches at the governmental level to cross-border cooperation were starting to emerge. Cooperation occurred in a lot of different areas (even though it often still remained within the sphere of high-level symbolic declarations (Scott & Matzeit 2006)): border infrastructure, spatial planning, transport, municipal governance, industry, trade, agriculture, environmental protection, health care, education, culture, tourism, and other areas. For example, the Ukrainian language became a second language in schools of the Polish border areas and the Polish language in Ukrainian border areas *visa versa* (EUDIMENSIONS 2009).

However, due to recent measurements related to the fortification of a heavily militarized external EU border, the region is seriously affected by local border conflicts and divisive effects on cross-border cooperation. The aim of the study is to analyse the current political status along the Polish-Ukrainian border in regard to openness and closure and its impact on transborder communities.

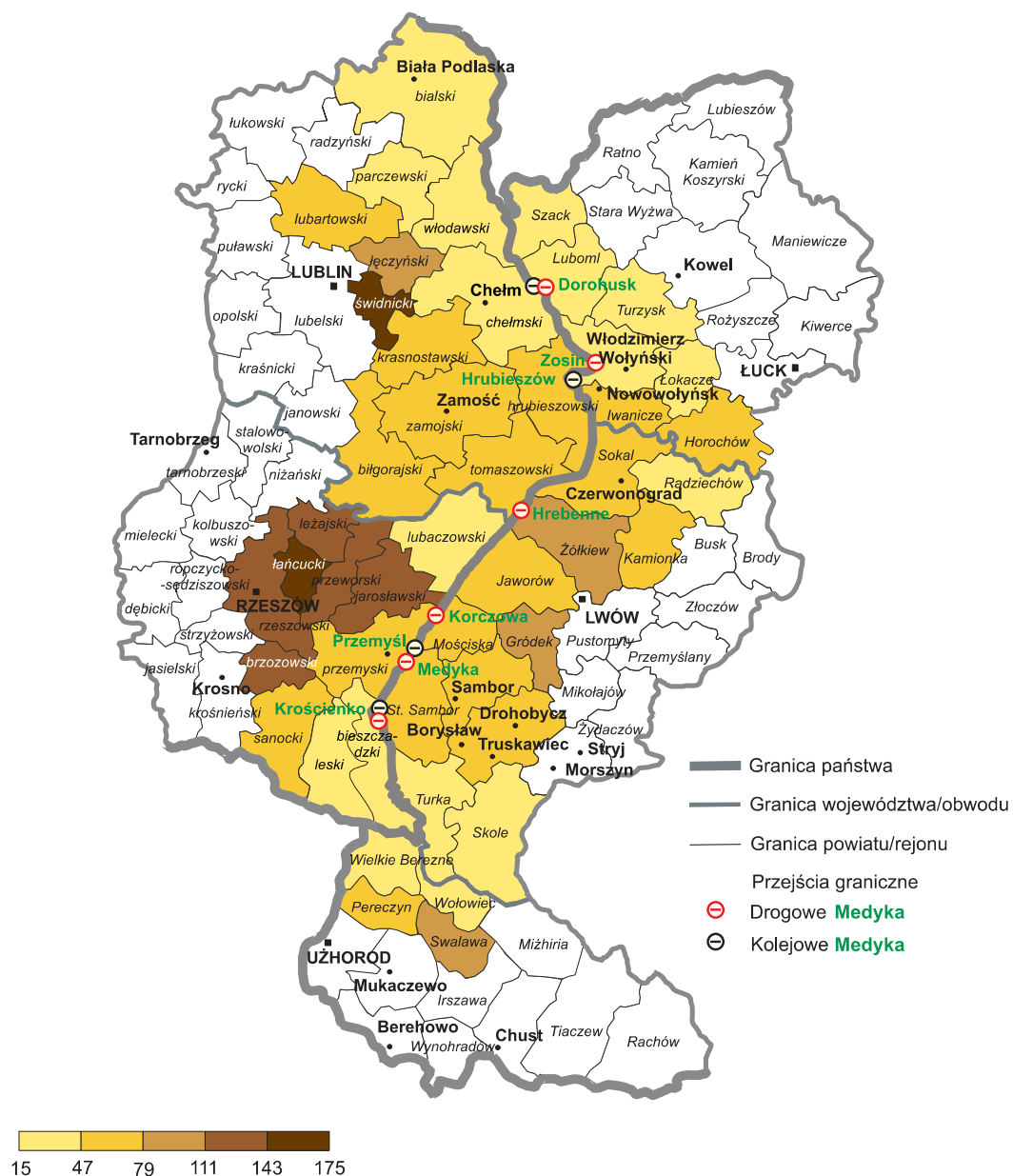


Image 1: Population of the Polish-Ukrainian borderland per km² in 2006 (Source: Tucki 2007)

The Polish-Ukrainian borderland covers two NUTS2 regions in Poland: the Lubelskie and Subcarpathian Voivodeships, which were inhabited in 2006 by 4.3 million people (11.2% of the population of Poland). On the Ukrainian side there are three border regions: the Lviv, Volyn and Zakarpattia Oblasts, which were inhabited in 2006 by 4,8 million people (10.3% of the population of Ukraine). During 2000-2006 the number of inhabitants of the borderland decreased about 1.4% on the Polish and about 2.7% on the Ukrainian side. The case study area is poorly populated, and its characteristic feature is the density of population which is lower than the average for Poland or Ukraine. The distribution of population is uneven which is due to the non-homogenous natural environment conditions, economic character, urbanization level and to the differentiated demographic settlement processes in the post-war period. In terms of population, the biggest cities of the area are Lviv (735,000 people) and Lublin (353,400 people). (European Centre for Integration and Self-Government Co-Operation 2008)

The demographic analysis of the inhabitants of the cross-border area shows the intensification of negative phenomena: a significant decrease in population number, negative population growth rate, negative net migration rate, aging of population, an increase in the number of disabled people and a shorter life expectancy of men. The demographic situation of the border areas in view of current trends looks unfavourable, and the demographic opinions and forecasts drawn up by Statistical Offices of Poland and Ukraine show that such tendencies are probable to last till 2020. It is predicted that the number of people will decline, and the higher decrease will occur in rural areas, where the pace of the decline will be twice as fast as in urban areas. (Ibid.)



Image 2: Bug river at the Polish-Ukrainian border near Ustyluh in the Volyn Oblast (Source: Szygiel 2009)

The Polish-Ukrainian border is partly formed by the small river Bug, partly by agricultural land and the last part of the line is running through the Carpathian Mountains. There are some barriers of a geographical nature in the case study area, which would have an impact on the cross border interaction. However, the Polish-Ukrainian border appears to be

perceived mainly as an artificial political barrier to social and economic interaction. This perception is particularly related with the impact of the EU external border regime. (Scott & Matzeit 2006)

Along the 535 km long Polish-Ukrainian borderline only 6 road and 4 railroad crossing points are in place. The existing border crossing points are not sufficient for the handling of the large transport flows across the border (by comparison: at the Polish-German border which is 467 km long, there are 21 road and 6 railway crossings). The only border crossing check point where pedestrian traffic is permitted is the Medyka-Szeginie check point. It is also the only place where you can cross the national border by bicycle (expeditiongreenthorn.com 2011).

Both Poland and Ukraine will host the EURO 2012 Football Championship after jointly applying for the opportunity to become the ground for the sports event. Poland plans to construct two new border crossings along its border with Ukraine, as well as modernize its current checkpoints, in order to be better equipped to process the intensified movement of fans and tourists during the tournament. However, the border security measurements for the EURO 2012 might further tighten the permeability of the borderline. (Nelson et al. 2011) In any case, the event could provide a chance for tourists and television viewers to become aware of the divisive effects of the Schengen regime on both neighbouring societies.

The Polish artist Jaroslaw Koziara created a giant land art installation at the Polish-Ukrainian border to offer resistance to this new line of division within Europe. "Ukraine is not a part of the Schengen Area and thus is the dividing line for the whole European continent. But artists cannot agree with that – this is how we create ideas that bring to life extraordinary border defying projects," said Koziara. From the bird's-eye view an onlooker may get the impression of two fish swimming across the Polish-Ukrainian border. The land art installation was created by seeding different kinds of plants on a field at the border between the villages Horodyszczce in the Lublin province of Eastern Poland and Varyazh in the Lviv Oblast of Western Ukraine. (WNU 2011)



Image 3: One of two giant fish crossing the Polish-Ukrainian border in 2011 (Source: Wojciech Pacewicz / EPA)

1. Impact of the EU external border regime on transborder communities

Until the late eighties of the previous century international mobility of the USSR citizens was strictly regulated and rare. Due to the restrictive policy, individual trips other than official tours were practically excluded. The lifting of visa requirements at the Polish-Ukrainian border in 1993 therefore was a historic moment for the people living in the borderland of meeting their neighbours on the other side of the borderline. The Polish-Ukrainian borderland became an experimental field of new population processes. (Iglicka et al. 2011)

The area of free travel established in the 1990s in Central Europe led not only to the development of friendly neighbour relations and cooperation between the two countries, but also was crucial for the survival of a certain category of Ukrainian citizens – primarily the population of border areas which were considered as regions that experienced the strongest impact of the economic crisis that followed the transformation in the 1990s. Growing unemployment and degradation of life conditions in Ukraine after the independence led to an increase of circular mobility and labour migration from the Ukrainian border areas. According to a study conducted in the three border oblasts (Volyn, Zakarpattia and Lviv) in 2003, a large majority of Ukrainians living in these areas had travelled to work in either Poland or Hungary (80%). (Malynovska 2006) The price increase in Poland, which was the effect of the transition to a market economy, caused the flourishing of petty border trade consisting in bringing into Poland cheap products of the disintegrating Soviet economy. During a short stay in Poland (usually not longer than a week) Ukrainians tried to sell commodity directly at local market places. These activities of Ukrainian border citizens were predominantly informal, spontaneous and developed as a form of self organisation of society. (Iglicka et al. 2011)

The EU enlargement and the introduction of Schengen rules on the Polish-Ukrainian border had tremendous impact on the emerging transborder communities. In preparation for signing the Schengen Agreement and in order to adjust its border-crossing policy to EU norms, the government of Poland introduced the Aliens Law in 1997. This law stopped the free movement of people from Ukraine across the Poland's eastern border, a movement that had been flourishing since the early 1990s. Borderland citizens crossing the border were now required to possess a legal document stating their identity and a tourist voucher. Citizens of the Polish border area were exempted from this requirement. In the following years, the EU increasingly imposed on Poland stricter conditions, in order to reduce the openness and strengthen the control of its future external borders. After the accession to the European Union in 2004 and to the Schengen zone in 2007, Poland had not only to harmonise its visa policy with the common visa policy of the EU, but additionally, it had to adopt the EU common external trade regime and abandon all previous bilateral trade arrangements with its non-EU neighbour Ukraine. (Olma 2010)

The Polish-Ukrainian border became an external border of the EU and the number of Ukrainian visitors to Poland dropped dramatically. After the Schengen accession of Poland, a significant decrease of 2.6 times fewer trips of Ukrainian citizens to EU member states are counted (CPCFPU 2008). What was before fluid movement across the border became characterized by long lines, customs, cash requirements and other ensuing difficulties (Iglicka et al. 2011). A visa is difficult to obtain as a regular Ukrainian citizen. There are many requirements (salary statements, invitations etc.) to receive a Schengen visa. Due to expensive visas, cross-border activities that were crucial for the survival of a certain category of Ukrainian citizens disappeared from the landscape of border marketplaces (Skowronek & Furtak 2009). The expansion of the Schengen zone is in this way deepening the national

and social gap between the Ukrainian elite and the rest of the society. The EU external border regime had a negative impact on cross-border trade and cooperation, travel and human contacts, and the situation of national minorities. A new line of division within Europe was established that cuts not only through transborder cultural, historic and linguistic ties but also hinders political and economic cooperation between areas that are already among the weakest economic regions in both countries (GDP per capita is about 70% of the national average) (Gorzalak et al. 2011). The border areas are determined by an increase of poverty and social exclusion of a great number of households, which is due to an unfavourable situation on the job market and lack of possibilities of earning an appropriate income. The Schengen regime constitutes a further significant barrier limiting the future development of the border areas. (European Centre for Integration and Self-Government Co-Operation 2008)

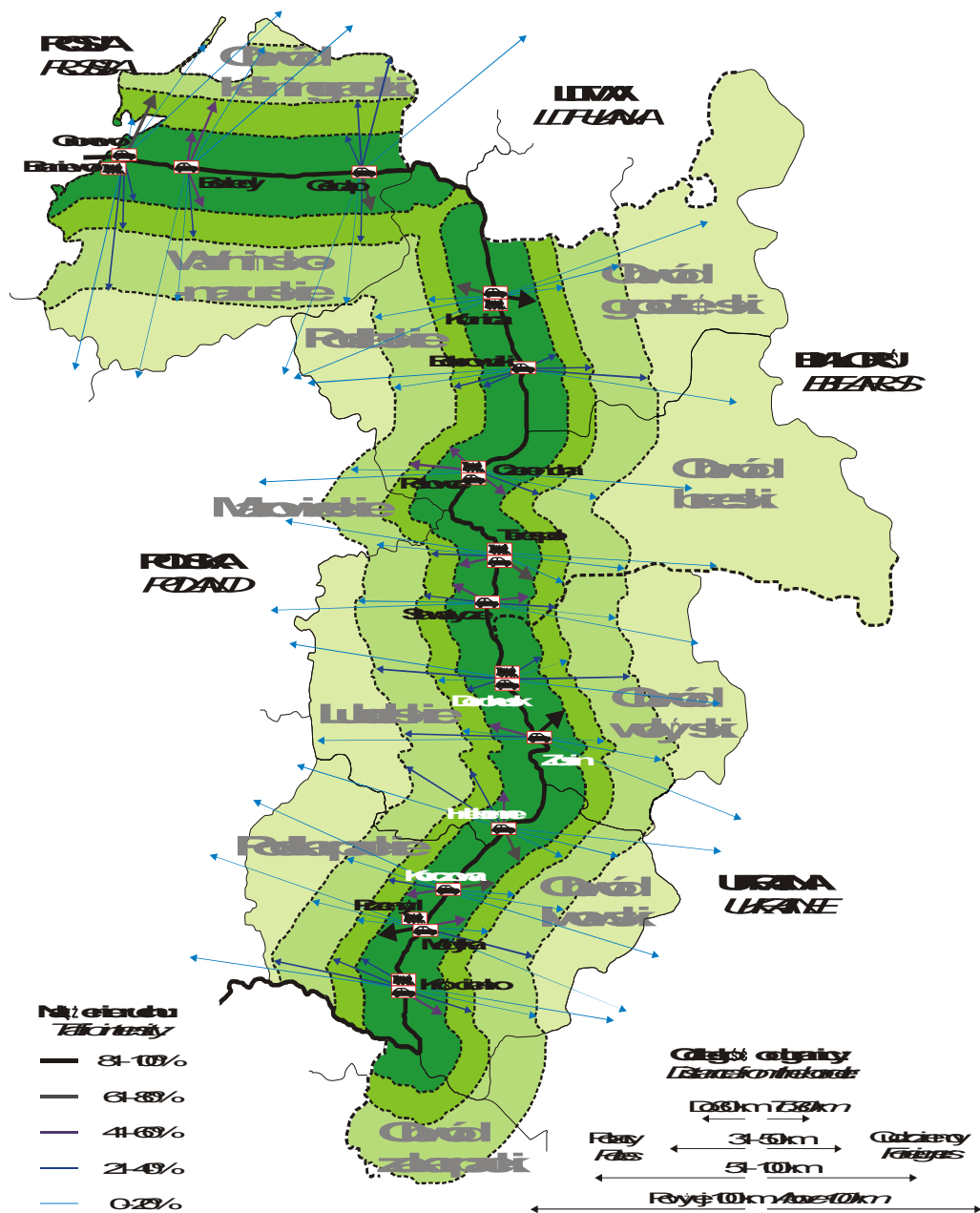


Image 4: Delimitation of areas under the influence of the border on the basis of distances from the border to the place of residence of Poles and foreigners crossing the European Union's external border on the territory of Poland in 2010 (Source: Central Statistical Office (Poland) 2010)

The population of Ukrainians living in the border areas was most strongly affected by the introduction of the new visa regime. Until October 2003 Ukrainians benefited from non-visas entrance that allowed them designing the length of stay according to their needs on the basis of legal residence visas and documents. After the introduction of the Schengen visa regime, the Ukrainian migrants have easily fallen into illegal residence, if, due to different reasons, their stay in Poland was extended without legal basis. (Iglicka et al. 2011)

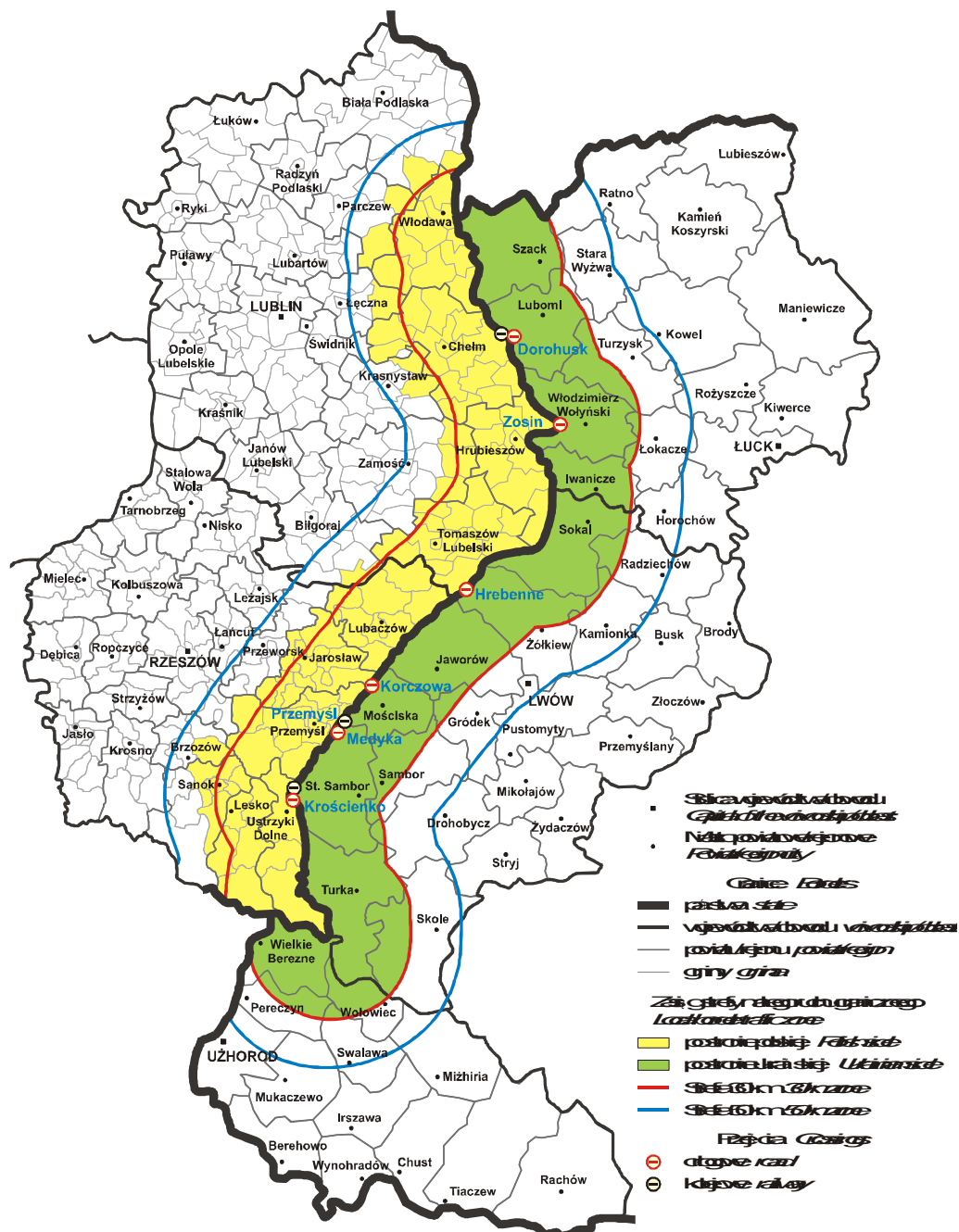


Image 5: Polish-Ukrainian local border traffic zone (Source: Central Statistical Office (Poland) 2011)

In regard to those problems, the EU Commission aimed to facilitate the crossing of the EU „external borders“ by locals of the bordering area of the neighbouring country. In 2006, a

corresponding regulation laid down specific rules on local border traffic (LBT) at the „external land borders“ of the Member States that should allow derogating, for persons living in a border area, from the general rules on border checks set out in the Schengen Borders Code (European Commission 2006). *“The aim is to avoid creating barriers to trade, social and cultural interchange or regional cooperation with neighbouring countries. The Regulation authorises Member States to conclude bilateral agreements with neighbouring non-EU countries, provided these agreements fully comply with the parameters set by the Regulation.”* (European Commission 2011a) An Agreement between the Government of the Republic of Poland and the Cabinet of Ministers of Ukraine on rules on local border traffic was signed on 28 March 2008. The agreement came into force on 1 July 2009.

The LBT regulation allows residents of Ukraine living within 30 kilometres from the border to buy for the sum of €25 a permit to travel the neighbouring borderland up to 30 kilometres. To obtain this visa the person needs a valid travel document; documents proving his/her status of border resident and the existence of legitimate reasons for frequent border crossing, such as family links, social, cultural or economic motives. Evidence for sufficient funding in relation to the stay is also required. Residents are excluded from the local border traffic permit for whom an alert has been issued in the Schengen Information System (SIS) for the purposes of refusing them entry. Also excluded from the permit is everyone who is considered to be a threat to public policy, internal security, public health or the international relations of any of the Member States, and in particular where an alert has been issued in Member States“ national databases for the purposes of refusing entry on the same grounds. (European Commission 2006)

The introduction of the bilateral LBT agreement between Poland and Ukraine had a positive impact on the level of border traffic intensity. Poland registered 883 696 LBT crossings during the period July 2009 to April 2010, with numbers tending to rise. The average number of visits to Poland per LBT permit is 20.4 and the average stay is around six hours (European Commission 2011a). The increase of cross-border traffic might stimulate a revival of border trade and thus mitigate the further economic decline of the border areas.

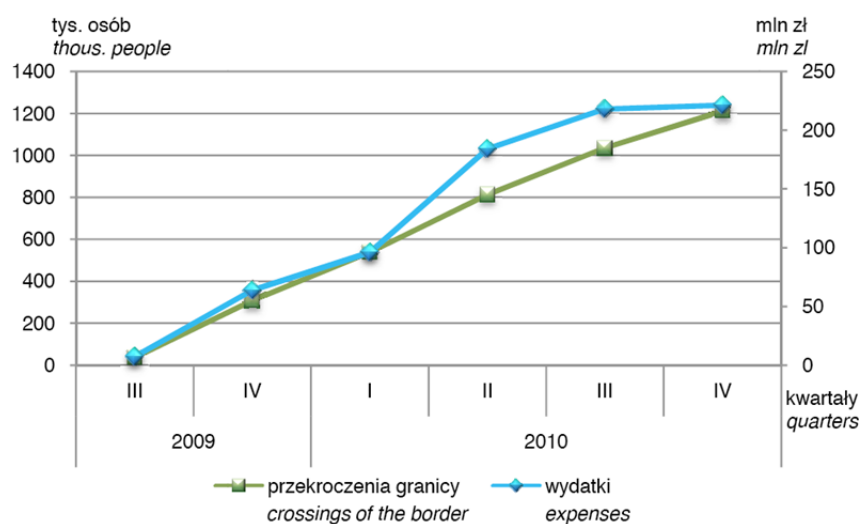


Image 6: Local border traffic at the Polish-Ukrainian border by quarters (Source: Central Statistical Office (Poland) 2011)

The regulation, however, does not provide for very generous concessions from the EU:

“Firstly, the zone defined as „border area “ (...) encompasses a relatively narrow territory of 30 kilometers. It is quite likely that people with links with the new EU member states (...) will live beyond this zone. Furthermore, although the visa can be issued for up to five years, the procedure for obtaining it (the required documents), as well as the necessary actions (in the majority of the cases it is most likely the local residents will need to undertake a fairly long journey to the closest consular or diplomatic mission of the EU member state, since no visas are issued at the border) are not doing enough to facilitate the process for the local residents.” (Kostadinova 2010) The Regulation does not affect the provisions of Community and national law applicable to third-country nationals relating to long-term stays, access to and exercise of economic activity or customs and taxation matters (European Commission 2006). Moreover, the agreement between Poland and Ukraine requires travel medical insurance contrary to the EU Regulation. Thus, it is not surprising that until April 2010 only approximately 2.7% of the total eligible population in the Polish-Ukrainian borderland made use of LBT permits. (European Commission 2011a)

Throughout 2010, Ukrainian was the nationality most often refused entry at an external border of the EU, with most refusals taking place at the land border between Poland and Ukraine, despite the LBT agreement (Frontex 2011).

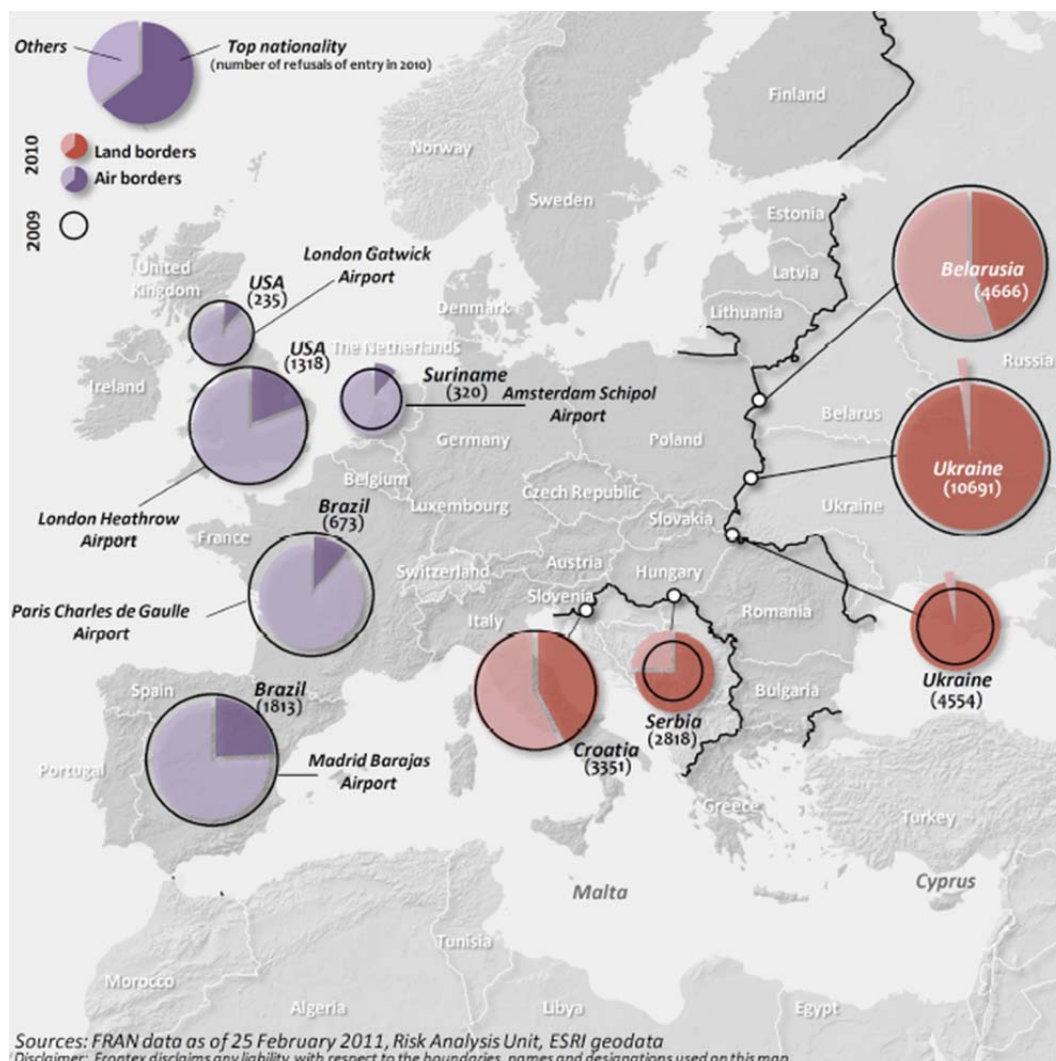


Image 7: Main areas of refusals of entry and share of top nationality in 2010 (Source: Frontex 2011)

Several authors even assume that the further „securitization“ of the EU external border in fact will effectively undermine the declared aim in the LBT regulation to avoid a socio-cultural and economic dividing line at the edges of the Schengen regime (Saari 2006; Kostadinova 2011). *“Despite the talk about Europe without dividing lines, the enlargement and the growing progress in home and justice affairs (JHA) of the EU unintentionally strengthens the trend of exclusion and produces the risk of marginalising the non-members. It has been noted that as the 'area of freedom, security and justice' expands and deepens within the Union, the outer edges grow sharper.(...) It has become increasingly evident that states that are neither EU members nor candidate countries are in danger of becoming permanent outsiders of the new Europe.”* (Saari 2006)

In this context, the European Commission itself expresses the impact of „security requirements“ on challenges to improve the potential territorial exclusion of border areas: *“Poland has called for a change in the way the Regulation defines the border area. Poland considers that the current definition leads to the division of integrated areas and excludes political and economic centres. Defining the eligible border area was one of the most difficult points during the discussion of the draft Local Border Traffic Regulation in 2006. While cross-border movements should indeed be facilitated, the security requirements of the entire Schengen area also had to be considered, as the LBT regime is an exemption from the general rules for external border crossings.”* (European Commission 2011a) *“The Commission therefore believes that the LBT Regulation strikes the right balance between facilitations and the security concerns of the Schengen area as a whole. Consequently, the Commission is not considering amending the LBT Regulation”.* (Ibid.)

The general character of the new border appears to be a key question in the very near future – will it become a “new-iron curtain” or a line of real co-operation? (Krok 2004) The dilemma, of course, is that when countries try to ‘harden’ borders – particularly where cross-border travel has boomed since the end of the Cold War (as between Poland and Ukraine) – they may end up fostering even more illegal cross-border activity, as people are forced to circumvent controls (Smith 2006).

In this context, the ENPI program has focused on border security rather than on cross-border socio-economic and socio-cultural development. The activities of the institutions established to support and promote cross-border cooperation, particularly the Carpathian and Bug Euroregions, are hardly noticed by both entrepreneurs and inhabitants. The extremely large geographical coverage of the Euroregions resulted in a weak involvement in the initiation, implementation and coordination of the cooperation. Moreover, EU funds allocated to this border were very small and allowed to cofinance only few joint small euroregional projects in the fields of tourism, culture, environmental protection, media, history and research and education. (Krok 2004) The introduction of the Schengen regime on the Polish-Ukrainian borderland in 2007 has produced a further obstacle to cross-border cooperation.

Precisely because of the Schengen regime, further efforts need to be undertaken to prevent the broadening of a socio-economic dividing line in Europe and to make use of the high socio-cultural and environmental values of the Polish-Ukrainian borderland.

Regarding education for example, a great number of cross-border migrants from the Ukrainian borderland have a secondary or tertiary level of education. Only 10% of migrants moving between Poland and Ukraine possess not more than basic secondary or primary education (SSCU 2009). However, migrants with secondary and even tertiary education are mostly employed as unskilled farm workers, cleaners or builders. The strategy of short term employment and shuttle migration is the one predominating among Ukrainian borderland citizens working in Poland. Significant worker shortages in certain sectors, further triggered

by the Polish outflow to the UK and Ireland after 1 May 2004, brought the Polish government to open its labour market to seasonal workers from the Eastern neighbouring countries. These regulations introduced in 2006, in spite of strong opposition of trade unions, were even liberalized, extending a period of a single stay to 6 months within a year and to all economic sectors. This policy has shaped a precarious and exploitative form of circular mobility for many high-skilled Ukrainian borderland citizen. (Iglicka et al. 2011)

The Polish-Ukrainian borderland is still, even after the border changes and population movements caused by the Second World War, one of the most diverse regions in Poland and Ukraine in terms of ethnic cultural heritage and minority cultures. The notion of Galicia is to some extent present in Poles' and Ukrainians' consciousness of a region of identification. While national identities appear to create partly ambivalent attitudes among border citizens, their cross-border heritage and practical understanding of the border can create multilingual places of everyday interactions between citizens with shared experiences. In recent years, local events and festivals addressed to the people from the region have brought about some positive effects such as a chance of getting to know the neighbours, their lives, customs and problems. However, despite a common history, cultural affinities, similar languages and a general awareness of these similarities, there is a lack of identification with the cross border region. (Scott & Matzeit 2006)

It is necessary in this context that the Euroregions are better tailored to local needs and are able to better involve local self-governments. Particularly a deeper involvement of youth cultural organisations from the smaller towns on both sides of the border is required to put aside stereotypes, prejudices and inhibitions. It will also be necessary to improve the cooperation between higher education institutions in terms of youth exchange programmes and the joint implementation of research projects and studies by scientists from Poland and Ukraine. (Ibid.)

Ukraine means literally “borderland”, as the country always has been a place of transit in between the East and West. Nowadays the Ukraine is an important gateway to the EU. From many countries in the world Ukraine is relatively easy to reach, as many nationalities do not need a visa for Ukraine. Around 70% of the migrants which use Ukraine as transit country enter Ukraine legally (Bordermonitoring Ukraine 2009). However, migrants and refugees are frequently refused an adequate status and remain irregular in Ukraine. (Düvell & Volmer 2009) The recognition rates of asylum seekers in Ukraine remain very low (3% over last 5 years) resulting in many asylum seekers spending years in legally precarious situations, which does not, of course, facilitate their integration prospects in Ukraine (UNHHR 2011a). Furthermore, an arising issue seems to be xenophobic movements among the public spheres particularly in western Ukraine where skinheads and racist groups are gaining prominence (Pylynskyi 2008). Because of their precarious situation in Ukraine, refugees are often trying to request asylum in the EU. However, after the expansion of the Schengen zone in 2007, refugees being legally in Ukraine became increasingly criminalized already before they were able to enter the territory of the EU to request asylum. (Kamphuis 2011)

The Ukrainian border guards service and militia are allowed to detain persons caught within 50-km from the border in special screening rooms in order to examine the purpose of their presence in the borderland. The limit on detention in these facilities close to the Polish-Ukrainian borderline is 10 days. In practice, however, prolonged detention does occur for up to three months. Non-citizens who are to remain in administrative detention are to be transferred to one of the country's two “migrant accommodation centres” (MAC). In the centres people are caught who are suspected of illegal entry, unauthorized arrival or visa violations. Individuals have to wait here before a decision is being made whether a visa will be granted or one will be repatriated to the country of origin. In these centres the maximum limit of detention is six months. (Global Detention Project 2009; Kamphuis 2011) Many migrants, including children, reported that border guards threatened to keep them detained

for a full period of six months unless they paid a bribe. Nothing in Ukrainian law prohibits the authorities from re-arresting migrants shortly after release from detention and detaining them for another six months. Human Rights Watch met a number of migrants who had been detained multiple times. Migration detainees in Ukraine have no consistent, predictable access to a judge or other authority or access to legal representation to enable them to challenge their detention. (Human Rights Watch 2010; Border Monitoring Project Ukraine 2010)

On January 1, 2010, a readmission agreement between the European Union and Ukraine came into force that provides for the return of third-country nationals who enter the EU from Ukraine including an accelerated procedure for individuals apprehended near the border. Readmission agreements are a cornerstone of the European Union's so-called externalization strategy for asylum and migration. The core of this strategy is to stop the flow of migrants and asylum seekers into the EU by shifting the burden and responsibility for migrants and refugees on those countries that neighbour the Union, in this case Ukraine. Such an agreement presumes, however, that the receiving state will provide comparable treatment and respect for rights as the sending state. However Ukraine should not be considered as a "safe third country" according to the Ukrainian refugee council based on the UN committee against torturing (Ukrainian Refugee Council 2010). The Global Detention Project defines the standards in the detention centres as: "*very poor, pointing to severe overcrowding, insufficient medical care, and prolonged detention, among other problems.*" (Global Detention Project 2009; Kamphuis 2011)

The fortification of the EU external border itself is located at the former edges of the Soviet Union. Most of the watchtowers and gates are still dating from this era and are still in function (Kamphuis 2011). The level of control at the Ukrainian side of the border is being raised as the EU is financing the Ukrainian border management as well. In the period from 2000 to 2006 the main funding source was TACIS (Technical Aid to the Commonwealth of Independent States), which spent more than €35 million on migration management and border control projects in Ukraine, of which about three-quarters went to private defence and security contractors for border control and surveillance equipment and training. The ENP (European Neighbourhood and Partnership Instrument), with a budget of €494 million for Ukraine from 2007 to 2010, helped to further militarize the Polish-Ukrainian border in order to create a ring of friends around the EU. The EU has also put considerable funding into strengthening the Polish-Ukrainian border through Frontex, the European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union. Frontex's reach has extended beyond the borders of the EU into Ukraine. Money for the improvement of "security" at the border could be used to improve living conditions for detained persons as well. However, the priority of the improvement of these standards is much lower according to the distribution of the European budget. (Human Rights Watch 2010)

UNHCR appeals to Poland to use every opportunity to make clear that border management is not only about state security. As recent events demonstrate, the refugees' access to the territory of the EU is crucial (UNHCR 2011). ECRE notes with concern that a number of essential safeguards for asylum seekers are still not legally guaranteed. These include *inter alia*, the prohibition of detention of unaccompanied minors; derogations from safeguards against arbitrary detention in vaguely defined "exceptional" circumstances or locations; the possibility to deny asylum seekers access to the labour market for up to one year in certain circumstances. (ECRE 2011)

The upcoming EURO 2012 Football Championships, which Poland and Ukraine will cohost, is going to further tighten the permeability of the Polish-Ukrainian border. Soccer fans will cross the Polish-Ukrainian border multiple times in order to attend the 31 matches that will be split between the two countries between June 8 and July 1, 2012. Poland plans to

construct two new border crossings along its border with Ukraine, as well as modernize its current checkpoints, in order to be better equipped to process the intensified movement of fans and tourists during the tournament. Four Polish border crossing points with Ukraine will be equipped with special lanes for fast clearance of fans. “Clearly, cross-border cooperation between Poland and Ukraine will be crucial in the run-up to and during EURO 2012, as it will challenge Poland’s border management infrastructure and personnel in new and untested ways. The EU authorities have expressed considerable concern regarding the potential for unwanted immigration into the European Union through Poland during the course of these games.” (Nelson et al. 2011)

2. Synthesis

The Polish-Ukrainian border constitutes a problematical barrier to the social, economic and territorial cohesion of the case study area. Due to recent measurements related to the fortification of a heavily militarized EU external border regime, the Polish-Ukrainian borderland is seriously affected by development obstacles and divisive effects on transborder communities. A new line of division within Europe has been established that cuts not only through transborder cultural, historic and linguistic ties but also hinders political and economic cooperation between areas that are already among the weakest economic regions in both countries (GDP per capita is about 70% of the national average). The border areas are determined by an increase of poverty and social exclusion of a great number of households, which is due to an unfavourable situation on the job market and lack of possibilities of earning an appropriate income. The Schengen regime constitutes a further significant barrier limiting the future development of the border areas. Positive side effects of the presence of the border such as small cross border trade became very difficult and as a visible result, Ukrainian citizens have disappeared increasingly from the landscape of border marketplaces in Poland.

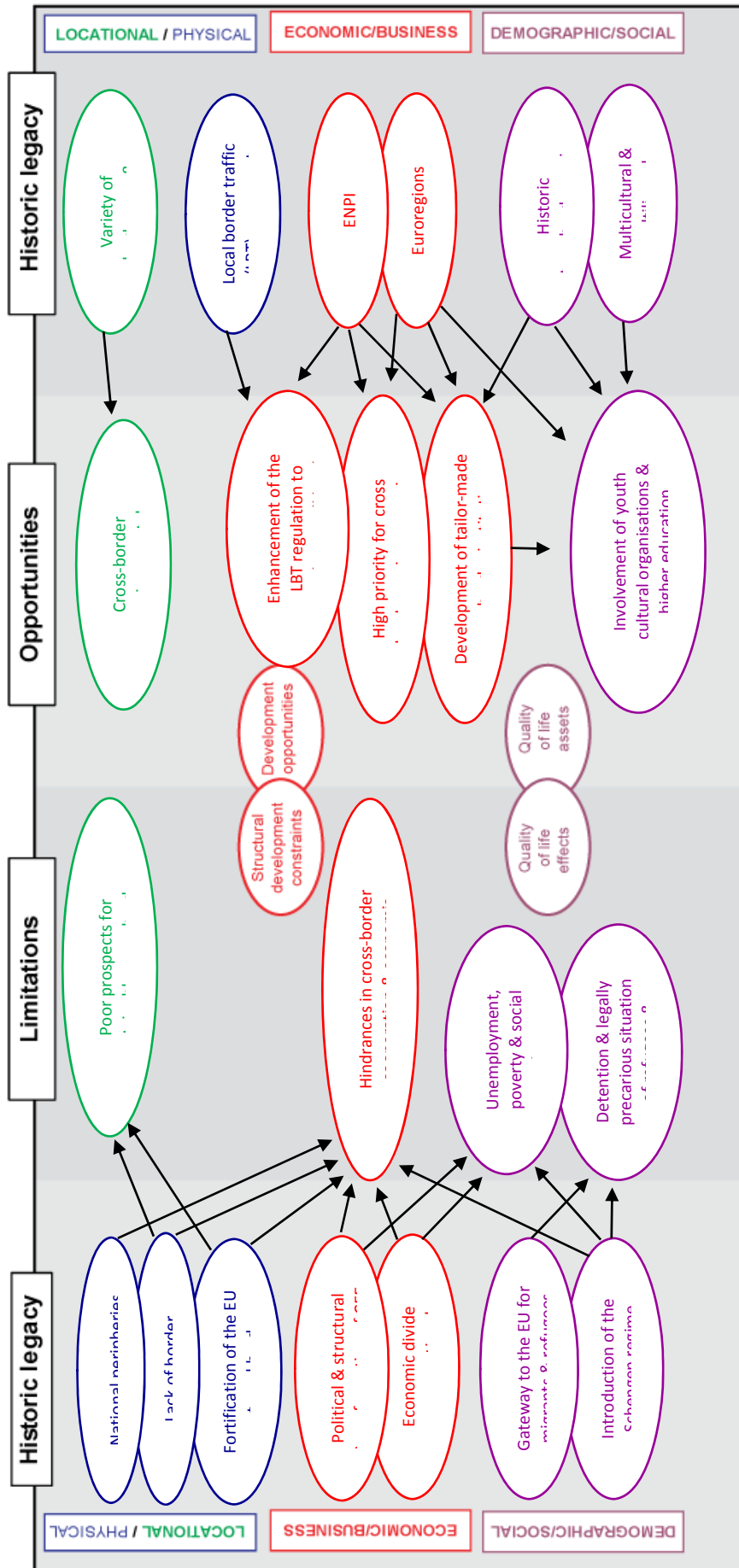
The EU Commission aims to facilitate the crossing of the EU „external borders“ by locals of the bordering area of the neighbouring country. A corresponding local border traffic (LBT) agreement between Poland and Ukraine came into force on 1 July 2009. The LBT agreement allows residents of Ukraine living within 30 kilometres from the border to buy for the sum of €25 a permit to travel the neighbouring borderland up to 30 kilometres. To obtain this visa the person needs legitimate reasons for frequent border crossing, such as family links, social, cultural or economic motives. Evidence for sufficient funding in relation to the stay is also required. The introduction of the LBT agreement had a positive impact on the level of border traffic intensity. The increase of cross-border traffic might stimulate a revival of border trade and thus mitigate the further economic decline of the border areas. The LBT agreement, however, encompasses a relatively narrow territory of 30 kilometres and it is quite likely that people with cross-border links will live beyond this zone. Furthermore, the procedure for obtaining the required documents are not doing enough to facilitate the process for the local residents. In the first years after the introduction of the LBT agreement, only a small percentage of the total eligible population in the Polish-Ukrainian borderland made use of LBT permits. Throughout 2010, Ukrainian was still the nationality most often refused entry at an external border of the EU, with most refusals taking place at the land border between Poland and Ukraine, despite the LBT agreement.

Along the 535 km long Polish-Ukrainian borderline only 6 road and 4 railroad crossing points are in place. The existing border crossing points are not sufficient for the handling of the large transport flows across the border. The handling of the traffic at the border is happening at such a slow pace that people often have to wait for hours or sometimes, especially cargo traffic, even days. There is only one border crossing check point where pedestrian and bicycle traffic is permitted. Two new border crossings are planned in order to be better equipped to process the intensified movement of fans and tourists during the EURO 2012 Football Championship. However, the border security measurements for the EURO 2012 might further tighten the permeability of the borderline. Several authors assume that the further „securitization“ of the EU external border in fact will effectively undermine the declared aim in the ENPI program and LBT regulation to avoid a socio-cultural and economic dividing line at the edges of the Schengen regime.

Ukraine means literally “borderland”, as the country always has been a place of transit in between the East and West. The Polish-Ukrainian borderland is nowadays an important gateway to the EU and still one of the most diverse regions in Poland and Ukraine in terms

of ethnic cultural heritage and minority cultures. The notion of Galicia is to some extent present in Poles' and Ukrainians' consciousness of a multicultural and multilingual region of identification. However, migrants and refugees are frequently refused an adequate status and remain irregular in the borderland. After the expansion of the Schengen zone in 2007, refugees being legally in the Polish-Ukrainian borderland became increasingly criminalized. The Ukrainian border guards are allowed to detain persons caught within 50-km from the border in order to examine the purpose of their presence in the borderland. Many asylum seekers spend years in detention or in legally precarious situations, which does not facilitate their integration prospects in the borderland. Furthermore, an arising issue seems to be xenophobic movements among the public spheres in western Ukraine where skinheads and racist groups are gaining prominence.

The ENPI program has focused on border security rather than on cross-border socio-economic and socio-cultural development. The activities of the institutions established to support and promote cross-border cooperation are hardly noticed by both entrepreneurs and inhabitants. Further efforts need to be undertaken to prevent the broadening of a socio-economic dividing line across the Schengen border and to make use of the high socio-cultural and environmental values of the Polish-Ukrainian borderland. It is necessary in this context that the Euroregions are better tailored to local needs and are able to better involve local self-governments. Particularly a deeper involvement of youth cultural organisations and higher education institutions from both sides of the border is required to put aside stereotypes and prejudices.



3. Generalisation from case study

Particularly for the transborder communities between Poland and Ukraine, Hungary and Ukraine, Romania and Moldova, Poland and Belarus, Finland and Russia, the Baltic States and Russia, as well as the Russian exclave Kaliningrad surrounded by Poland and Lithuania, the Schengen visa requirements at the new EU 'external land borders' mean a rough intervention in their former shared living environment and cut existing cross-border contacts (Saari 2006). The free movement of people between Schengen and non-Schengen countries became increasingly suppressed by the erection of functional barriers and the split-up between the rights of citizens of Schengen states and third country nationals. The EU Commission agreed in 2006 on a local border traffic (LBT) regulation that should allow derogating, for persons living in a border area, from the general rules on border checks set out in the Schengen Borders Code. However, several authors assume that the 'securitization' of the EU external border regime in fact effectively undermines the declared aim in the LBT regulation and in the official documents of the European Neighbourhood Policy (ENP) to prevent the emergence of new dividing lines on the continent.

The 'external borders' of the enlarged Union cut not only across neighbouring areas that traditionally have had very close relations, but as well across transcontinental transit routes of migrants and refugees. In regard to the situation of migrants and refugees who are buffeted in the Schengen borderlands, several institutions have outlined the potential or *de facto* violations of the EU Member States' obligations under international law, notably the Refugee Convention and the Children Convention.

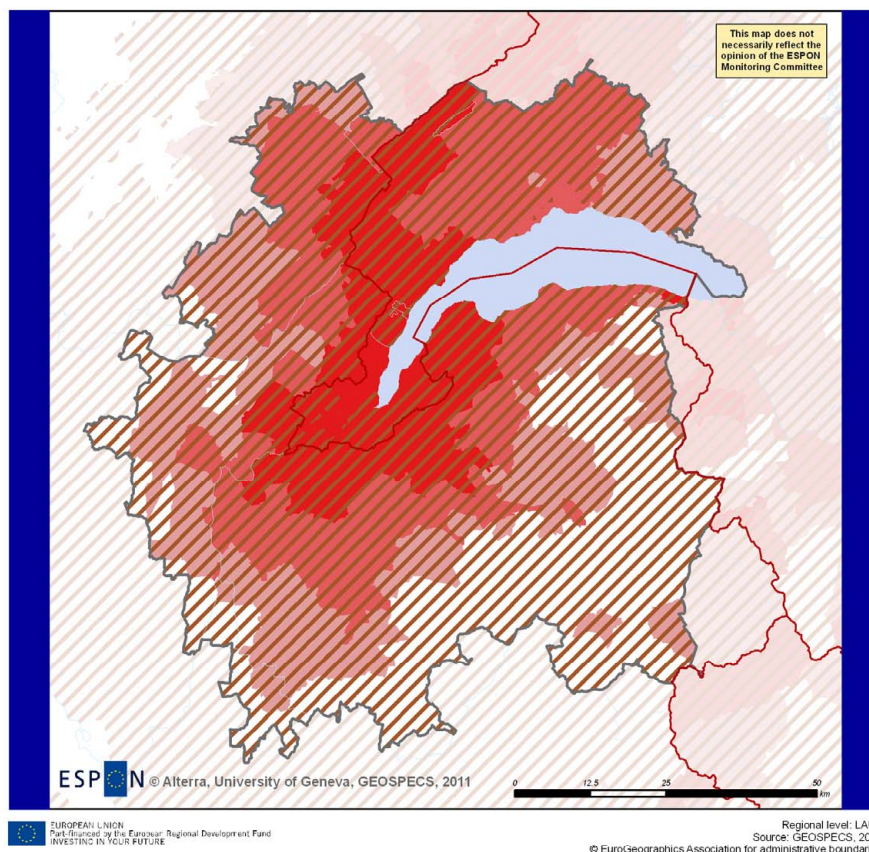
The ENPI program has focused on border security rather than on cross-border socio-economic and socio-cultural development. Further efforts need to be undertaken to bridge the political dividing line at the edge of the Schengen regime and to make use of the socio-cultural and environmental values of the borderlands. It is necessary in this context that Euroregions are better tailored to local needs and are able to better involve local self-governments. Particularly a deeper involvement of youth cultural organisations and higher education institutions from both sides of the border is required to put aside stereotypes and prejudices.

Annex 34: Case Study Geneva









Description of the case study area and its geographic specificity

GEOSPECS Case Studies

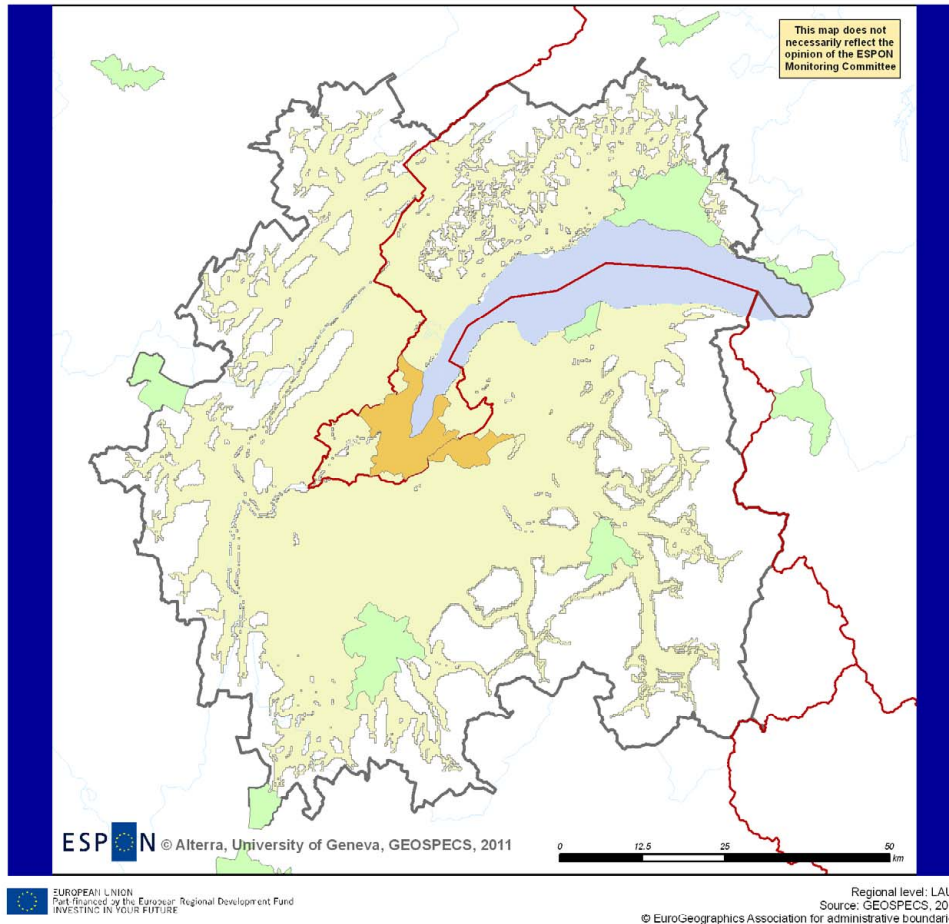
Geneva cross border metropolitan region (specificities)







GEOSPECS specificities spaces

-  Case study delineation
-  NUTS0 boundary
-  NUTS3 boundary
-  Lac léman
- Mountain areas**
-  Mountain area
- Travel time to the border (in minutes)**
-  0 - 15
-  15 - 30
-  30 - 45

Geneva cross border metropolitan region (Potential Urban Strategic Horizon - 2)





GEOSPECS specificities spaces

-  Case study delineation
-  NUTS0 boundary
-  NUTS3 boundary
-  Lac léman

Potential Urban Strategic Horizon-2 (Genève-Annemasse)

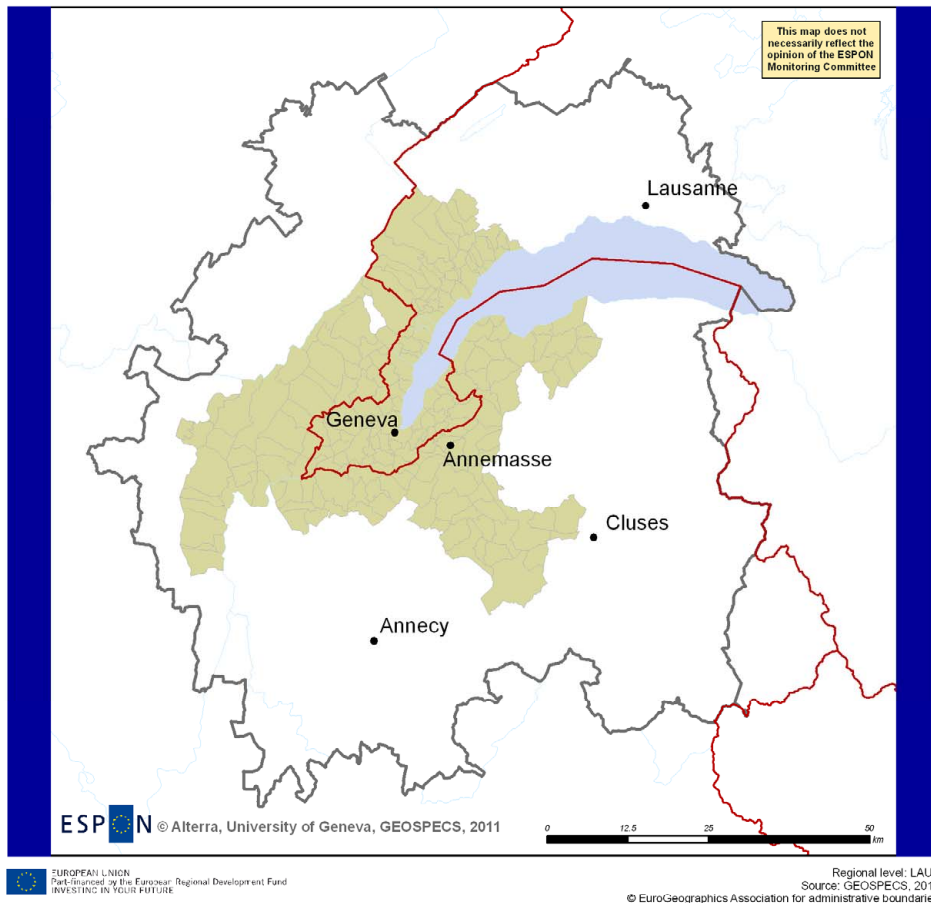
-  Potential Urban Strategic Horizon-2 (Genève-Annemasse)

Morphological Urban Area






-  Geneva-Annemasse MUA
-  Other MUA

The Potential Urban Strategic Horizon - 2 (PUSH2) is the 45 minutes travel time area around the edge of the Morphological Urban Area (MUA). These overlapping PUSH2 area are designed as a proxy for potential commuting areas. The representation is based on a selection of the PUSH whose Fonctional Urban Area population is superior to 750000 inhabitants.

Geneva cross border metropolitan region (agglomeration project)



GEOSPECS specificities areas

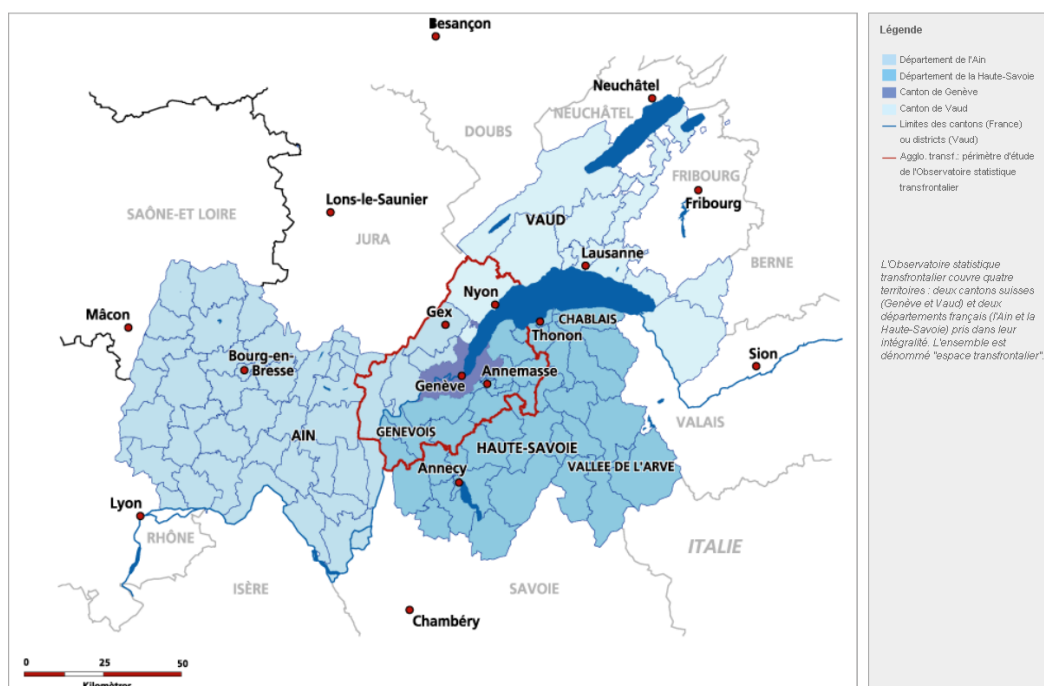
-  Case study delineation
-  NUTS0 boundary
-  NUTS3 boundary
-  Lac léman
- "Franco-Valdo-Genevois" agglomeration project**
-  Participating municipality (208)

Geneva has been identified as one of the most dynamic cross-border metropolitan regions in Europe (ESPON 2010). These regions combine both institutional and functional characteristics: they are both political constructions driven by a multitude of political actors from several levels, large urban areas transcending national boundaries, and urban centres engaged in globalized network. Geneva is particularly representative of such regions, because of the high level of cross-border integration with neighbouring France and the recent development of cross-border institutions.

Functionally, the Geneva region is mostly driven by knowledge intensive services and manufacturing activities. The presence of specialised financial services in private wealth management and commodity trading as well as international institutions is a major driver of the regional population and economic growth. As a consequence, the Geneva Agglomeration experienced a strong average annual population growth over recent decades, which strongly affects the residential market, leading to a long-term shortage of houses and apartments available in the City and to the development of extensive suburbs in neighbouring France.

Institutionally, Geneva has long considered itself as an international centre without necessarily trying to build a strong hinterland. In recent decades, however, several initiatives have contributed to develop more regionally-based strategies with neighbouring Swiss (Nyon) and French territories (Pays de Gex, Savoie). This led to the development of a more institutionally integrated cross-border metropolitan area at the regional level.

Map 1: The Geneva Cross-Border Metropolitan Region



Source: Observatoire statistique transfrontalier 2011.

Cross-border commuting, spatial urban planning and the need for large-scale infrastructure have fuelled the development of cross-border institutional initiatives over the last years. In the Geneva region, cross-border cooperation has been developed across a space whose extension is close to that of the functional metropolitan area. Through the work of the Franco-Genevan Regional Committee (CRFG) created in 1973, experiences of cross-border cooperation have been formalised in an agglomeration approach (2004-2007), on the basis of a charter developed in 1997 (see Map 1). The current Geneva Agglomeration Project

(Projet d'agglomération franco-valdo-genevois) is based on an agreement between the Canton and the French municipalities, organised in the Genevan Association of Regional Cooperation (ARC) and which have played a defining role in the development of the Agglomeration Project. Over the years, the Project has developed into an increasingly institutionalised body and is ready for its second generation of actions (see Surchat Vial, Bessat and Roulet 2010).

The Geneva agglomeration project has benefited from the agglomeration policy launched by the Swiss Confederation in 2001. This policy followed the signing of Bilateral Agreements with the EU in 1999 and 2004 and aimed at reinforcing the integration of urban spaces, by proposing the financing of transport infrastructures at agglomeration level. The agglomeration policy also encouraged public authorities (Swiss cantons and municipalities) to undertake a strategic reflection on urban development. Geneva has succeeded in consolidating the metropolitan development by involving the main political actors in Switzerland and France, reconciling the interests of various political authorities such as other cantons and French municipalities and being integrated in the cooperation instigated by the Interministerial Delegation of Planning and Competitiveness of Territories (DIACT) in 2003.

The case of Geneva illustrates that the presence of an external EU border, tempered by bilateral agreements, does not necessarily constitute a limiting factor in the scope of cooperation strategies. The presence of a national border seems to be a key factor in the case of Geneva, by pushing local actors to interact and find solutions with neighbouring partners in France in order to ensure the smooth operation and attractiveness of the metropolitan centre. As evidenced by the recent development of the Agglomeration Project to secure federal funds, local politicians seemed able to align the federal objectives in terms of spatial planning and transports with their own objectives.

▪ **2. Economic, Social and Environmental processes related to the geographic specificity**

In 2005, the Geneva cross-border metropolitan region had nearly 400,000 jobs, characterized by the predominance of the tertiary sector. The Geneva region has been successful in projecting its activities on world stage by welcoming global companies and institutions. Its rank in the global classification of cities is, consequently, much higher than what could be expected from the population of the city or the region (Rozenblat and Cicille 2003, Taylor and Aranya 2008).

This is firstly due to the fact that Geneva is a well-known international financial centre which plays an important role in the global economy thanks to its specific competencies in wealth management and commodity trade. Geneva proved resilient to the recent financial crisis: job losses were similar to those in Luxembourg (-2.6% in banking from September 2007 to July 2009, according to the Geneva Statistical Office). With about 35,000 direct jobs in 2010, the financial industry is certainly one of the engines of the Geneva economy (Genève Place Financière 2010, Walther, Schulz and Dörry 2011).

The importance of finance activities makes Geneva a “global specialist” (City of London 2010) very similar with Luxembourg, another specialised International Financial Centre in Europe. As Table 1 shows, Geneva has about the same number of banks as Luxembourg. However, Luxembourg employment in both the financial sector and the banking sector are higher, as is the share of the sector in the Gross Domestic Product.

Geneva economic success and international recognition is also related to the presence of a large number of international agencies, notably from the United Nations, which forms what is called the “International Geneva”. There is currently about 40,000 diplomats and

international civil servants working in Geneva, as well as 2,400 jobs in Non-governmental organisations according to the Federal Department of Foreign Affairs. Thirdly, Geneva is a well-known cluster of research (CERN) and hi-tech manufacturing activities, which both contribute to attract highly qualified staff from around the world representing the knowledge economy, who find there a specialised and attractive employment market, but also unskilled individuals whose economic activity supports the development of an overlying service economy.

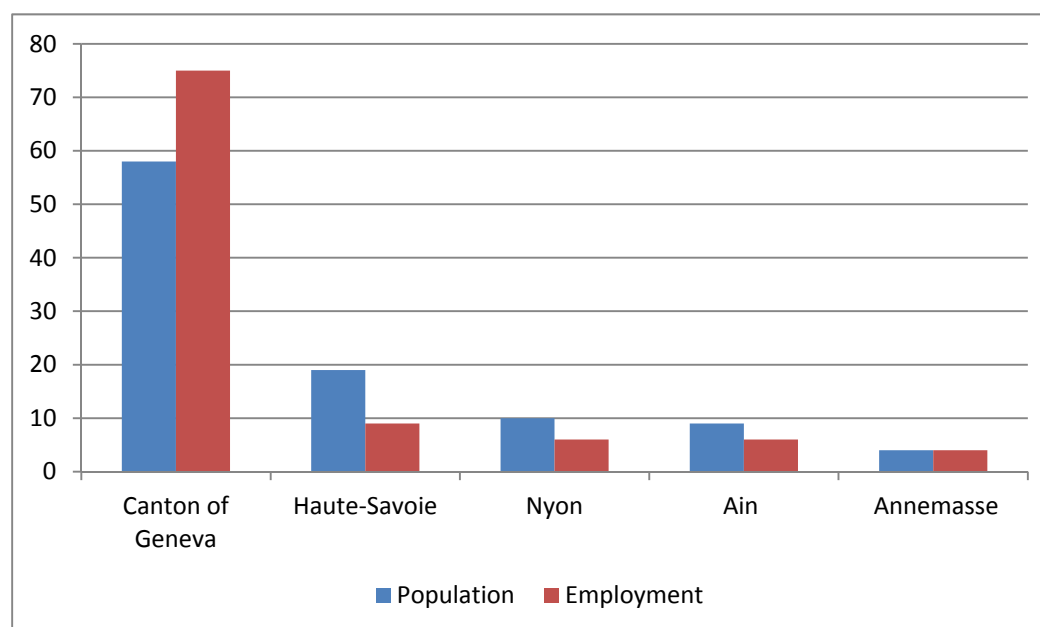
Table 1: Employment in the financial sector

	Jobs in the financial sector (2010)	Number of banks (2011)	Jobs in the banking sector (2011)	Share in the GDP (2009)
Geneva	35,482	140	20,625	19%
Luxembourg	40,866*	143	26,809	32%

Sources: Financial Sector Supervisory Authority (CSSF), Central Bank of Luxembourg (BCL), Genève Place financière 2011a and b, BCGE 2007, OCSTAT 2008. Note: the Professional of the Financial Sector (PSF, N=14,159) category are not included.

The presence of a state boundary strongly affects the geographical distribution of jobs in the region. At the regional scale, employment remains strong concentrated in the canton of Geneva, which accounts for about 75 % of the total employment of the metropolitan region, whereas it comprises only 57 % of the total population (see Figure 1). Over recent decades, this imbalance has decreased gradually: the Canton of Geneva accounted for 79% of the jobs and 63% of the population in 1982 and only 76% and 59% in 1990 respectively.

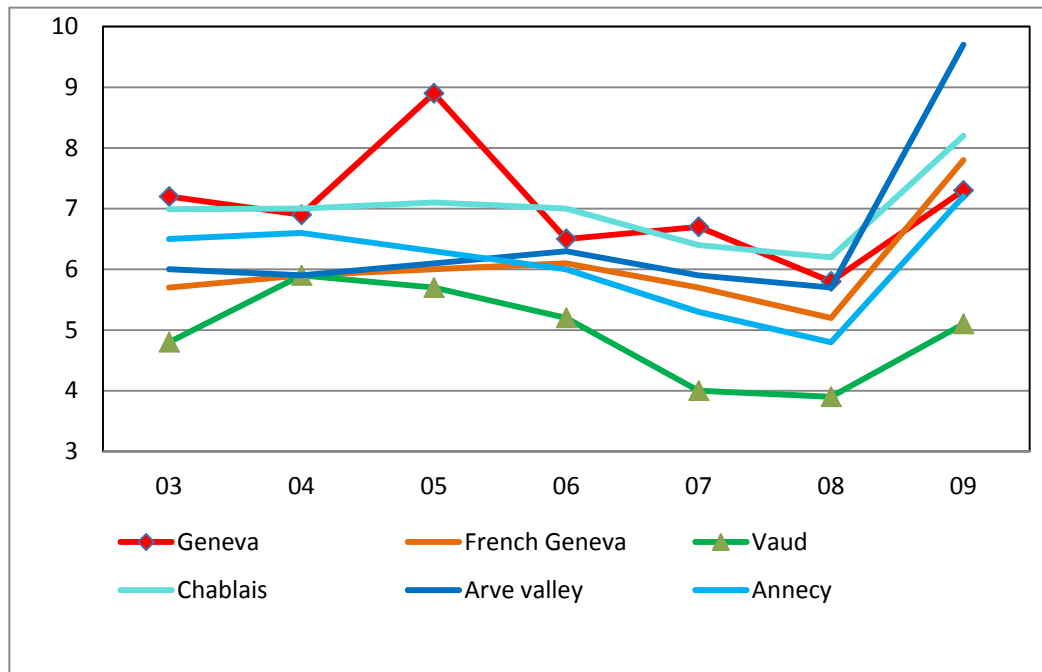
Figure 1: Distribution of population and employment, in %, 2007



Source: OCSTAT and Insee

In Switzerland, Geneva is probably the most polarised urban region between rich and poor populations (Schuler et al. 2007) and has the highest unemployment rate in the country (5.6% in October 2011). In 2011, the unemployment rate in the canton of Geneva (5.6% in October) was similar to the one in Haute Savoie, compared to an average of 2.9% in Switzerland and 9.1% in metropolitan France according to Insee (Figure 2).

Figure 2: Unemployment rates according to regions, 2003-2009



Source: Observatoire statistique transfrontalier, 2010

Geneva has experienced a strong spatial segregation with jobs being mainly concentrated in the Swiss part of the agglomeration and population preferentially concentrated in French suburbs. This situation is first explained by the scarcity and high costs of land, which generate a strong competition for land use activities. This polarization of jobs is further enhanced by border effects: the value added activities are concentrated mainly in Switzerland due to differences in taxation, wages and social legislation.

Over recent decades, Geneva experienced strong annual growth of employment (+1.4% between 1995 and 2005). The pronounced orientation of the regional economy towards knowledge-intensive activities has also led to an increased dependency on national and cross-border work. In August 2011, more than 74,000 commuters crossed the border every day from neighbouring France into the country according to the Geneva Statistical Office (OCSTAT 2011), contributing to the development of a functionally-integrated cross-border metropolitan area of around 850,000 inhabitants, comparable in size to Luxembourg, another knowledge-intensive European metropolitan centre (Sohn, Reitel and Walther 2009). Such an integrated functional region provides support to the overall performance of the regional economy, characterised by a predominance of tertiary activities, in particular financial services, which represented about a fourth of the total added value.

In Geneva, the number of cross-border commuters underwent significant growth: +9.0% between 2000 and 2006 according to ESPON (2010); the phenomenon is at least twice as high here as in some other metropolitan regions in Europe. As in Luxembourg, Basel, Nice, Saarbrücken, Copenhagen-Malmö or Strasbourg, cross-border flows in Geneva are highly asymmetrical: the quasi totality of cross-border workers are moving from French border peripheries towards the City and Canton of Geneva. This form of economic integration is

based on a relation of a centre-periphery type, as described by Decoville et al. (2011). Interestingly, as in the border between the Netherlands and Germany (Van Houtum and Gielis 2006) and in the Luxembourg region (Carpentier 2010), an increasing number of workers choose to commute into their own country from France, due to the lack of affordable real estate (INSEE-OCSTAT 2008, 2010).

Cross-border commuters occupy 15 % of jobs in the canton of Geneva. The majority (73%) of them are domiciled in the French part of Geneva, notably in the city of Annemasse, which has become the primary residence of commuters, due to both its proximity to employment centres. The northern part of the Pays de Gex and Saint-Julien-en-Genevois also welcome a significant number of commuters (Projet d'agglomération 2007).

The mix of national and tourist identity has certainly reinforced the tourist image of Switzerland, especially of Geneva. As noted by Lévy and Matos (2002), despite its peripheral location in extreme western Switzerland and its international spirit, Geneva has been part of the Swiss national image since the founding of modern tourism in the 19th century. Today, Geneva is presented as one of the most beautiful and most cultured cities in the world, combining the charms of nature with a rich range of historical and architectural offerings. In addition, the city presents a major gateway to the Alps for outdoor tourists throughout the year.

In 2000, Geneva was at 18th world rank as an international meeting point (30 % of night spend in Geneva were due to international organizations activities). According to Lévy and Matos (2002: 247), *“it is clearly one of its dominant forms of tourism, coupled to the presence of multinational headquarters and of the overdeveloped financial sector”*.

Regarding cross-border tourism, there are several joint initiatives. For instance, the joint efforts of the Canton of Geneva, the French national Geographic institute (IGN) and the Federal Office of Topography led to the publication of a unified tourist map of the region. Geoportail, a Geographic Information System for the Geneva agglomeration project is also available online. In order to enrich the diversity and quality of services provided by tourism facilities, the Chamber of Commerce and Industry of Doubs, Iméa Entreprises (France) and Formaconseil.ch (Switzerland) in collaboration with several regional and European authorities initiated the joint project “Tourisme transfrontalier”. A part from that, a few collaborations between France and Switzerland have taken place. Most of them were conducted within the framework of INTERREG, such as: the 13th *Université d'été du Tourisme*; several projects under the Trans-Jurassienne conferences (CTJ); pedestrian tourist guides (Hoppy and Navidoo, Transdoubs); and private French-Swiss initiatives and collaborations in the culture scene (Théâtre de l'Unité et Théâtre Côté cour, Boncourt – Delle, Lucelle).

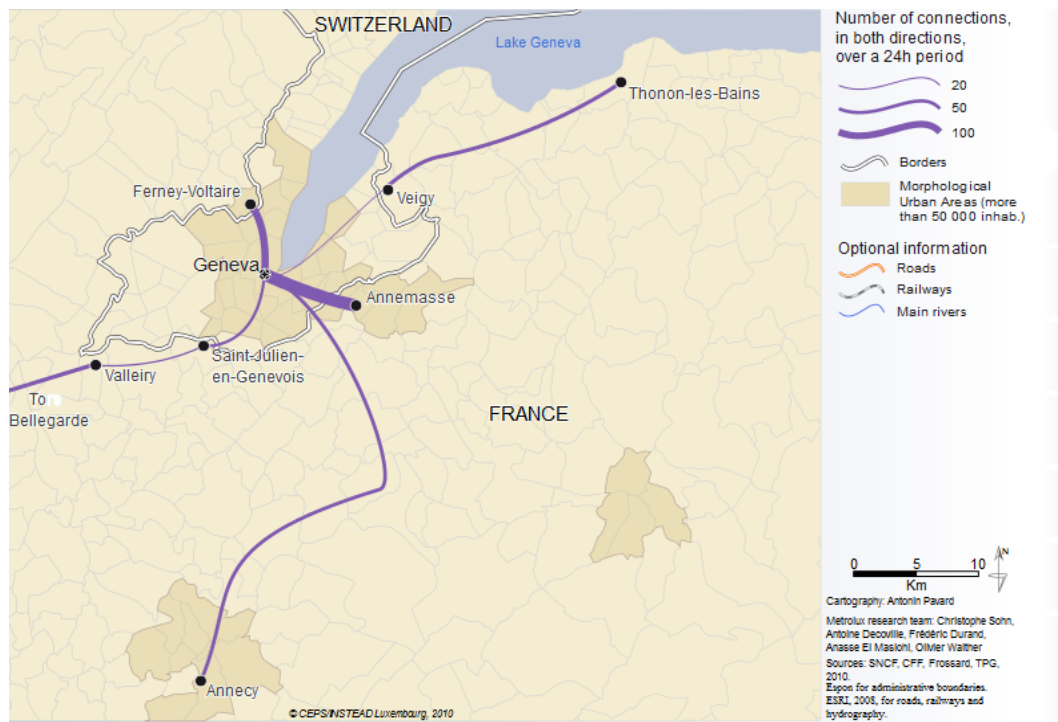
Given the intensification of road traffic in the centre of Geneva as well as in its periphery, issues related to cross-border infrastructure have become a central question for local authorities. To investigate the mobility of cross-border workers, the study conducted by Kouti and Ramirez (2009) analyzed the mobility habits of cross-border commuters with special emphasis on the use of public transport and its determinants in the Canton of Geneva.

They found that at least one fifth of Geneva's labour force is composed by cross border workers and that the car is the main mean of transport used to go to work by this population. In the Canton of Geneva despite relatively good public transportation network, as well as the possibility of using “Park & Ride” system, a very small proportion of cross-border commuters use a combination of car and public transport. The offer of public transportation network between France and Geneva's city centre, however, remain unsatisfying (see Map 2).

In order to improve offer for the cross-border commuters, especially for those coming from the department of the Haute-Savoie, the policy makers initiated different projects such as the

Geneva-Annemasse CEVA rail project and implementation and management of different cross-border Public Transport (bus) routes (for instance creation of a Local Cross-Border Cooperation Group - LCBCG).

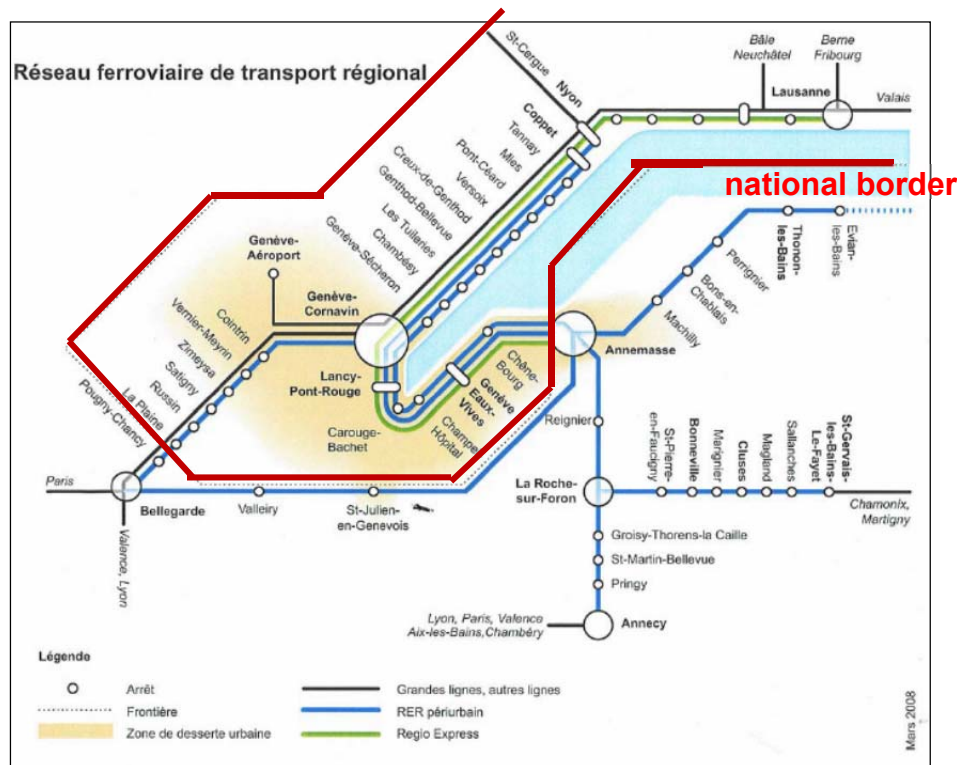
Map 2: Capacity of cross-border public transport networks in the Geneva region, 2010



Source: Cross-border metropolitan regions atlas, CEPS/INSTEAD 2010.

The CEVA (Cornavin-Eaux-Vives-Annemasse) project aims to link the main's Geneva train station (northern part of the city) with the French city of Annemasse, located in proximity to the south-east border of the canton of Geneva.

Figure 3: The CEVA, an essential link in the Franco-Swiss regional railway network



Source: Projet d'agglomération 2007.

According to Kouti and Ramirez (2009), the choice offered to cross-border commuters coming from France is rather limited. In fact, there is no real choice regarding public transport in and around the canton of Geneva: “busses and tramways are essentially complementary, and there is only one fare for both means of transportation” (Kouti and Ramirez 2009:5).

As for the general service provision, the public facilities across CBMR of Geneva influence urban development decisively. This due to the fact that they meet the needs for the life in a community, but also impact significantly for the attraction of a specialized audience and convey the name of the urban area beyond its borders to the position in competitiveness "inter-city." Another important contribution of general service provision is the ability to provide urban regeneration and reduce social tensions between cities and their neighbourhoods. In the cross-border context, a strategy that properly addresses the distribution and availability of general infrastructure is therefore a very important aspect of exchange between regions that are divided with borders.

The current situation of general service provision in CBMR of Geneva displays disparities in the level of services and distribution to their residents. So far, no coordination has been made jointly between the three territories in order to achieve a coherent distribution and provision. According to the Geneva agglomeration project, the major facilities are concentrated in the heart of agglomeration and are particularly lacking in the regional centres identified by this project, such as Annemasse, St-Julien, Saint-Genis Pouilly, Ferney-Voltaire and Thonon.

Regarding accessibility to services, for a long time, relations across the borders were limited to windfall, each taking advantages of differences that have been available on the other side of the border, such as: higher wages, commodity prices, real estate offers, etc. Thus, it is no coincidence that the ideas of joint strategies begin to emerge when these differences tend to be reduced. Moreover, the logic of proximity in the case of CBMR of Geneva tends to win.

For instance, the inhabitants of the Pays de Gex would prefer to be treated at the hospital in Geneva rather than in Lyon because of the complex interventions that are available at a Geneva University Hospital.

Therefore, the "Stratégie de définition et d'implantation des grands équipements" (Definition of strategy and implementation of major infrastructure), defines the organization and location of major public facilities in CBMR of Geneva. It aims to contribute to the urban scheme approved by partners within the Agglomeration Project. The Geneva agglomeration project for 2030 forecasts growth of 200.000 inhabitants (50 % in the canton of Geneva) and 100.000 jobs (30% in the French territories) further divided by territories. The multi-polarity appears as a fundamental element of agglomeration pattern and the study of *Grands Equipements* (major facilities) with the localization strategy (with equipment characterization) will contribute importantly to the definition of this multi-polarity, the role of each pole, relations between them and with the centre.

2.2. Social

In Geneva, the historic stability of national borders has led to the strong differentiation of national territories from the point of view of population density between Switzerland and its French neighbours. This trend has been reinforced by the current development of Geneva as a small but globalised city well connected at the global level. As a result, the Geneva region is experiencing a strong demographic growth, which results from population movements within Switzerland, the EU and from international migrations (+1.3% between 1995 and 2005). As shown by Schuler et al. (2007), the highest rate of demographic growth in Switzerland (both in absolute and relative terms) has occurred in the two major metropolitan regions of the Lake Geneva region and Zurich since the 1980s. With a density about 12,000 inhabitants per square kilometres, the City of Geneva is the densest in Switzerland and one of the densest in Europe. Demographic growth was even stronger in the French part of the agglomeration (+1.3% between 1990 and 2003), particularly in the urban area of Annemasse (+2.0%). Overall, between 1999 and 2007, the Geneva cross-border region gained an average of 12,000 new inhabitants every year. The Functional Urban Region, defined by ESPON (2010) as the cross-border regional labour market, reached 808,000 in 2006. A comparison with Luxembourg, shown in Table 2, another small and specialised international European centres shows that the city and morphological urban area of Geneva is much more developed than its Luxembourg counterpart, despite the fact that the cross-border functional urban area is comparable in size and economic functions.

Table 2: Comparison between Geneva and Luxembourg

	City (2011)	Canton/Country (2011)	Morphological urban Area (2006)	Functional Urban Area (2006)
Geneva	191,000	465,000	478,000	808,000
Luxembourg	94,000	512,000	130,000	931,000

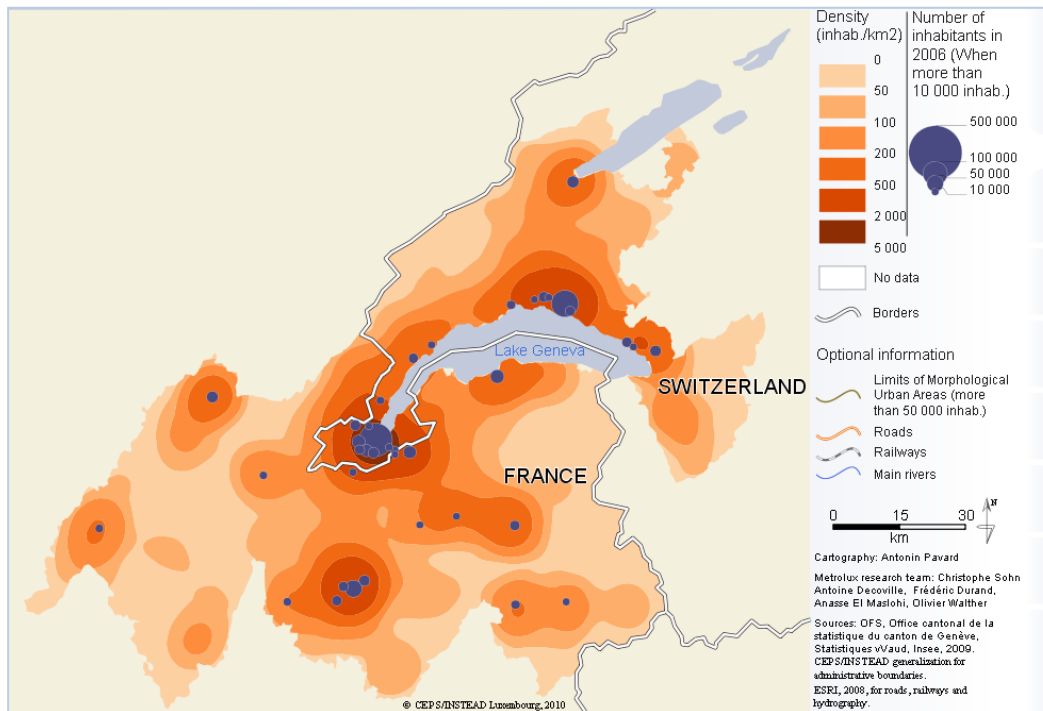
Sources: STATEC, OCSTAT, ESPON 2010.

Map 3 shows that in the Geneva region, the population is concentrated in the urban centres around the Lake Geneva region and in Annecy, Lyon and Chambéry, displaying high densities above 130 inhabitants per km². Here, we can observe also discontinuous belt around the edge of Lake Geneva and in Pays de Gex, to the west of the city.

The strong demographic growth has led to the development of municipalities with a typically peri-urban demographic profile, particularly in the north east of the region (Canton of Vaud) which benefits from the shortage of accommodation in the Lake Geneva region, and in the

south and west of Geneva in France, where cross-border workers are predominantly located (see Map 4). As shown by Walther (2012: 155), cross-border demographic integration seems rather developed between Geneva and the French municipalities in the west of the metropolitan area (Pays de Gex): “The densities of the French Pays de Gex have grown more significantly than those in the canton of Geneva, which has contributed to reducing the differential between these two countries”.

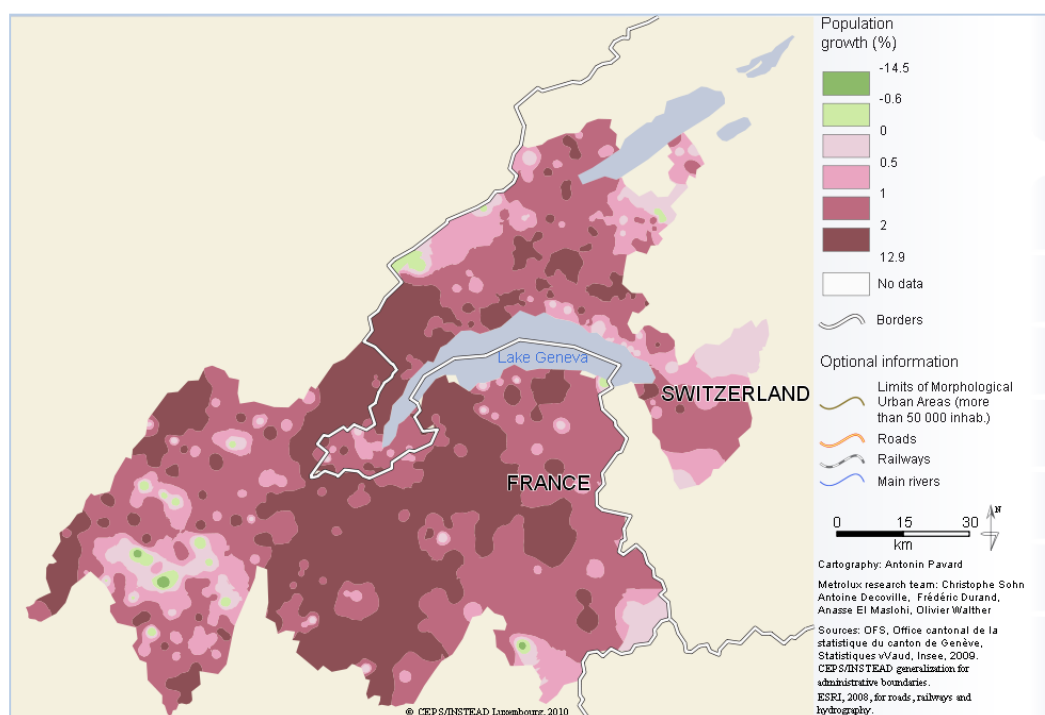
Map 3: Density and distribution of the population, 2006



Source: Cross-border metropolitan regions atlas, CEPS/INSTEAD 2010.

As in most European cities, the population of Geneva is experiencing a gradual ageing: the share of more than 60 years increased from 17% to 19%, constrained in part by the phenomenon of immigration of younger population. The average age is already higher in the canton of Geneva, as in other large cities. Ageing, combined with a high divorce rate and a low fertility rate, resulted in the decrease in households' size from 2.7 to 2.4 in the periphery and from 2.2 to 2.1 in the canton of Geneva from 1995 to 2005 (Projet d'agglomération 2007:11).

Map 4: Average annual growth rate of population in the Geneva region, 2000-2006



Source: Cross-border metropolitan regions atlas, CEPS/INSTEAD 2010.

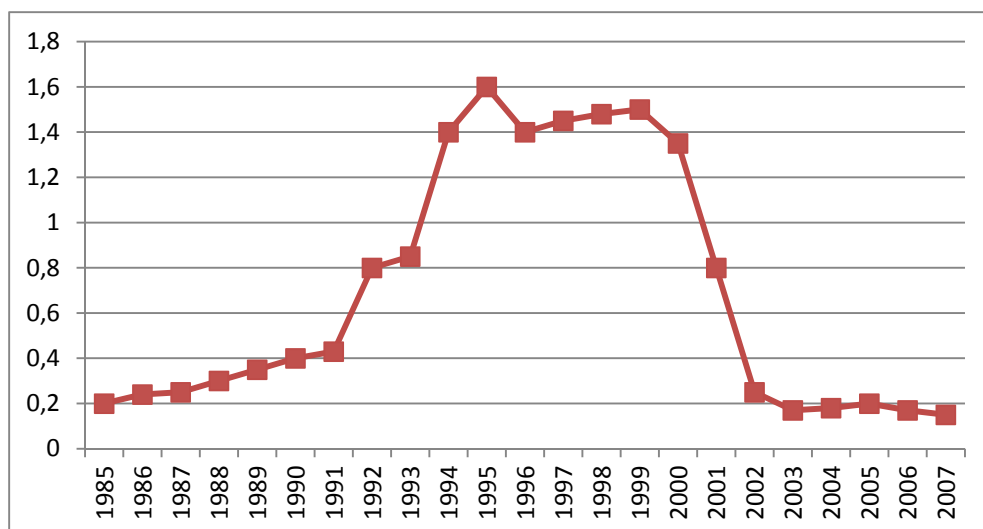
Geneva hosts about 370,000 housing units, including a significant proportion of holiday houses, particularly in more peripheral areas. Given the decrease in the size of households, demographic growth has been accompanied by an even faster growth housing stock, up to 21.6% from 1990 to 2005, which corresponds to an annual rate of 1.3%. However, the current housing stock is insufficient to meet demand, particularly in the canton of Geneva, where the vacancy rate is extremely low: 0.19 % in 2007 as shown by Figure 4.

In the canton of Geneva, population density increased from 6,400 to 7,000 inhabitants per km² between 1994 and 2005 of building area for housing. In order to control urban sprawl within its territory, the canton of Geneva created an early protected agricultural greenbelt. Nevertheless, this proactive planning led to the number of negative effects: (1) slowing the pace of building in Geneva in the last 30 years not well adjusted to the population growth; (2) Strong pressures in housing market along with urban sprawl has been accelerated by bilateral agreements; (3) Acute housing crisis with a vacancy rate of 0.12 % in the canton of Geneva resulted along with a general shortage of housing (see Figure 2); (4) Rise in land prices and real estate near borders, where is almost impossible to find accommodation with French normal income

The heavy integration of the housing market is notably fed by the differentials of cost and access to land and property. As mentioned by Decoville et al. (2011: 15), "This leads to particularly delicate planning problems, as the organisation of residential space is not only dependent on the relations between centre and periphery, as in any other metropolitan area, but must also take into account the existence of a national border". During 2009, around 1,200 new houses have been placed on the Geneva market, representing increase of 14% when compared with 2008. In 2009, 1,230 new homes were built in the canton of Geneva, only 238 being individual houses and 992 in collective housing (see Figure 5).

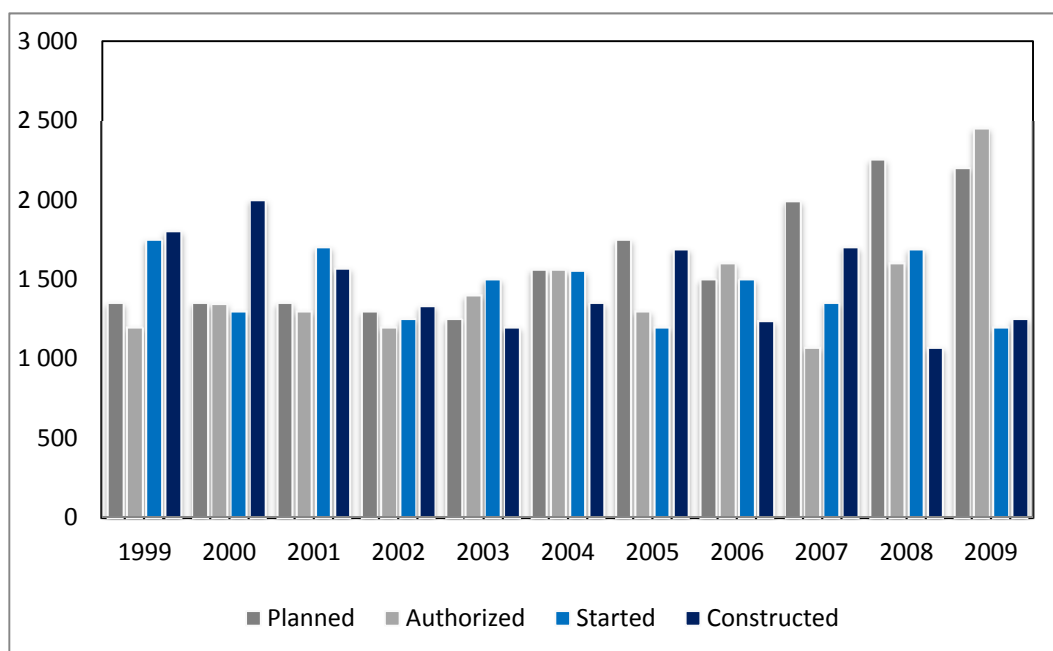
As noted above, population growth is not accompanied by adequate housing supply that had a significant impact on housing prices between 1990 and 2009 (see Figure 2).

Figure 4: Vacancy rates in Geneva, in %, 1985-2008



Source: Projet d'agglomération 2007.

Figure 5: Evolution in the housing construction in the canton of Geneva, 1999-2009

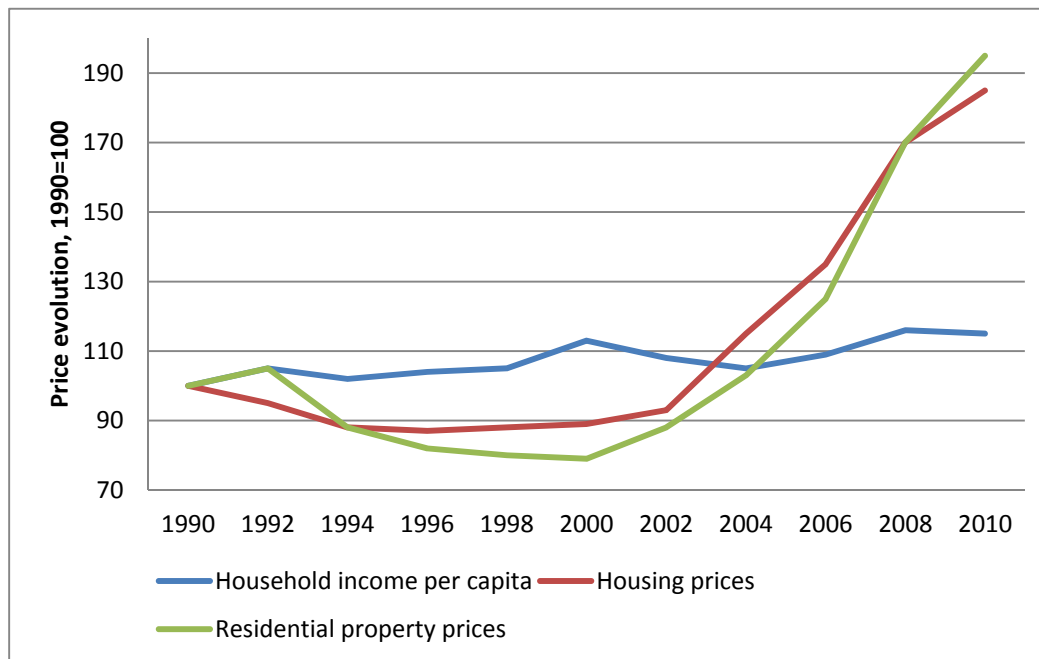


Source: Projet d'agglomération 2007.

The evolution of income and housing prices depicted in Figure 6 shows very clearly that house ownership in the Geneva canton has become increasingly difficult since the beginning of the 2000s. As in Paris or New York, Geneva has experienced a gradual disconnection between the property market owned by foreign and wealthy residents on one side and the purchase capacity of the average local residents.

The clear differences in housing prices do not result in residential segregation on both sides of the border. Instead, there is a evidence of 'classic' pattern but split by the border: city-centres heavily gentrified by new categories of wealthy or creative individuals, suburban areas populated by middle-class workers and periurban areas populated by rich households.

Figure 6: Evolution of prices and income, 1990-2010



Source: OCSTAT 08.2011.

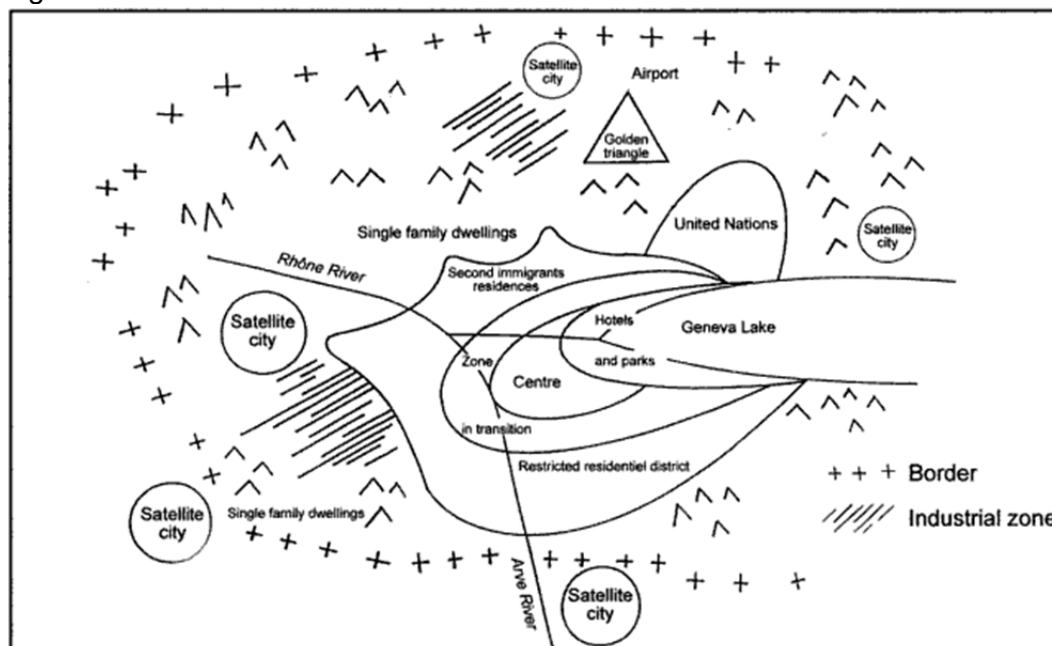
In 1997, Bailly (2000) identified various geographic zones that already at that time displayed existence of social disparities.

Figure 7 depict several social zones:

- the so-called transition zones, often of foreign origin (or population recently arrived from Swiss peripheral cantons);
- the zone of immigrant residences with medium-standard and moderately priced housing;
- the U.N. sector with its office buildings and residences for high ranking officials, followed by wealthy suburbs;
- the satellite cities of mainly middle-class white-collar workers or new immigrants.

The French part of Geneva region is populated with high number of French cross-border commuters who work in the Canton of Geneva. However, Bailly (2000) noted that this international border allows cantonal authorities in Geneva to control this daily flow in case of economic downturn. In fact, cantonal authorities have the option of not renewing work permits of these commuters, since they live outside Switzerland's borders.

Figure 7: Geneva's social areas



Source: Bailly 2000.

Nowadays, Geneva is facing new challenges where social sustainability is becoming an issue. Due to land scarcity, high densities and an increasing number of cross-border commuters, Geneva faces several problems: increased traffic congestion, land of land, high living cost, etc. The issues of immigration, citizenships, residence and work permits lie at the heart of Geneva's particular form of economic and social situation. On the one hand, restrictions on the right to reside or work highly exclude cross-border commuters from Swiss social benefits (Bailly, 2000). On the other hand, in October 2009, the MCG (*Mouvement des Citoyens Genevois*) conducted a campaign - "invasion of Geneva by cross-border commuters" focusing on the need to keep jobs for Genevans.

Nevertheless, according to Bailly (2000), the city of Geneva offers urban environment that encourage social integration, foster cultural and scientific creativity and a clear sense of political and social identity. Switzerland has three official languages: German, French and Italian. In Geneva, French is the predominant spoken language, however, most citizens speak also other tow languages.

Despite its small size, the city of Geneva has a reputation of international city with high quality of life standards in beautiful settings. In 1992, on the basis of 13 indicators, Marc Boneville and his colleagues classified Geneva in the same league as cities such as Barcelona, Amsterdam and Frankfurt, despite their differences in size. The importance of employment in the financial sector, the volume of airport traffic, the number of upscale hotels catering to foreign visitors and the importance of foreign-born population were among various criteria for the comparison of these international cities (Bailly, 2000).

2.3. Environment

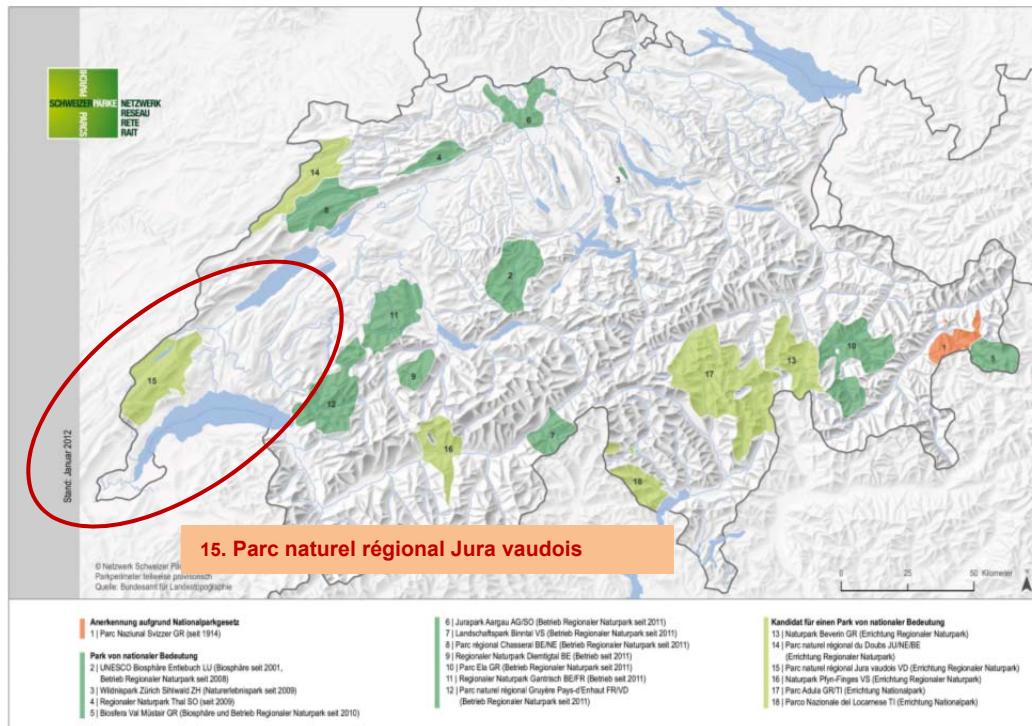
The cross-border region of Geneva is part of a high quality natural environment, surrounded by large natural spaces between the Alps and Jura in the setting formed by the Lake Geneva area. This contributes strongly to its reputation as a "green metropolis", particularly in the context of development economy and tourism.

The Swiss park network association was established in 2007 in order to ensure the quality and sustainability of national parks in the long run. The network association administers the interest of its members and lead the establishment and operation of parks. Its main objective is to support the park sponsorship and achievement of goals in accordance with the Nature and Cultural Heritage Protection Act NHG. In addition, the network fulfils important functions in implementation of the parks policy of the federal government.

▲

The Map 5 illustrates the current situation of the parks and park projects in Switzerland. Most of them have been established since 2008 on the basis of the Nature and Cultural Heritage Protection Act (NHG). Within their legislation, three categories of parks have been differentiated: national parks, which enable the conservation of large-scale natural habitats, regional nature parks, which enable the sustainable use of local resources and nature discovery parks, which provide recreational zones near large towns and cities. Among 19 national parks, regional park of *Jura vaudois*, located in the canton of Geneva, along French border, received the candidate label and it's still in the establishment phase. In fact, a natural park of *Jura Vaudois* is an extension of French regional park *Haut Jura*. Even though there is evidence of cooperation between local park associations, the level of cooperation is unsatisfactory.

Map 5: The Swiss Parks Network



Source: Swiss parks network, Federal Office of Topography 2011.

The rate of development observed in recent decades and the land constraints of the Geneva area have strongly influenced the permeability of the border and have generated a strong and rapid metropolitan integration. This dynamic is an opportunity for the area, but also a potential risk that can be overcome through cross-border cooperation. The process of urban sprawl on French territory creates a huge consumption of land, the fragmentation and compartmentalization of natural areas and urban sprawl across rural areas. This urban expansion impacts on various functions of rural areas, particularly on the environment and natural landscapes. Increased use of motor vehicles results in a situation clearly unsatisfactory in terms of rational use of energy, emissions, air quality and noise pollution. The urban development also raises other issues that must be addressed at the regional scale, such as

2. yntesis

Historic Legacy and Structural Development Opportunities and Constrains

Geneva has been identified as one of the most dynamic cross-border metropolitan regions in Europe (ESPON 2010). Functionally, the Geneva region is mostly driven by knowledge intensive services and manufacturing activities. The presence of specialised financial services in private wealth management and commodity trading as well as international institutions is a major driver of the regional population and economic growth. Institutionally, Geneva has long considered itself as an international centre without necessarily trying to build a strong hinterland. In recent decades, however, several initiatives have contributed to develop more regionally-based strategies with neighbouring Swiss (Nyon) and French territories (Pays de Gex, Savoie).

The case of Geneva illustrate that the presence of an external EU border, tempered by bilateral agreements, does not necessarily constitute a limiting factor for the development of the region. The presence of a national border seems to be a key factor, by pushing local actors to interact and find solutions with neighbouring partners in France in order to ensure the smooth operation and attractiveness of the metropolitan centre.

On the one hand, Geneva has benefited from its recent cross-border agglomeration project, in order to develop a common vision of the binational region and implement concrete measures to enhance its regional cohesion. On the other hand, one should note that the populist appeal of certain political parties running against cross-border commuters has been strongly expresses in the agglomeration of Geneva.

Physical/Locational

In the Geneva CBMR, the long-standing national peripherality has resulted in some limitations concerning intra-regional accessibility. This is especially true for interregional railways connections that are still lagging behind. With the opening of borders and the rise of strong functional interdependencies between the urban centres and their cross-border periphery, such an historical legacy might also be interpreted as a stimulus for local and regional actors to cooperate.

Another locational historic legacy is the scarcity of land. This factor is particularly relevant due to the position of Geneva as a quasi-enclave and its restrictive planning policy as far as urban development is concerned. Such 'physical' constraints have strong consequences on structural development as they result in fierce competition for land use and high real estate prices.

Economic/Business

From a social and economic point of view, the presence of borders has traditionally been perceived as an obstacle to the optimal distribution of activities in space (see Hansen 1981 for a synthesis on classic locational theories). Border areas have thus been considered as marginal for urban development due to their divided market area and high transaction costs.

With the opening of borders, such historical legacy represents both constraints and opportunities. On the one hand, the presence of different regulatory frameworks and asymmetric economic development may render cooperation between the actors located on either side of the border more difficult: centre-periphery logics, different institutional frameworks and mental barriers constitute limitations difficult to overcome. On the other

hand, the inherited disparities linked to the presence of a border offer opportunities to develop new comparative advantages. The differentials in income wages (pull factor) and unemployment rates (push factor) are driving forces for the polarization of labour flows in the Agglomeration of Geneva, resulting in strong cross-border economic interdependencies between the metropolitan core and its borderland periphery.

Demographic/social

In the CBMR of Geneva, strong disparities can be observed as far as the level and distribution of services to the residents are concerned. This has led to an important functional division of space, the urban centre being well-equipped, and the periphery offering mainly residential services but very little jobs. The concentration of both public services and business infrastructure in the core of the metropolitan region is a clear indication of its monocentric structure. The unbalanced urban development that characterises Geneva is mainly the result of strong wealth differentials and has not yet been really affected by redistribution measures enforced by cross-border cooperation bodies. Despite the fact that it has proved especially competitive in economic terms, this kind of cross-border integration represents a risk for social and territorial cohesion at the regional level. Border effects are still very important when it comes to residential attractiveness.

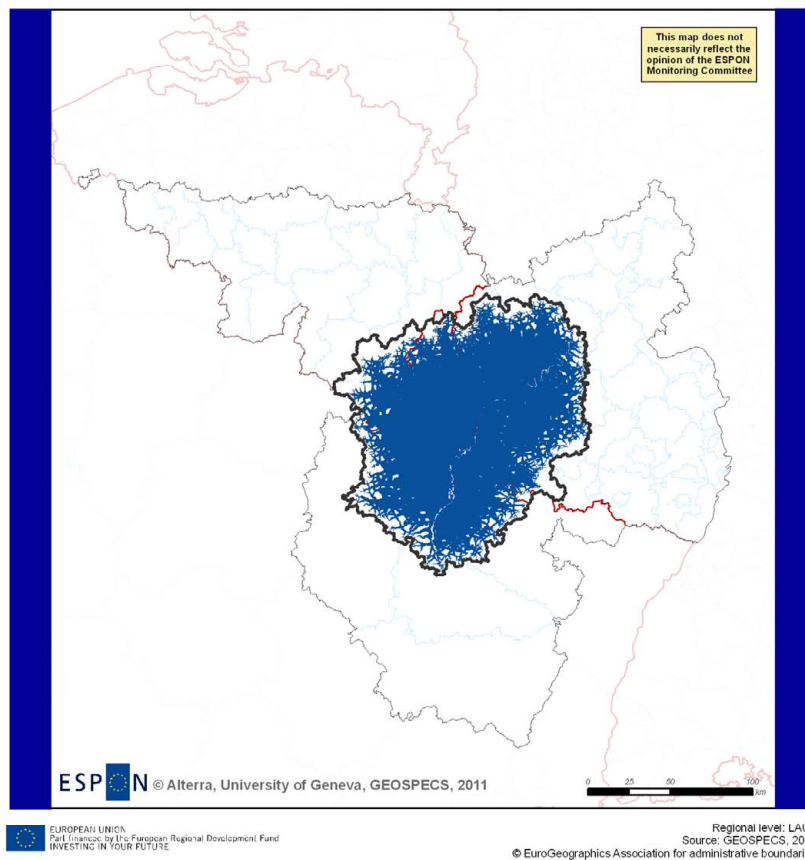
The Geneva experienced a strong average annual population growth over recent decades, which strongly affects the residential market, leading to a long-term shortage of houses and apartments available in the City and to the development of extensive suburbs in neighbouring France. However, this knowledge-intensive economy is attracting an increasing number of highly-qualified and innovative individuals from all around the world, creating a multilingual and multicultural environment. Such a multicultural and multilingual society can be an asset for stimulating cross-border projects between local, regional and international actors across borders and contribute to enhance greater social cohesion.

Annex 35: Case Study Luxembourg






Description of the case study area and its geographic specificity

GEOSPECS Case Studies

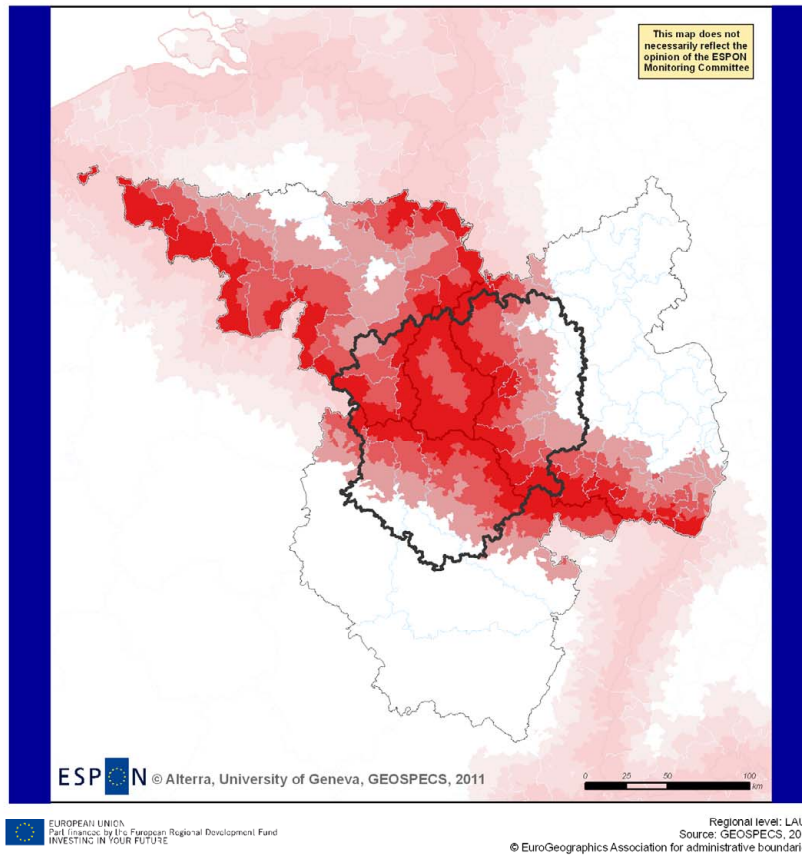
Luxembourg Cross-border Metropolitan Region (1)










GEOSPECS specificities areas

-  Potential Urban Strategic Area - 2 (Luxembourg, Trier, Thionville)
-  Case study delineation - fonctionnal area
-  Greater region - political and economical agglomeration
-  NUTS0 boundary
-  NUTS3 boundary

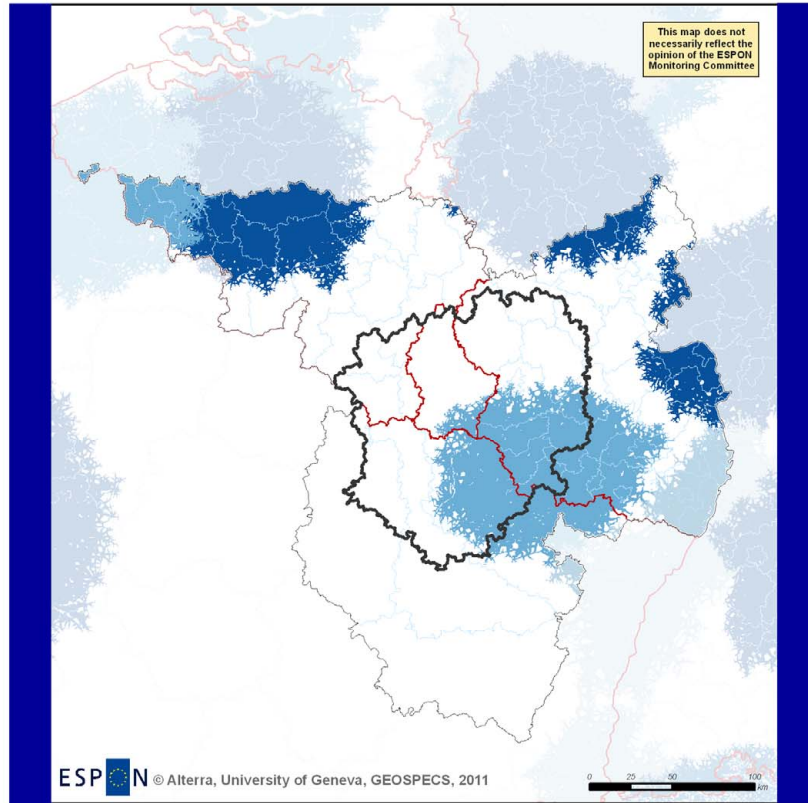
Luxembourg Cross-border Metropolitan Region (2)



GEOSPECS specificities areas

-  Case study delineation - fonctionnal area
 -  Greater region - political and economical agglomeration
 -  NUTS0 boundary
 -  NUTS3 boundary
- Travel time to the border (in minutes)**
-  0 - 15
 -  15 - 30
 -  30 - 45





Luxembourg Cross-border Metropolitan Region (3)




EUROPEAN UNION
 Just Transition by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

Regional level: LAU2
 Sources: GEOSPECS, 2011
 © EuroGeographics Association for administrative boundaries

GEOSPECS specificities areas

-  Case study delineation - fonctionnal area
-  Greater region - political and economical agglomeration
-  NUTS0 boundary
-  NUTS3 boundary

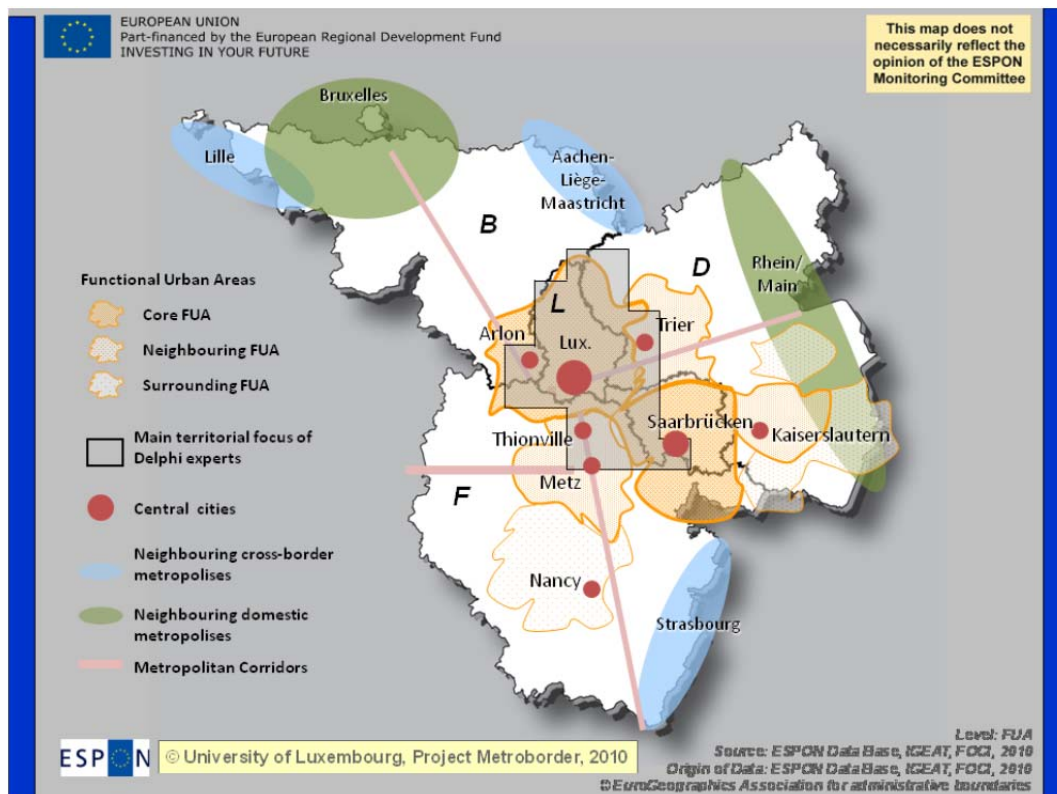
FUA population of the Potential Urban Strategic Area - 2

-  750000 - 1000000
-  1000000 - 1500000
-  1500000 - 2000000
-  2000000 - 12000000

The Potential Urban Strategic Horizon - 2 (PUSH2) is the 45 minutes travel time area around the edge of the Morphological Urban Area (MUA). These overlapping PUSH2 area are designed as a proxy for potential commuting areas.

The Luxembourg cross-border metropolitan region (CBMR) is located in the heart of the Greater Region, a cross-border institutional cooperation between Luxembourg, Lorraine (France), Wallonia (Belgium), Saarland and Rheinland-Pfalz (Germany) initiated in the 1970s and initially named Saar-Lor-Lux (Map 1). With an area of approximately 2,586 square kilometres, Luxembourg is a small country surrounded by three different international borders. Thus, this specificity is strongly rooted in the country as well as in its neighbouring borderlands (see notably the map with travel times to the borders).

Map 1: The Cross-Border Metropolitan area of Luxembourg



Source: ESPON 2010.

The development of Luxembourg as one of the wealthiest countries in the world as far as the GDP per capita is concerned goes clearly against the classic views developed in location theories that see the presence of a border as an obstacle to the optimal distribution of activities in space and thus, borderlands as marginalized areas from a social and economic point of view. On the contrary, the proximity of national borders seems to have advantaged the Grand-Duchy in its economic development, insofar that it allows Luxembourg to recruit skilled workers without having to bear the cost of their social reproduction. This strategy is reinforced by a niche policy based on certain tax and protective regulatory measures associated with the sovereignty of the state (Sohn, Reitel and Walther 2009).

The concentration of knowledge-intensive activities in Luxembourg in relation to the development of financial services since the 1970s is accompanied by strong functional integration of the German, Belgian and French bordering areas. In 2011, more than 152,000 workers living in Lorraine, Saarland or Rheinland-Pfalz and Wallonia were working in Luxembourg. This phenomenon of cross-border commuters is the strongest in Europe, both in absolute and relative terms (ESPON 2010).

2. Economic, Social and Environmental processes related to the geographic specificity

2.1. Economy

The development of Luxembourg as a cross-border metropolitan region results from the combination of both financial activities and European employment, which contribute to support the economic and political centrality of the city and urban region. As a consequence, the influence of Luxembourg City is significantly greater than one would expect from its population (94,000 inhabitants in 2011). As far as financial activities are concerned, Sohn and Walther (2012) argued that: "The flourishing of Luxembourg's metropolitan functions began in the 1970s. In this era, marked by the start of the decline in the national steel industry, the Luxembourg state decided to develop a policy of niches on the basis of tax regulation attractive at the international level. This strategy resulted in the establishment of an increasing number of foreign banks, accompanied from the 1980s onwards by an industry of higher service industries specialising in financial services". Such a niche policy induced a strong economic growth in Luxembourg, in contrast with the one in other European countries, especially in the neighbouring regions of France, Belgium and Germany, which suffered from desindustrialisation. Over time, Luxembourg has developed into a specialised financial centre, mostly devoted to fund administration and private banking. As in any other financial centres, most of the knowledge-intensive jobs are clustered in the capital city, Luxembourg City, which hosts one and a half times as many jobs as inhabitants, a ratio that can only be found in places such as Manhattan, NYC.

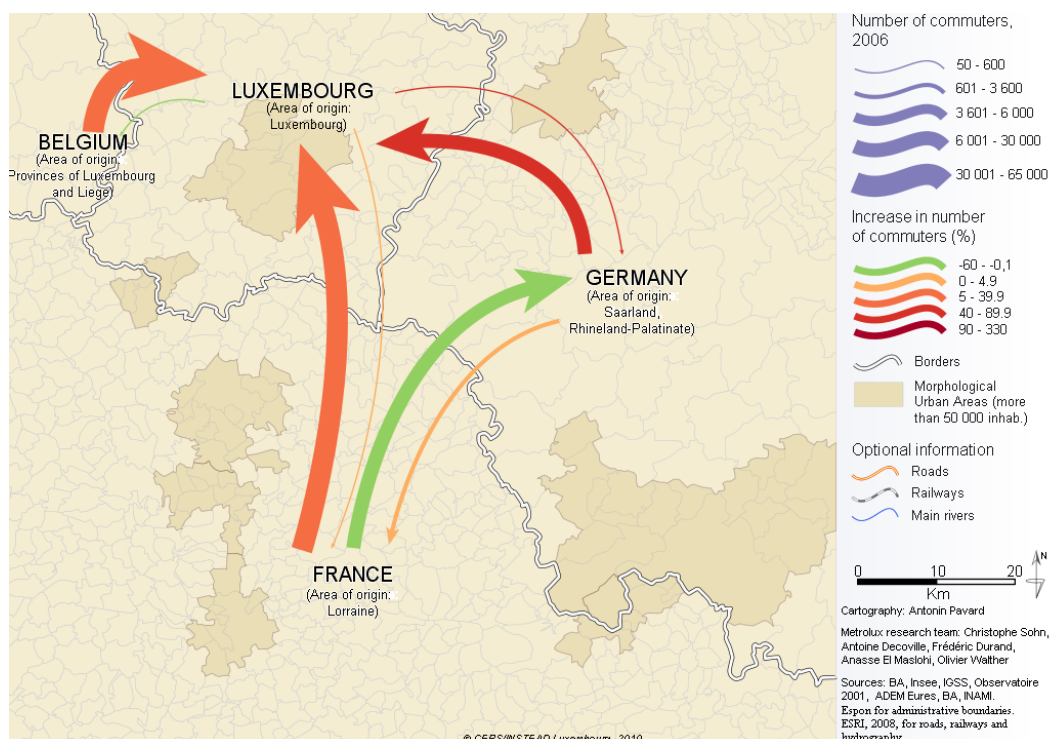
In addition to these finance-related jobs, Luxembourg hosts a number of European institutions such as the European Commission, the Court of Justice, the Court of Auditors and the European Investment Bank. Because they rely on qualified employees, these activities contribute to the development of a highly qualified labour pool in the Greater Region.

Since the 1980s, the economic success of Luxembourg has contributed to the increase of cross-border commuters from neighbouring France, Germany and Belgium. While Luxembourg attracted only 12,000 cross-border workers in 1980, more than 150,000 of them cross the border every day in 2011 according to STATEC. As Sohn and Walther (2012) argue: "The attractiveness of Luxembourg to cross-border workers is remarkable, both in absolute terms and as a proportion of the national workforce – 44% of the latter consists of persons from Luxembourg's neighbouring countries. The focusing of the peripheral areas on the Luxembourg agglomeration is exceptionally marked: the metropolitan area includes 930,000 inhabitants, almost double the total population of the country".

These labour market dynamics are not influenced by the legal framework conditions regulating cross-border labour market access in Europe as Luxembourg and its neighbouring countries are all part of the common market since 1992 and part of the Schengen space since its beginning. Within the Greater Region, workers can thus freely cross the borders and work in a neighbouring country.

Within EU, the number of cross-border workers is estimated at 600.000 and 25 % of them are in the Greater Region (MKW 2009). In 2010, with 152,251 cross-border workers, the Greater Region had the largest number of them when compared with other cross-border metropolitan regions in Europe. This situation reflects the interdependence of cross-border employment markets.

Map 2: Evolution of cross-border commuters, 2000-2006



Source: Cross-border metropolitan regions atlas, CEPS/INSTEAD 2011.

What is clearly influencing the cross-border worker flows are the differentials concerning income wages (pull factor) and unemployment rates (push factor) among the different regions. As shown in Table 1, more than 99% of the cross-border commuters in the Luxembourg CBMR are working in Luxembourg, reverse flows being marginal. These one-way commuting flows reflect the strong attractiveness of Luxembourg as far as economic activity is concerned and is based on comparative advantages in terms of tax regulations (corporate tax, VAT, etc.).

Table 1: Cross-border commuting in Luxembourg, 2000-2006

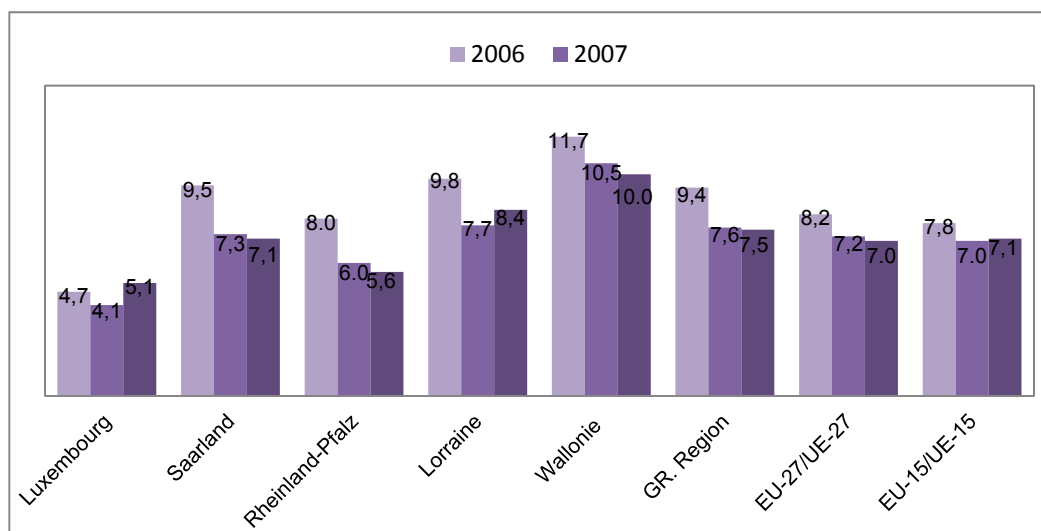
	Number of cross-border commuters		Proportion of commuters to each country	
	2000	2006	2000	2006
Luxembourg	87,300	126,723	99.3	99.6
France	200	200	0.2	0.2
Germany	108	196	0.1	0.2
Belgium	300	132	0.3	0.1

Source: ESPON (2010: 89)

The asymmetry of the labour flows is also linked to strong differentials in unemployment rates between Luxembourg and its bordering regions as shown in Figure 1.

In 2008, unemployment rate averaged 7.5% in the Greater Region as a whole. In comparison to the figures from previous years, this was noticeably lower (Figure 1, Map 3). The declines in unemployment rates have been recorded in all parts of the Greater Region, with the exception of Luxembourg, where the unemployment rate increased from 4.1 in 2007 to 5.1 in 2008.

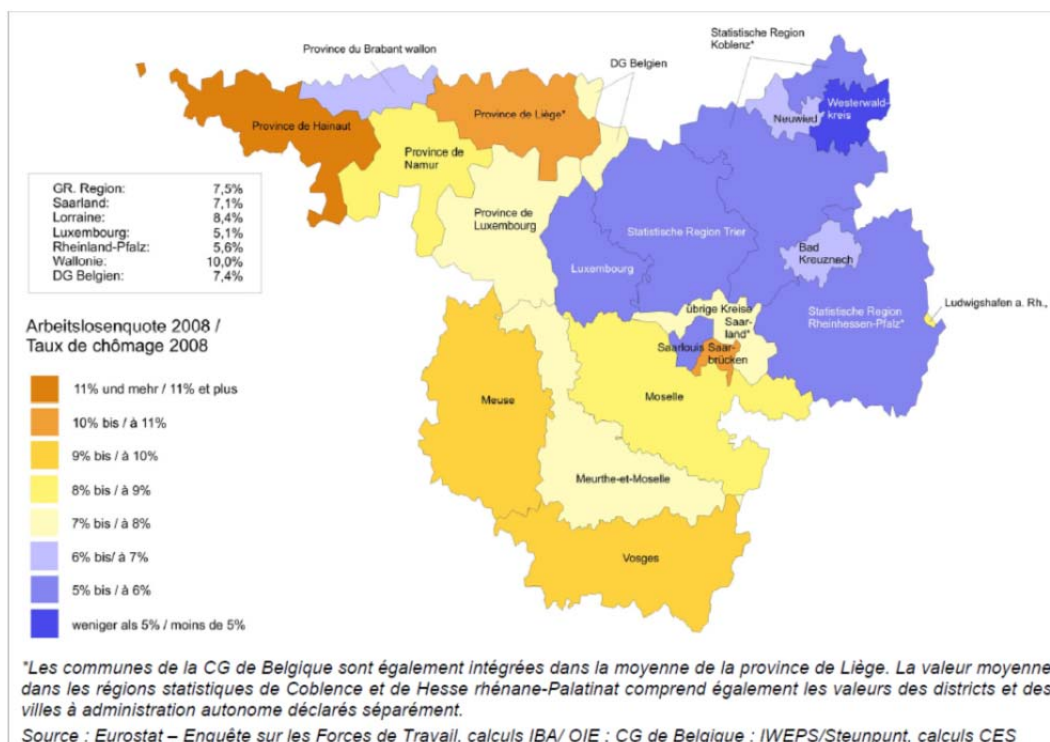
Figure 1: Unemployment rate in the Greater Region (in %), 2006-2008



Source: Interregional Observatory of labor market. Seventh report of the OIE: market conditions of employment in the Greater Region, 2010.

Figure 1 shows large disparities in the level of unemployment between the different regions. Between 2006 and 2008, the rate has been particularly high in Wallonia. However, in comparison to 2006 it decreased by 1.7 points. Regarding Luxembourg, despite increase (with a 1 point rise), the unemployment rate remains by far the lowest in the Greater Region. Luxembourg is followed by Rhineland-Palatinate with a value of 5.6%.

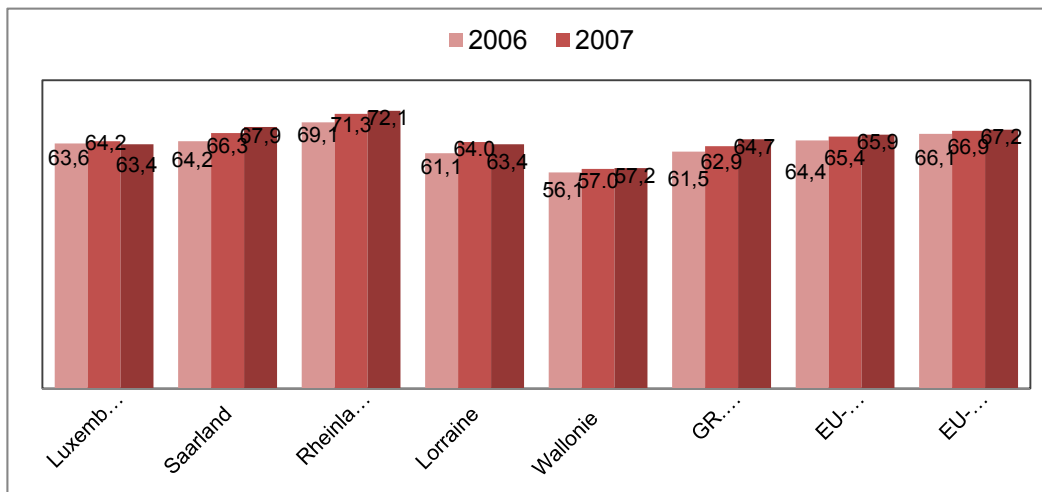
Map 3: Unemployment rate in 2008 (in %)



Source: Interregional Observatory of labor market. Seventh report of the OIE: market conditions of employment in the Greater Region, 2010

As far employment is concerned (Figure 2, Map 4), the overall employment rate in the Greater Region was 70.3% in 2008 (approaching the EU-27 average - 70.9%).

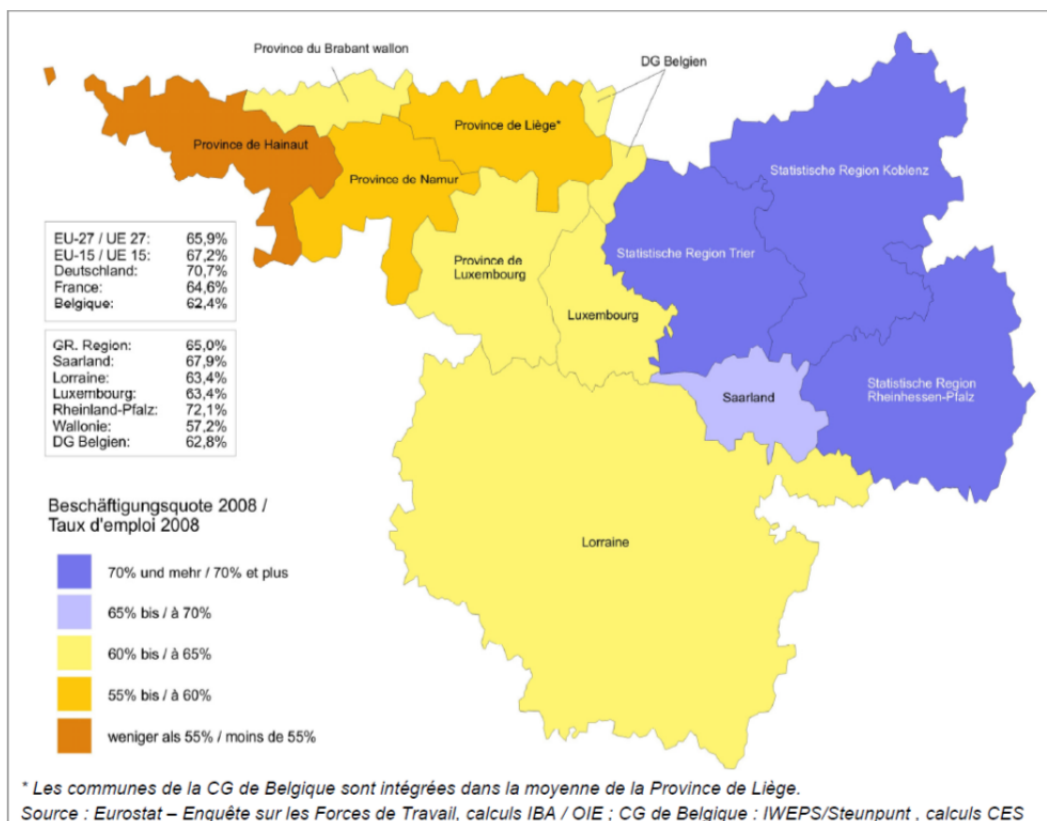
Figure 2: Employment rate in the Greater Region (in %), 2006-2008



Source: Interregional Observatory of labor market. Seventh report of the OIE: market conditions of employment in the Greater Region, 2010.

Since 2000, an overall positive rate is observed in all the parts of the Greater Region, the latter reaching its peak in 2008 (slightly below the European average - 65, 9% in the EU27 and 67.2% for the EU-15).

Map 4: Employment rate in 2008 (in %)



Source: Interregional Observatory of labor market. Seventh report of the OIE: market conditions of employment in the Greater Region 2010.

Between 2006 and 2008, Rhineland Pfalz had a considerable influence on the employment rate. In 2008, the participation rate was 72%, well above the average of the Greater Region (also above European average). Also, Saarland with a result of 68%, showed favorable record in comparison to regions of Wallonia, Lorraine and Luxembourg that were below the average of the Greater Region and the EU.

As in other cross-border regions across Europe, a European Employment Services (EURES) partnership has been put in place in Saar-Lor-Lux-Rhineland-Palatinate in 1997. This structure provides information about the living and working conditions in the four partner regions and promotes the exchange of information on supply and demand in the labour market in the border regions, particularly placing people in jobs. In general, EURES intends to facilitate the free movement of workers in the 30 countries of the European Economic Area (EEA). It includes networks of partnership between public employment services, trade unions and employers' organizations, coordinated by the European Commission.

Regarding labour mobility, the ESPON Metroborder Report (2010) indicates that multilingual and multicultural conglomerates might facilitate and increase cross-border mobility in the Greater Region. Nevertheless, according to their result, insufficient language skills are seen as the main barrier for the improvement of cross-border professional mobility. To overcome this barrier, there is a need to boost public actions which will provide better training opportunities and more efficient educational system.

Regarding tourism and leisure activities, borders at the same time generate specific opportunities and challenges for cross-border areas. Analysis of the structure of tourism in Luxembourg CBMR is challenging in that it involves four different nations with a total of five different regional authorities. For instance, the organization and marketing of tourism in Rhineland-Palatinate and Luxembourg displays a high degree of professionalism whereas the management of tourism in the other three regions is still determined by the administrative barriers. It is also important to note that most websites, including brochures are only in French and German, which represents the major obstacle to attracting tourists from other parts of the world.

The structure of tourism in the Luxembourg cross-border metropolitan region is very diverse: wine tourism, active tourism (close to nature), cultural tourism, welfare tourism, etc. Among these, active tourism (close to nature) and wine tourism are of central importance (GR-Atlas 2011). Regarding cultural tourism, the historical heritage plays a central role and is prevalent in almost all regions of Luxembourg CBMR. All these forms of tourism are important to the economic development of cross-border areas. However, the asymmetry in approaches of tourism management institutions between border areas still plays an obstacle in achieving a satisfied level of tourism development.

When considering the types of tourism that are generated by "border effects", there are several projects that are distinguished by their cross-border aspect. For instance, some tourist routes, hiking trails and long distance cycle routes that cross borders are subject of the numerous cross-border projects. Nevertheless the number of these projects should be increased, together with the complete census and reliable information that concern day tourist and those who stay for one night at least, for all border areas in the Greater Region. The discontinuous and incomplete census of such information is a recurring problem. For instance in 2006, no reliable data was found for the Rhineland-Palatinate and Saarland.

These initiatives should be encouraged by the fact that tourism is an important component of any regional and national economy. Therefore, in order to generate tourism in the border areas of Luxembourg CBMR, joint marketing activities should be carried out between different organizations and national tourist offices. These initiatives will reinforce cross-

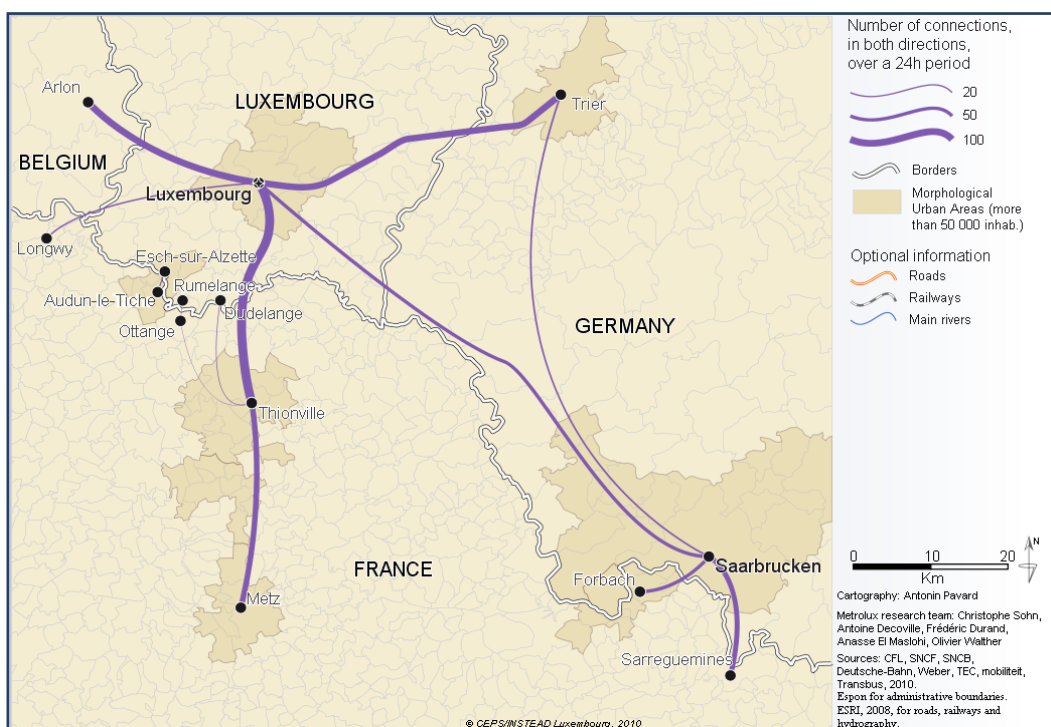
border cooperation among responsible tourist organizations, between institutions, associations, local and regional actors, and active citizens.

Additionally, this kind of initiatives should certainly be supported and encouraged by local and regional authorities on both sides of the border areas. This would also entail the development of cross-border tourism organizations to manage and promote a variety of cross-border tourist attractions. Apart from attraction of tourists from other regions, it is equally important to promote cross-border tourism between the border areas in Luxembourg CBMR.

As far as transport is concerned, Luxembourg is an important transit place (between northern and southern Europe) as well as the place with the most cross-border commuters across Europe, 150,000 workers crossing the borders every day. Almost 90% use their car (Carpentier and Gerber 2009); this constitutes a specific challenge for the different public authorities in charge of the planning of public transport infrastructure in Luxembourg but also in the neighbouring countries. The increasing number of cross-border workers and the enlargement of travelled distances provoke growth in internal mobility requirements and result in the saturation of the road networks. These trends hinder not only individual mobility itself, but also the living environment in agglomerations. When considering the cross-border transportation lines between major cities in the Luxembourg CBMR, the high number of daily commuter frequencies can be observed mainly running to and from Luxembourg City. These high frequencies are the result of cross-border commuters coming from Lorraine, Wallonia, Rhineland-Palatinate and Saarland to Luxembourg City, creating bottlenecks in cross-border transport (ESPON 2010).

Within the Luxembourg CBMR, there are good railway connections that link secondary urban centres like Thionville, Arlon, Trier and Longwy to Luxembourg City which is the main centre for the labour market (ESPON 2010). Such an offer is however still not sufficient in order to fulfil the needs for transport that arises from the vast number of cross-border commuters in the region (Map 5).

Map 5: Capacity and efficiency of cross-border public transport, 2010



Source: Cross-border metropolitan regions atlas, CEPS/INSTEAD 2011.

According to the METROBORDER analysis (ESPON 2010), the accessibility index for the Greater Region, as measured falls within the European average, with Luxembourg apparently enjoying a more favourable position in comparison to other surrounding regions. However, as noted by the Report (ESPON 2010: 168), "Transport issues are regarded as one of the most pressing policies in the Greater Region. Many of them must be handled on the bilateral level as concrete investments and technical questions have to be dealt with, and the bilateral agreement between Lorraine and Luxembourg or the currently elaborated bilateral mobility concept between the Saarland/Rhineland-Palatinate and Luxembourg might be pathbreaking".

The metropolitan connectivity of the Greater Region to the rest of Europe and the world is considered to be relatively good to Paris but the links between Luxembourg and the two other European capitals of Brussels and Strasbourg are inadequate, as is the connection to the Rhine Valley. The Eurocap-rail project, a high-speed train between Brussels-Luxembourg-Metz-Strasbourg is one of the priority projects of the Trans-European Transport Networks and could improve the current situation.

To achieve efficiency in transport planning and to better balance the organization of the entire territory, it is important to take into account cross-border flows between the border areas of the Greater Region. These issues require by definition greater co-operation in transport planning that should take place at supra-regional level. In addition to the importance for achievement of better quality of life, the transport quality is also important for the positioning of the Luxembourg CMBR on the European scene. Better connectivity enhances the attraction of foreign investments and influences higher international competitiveness.

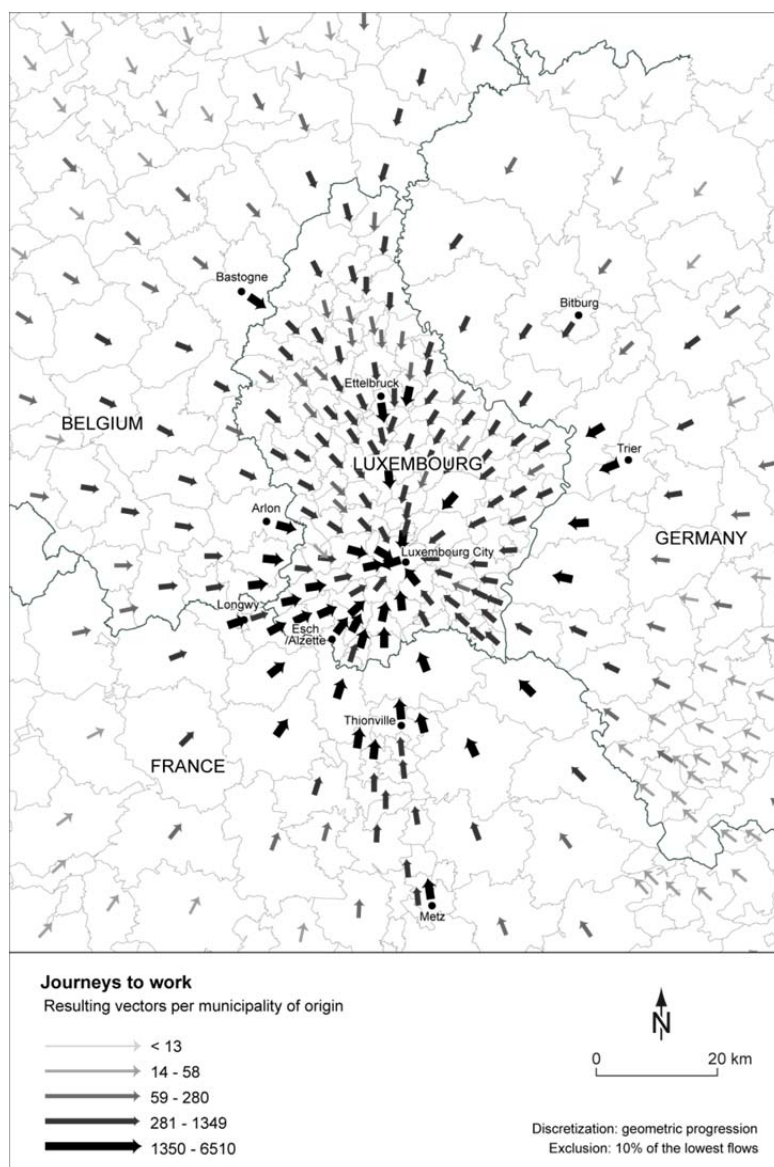
When considering the growing number of cross-border workers, territorial planning have to precisely counteract these growing cross-border commuting tendencies. So far, 85 % of cross-border trips are made by cars, while public transport is used for only 4 % of cross-border commutes. As shown by Map 6, the main orientation of home/work flows is to Luxembourg-City, which remains by far the largest employment centre in the country, which induces considerable road congestion.

Considering the fact that the cross-border trips are split between the two sides of the border, the growing number of initiatives supporting cross-border cooperation are in favour of integrated concepts and managements. One of the main challenges is to reduce the volume of car travel and the resulting nuisances (congestion, greenhouse gas production and energy consumption, etc.) through a different localization policies and alternative transport solutions. For this reason, a consortium of consulting firms produced IVL study, accompanied with alternative scenarios that provided elements for political decisions that are being implemented (OECD 2007). In addition to the IVL study, there are several other important initiatives that aim to improve cross-border transport conditions.

For instance:

- cross-border mobility scheme - SMOT (*Schéma de Mobilité Transfrontalière Luxembourg-Lorraine*), published in 2009, aimed to improve, supplement and integrate transport infrastructure between the Luxembourg and Lorraine (GR-Atlas, 2012);
- since 2007, the Economic and Social Committee of the Greater Region (CESGR - [Comité économique et social de la Grande Région](#)) organizes conferences every year with the main focus on transport issues.

Map 6: Main orientations of home/work flows, 2008

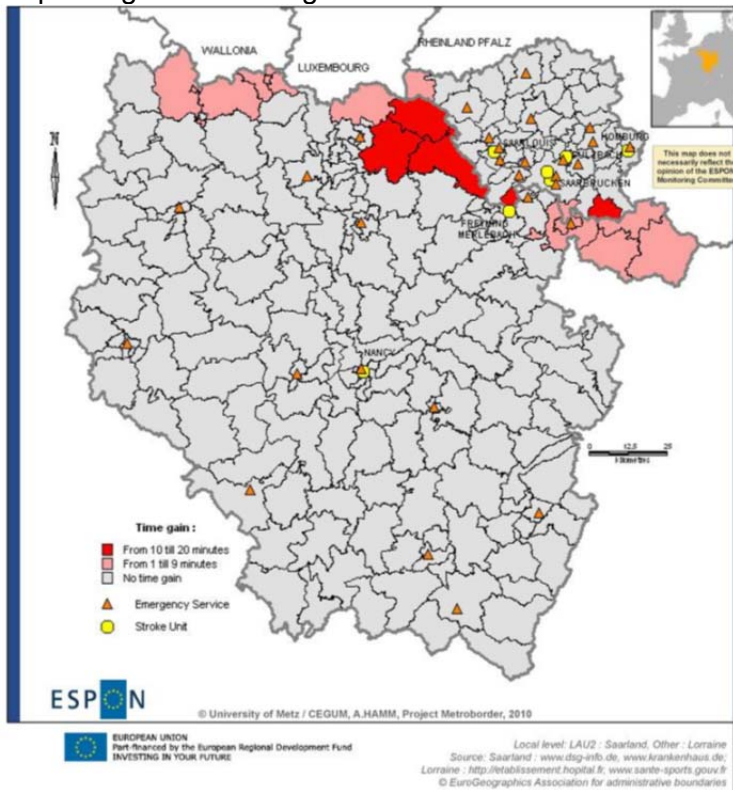


Source: Gerber, Klein and Carpentier 2011.

The current situation of general service provision in the CBMR of Luxembourg displays disparities in the level of services and distribution to their residents. So far, no coordination has been made jointly between the three territories in order to achieve a coherent distribution and provision. Among many possibilities, one improvement could be to rethink accessibility to emergency services, by investigating the cross-border dimension of such services, as has been recently done in the Metroborder project (ESPON 2010, see also de Ruffray and Hamez 2009). In this study, travels from emergency hospitals to the place of injury and travels to the specialist hospitals are considered.

By proposing a case study for a particular disease (cerebrovascular accidents, or strokes), the study focuses on time necessary between attack and the arrival of the patient in the stroke unit in the regions of Lorraine and Saarland. Two different scenarios in relation to the borders were tested: a) National borders are not permeable - the emergency unit which arrives belongs to the same country, and the patient is driven to a stroke unit in the same country; b) National borders are permeable - the emergency unit to arrive is the nearest one, from whichever country, and the stroke unit used is also the closest one (ESPON 2010).

Map 7: Significant time gains for the residents

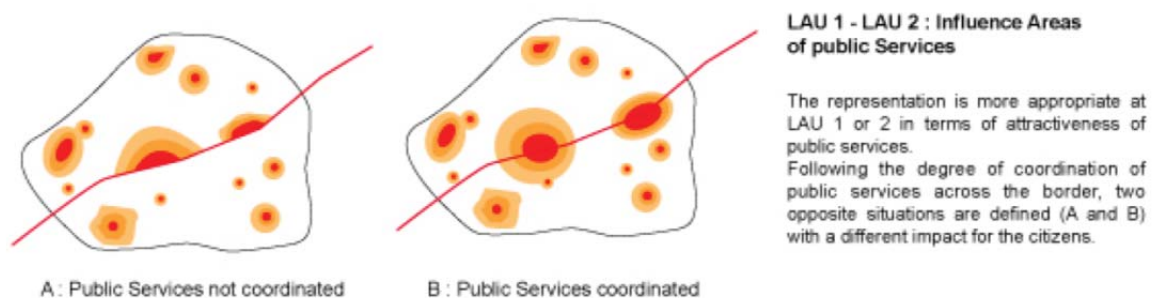


Source: ESPON 2010.

Thus, in case of cross-border cooperation and health harmonization, Map 7 shows the differential between both scenarios by allowing a measure of the time gains and therefore the additional chances of survival of the patients. According to Metroborder result, we might conclude that cross-border arrangements in this field will certainly improve general provision of services to residents of border areas.

Similarly, de Ruffray and Hamez (2009) investigated the accessibility to maternity hospitals in the Greater Region, with the particular attention to the situation along national borders. They argue that borders are important discontinuity lines in terms of provision and organization of services. Figure 3 illustrates two possibilities of the distribution of services in the area divided with national border. In the first case, the availability of services is influenced by the state border (Figure 3A) while in the second case, the distribution is coordinated through cross-border cooperation (Figure 3B).

Figure 3: Provision and organization of basic services and facilities in border regions

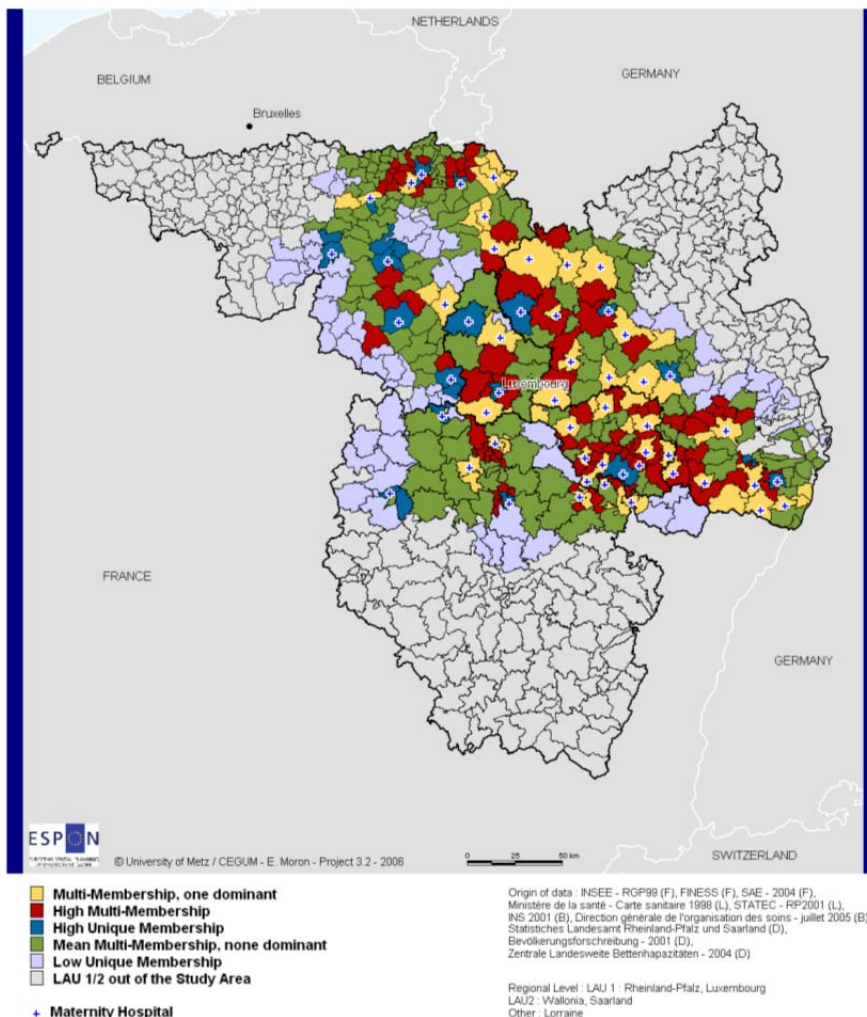


Source: adapted and modified from de Ruffray and Hamez 2009.

To investigate the accessibility to maternity hospitals in the Greater Region, de Ruffray and Hamez (2009) used a very small set of data: the demand (number of births in the Local Administrative Units - LAUs), the capacity (number of beds in each maternity hospital), and the accessibility to each maternity hospitals. They also considered the political meaning of “accessibility to essential services” by arguing that the choice of operators determines different visions of accessibility (particularly when the inhabitants belong to the influence areas of several services).

With the application of fuzzy sets and possibility theory, authors developed classification based on a membership values to an influence area (see Map 8). To do so, they used a threshold of 30 minutes travel distance (time to reach the maternity hospital from each LAU) by considering accessibility to a 146 maternity hospitals located near the borders. In cases when the distance between a LAU and a maternity hospital exceeded 30 minutes, they assumed zero or no accessibility.

Map 8: Typology of a maternity hospitals accessibility



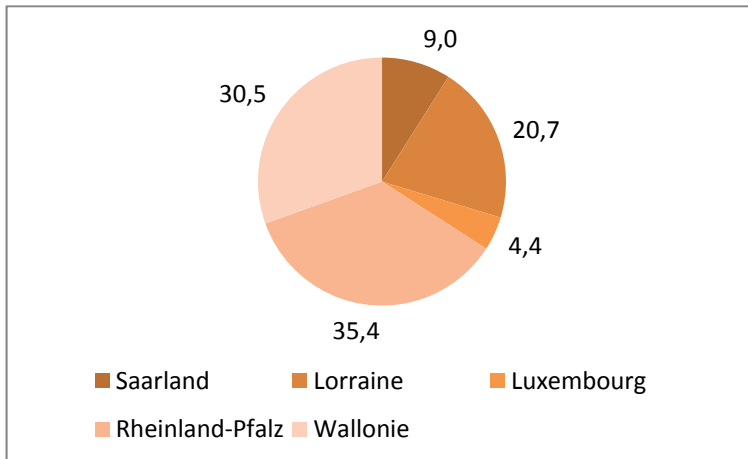
Source: de Ruffray and Hamez 2009.

The distinction of five classes (Map 8) revealed the spatial complexity of the accessibility to basic services in Luxembourg and surrounding areas. For instance, they state that the LAUs of the East of the Moselle French department (marked in blue) or LAUs in the Walloon core that are in more dramatic situation, require a better cooperation of their social security systems and the policy maker’s full attention.

2.2. Social

In 2008, the Greater Region had 11.36 million inhabitants, which accounted for nearly 2.5 % of the population of EU25. Figure 4 shows the proportion of each region in the total population of the Greater Region in 2008. The region of Wallonia and Rhineland-Palatinate contained two-thirds of the overall population. The region of Lorraine accounted for a fifth of the overall population (21%), whereas region of Saarland with less than 10 %, followed by Luxembourg with only 5 % of all the inhabitants.

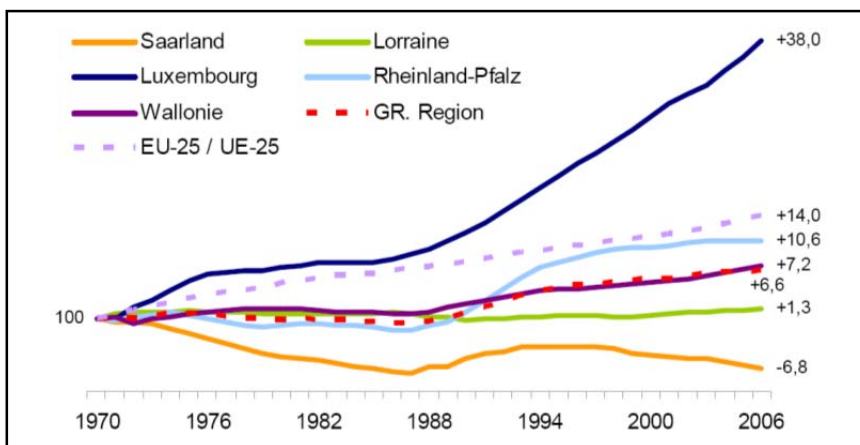
Figure 4: Weight of the regions in the total population of the Greater Region, in %, 2008



Source: Statistical office of the Greater Region 2011 (*Offices statistiques de la Grande Région*).

Since 1975, two demographic trends can be distinguished in the Greater Region: a period of continues decline until 1987, followed by a period of population growth until the present day (OECD 2007). This overall demographic growth is mainly due to immigration, particularly in Luxembourg and to a much less degree, in Rhineland-Palatinate and the Walloon region. The different regions that constitute the Greater Region show contrasting demographic trends as illustrated by Figure 5. While Luxembourg has experienced strong demographic growth due to the attractiveness of its knowledge-intensive oriented economy, Lorraine population has stagnated and a demographic decline can be observed in Saarland, in both cases due to the desindustrialisation process taking place in those regions (OIE 2007).

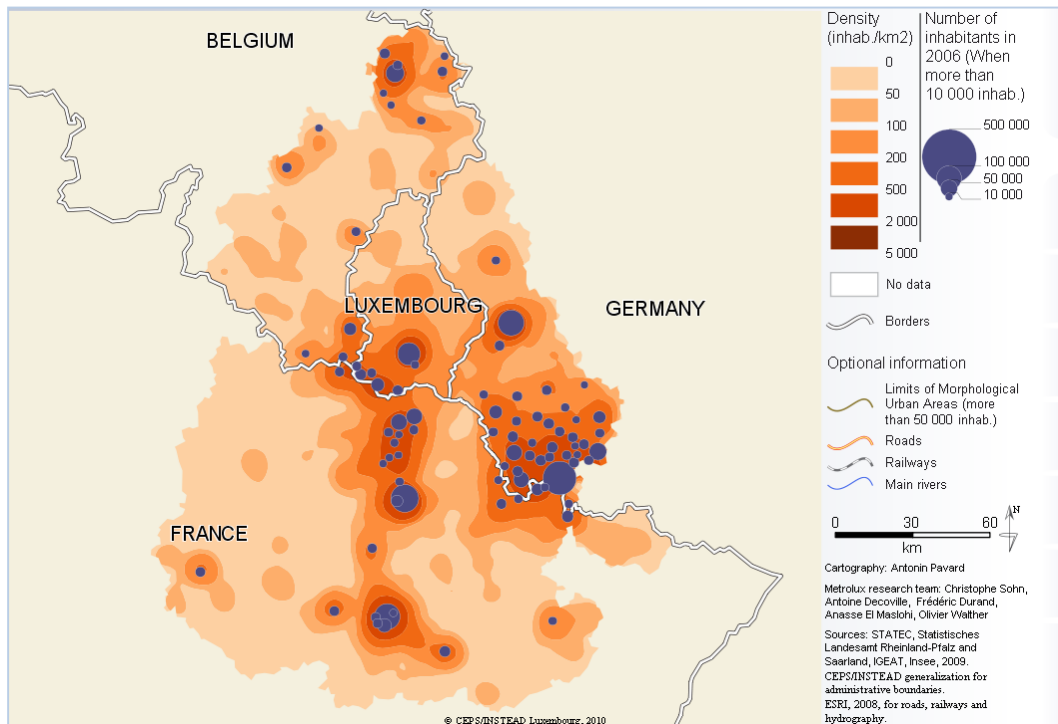
Figure 5: A contrasted demographic evolution, 1970-2006



Source: Statistical office of the Greater Region 2011 (*Offices statistiques de la Grande Région*).

Map 9 shows that the distribution of population in the Luxembourg cross-border metropolitan region is concentrated in the (main) urban centres (Luxembourg, Trier, Saarbrücken, Metz and Nancy).

Map 9: Luxembourg CBMR - population distribution in 2006



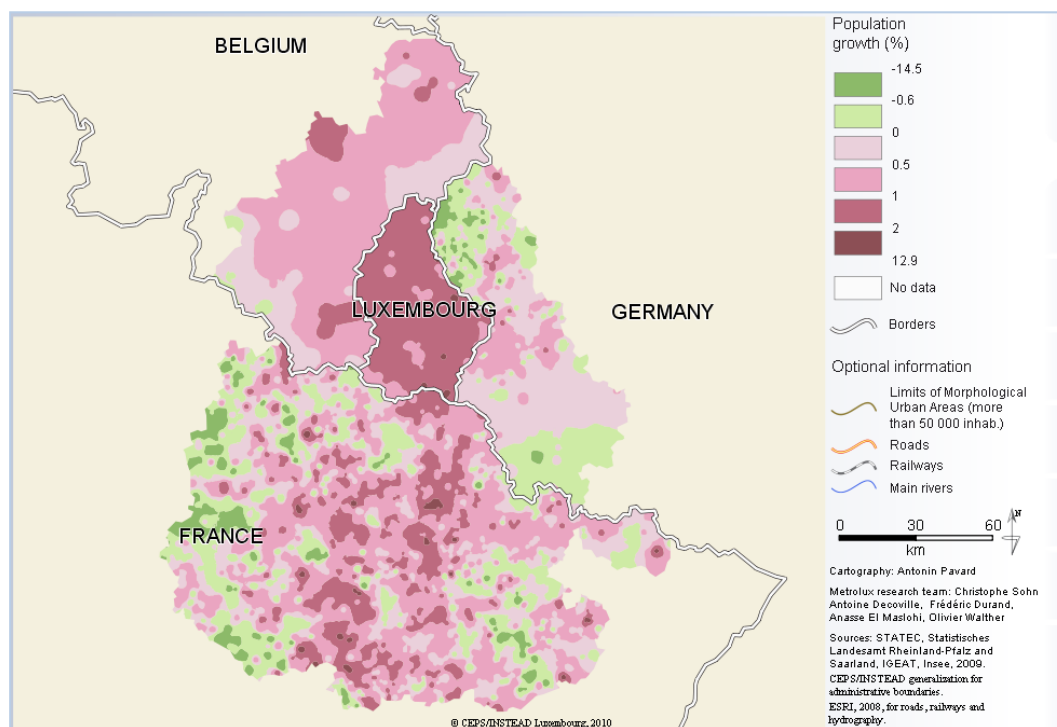
Source: Cross-border metropolitan regions atlas, CEPS/INSTEAD 2010.

These centres show high densities - above 130 inhabitants per km². In Luxembourg City, the area forms a discontinuous belt around the south of the capital. Regarding other urban centres, we observe that population densities decrease (in a regular manner) between the metropolitan centres and the peripheries (Walther 2011).

Regarding the average growth rate of population in the period 1982-2006, the urban centre of Luxembourg shows strong demographic growth, defined as an annual rate of growth of over 2.0%. When considering the population growth from 1982 to 2006, it could be observed that the urban area of Saarbrücken, although showing high densities, follows the trend of population decline (see Map 10).

As in most European cities, the population of Luxembourg CBMR is experiencing a gradual ageing: the share of those aged 60 and over accounts for 24 % in 2008, in comparison to 22% in 2003 (Offices statistiques de la Grande Région 2011). This trend is less pronounced in Luxembourg than in the other parts of the Greater Region. In 2008, the percentage of population aged 80 or more in Luxembourg was 3.6 % which is much smaller than in neighboring areas: in Wallonia 4.7%, Rheinland-Pfalz 5.4%, Saarland 5.5% and Lorraine 4.5% (Offices statistiques de la Grande Région 2011). Nevertheless, the case of Luxembourg is specific due to the large foreign resident population, having a fertility rate higher than that of the citizens of Luxembourg.

Map 10: Luxembourg CBMR - population growth 1982-2006



Source: Cross-border metropolitan regions atlas, CEPS/INSTEAD 2010.

Concerning the effects of border on the residential attractiveness, one can witness contrasting trends. According to Gerber, Klein and Carpentier (2011), borders seem to represent a strong barrier effect when it comes to residential mobility. Most of the residential flows monitored in the Luxembourg CBMR are not cross-border but intra-regional. This is mainly due to strong differentials in real estate prices (see Map 11) as well as identity-based behaviour that show some kind of place attachment (Eaux and Gerber 2008).

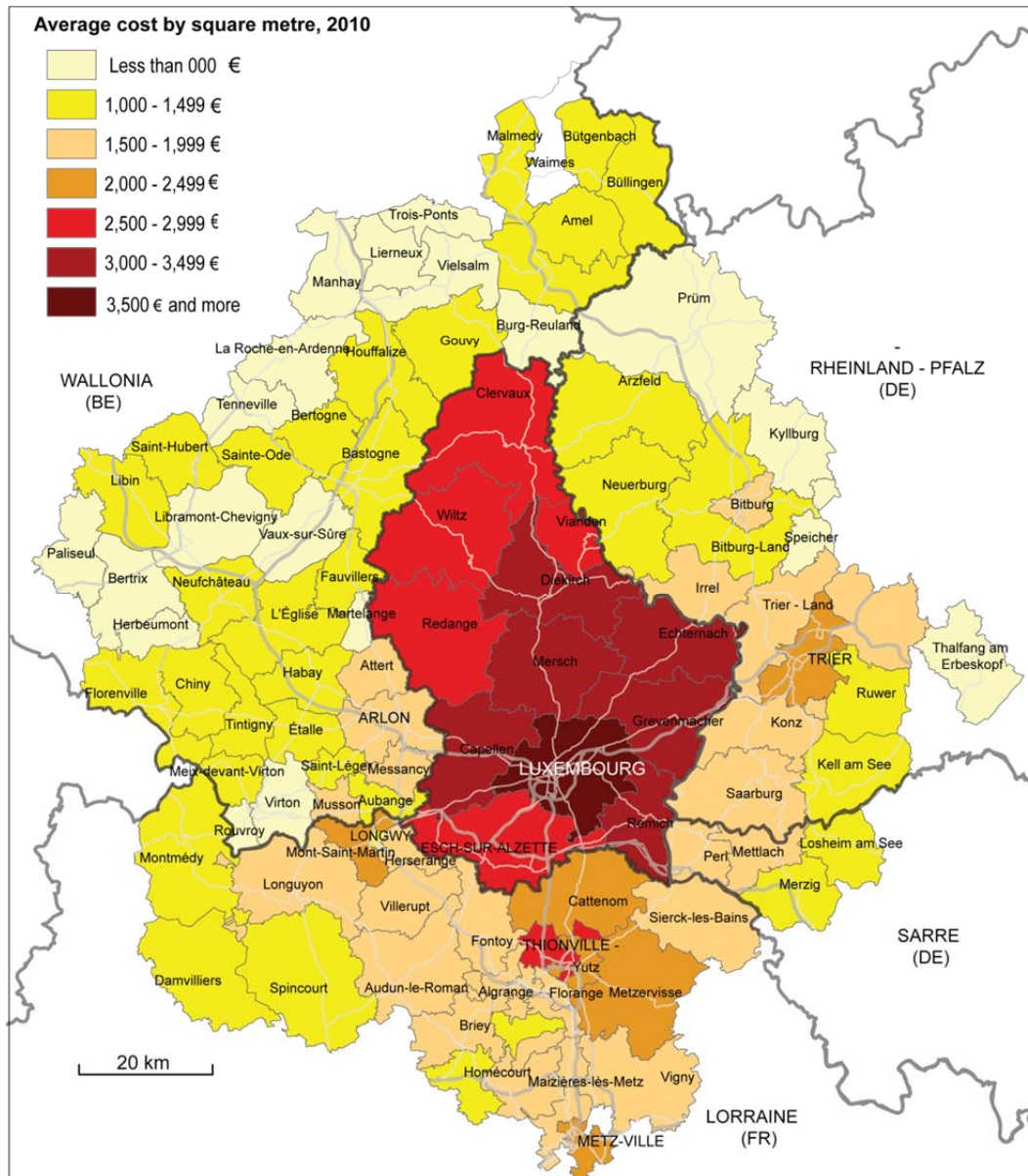
In the mean time, many cross-border workers try to reduce the travel time (and therefore cost) to their place of work (Luxembourg City) and therefore tend to locate their place of residence near the border. Thus, according to Gerber, Klein and Carpentier (2011:159), the borders constitute a kind of residential paradoxical attractor where: “at the level of residential movements, the border plays the role both of attractor, as the dominant trend is one of moving closer (at least for cross-border workers), and the role of barrier, illustrated by the relative weakness of flows of households moving across borders. While the differentials can again be cited, the cultural differences cannot be ignored, in particular for those people from neighbouring countries.”

Against this general trend, there are also people who cross the border in order to live in a neighbouring country. Within the Luxembourg CBMR, the majority of these migrations are directed towards Luxembourg, especially the capital city and its agglomeration. Despite the high differentials in real estate prices, Luxembourg remains an attractive place for workers who can afford it. The access to urban amenities specific to a metropolitan centre and the proximity with the place of work are strong incentives.

On the other hand, there are also households living and working in Luxembourg that decide to migrate to a neighbouring region while keeping their job in Luxembourg. This phenomenon called ‘residential escape’ (Carpentier 2010) is concerning around 7700 people between 2001 and 2007 (Carpentier and Licheron 2010).

Although relatively marginal, this phenomenon is increasing, especially for Luxembourgish citizens that become cross-border workers from their own country. The main motivations are the fact that housing is significantly cheaper in the neighbouring countries than in Luxembourg, thus making it possible for some households to get access to ownership.

Map 11: Housing prices per square meters in the Luxembourg region, 2010



Source: Diop 2011.

The Luxembourg CMBR is defined by its multilingualism, its history, its industrial heritage, the architectural monuments, many world heritage sites and artistic dynamisms in the fields of theatre, music, dance and arts. Concerning regional identity and cultural heritage potentials, the project 'European Capital of Culture' (ECOC) encouraged new modes of cultural participation of Luxembourg society (Luxembourg and Greater Region, European Capital of Culture 2007, Final report, 2008). Luxembourg joined the project in 1995 with the theme 'European city of all cultures' by highlighting the richness of its multicultural society. To support the idea of sustainable cultural development through cross-border cooperation, the Prime Minister of Luxembourg, Jean-Claude Juncker, in 2000 proposed to the Summit of Ministers of the Greater Region that the event should cover Greater Region as well. Since

then, the ECOC project aimed to combine the efforts of cultural actors, politicians, citizens and different communities across borders in the Greater Region area.

Another important initiative in Luxembourg CBMR is the association *Espace Culturel Grande Région* (Cultural Space Greater Region, co-financed by the European Regional development Funds). It has been created in 2007 within the framework of the *INTERREG IV A program Grande Région*. The main mission of this association is to develop cultural cooperation in the Greater Region area in order to bring cultural authorities of the Greater Region together, through cross-border cultural programs, professional skills networking, communication, mobility, initiatives and information technologies (Espace Culturel Grande Région 2011). Beside these two associations, there are many others such: *Association of the museums of the Greater Region*, *Cultural portal of the Greater Region plurio.net*, *University of the Greater Region*, etc. These initiatives certainly foster/enhance the long term development of cross-border cultural cooperation.

The stimulation of durable cultural exchanges between local and international creators, between institutions, associations, professional actors and active citizens across borders remain a great challenge for the Luxembourg CBMR. In this sense, the barriers to cooperation that continue to play a role are: administrative obstacles, linguistic barriers, political and mental borders among different cultural actors.

The Luxembourg CBMR, in addition to its favorable geographical position at the heart of Europe and its numerous European institutions, is characterized by multilingualism and a population made up of almost 150 different nationalities. In this trilingual region, French, German and Luxembourgish are spoken. Multilingualism is partly due to the large number of foreigners who are attracted by favorable working and living conditions in Luxembourg, but mostly because of historical reasons. The multi-linguistic context enables French, German and English speaking people to easily enter the labour market without major obstacles. Therefore, multilingualism plays an essential role for fostering the strategic development of the Luxembourg CBMR.

2.3. Environment

In Luxembourg, the protection of nature and natural resources is defined by the 1982 Law which defines the authorities responsible for their administration and management. The Department of environment of the Ministry of Sustainable development and Infrastructure in consultation with the local authorities is responsible for the initial stages in the designation of protected sites. In this regard, the major document that provides the basis for the protection of natural areas in Luxembourg is the *Plan d'aménagement partiel concernant l'environnement naturel 2007-2011* (Partial Development Plan Concerning the Natural Environment).

According to the World Resources Institute, in 2003, the total land area of biodiversity and protected areas protected by IUCN Category in Luxembourg was 259.000 ha. Even though these areas are considered as attractive for the promotion of eco-tourism and further leisure activities, the growing urban pressure of the surrounding areas, as well as the on-going process of agriculture system restructuring are transforming the physiognomy of these natural landscapes. The dynamic change occurring in these areas on the one hand and the special challenge to protect and manage them on the other hand have turned them into fragile objects that require special attention. Moreover, the *Plan d'aménagement partiel concernant l'environnement naturel* for the period of 2007/2011 covers/treats only the parts of protected areas that are within the country of Luxembourg. When considering the fact that the pollution does not stop at the border and that human activities on one side of the border area can have an impact on other side, these types of plans are becoming non-effective for the prevention and monitoring. For that reason, the responsible authorities from different

parts of the Greater Region are trying to group themselves in a systematic network of cross-border cooperation.

At the regional level, there are several projects that provide a platform for cooperation management. For instance, the INTERREG IV a - project 'Réseau des parcs naturels de la Grande Région' (Network of the natural parks in the Greater Region) aims to provide a tool of cooperation between different natural parks by covering 22 natural parks within the Greater Region cooperation area. Most of them are located in border areas (Map 12), indicating that the border presence might strongly influence their protection and management. This confirms that biodiversity is rarely confined within a particular territorial surface. Therefore its management cannot be processed by only a single jurisdiction, but requires cross-border management that is reinforced by a multiplication of different governance levels.

Map 12: Network of natural parks of the Greater Region



Source: Portail de la Grande Région 2011

The double objective of protection and management of the natural heritage on the one hand and spatial planning with respect to local economic and social development raised the need for joint cooperation projects across borders. So far, the following forms of cross-border cooperation exist in the Greater Region:

- Transfrontier Biosphere Reserve Vosges du Nord-Pfälzerwald
- Deutsch-Luxemburgischer Naturpark
- Vallée de l'Attert Belgo-Luxembourgeoise
- Convention between Parc naturel Haute-Sûre (GDL) and Parc naturel Haute-Sûre
- Forêt d'Anlier (Wallonie)

- Parc naturel Hautes Fagnes-Eifel
- Réseaux des parcs naturels de la Grande Région (INTERREG IV A)

These cross-border cooperation agreements greatly affect the way in which these areas are being protected and managed. Clearly, the presence of state borders in protected areas reflects an arena of different interests and goals between the various authority levels responsible for their protection and management. However, a growing number of cross-border agreements indicate that the negative effects of borders can be reduced with the joint cooperation projects.

Regarding the exploitation of natural resources, the Longwy European Development Pole is an interesting experience in relation to the management of industrial transition after the end of the mining industries. According to the MOT (2011): “The Longwy European Development Pole, situated at the border between France, Luxembourg and Belgium, forms a cross-border conurbation covering 22 municipalities (in the 3 countries) and over 127,000 inhabitants. For many years specialised in the mining and steel industries, the conurbation has, since the 1970’s, been confronted with an economic reconversion crisis and the dismantlement of the Belgian plants, then the French ones, which lasted until the 1990’s”. France, Belgium and Luxembourg first signed an agreement in 1985 in order to redevelop this former industrial area. Local authorities followed in 1996 by creating the cross-border association of the Longwy European Pole. According to the MOT (2011): “This is a unique initiative in Europe and involves active collaboration at and between different decision making levels (European, national, cross-border and local). The initial goal is to favour the establishment of labour companies to meet the industrial crisis”. Since then, the European Development Pole’s cross-border association has established a trinational urban planning agency and been involved in several fields, including the environment, tourism, training, and culture.

Due to the significant economic growth of Luxembourg-City, half of the population of the European Development Pole is now working in the capital. As the MOT (2011) argues, “The population of the Belgian and French territories of the conurbation which appear to be becoming the labour force reserves of the Luxembourg municipalities is registering a significant growth, linked to the important migratory flows. This growth is the result of a tertiarisation of jobs linked to a residential economy (commerce, services), the dynamic of which is fed by two main factors: the catch-up effect accumulated over the years of conversion and the significant purchasing power of the cross-border workers”.

The European Development Pole is locally competing with the new City of Sciences built by the State of Luxembourg in Esch-sur-Alzette, located within the same cross-border urban area and which has received much attention and investments over the last years. The purpose of the City of Sciences is to re-develop a steel site from ArcelorMittal and transform it into a tertiary pole comprising financial and Research and Development activities. The aim of the project, which was originally conceived as a national initiative, is to accommodate 34,000 people and 20,000 tertiary, including the University of Luxembourg. Very recently, cross-border initiatives have been established between Luxembourg and France, in the framework of a European Group of Territorial Cooperation (GECT) Alzette-Belval signed in 2011 between the States, regional and local authorities of the two countries.

3. Synthesis

Historic Legacy and Structural Development Opportunities and Constrains

Cross-border metropolitan region of Luxembourg is located in the heart of the Greater Region, a cross-border institutional cooperation between Luxembourg, Lorraine (France), Wallonia (Belgium), Saarland and Rheinland-Pfalz (Germany). At the European scale, Luxembourg appears as a middle-sized European city-region with a very pronounced international profile mainly based on specialised financial activities and EU bodies. In Luxembourg, the proximity of national borders seems to have advantaged the Grand-Duchy in its economic development, insofar that it allows Luxembourg to recruit skilled workers from surrounding regions without having to bear the cost of their social reproduction. Furthermore, Luxembourg is experiencing a strong demographic growth with a high proportion of foreigners and an increasing number of cross-border commuters. The concentration of knowledge-intensive activities in Luxembourg is accompanied by strong functional integration of the German, Belgian and French bordering areas.

Physical/Locational

In the CBMR of Luxembourg, the long-standing national peripherality has resulted in some limitations concerning intra and inter-regional accessibility, especially for interregional railways connections that are still lagging behind. With the opening of borders and the rise of strong functional interdependencies between the urban centres and their cross-border periphery, such an historical legacy might also be interpreted as a stimulus for local and regional actors to cooperate.

Another locational historic legacy is the scarcity of land. The presence of brownfields along the French border has strong consequences on structural development as it result in fierce competition for land use and high real estate prices.

Economic/Business

From a social and economic point of view, the presence of borders has traditionally been perceived as an obstacle to the optimal distribution of activities in space. Border areas have thus been considered as marginal for urban development due to their divided market area and high transaction costs. With the opening of borders, such historical legacy represents both constraints and opportunities. On the one hand, the presence of different regulatory frameworks and asymmetric economic development may render cooperation between the actors located on either side of the border more difficult: centre-periphery logics, different institutional frameworks and mental barriers constitute limitations difficult to overcome. On the other hand, the inherited disparities linked to the presence of a border offer opportunities to develop new comparative advantages.

Luxembourg and its neighbouring countries as a part of the common market and part of the Schengen space since its beginning, enable workers to freely cross the borders and work in a neighbouring country. However, the differentials in income wages (pull factor) and unemployment rates (push factor) are driving forces for the polarization of labour flows, resulting in strong cross-border economic interdependencies between the metropolitan core and its borderland peripheries.

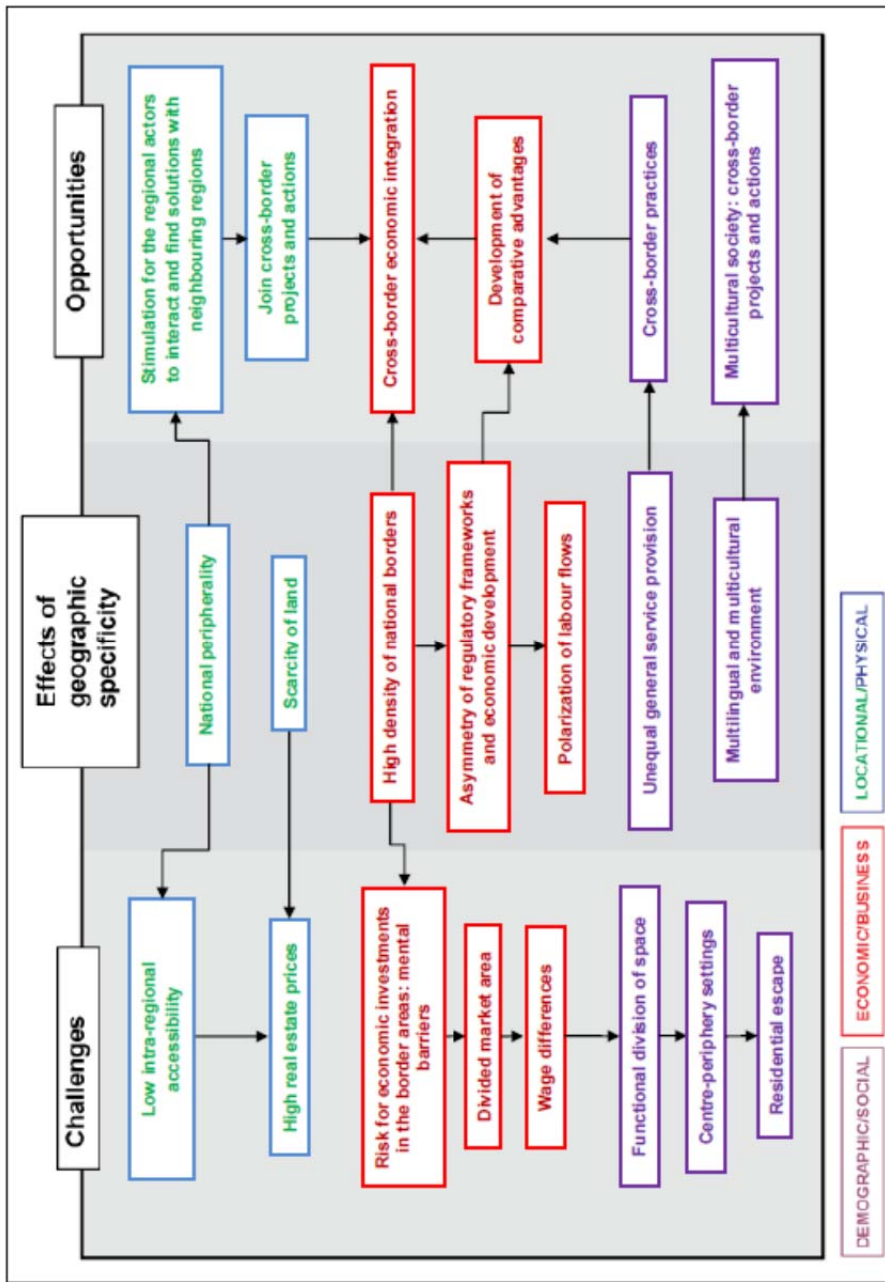
Demographic/social

In the CBMR of Luxembourg, strong disparities can be observed as far as the level and distribution of services to the residents are concerned. This has led to an important functional division of space, the urban centre being well-equipped, and the periphery offering mainly residential services but very little jobs.

Due to strong differentials in real estate prices, a significant number of households have chosen to leave the urban agglomeration for its periphery in the neighbouring countries (a phenomena known as 'residential escape'). However, despite the high differentials in real estate prices, Luxembourg remains an attractive place for workers who can afford it. The access to urban amenities specific to a metropolitan centre and the proximity with the place of work are strong incentives.

Luxembourg has experienced strong demographic growth over the last decades, mainly because of combination of both financial activities and European employment. This knowledge-intensive economy is attracting an increasing number of highly-qualified and innovative individuals from all around the world, creating a multilingual and multicultural environment. In addition to wealthy and creative expats, cross-border workers also contribute to the cultural diversity of the region. Such a multicultural and multilingual society can be an asset for stimulating cross-border projects between local, regional and international actors across borders and contribute to enhance greater social cohesion.

Nexus model- Cross-border metropolitan region of Luxembourg



4. Generalisation from case study

Given the multiplicity of specific cases in Europe, a generalisation taking into account both the functional and institutional dimensions of cross-border integration can only be illusory (Sohn, Reitel and Walther 2009).

Nevertheless, as suggested by a comparative study including 10 European CBMR (Decoville et al. 2010), the case of Luxembourg is showing similar functional integration patterns than Basel and to a lesser degree the Vienna-Bratislava region. The different cases display a “process of *integration by polarisation*, [where] the flows of labour and the residential displacements both primarily converge on the dominant urban centre. Given the significance of the differentials of property prices between the centre and the periphery, the centripetal residential movements involve primarily wealthy households. Functional specialisation of space which tends to separate economic activity from residential areas is combined with a mechanism of social selection driven by market logic. This model, which is beneficial for the urban centre in economic terms, is however inegalitarian and raises the question of its durability within a larger process of European integration, of which the very idea cannot be dissociated from greater territorial cohesion, a factor promoting stability.”

Annex 36: The cross-border intra-firm networks in the Greater Region

1. Introduction

Since the end of World War II, the processes of globalization were largely driven by the states through the creation of free zones and deregulations. Nowadays, these processes are clearly dominated by transnational and cross-border interactions of capital between firms that concentrate most of the world wealth. Although, the state's institutional structures and the international treaties remain determinant in the spatial organization of firms, the relative opening of the borders offers new opportunities to economic and political actors located near a state border (Ratti and Reichman 1993).

Increased openness and mobility reinforce firms to externalize non-core activities through various types of networking and resulted in the growing reliance on the external environment (Geenhuizen and Ratti 2001: 3). However, the nature and extent of these interactions depend on the heterogeneity and the different levels of economic development, institutional arrangements and levels of entrepreneurship of border regions (Smallbone and Welter 2009).

By focusing on the Greater Region area, this paper investigates the organizational structures of cross-border intra-firm linkages and their spatial pattern. In order to determine whether these networks are influenced by national borders, the analysis focuses on cross-border specificities and on the spatial organization of intra-firms networks at the regional scale.

2. Conceptual Framework

i. 2.1. Study area

The Greater Region is an institutionalized cross-border cooperation area, constituted by the Grand Duchy of Luxembourg, the French and the German speaking community of Belgium, the German Länder of Saarland and Rhineland-Palatinate and the French region of Lorraine. The Greater Region presents a high degree of

cross-border integration that can rarely be found elsewhere in Europe. This is mainly due to the economic development of Luxembourg which attracts more than 150 000 cross-border workers.

In the Greater Region, the high density of national borders provides both opportunities and limitations for cross-border entrepreneurship. In order to discover them, the analysis focuses on the cross-border linkages that are taking place in the border areas. This approach therefore deals with different concepts from the literature: (1) the cross-border dimension (closed vs. open borders); (2) intra-firms networks (space of places vs. space of flows); and (3) globalizing regional development (nation state vs. regions).

ii. 2.2. Research Concepts

(1) The presence of borders has long been perceived as an obstacle to the optimal distribution of activities in space (e.g. Christaller 1966 and Lösch 1944). For instance, Losch (1944) claimed that borders represent distortions in the market networks and in the long term affect the economic landscape and consequently divide market areas. Nowadays, the European integration and globalization processes opened up many national boundaries, providing new opportunities to exploit border differentials (Sohn, Reitel and Walther 2009). Even though characterized by economically, politically and culturally separated territories, border regions function at the same time as areas of contact and mutual fertilization.

(2) Firm ownership linkages have rarely been used to detect the effects of borders on the economic performance of the border areas. Even though highly important for providing insight into the different channels of decision making and power among firms, the creation and functioning of intra-firms networks in relation to national borders was never fully investigated. The increasing importance of knowledge, capital, and labour flows in the globalised world (Castells 1996) has led to reconsider how places are being transformed by these flows and at the same time how places (border areas) transform flows located in place-specific domain (Henderson et al. 2002).

(3) Until recently, the usual unit of analysis of the majority of studies of the world economy has been the nation state. The Global Commodity Chains and Global

Value Chains approaches have notably argued that such a perspective said little about how the sub-national regions and institutions were shaped by transnational production systems (Coe et al. 2004). However, this level of aggregation is less useful when we take into account economic activities that are increasingly going beyond national boundaries. Globalization process such as rapid technological change, enhanced capital mobility and inter-regional competition focused attention on sub-national regions and the need for policy interventions at the regional level. In this regard, regions should not be seen as bounded territories, but rather as permeable territorial formations whose national boundaries are straddled by a broad range of network connections with other regions within and out of national territory (Amin 2002, Coe et al. 2004).

iii. 2.3. Research questions

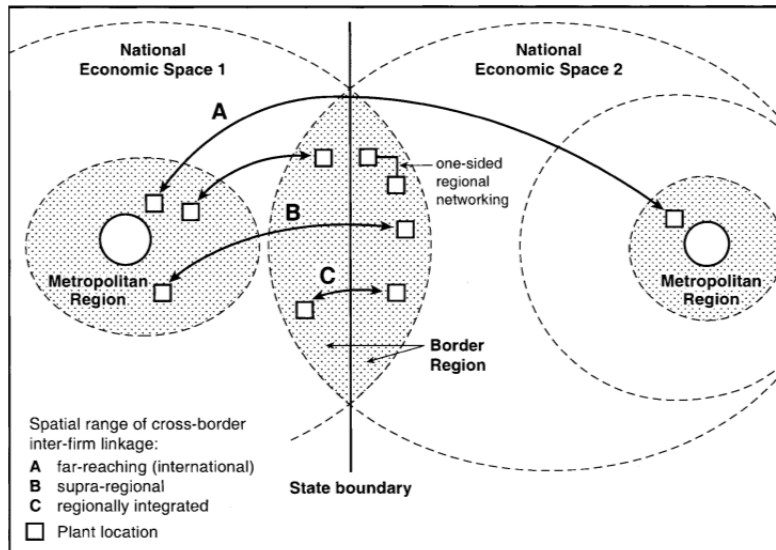
The overall objective is to investigate intra-firms networks in the Greater Region through consideration of the border effects on the location of enterprises. Within this objective, we try to distinguish between cross-border links that exist in the border areas from those that have international character and that exist independently of the borders. In this regard, the first question that arises is: ***What is the spatial pattern of cross-border intra-firm linkages in the Greater Region?*** To determine whether these networks are influenced by national borders, we then ask: ***Which border areas host the highest number of firms and connections?*** and investigate the spatial organization of companies with regard to national boundaries.

From a spatial perspective, our hypothesis is that the spatial dimension of cross-border networks offers a better understanding of the role of borders and interdependencies that exist between firms and cities that host them, due to agglomeration economies.

In this regard the third question is: ***Which border cities within the Greater Region area have the highest number of economic ownership relationships?*** Cross-border firm networks are structured by inherited framework of regional and national systems of cities (well described by Christaller). Therefore, a spatial approach of the firms' networks enables a comprehensive picture of how and under what conditions these networks shape the border city-regions.

For instance, to identify the firm linkages that matter for cross-border integration, Krätke (1998: 635-636) developed an approach on the basis of their geographical dispersion (Figure 1).

Figure 1: Three types of cross-border firm linkages



Source: Krätke 1998.

Three different forms of cross-border cooperation between firms across borders are distinguished: long distance, supra-regionally and regionally integrated linkages. In terms of cross-border integration, Krätke (1998) argues that firm linkages on both sides of the border within the border area reflect actual cross-border integration, in contrast to long distance linkages that do not affect border regions.

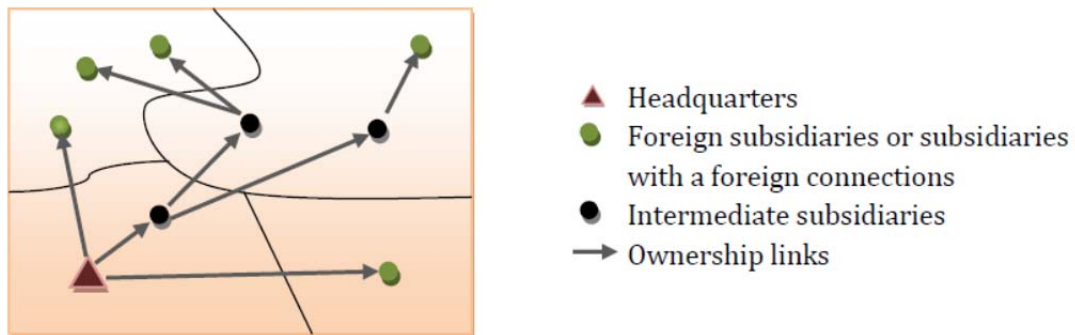
3. Methodology

3.1. Dataset

Our data comes from the ORBIS database from the Bureau Van Dijk and available at the University of Lausanne. From a quantitative point of view, this database provides comprehensive information on the geographical locations of 600,000 subsidiaries located throughout the world. It includes information regarding their geographical location at the municipal level, country of origin, their sector of activity (NACE code), their size (turnover and number of employees), their function in the firm and other relevant information such as headquarters and ownership links (see Figure 2).

Thus, this database is used to extract the information about enterprises that are located within cross-border areas of the Greater Region.

Figure 2: Ownership links contained in ORBIS data base



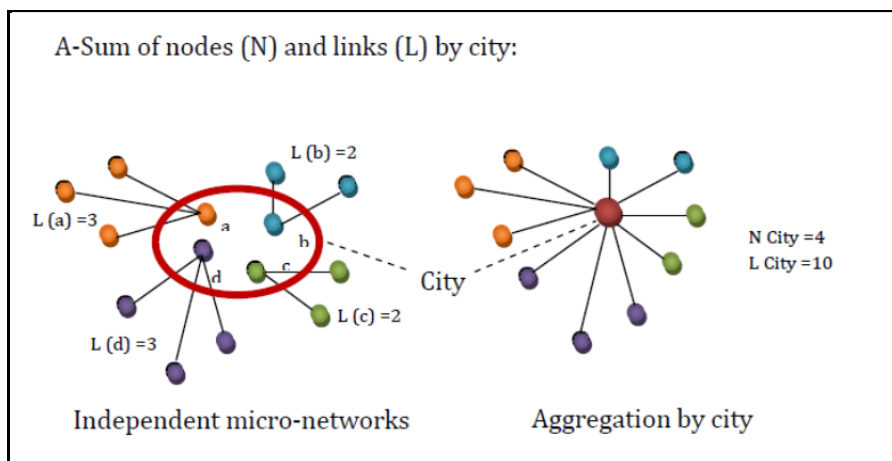
Source: Rozenblat 2007.

3.2. Methodological steps

The ORBIS database provides information on the location of firms at the municipal level, which allows selection of links based on their geographic location. Therefore, the **first step** includes the emphasis on interactions that occur between the headquarters of companies and their subsidiaries located across the border (i.e. “regionally integrated” linkages).

Since the goal here is to analyze the network of cities in which firms decide to locate, the **second step** involves grouping of firms at the level of their morphological urban areas (MUAs). Morphological Urban Area perimeter better reflect the urban space and take into account the area outside the administrative boundaries (complete build up area). Figure 3 illustrates an example of firms’ aggregation by city (MUA).

Figure 3: Four networks aggregated by city- from micro networks to city networks



Source: Rozenblat 2009.

Because cities can have more than one tie to another city, the **third step** involves investigation of the strength of relationship between cross-border firms. This measure allows the analysis of valued ties and shows the border cities with the most connections (Wall and Knaap 2009).

Following the objectives of GEOSPECS, the **fourth step** involves the use of the GEOSPECS delineation of the border areas based on travel distance. It is argued that 45-minute travel distance to a border plays a key role for a large range of socio-economic processes (GEOSPECS 2011) and that the linkages between firms on both sides of the border within the border area reflect actual cross-border integration (Krätke 1998).

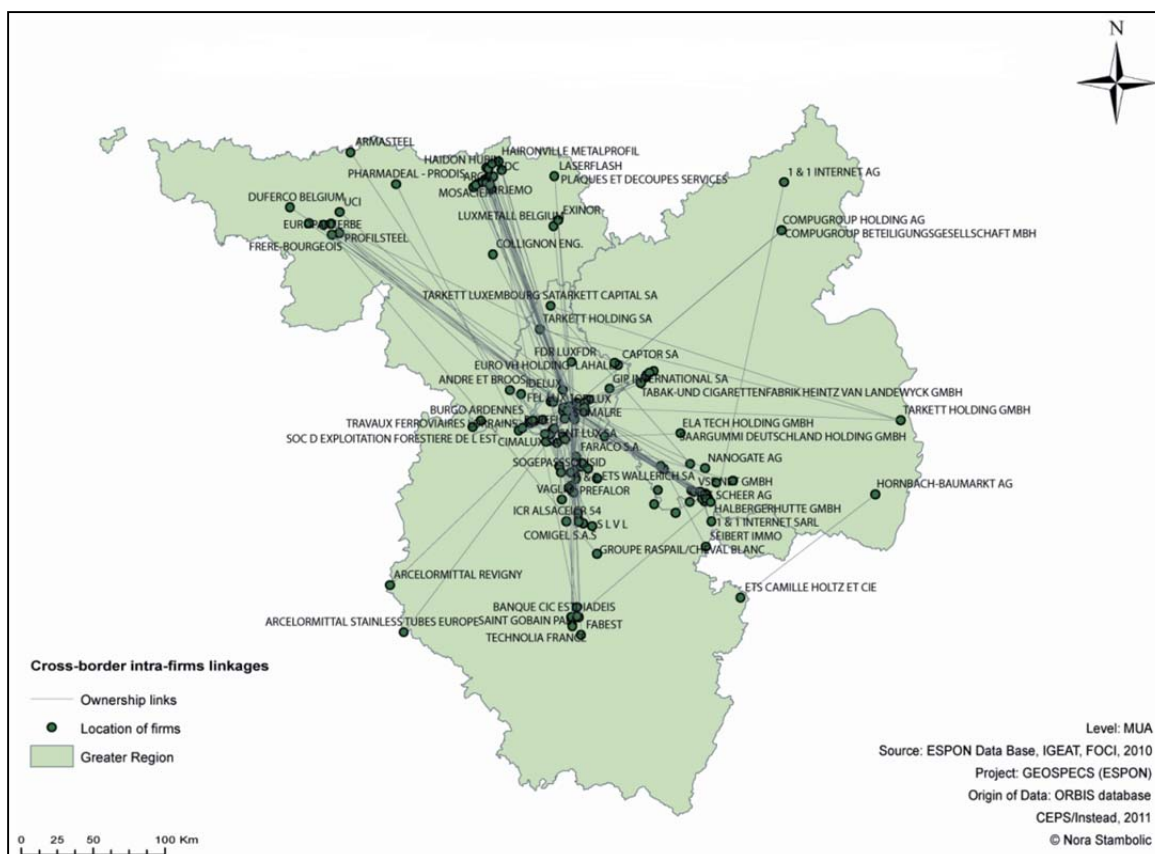
4. Results

4.1. The spatial pattern of intra-firm networks within the Greater Region

According to the ORBIS database, the overall spatial pattern of cross-border networks reflects hierarchical rather than heterarchical organizational structure, as can be seen in Map 1. In these networks, the city of Luxembourg occupies a prominent place in relation to the number of firms, as expected.

Regarding the interactions between countries, the majority of these connections occur between Luxembourg and Lorraine, Wallonia, Saarland and Rheinland-Pfalz, while the interactions between the regions surrounding Luxembourg are rather weak. What is surprising is that between the German regions (Saarland and Rheinland-Pfalz) and Wallonia there are no ownership ties at all.

Map 1: Spatial pattern of cross-border intra-firm networks in the Greater Region



Source: Stambolic 2011.

In order to determine the exact number of cross-border firms that are located in the country of Luxembourg and in the regions of Wallonia, Lorraine, Saarland and Rheinland-Pfalz, it is useful to aggregate firms based on their country/region of origin. This will reveal the proportion of firms within each region (Table 1).

Table 1: Number of cross-border firms within each region

Region/ Country	Number of firms
Luxembourg/Luxembourg	80
Wallonia/Belgium	59
Lorraine/France	56
Saarland & Rheinland-Pfalz/Germany	40
Total	235

Source: Stambolic 2011.

From a total of 235 firms, 80 are located in Luxembourg, 59 in Wallonia, 56 in Lorraine and 40 in Saarland and Rheinland-Pfalz (see table 1). Apparently,

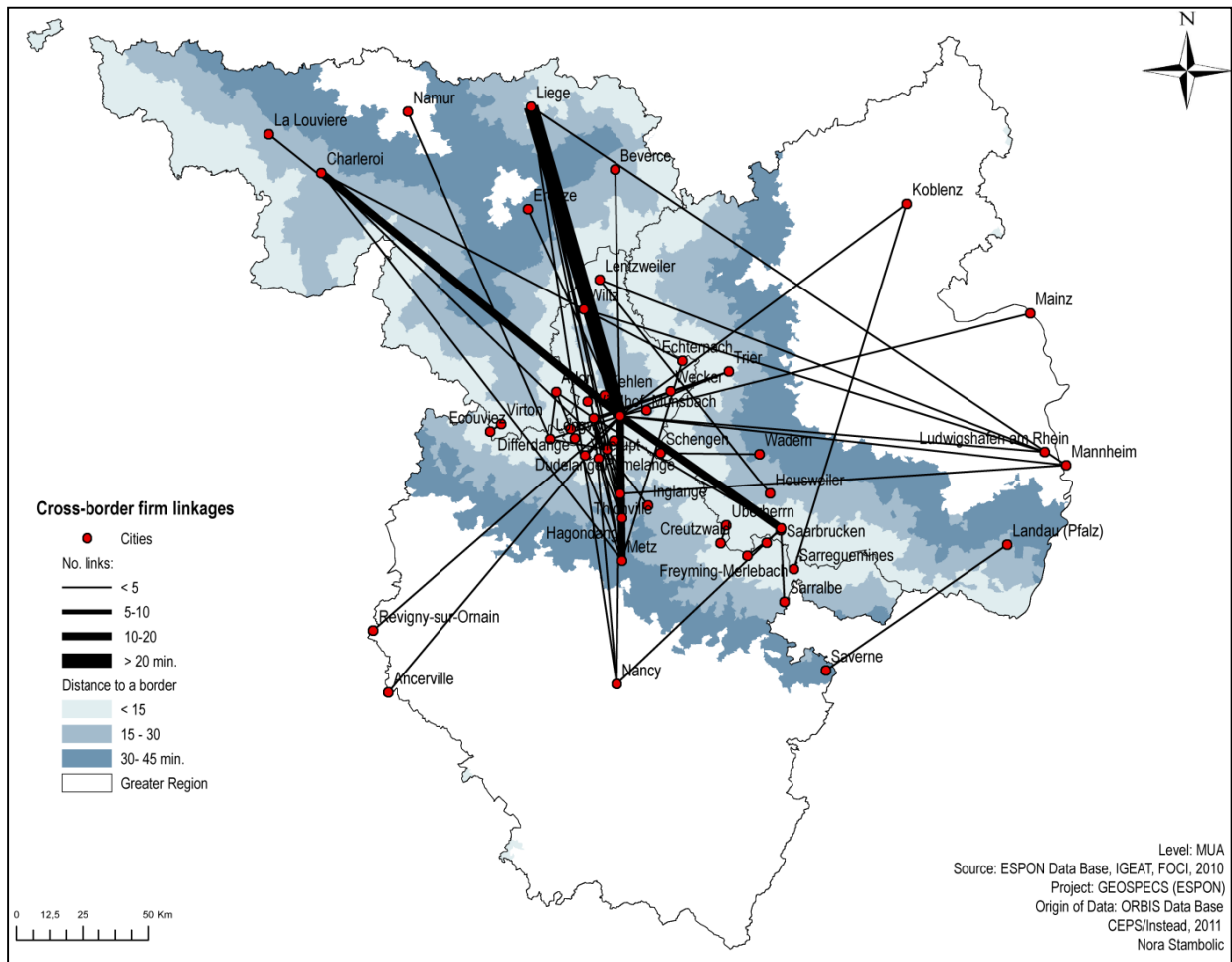
Luxembourg is polarizing most of the connections of other cities, due to the central position in the Greater Region and because of its economic development. Another reason might be the presence of medium sized cities in the regions of Wallonia, Lorraine, Saarland and Rheinland-Pfalz.

4.2. The spatial pattern of city networks within the Greater Region

The aggregation of the data from the firm level to the city level (MUA delineation) allows mapping the cross-border linkages between the cities located within the Greater Region (Map 2). The position of Luxembourg as the leading economic centre within the Greater region is clearly represented on the map through the central position of the city in the ownership networks. Most of the cross-border linkages converge towards Luxembourg and the network is star shaped.

The overlay of the city networks with the border areas based on 45 minutes travel distance to the borders illustrates the fact that most of the links concern cities located in border areas. Only a few ownership linkages are going beyond the border areas (e.g. Nancy- Luxembourg, Koblenz-Luxembourg, Mainz-Luxembourg).

Map 2: Spatial pattern of cross-border intra-firm networks and GEOSPECS delineation

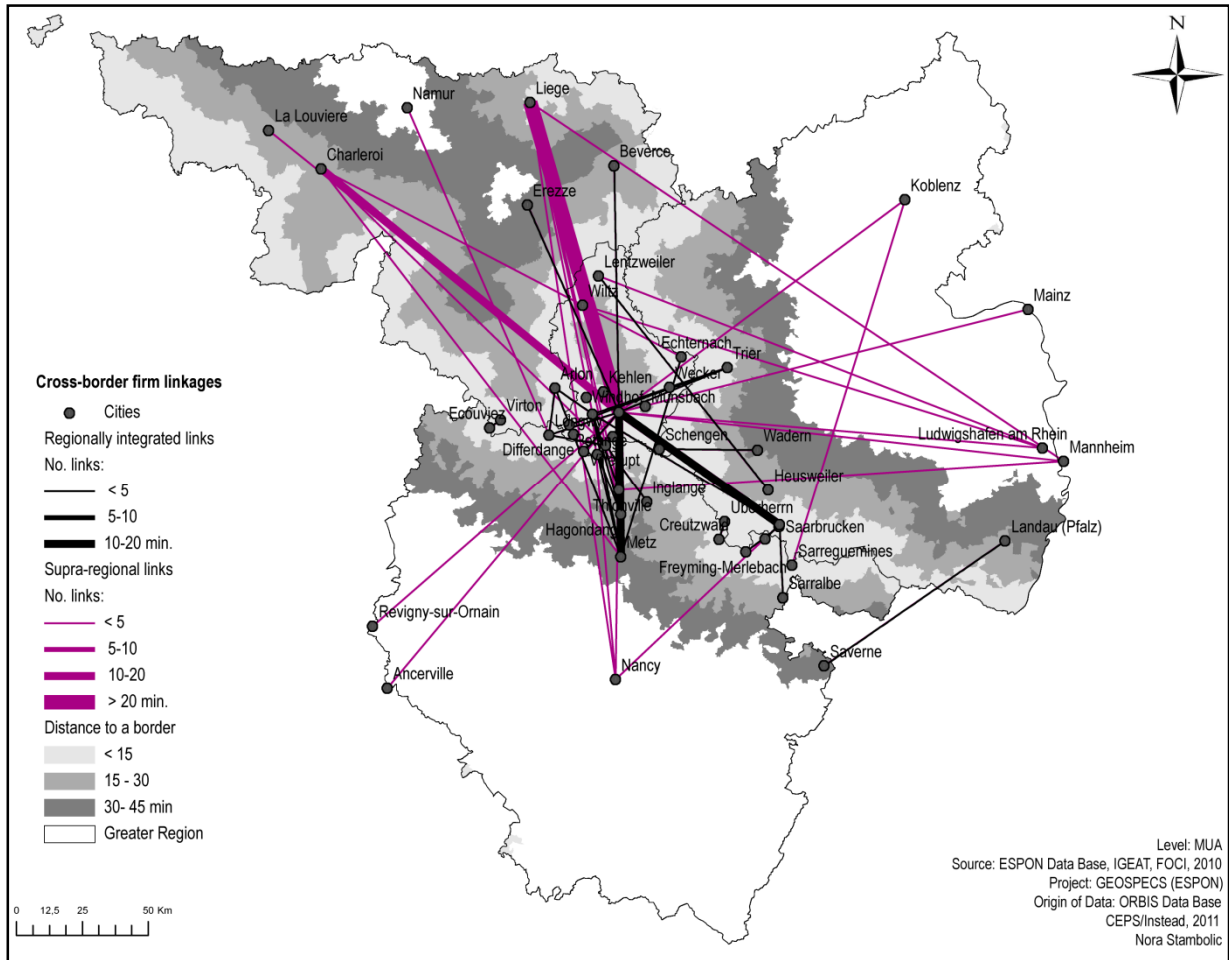


Source: Stambolic 2011.

4.3. The distinction between supra regional and regionally integrated cross-border linkages

Due to the presence of four state borders within the Greater Region, it is necessary to distinguish between linkages that concern cities located within a same cross-border area (two adjacent border areas separated by one border) from the linkages that concern cities located in different border areas (related to different borders). The first case corresponds to the 'regionally integrated links' identified by Krätke (1998), whereas the second case corresponds to the 'supra regional links'.

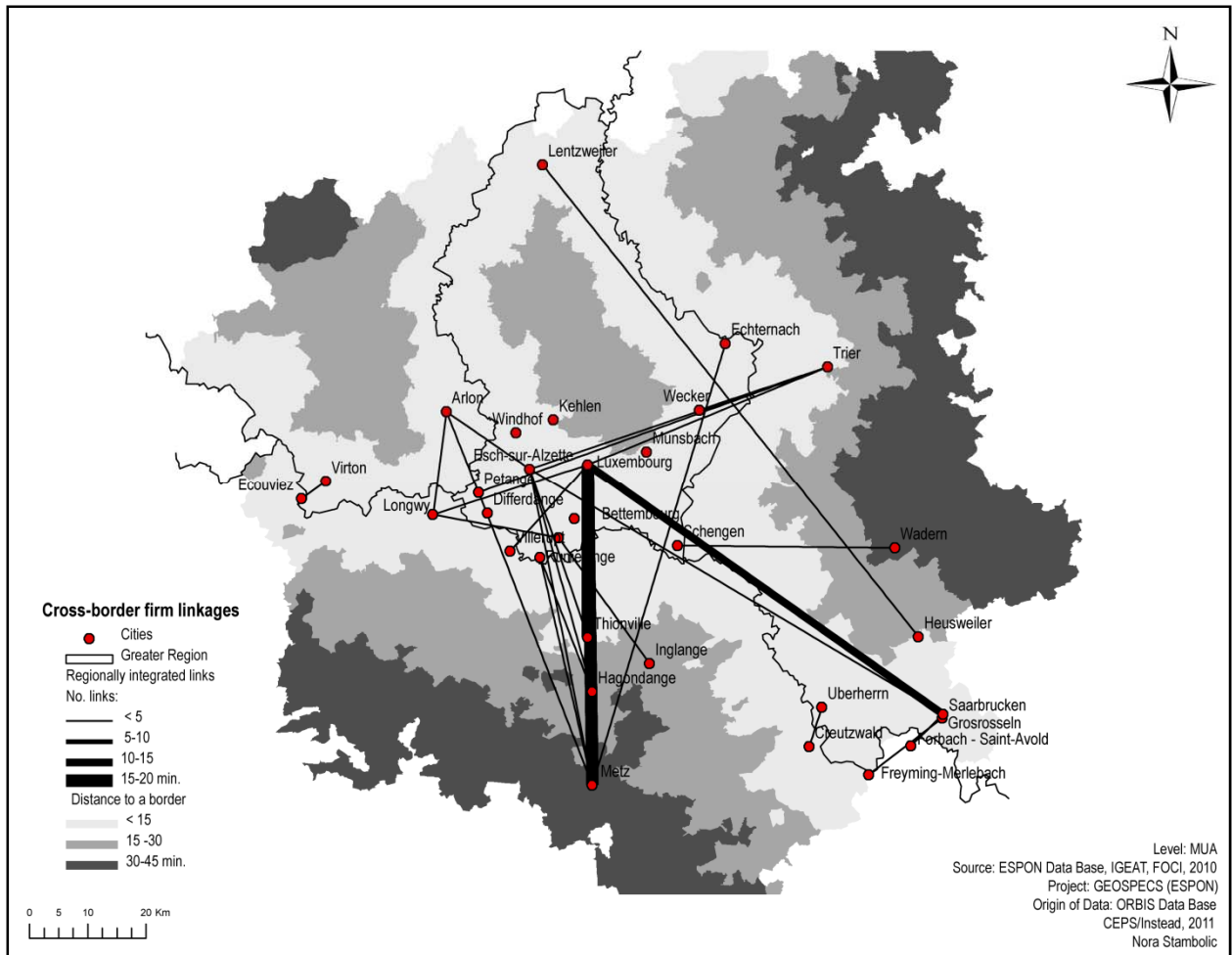
Map 2: Supra regional and regionally integrated cross-border links between cities within the Greater Region



Source: Stambolic 2011.

Map 3 shows the two different types of linkages. From a total of 189 cross border ownership links, 92 have a regionally integrated character and are located within the functional cross-border area of Luxembourg. Map 4 represents the regionally integrated firm linkages within the cross-border metropolitan area of Luxembourg.

Map 4: Regionally integrated firm linkages within the CBMR of Luxembourg



Source: Stambolic 2011.

According to these results, the majority of links go over the Luxembourg-French border (between firms within the MUAs of Luxembourg and Thionville). The second largest number of links extends over the border zone of Luxembourg and Germany (between the MUAs of Luxembourg and Saarbrücken), while the Luxembourg-Belgium border area has just few ties. In total, the border zones between Luxembourg and France have 46 ownership ties, whereas border areas between Luxembourg and Germany 27 (Table 2).

Regarding the intensity of the ties between headquarters and subsidiaries within border cities, Table 2 illustrates the highest number of links among them. Here, the distinction is again made between the regionally integrated and supra-regionally and long distance firms linkages.

Table 2: Number of cross-border inter-city linkages (part of the dataset)

Link Type	Owners	Subsidiaries	Number of links	
Regionally integrated	Luxembourg	Metz	0	16
	Metz	Luxembourg	16	
	Luxembourg	Saarbrücken	11	19
	Saarbrücken	Luxembourg	8	
	Luxembourg	Thionville	18	19
	Thionville	Luxembourg	1	
Supra-regionally and long distance	Luxembourg	Liege	34	34
	Liege	Luxembourg	0	
	Luxembourg	Charleroi	11	26
	Charleroi	Luxembourg	15	

Source: Stambolic 2011.

When considering the regionally integrated linkages, it can be observed that the highest number of connections is between Luxembourg and Saarbrücken and between Luxembourg and Thionville. If we consider the direction of ownership, Luxembourg owns 11 subsidiaries in Saarbrücken, while Saarbrücken owns 8 such firms in Luxembourg. Thionville has only one branch in Luxembourg while Luxembourg has 18 in Thionville. It is surprising that Luxembourg has no single subsidiary in Metz while this French city has 16 branch offices in the Grand-Duchy.

Regarding supra-regionally and long distance linkages, the highest number of connections appears between Luxembourg and Liege. This is also the strongest link in the cross-border networks of firm. If we consider the direction of ownership, the number of subsidiaries in Liege owned by Luxembourgish headquarters is 42 most of them being part of the Arcelor-Mittal group, while the headquarters from Liege have no subsidiaries in Luxembourg. Apart from connections with Liege, Luxembourg also has a strong cross-border relationship with Charleroi. Luxembourg has 11 subsidiaries in Charleroi, while Charleroi has 15 subsidiaries in Luxembourg.

5. Conclusion

Looking back on the total number of ownership connections in the Greater Region, we noted that the firms are concentrated in a number of cities, reflecting the existence of multiple centres. We might conclude that the Greater Region has a monocentric pattern in relation to the interactions, whereas regarding the nodes, the spatial pattern reflect polycentric spatial pattern.

The strength of connections in the networks identifies which cities have a leading position in the number of companies and relationships in the region. Therefore, based on an analysis of the entire network, it can be concluded that the first place in the region is occupied by Luxembourg City. Luxembourg City also leads in the number of companies and connections with other cities.

To distinguish positive and negative effects of each type of border, we used the GEOSPECS delineation based on the 45-minute travel distance to a border. In the case of the Greater Region, our results confirm that the majority of cross-border links occur within the range of 45-min travel distance, reflecting positive border effects. It is observed that the highest number of connection within this range crosses the Luxembourgish-French border. The strongest tie appears to be between Luxembourg City and Liege. Apart from that, strong links are observed between Luxembourg and Charleroi, and between Luxembourg and Thionville.

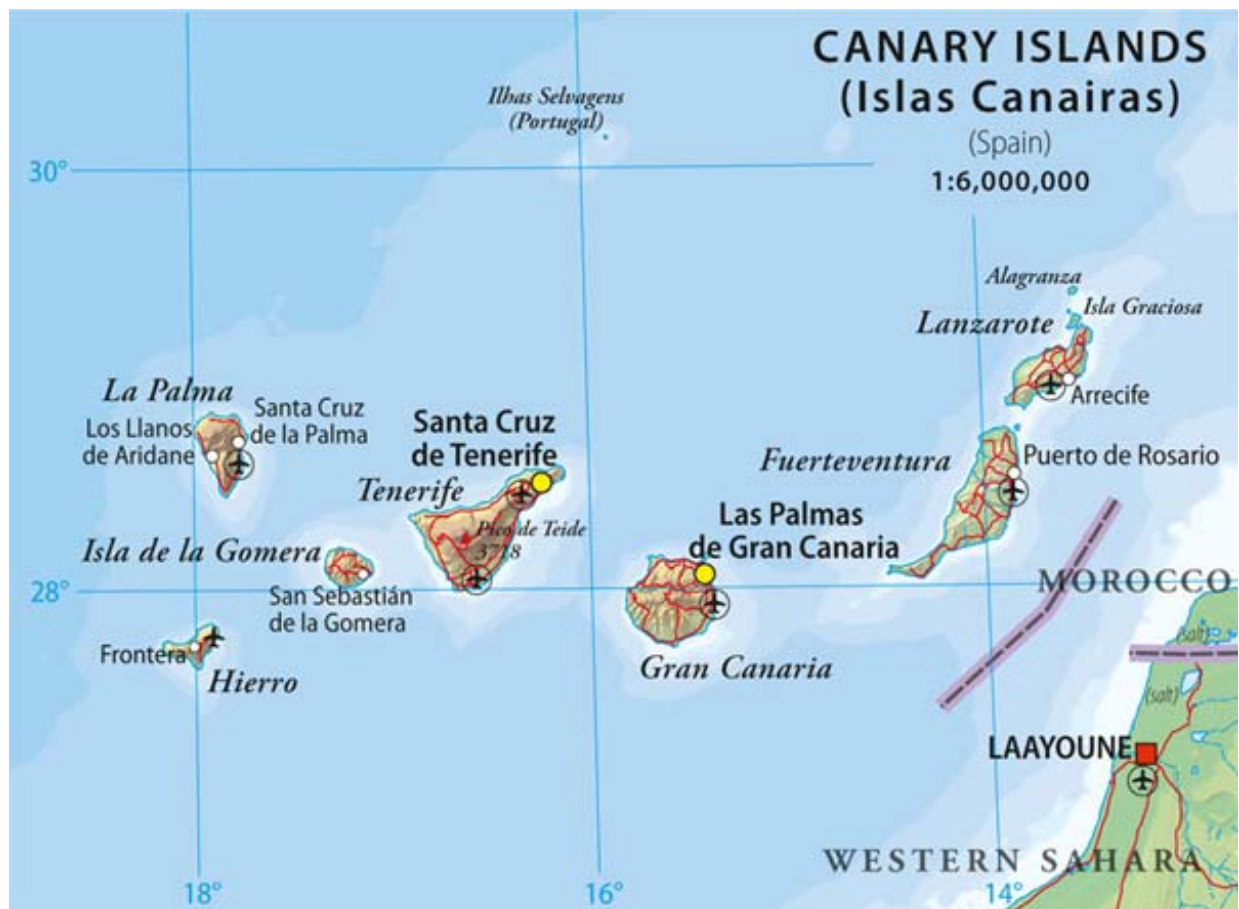
These results might lead to further research. Interviews with locally-involved firms could first notably help us understand firm location-strategies and identify possible shortcomings. This could lead to analyse what are the variables considered by entrepreneurs when they decide to settle beyond state borders, to determine whether the benefits of cross-border linkages are really superior to the legal and administrative obstacles that they generate, and what is the share of the benefits of cross-border economic differentials in comparison with so called “untradable interdependencies” (Storper 1995) that influence economic actors under conditions of uncertainty.

Interviews with state or regional representatives would also allow evaluating the institutional response to the development of cross-border linkages in the Greater Region. This would notably lead to analyse whether cross-border business is encouraged by public policy or is the result of opportunistic entrepreneurs and test

Scott's (1999 : 613) interesting argument, according to which, unlike North America, "border regions policies in Europe "have maintained an administrative, bureaucratic character that appears to have inhibited private-sector participation"

Annex 37: Case Study Canary Islands

Description of the case study area and its geographic specificity



The Canary Islands form 13-island Spanish archipelago, located 100 kilometres off Moroccan coasts and close to the equator. The seven largest of these islands - Tenerife, Gran Canaria, Fuerteventura, Lanzarote, La Palma, La Gomera and El Hierro – are inhabited. The total area of the archipelago is 7493 km² and the distance between El Hierro and Lanzarote is 460 kilometres. The islands have various geographic characteristics (in terms of topography, climate, animal and vegetal species...) but share volcanic origins and a globally subtropical climate. Depending on their position with regard to the north-east trade winds, the islands are more or less influenced by the moist Gulf Stream or by dry air masses from the African continent, and experience many micro climates. As for relief, the island of Lanzarote culminates at 670 metres whereas Mount Teide on the Tenerife Island is Spain's highest summit and the third tallest volcano in the world (3 718 m)⁴⁰².

⁴⁰² Mount Teide 3.718 meters (Tenerife), Roque de los Muchachos 2.426 meters (La Palma), Pico de las Nieves 1.949 meters (Gran Canaria), Pico de Malpaso 1.500 meters (El Hierro), Garajonay 1.487 meters (La Gomera), Pico de la Zarza 812 meters (Fuerteventura), Peñas del Chache 670 meters (Lanzarote)

The Canary Islands are a Spanish Autonomous Community led by an independent regional government (Gobierno de Canarias). The role of capital city of the Autonomous Community is shared by the cities of Santa Cruz de Tenerife and Las Palmas de Gran Canaria, which in turn are the capitals of the 2 provinces of Santa Cruz de Tenerife and Las Palmas. Each of the seven major islands is ruled by an island council named Cabildo Insular. With a population of 2,117,519 inhabitants in 2011, the Canary Islands are the eighth most populous of Spain's [autonomous communities](#), with a theoretical density of 282.6 inhabitants per km². Effective density is however much higher since the two islands of Tenerife and Gran Canaria alone host over 80% of the total Canarian population. Due to the mountainous nature of both islands, inhabitants are moreover concentrated on coastal areas.

The Islands' great natural attractions (Teide National Park is Spain's most visited national park), climate and beaches make the islands a major tourist destination, being visited each year by about 10 million people. The economy is based primarily on tourism, which makes up 32% of the GDP (plus an important leverage effect on other sectors such as construction, transport, etc.), and more generally on services. As a result, the Canary Islands represent the most developed Outermost region and are now close to the EU-27 average in terms of GDP per capita. It is however structurally strongly dependent on imported goods.

However the extensive development of tourism, by increasing the land pressure already exerted by regular inhabitants, has generated various problems in terms of land planning and environmental protection. Water supply relies on desalination plants. As a result, the water price is very high and requires a lot of energy which is difficult to produce and even more to distribute in such a territory. In order to address the difficulties caused by over-frequentation, the Canary Islands Government has taken the first step by laying down a protectionist measure, namely a tourism moratorium, limiting the construction of new accommodation units. However, it appears that problems are not yet solved as the region is still facing illegal construction of hotels and other development projects in protected areas.

In terms of regional positioning, the Canary Islands hold a somewhat complicated position. There is a conflict over international boundaries with Morocco (for reasons linked with possible seabed oil deposits and other ocean resource exploitation). Besides, the archipelago has faced major problems of illegal immigration and drug traffic between Latin America, West Africa and Europe.

Economic, Social and Environmental processes related to the geographic specificity

2.1. Economy

Specific handicaps and geographic specificities contribute to shaping the economic structure

As an Outermost Region, the Canary Islands suffer a certain number of handicaps that are recognized as permanent by the Treaties and sufficiently burdening to justify specific support measures: remoteness from the continent, small market size that induces various additional costs for economic actors, etc.

A study led by the European Commission in 2003 examined the Outermost Regions of the EU in an attempt to define the economic and social behaviour of the territories, taking account of the constraints imposed by exogenous factors. The results show clearly that the most significant of these factors is distance, i.e. remoteness/isolation from the European continent, which is believed to explain more than 50% of the behaviour of the territories concerned. Next come geomorphologic conditions (39%) and then size (8%). A local centre for economic studies (Foundation Tomillo) has analysed in more details the costs induced by the region's handicaps on its specific economy, and found that remoteness from major production and consumption centres as well as the reduced size and fragmentation of the market (7 islands, "double insularity") are the main factors that generated costs for Canarian enterprises. These handicaps being permanent, associated costs also are. The heavier of these costs are related to transportation, human resources, business trips and some business services (such as marketing). Stocking and financing costs are also major issues.

Despite the obvious influence of these various geography-linked factors, the Canary Islands are the only Outermost Region whose performances are comparable with a number of continental regions. It is thus specifically interesting to examine how the Canarians managed to get over these handicaps and how well they did.

→ 'Handicaps' particularly hamper the development of industry

The study led by the Foundation Tomillo cited above shows that there are significant differences between companies as to the costs they have to bear. Size, sector of activity and location are indeed differentiating factors and most additional costs weigh on industrial actors (as well as on micro-enterprises and companies located in the non-capital islands - i.e. not on Grand Canaria or Tenerife).

This appears more clearly when one more closely examines the nature of additional costs induced by the regions' specificities (LL&A and ULB):

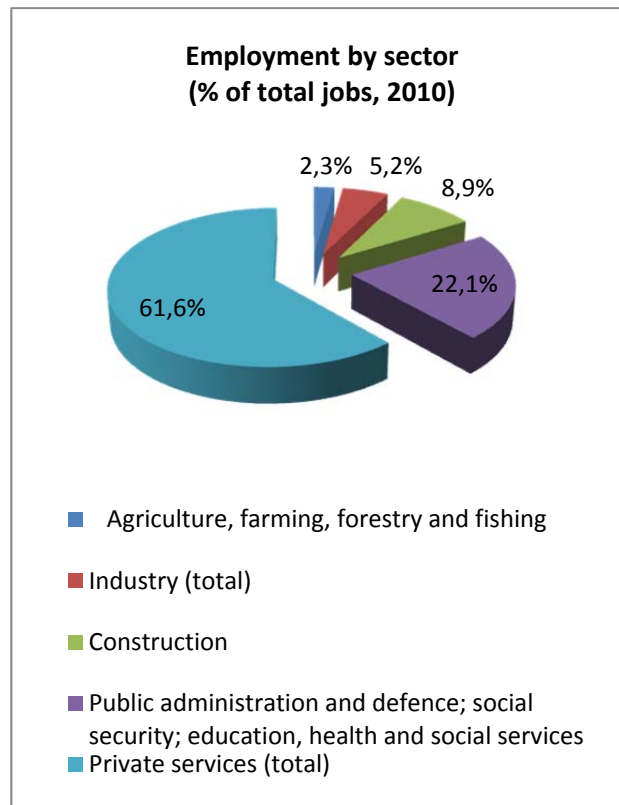
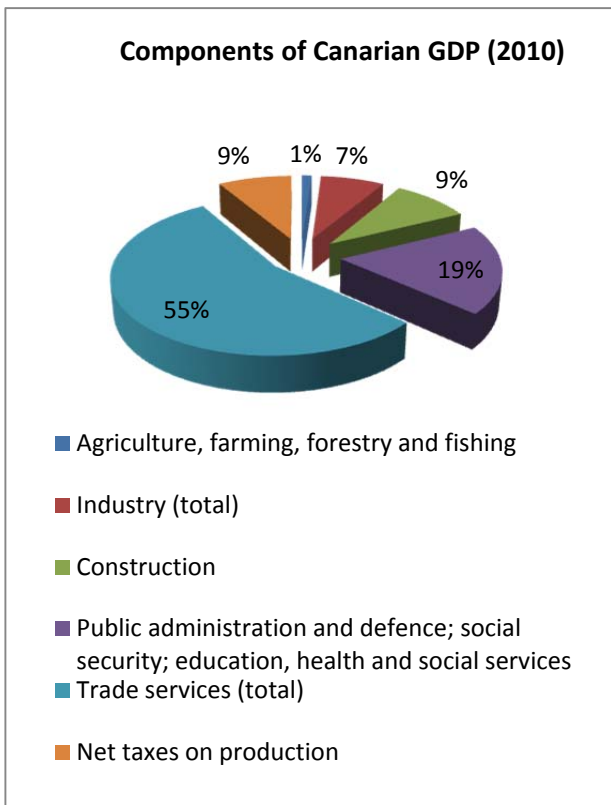
- The small size of the market and its fragmentation hamper economies of scale: infrastructures and teams are necessarily limited in size, if not dispatched throughout the archipelago and can barely reach the minimal scale needed for efficiency. As a consequence, productive equipments are generally oversized, which contributes to generating very high average production costs and limits strategic options in terms of diversification, specialisation, etc.
- Market characteristics (limited size and fragmentation again) are also a challenge in terms of human resources. Wages are much lower in average in the Canary Islands than in continental Spain, but qualified workers are rare; employers can higher well trained workers from continental Spain (but at higher wages) or themselves launch training programmes (which is costly and reduces productivity). Besides, mobility issues between islands increase this problem of access to qualified workers.
- Other production costs are also impacted by the region's characteristics: Companies need to stock more than their continental counterparts in order to face potential supply problems, but free

space is rare and expensive, which makes stocking especially expensive. Water and energy generation and distribution are a major issue in the archipelago, require major investments and induce high consumption prices. Waste management is also more challenging and thus more expensive than on the continent.

- Finally, remoteness from economic and political centres like Madrid and Barcelona induce frequent trips to continental Spain for Canarians, etc.

These additional costs apply to all enterprises in the archipelago. Given their detail and nature, it is however obvious that they are a particularly heavy burden to industrial producers. This can certainly explain the limited share of the industry in the economy, and the strong orientation towards services. However, it must be noted that industry is supported by a local tax (the AIEM) that contributes to elevating the price of imports to the level of local production prices, in order for local production to subsist. This contributes to maintaining jobs, preserving traditional productive activities, and containing the region's already massive dependence on imported goods.

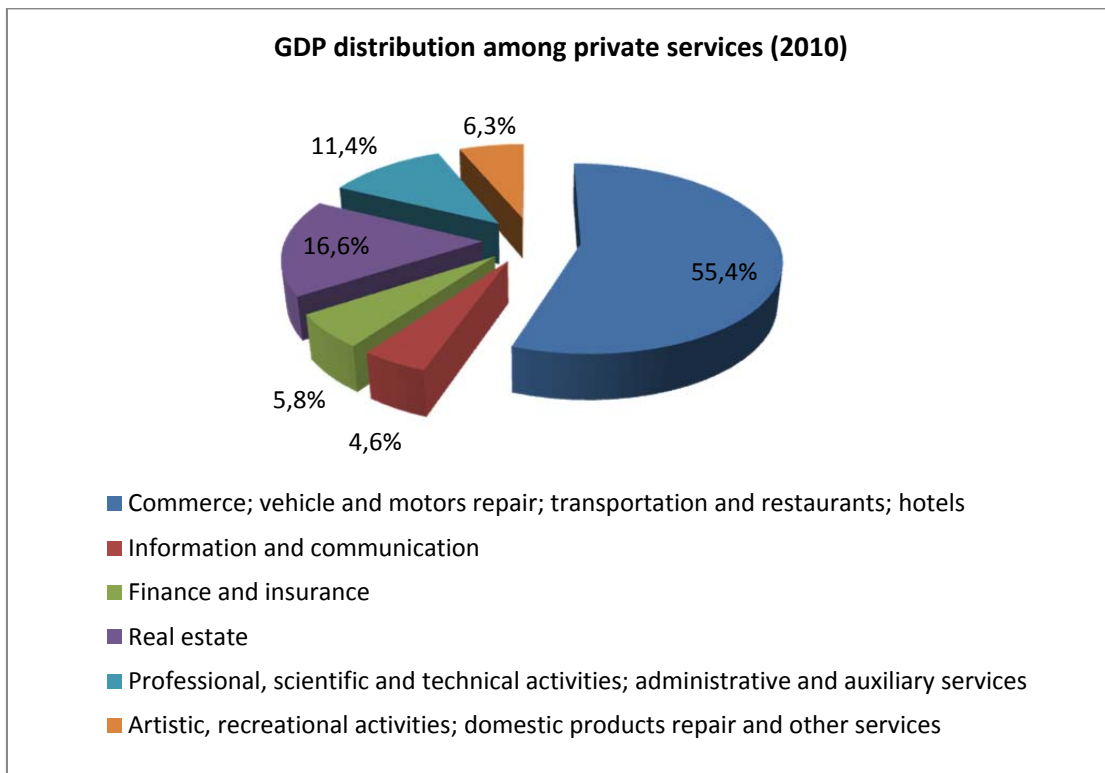
➔ **A strong reliance on services, especially tourism: harnessing geographic assets, managing land pressure**



Sources: Instituto Canario de Estadística (ISTAC) and Instituto Nacional de Estadística (INE)

As a consequence of the handicaps mentioned above, industry is no major contributor to the Canarian economy (5% of jobs and 7% of GDP in 2010). The graphs above make it obvious that the region has turned to services to develop: trade services make up 55% of GDP and represent 62% of employment, whereas trade and non trade services together represent 74% of GDP and 88% of jobs. These ratios are particularly high and much higher than in continental Spain for example.

Construction is the third major contributor to the Islands' economy, before industry, and the share of agriculture and fishing activities is near to anecdotal.

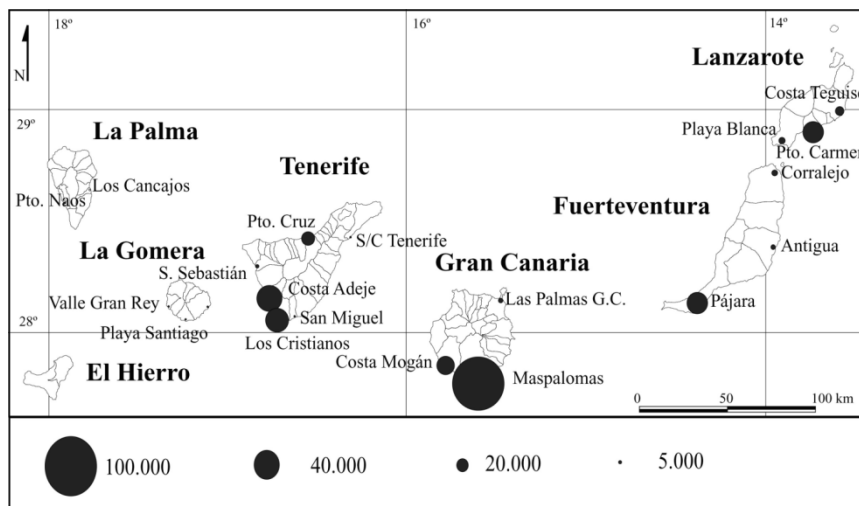


Sources: Instituto Canario de Estadística (ISTAC) and Instituto Nacional de Estadística (INE)

Whereas geographic specificities certainly are a handicap to the development of industry, they however represent a major asset for tourism. Climate, beaches, natural assets such as national parks have made of the Canary Islands a major destination for European tourists. They are visited by over 10 million tourists each year. Among those, a vast majority comes from the UK and Germany and concentrates on the three islands of Tenerife, Gran Canaria and Lanzarote.

Tourism is thus by far the main activity sector in the archipelago; it makes up a third of total GDP (versus slightly more than 10% in Spain), employs 37% of active residents (10% in Spain), which accounts for around 288 000 jobs. Besides, the sector concentrates 21,2% of investments, which is four times more than in Spain. It is of course also a development vector for related activities: construction (as seen above, construction alone represents around 10% of GDP and employment), but also real estate, recreational activities... These sectors have known an exceptional growth rate in few years, since the number of visitors has increased from around 6 million in 1992 to above 10 million in 2001 (66% increase over 9 years), reaching a peak just before the 9-11 events. This trend has been supported if not encouraged by the low exchange rate of the Peseta before the adoption of the Euro, as well as by Spain's, and especially Canary Islands', low average labour costs. Moreover, until the mid-nineties, territorial planning was managed at an insular level and not at the scale of the whole Community. Each island thus engaged in a competition race to welcome more and more tourists.

Costal accommodations capacity, 2002 (Parreno Castellano)



Seasonal, massive and geographically concentrated arrivals are however also a big challenge for territories where high relief and insularity leave little habitable space available, and where population density is already high throughout the year. The strong reliance of the economy on tourism has led to the development of immoderate hosting facilities in some areas, thereby contributing to exerting a major land pressure. Landscape

degradation is of course at stake, but the challenge also lies in the Islands' ability to provide their millions of visitors (and regular inhabitants at the same time) with basic resources such as water (the Canary Islands depend on desalination plants for drinkable water), energy (there again, energy generation and distribution are challenging), as well as to manage waste and pollution levels.

These elements have over time downgraded the very image of tourism in the Canary Islands, and this creates a vicious circle: the destination is increasingly perceived as a mass tourism destination, attracts more and more "low-cost" type clients, thereby not encouraging a reorientation towards a higher quality type of tourism.



Territorial development strategies evolved during the nineties to finally be dealt with at the regional, Canarian level. Initiatives were launched by the authorities, to bring about a more sustainable model of regional tourism. This new approach is meant to preserve natural landscapes and resources, develop high quality facilities for a more valuable tourism, to better manage the coexistence of residents and tourists and better distribute the resources to be generated by this renewed tourism industry. A first law for the Organization of the territory and Natural Spaces of the Canary Islands was voted in 2000, introducing a first set of normative guidelines for sustainable tourism. It was followed in 2001 by a law defining emergency measures, among which moratorium on tourism growth that suspended the planned projects for new touristic zones when these projects had not been launched yet, as well as the licences for new constructions, except when those concerned rural tourism facilities, or four- or five-star hotels with specific equipments (congress, golf facilities...)

Rural tourism facilities, bound to rigorous quality criteria (including environmental conditions), indeed developed in the Canary Islands since the turn of 2000, and winter / "green" / rural tourism increased over the last years. However, the orientation towards a new high quality model for tourism cannot be considered as fully satisfactory since a true reorientation towards quality tourism would require a net decrease in number of available accommodations, together with solid investments in the remaining ones, in order to upgrade them. Besides, some choices made (developing golf tourism for example) appear as contradictory with certain environmental and technical constraints facing the Canary Islands such as ensuring access to water, or protecting endangered species.

Services of general interest and public infrastructures: focus on transportation and health

A study was made in 2007 by the Canarian authorities, in an attempt to identify and quantify the costs imposed on the public sector by the region's specificities. The major costs identified are those related to:

- Human resources: restricted access to qualified contributors, payment of financial compensations to public workers employed in the Canary Islands...
- Trade: intermediary goods are more expensive than in continental Spain
- Services rendered to enterprises (more needs and more constraints)
- Multiple infrastructures: the territory's remoteness from the European continent and fragmentation were mentioned above as handicaps that induced specific costs for private actors. This of course is true also for public actors, especially in terms of provision of services of general interest. Public infrastructures (hospitals, ports, airports...) are distributed on several islands, which represents a double burden: public authorities have to support an important number of separate infrastructures, among which very few can reach a critical size to benefit from economies of scale.

These identified costs were estimated by the Hacienda Canarias study at around 18% of the public gross value added. Infrastructure costs account for 47% of these, and human resources related costs for 34%.

→ Transportation: double insularity – double challenge

Inter-island and external connections

The Canary Islands being an archipelago, transportation issues are specifically important. The main features of the regional transportation network are the following.

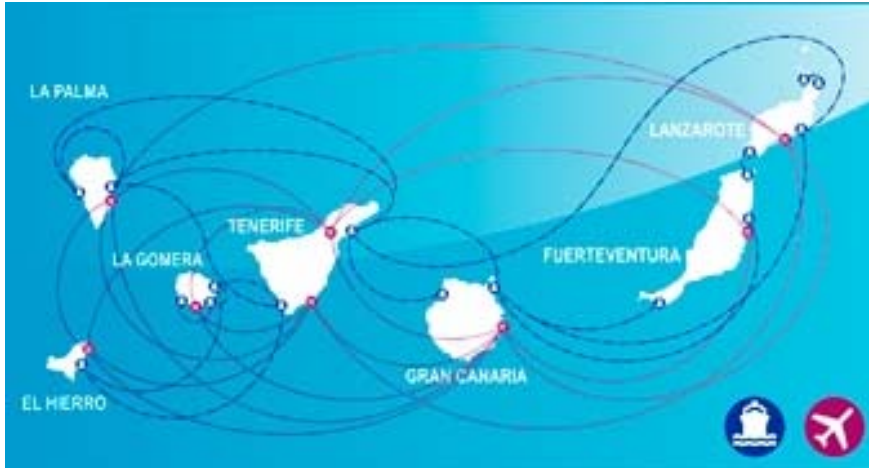
The region is equipped with 8 airports: two are located on the Island of Tenerife, one on each other island. Among those, 6 are international airports mainly serving EU destination, and 2 (El Hierro and La Gomera) only serve inter-island connections. The Gran Canaria is the fifth busiest airport in Spain, with over 10 million passengers a year (10,5 in 2011), and is still under construction. According to the Canarian tourism office, the distance by plane between islands is less than an hour.

Two of the main ports of Spain are located in the region. La Palmas is a major commercial port (4th in Spain) and has strong connections with Europe, Africa and North and South Americas. Besides, ferry boats (fast ferries and cargos transporting vehicles) connect the islands. A crossing lasts between 1,5 and 8 hours, and calls are sometimes necessary to go from one island to another, especially when both are not located in the same province (Tenerife-Gran Canaria seems to be the only interprovincial maritime connection available).

Generally speaking, the inter-insular connections are mostly maritime when it comes to merchandise, mostly aerial when it comes to passengers. The cargo capacity of the planes that serve the Islands is indeed very limited. Maritime transportation means have developed over time, in order to best suit the Canary Islands' specific needs and constraints. The archipelago is extensive and situated in full ocean. The main meteorological regime applying is that of trade winds, but the Islands can also be exposed to Atlantic storms, winter monsoons, tropical depressions... These conditions can create 8 to 10-meter waves, whereas the average height is around 2 meters. The archipelago has thus been over the years a bank of trial for speed crafts (Rodríguez, Garcia & Poleo): hydrofoils, hovercrafts, jet-foil, SES, mono-hulls and catamarans. Catamarans seem to have won the battle due to their combined qualities (cargo capacity, navigation safety and passenger comfort) and currently link all the islands.

The map displayed by the Canarian Tourism Office shows that connections (maritime or aerial) are numerous, but that joining two distant islands, especially located in each of the two provinces, can require at least one stop-over.

Air and maritime connections in the Canary archipelago



Source: www.turismodecanarias.com

Three axes of the 2007-2013 ERDF Operational Programme are dedicated to the improvement of transportation within the region and between the Canary Islands and the rest of the world.

- The objectives pursued under the “transport and energy” axis are to improve these connections by consolidating the safety, quality and competitiveness of the archipelago's ports and airports. The global envelope for this axis (energy and transportation all together, ERDF + local cofinancing) is 145M€.
- Most importantly, axes 8 and 9 aim at the « **reduction of additional costs hampering the development of the outermost regions** ». **Axis 8 comprises investment expenditures, oriented towards public authorities, whereas axis 9 funds operating expenditures dedicated to the private sector. In both cases in the Canary Islands, this support is concentrated on offsetting additional costs arising from the archipelago's poor accessibility and territorial fragmentation.** Planned funding is aimed at improving transport and communications infrastructures (including mainly ports and airports), especially on the 5 « non-capital » islands, and at supporting aid for the sea and air transportation of goods as well as for the launching of new transport lines. Each axis represents a total envelope of 490M€.

Inner connections: terrestrial transportation

The only existing means of inner-island transportation are highways and roads, with particularly dense networks in some urban areas. In this matter also, the Canary Islands face specific constraints. Apart from Fuerteventura and Lanzarote, 80% of the Canarian territory is on a slope (in average, the gradient exceeds 20%). This requires designing winding roads, which in turn induces increases in fuel and tires consumption, in pollution, as well as in maintenance costs. This, in addition with a difficult access to construction raw materials (located in Tenerife and Gran Canaria) restricts possibilities in terms of roads networks development.

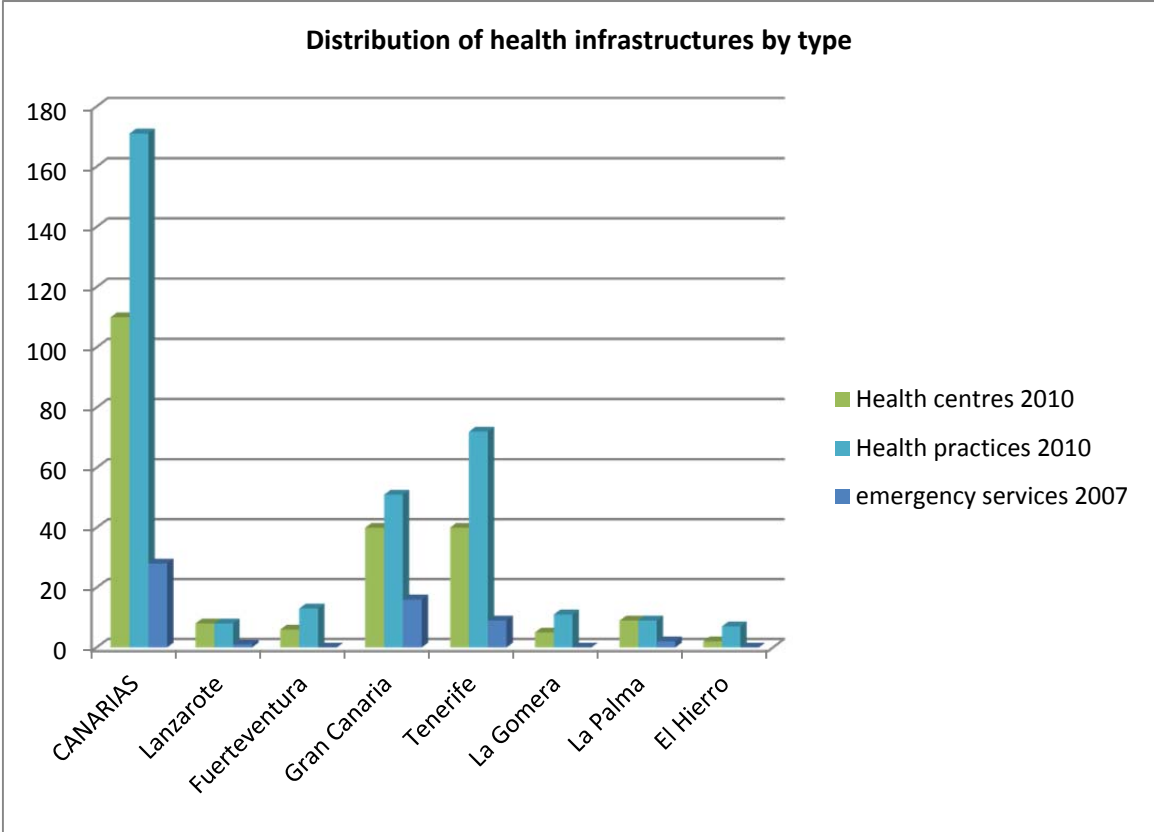
According to a 1996 Eurisles study, road transportation costs (in terms of price/km) for passengers as well as goods are higher, and up to four times higher, in the Canary Islands than in Spain. The factors mentioned above are part of the explanation, the weak level of intermodal coordination due to the very few alternatives to road transportation are another.

The Island of Tenerife, with the Santa Cruz tram, is actually the only Canary Island proposing an alternative to road transportation. The tram is operated by a company 80% owned by local authorities. It started its service in June 2007 and a second line was created and opened in 2009. The tram is used by around 15 million users a years and is believed to have reduced traffic congestion by almost 10% within a few years.

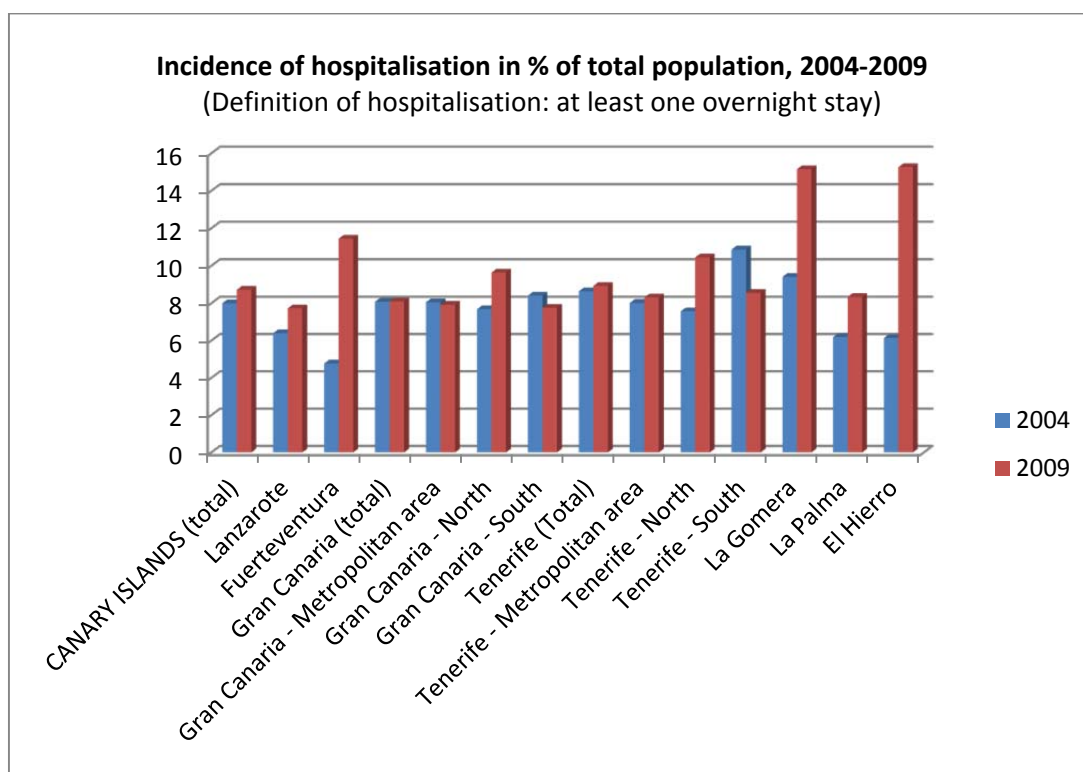
Maybe in part due to this success, projects are supported by local authorities in Grand Canaria and Tenerife to create North-South train lines. These could contribute to relieve congestion as well as pollution levels in particularly densely populated areas and on very used itineraries. These projects face financing problems but have resisted a government change in the Canary Islands: even if costly, the objectives pursued by these projects are largely shared and they are expected to create jobs in the islands.

➔ **Health care : physical infrastructures and IT**

The Autonomous Community of the Canary Islands has strong responsibilities in health care issues, and these have been reinforced by a law in 1994. Central responsibilities on health coordination are pursued by the Spanish Department of Health, but the Canarian Health Service is in charge of managing the regional health care network and consequently of addressing issues of infrastructure shortages caused by the combined effects of pressure of demand (increases in the resident and seasonal population) and territorial fragmentation. A few data can illustrate this: the first graph below shows the distribution of health infrastructures by type and by island in 2010 (and 2007 for emergency services), whereas the second graph gives an indication on the incidence of hospitalization (evolution between 2004 and 2009, in % of the total population).



Source: ISTAC (Canarian Institute for Statistics)



Source: ISTAC (Canarian Institute for Statistics)

It appears clearly that most infrastructures are concentrated on Gran Canaria and Tenerife⁴⁰³, which is logical given the number of inhabitants and visitors also concentrated on these two islands. However, it also appears that there is no emergency service on the three islands of El Hierro, Fuerteventura and La Gomera, whereas the share of the population that needed hospitalisation has dramatically increased within 5 years on these same islands, and is now higher than elsewhere in the archipelago. In absolute numbers, this of course represents a limited number of persons, but it means that specialised transportation services, including emergency transportation services, are needed to transfer inhabitants from these isolated areas to the two capital islands. This of course has a cost, in addition to that of maintaining numerous health centres in activity across the region.

Regional health plans have focused and still focus on a double objective of quality and equity: health is intended to be accessible to all Canarian citizens, and of satisfying quality on all islands and on all parts of these islands. Investments thus are directed at improving accessibility to health care (infrastructures as well as assistance programmes) and at improving the quality and intensity of the offer (improvement of human resources, of drug use, of consultations and surgery...) Health care plans also concentrate on the ageing phenomenon and on its increasing impact on health care needs. There again, the most isolated islands of the archipelago are the ones where the population is ageing at the fastest pace.

The ERDF Operational Programme for the Canary Islands contributes to these investments: measures planned are designed to provide the Autonomous Community with a network of adequate medical centres and hospitals, and to improve facilities and equipment in the existing centres. The ERDF envelope amounts to 108M€, complemented by a 36M€ national cofinancing.

⁴⁰³ Interactive map of Canarian health infrastructures (link active in Feb. 2012):
<http://www2.gobiernodecanarias.org/sanidad/scs/mapa.jsp?idDocument=8eec7683-51b7-11de-929f-bd8858499706&idCarpeta=0428f5bb-8968-11dd-b7e9-158e12a49309>

Efforts towards a better and more accessible health care system in the Canary Islands are directed at physical infrastructures and human resources, but also at IT solutions. The Canarian Health Service recently improved its administrative and medical management IT system; this system is active throughout the archipelago and allows 7000 users (primary care medical and sanitary workers) to access the complete medical history of their patients online. This platform will also allow these users to exchange on various matters: inter-professional advice on a specific case, rationalisation of drug use, etc. Patients of course also have protected access to their personal data. Such a system is particularly useful in a context of fragmented health care infrastructures.

IT solutions are also built upon to address more specific health issues. There is a high prevalence of diabetes in the Canary Islands (over 100 000 persons), as well as of associated pathologies, among which retinopathy. In order to improve the early detection of this pathology, the telemedicine project RETISALUD was launched. Patients are invited to go to a local health centre (there is at least one on each island), where pictures of the retina are taken. These pictures are all processed in larger health centres, and the ones identified as pathological (around 20 to 30% of the total) are sent to ophthalmologists. Patients who need it (around 8%) are invited to see a specialist in the end of the process.

This role of IT in health care is of course of general economic interest for local enterprises. The Chamber of Commerce of the Canary Islands recently organised a meeting on various topics, including a reflexion on how IT firms could improve their contribution to the regional health system.

2.2. The Canarian population: residential attractiveness, demography and identity components

The population of the Canary Islands was estimated at 2 117 519 inhabitants in 2011, which makes the region the 8th most populated of Spain's Autonomous Communities. As mentioned above, population density is especially high. This population is extremely diverse and its composition deserves closer attention. In 2009, 86% of the total population were Spanish (74% native Canarians and 12% from continental Spain: Galicians, Castilians, Catalans, Basques...), and 14% were foreigners.

Of these:

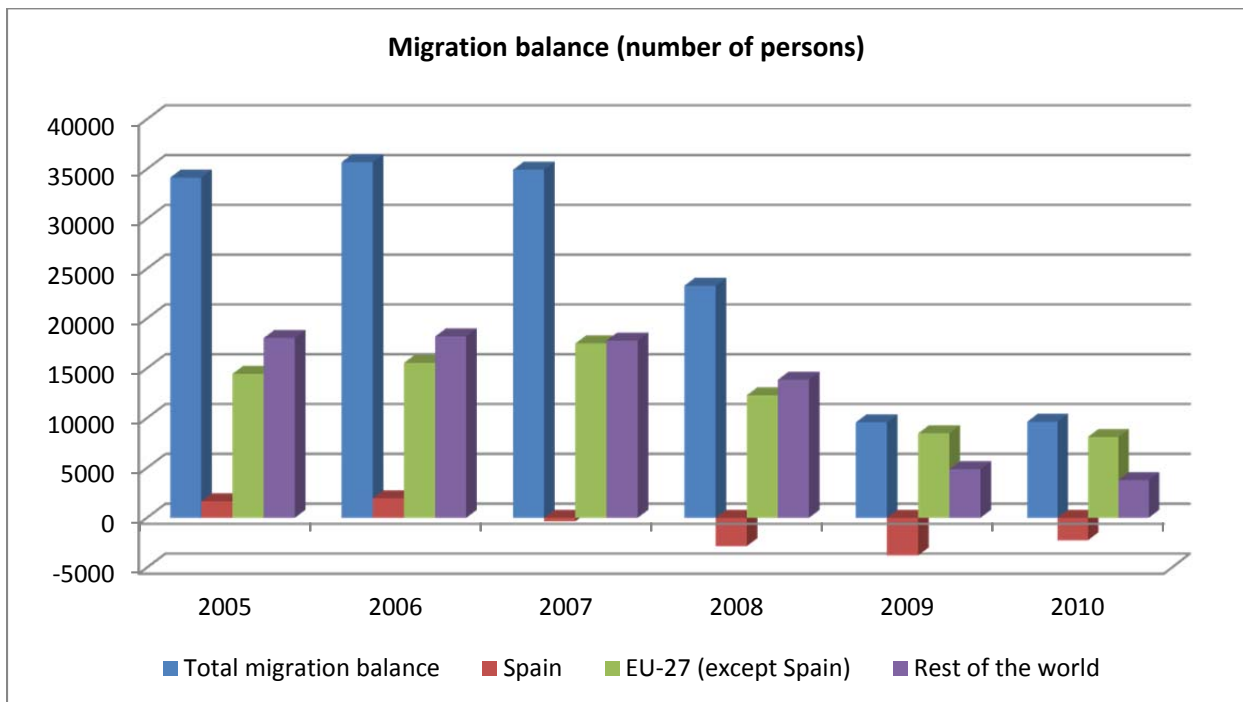
- 55% are Europeans: including Germans (39,505), British (37,937) and Italians (24,177).
- 29% are Americans (North and South): mainly Colombians (21,798), Venezuelans (11,958), Cubans (11,098) and Argentines (10,159).
- 9% are Africans, mostly Moroccans (16,240).

To this, irregular migrants must be added, although it is of course impossible to obtain reliable data.

➔ Migration balance : by island, by origin, by age

All islands – and thus the archipelago as a whole – show a positive migration balance. Depending on data, this balance is estimated between 9 600 and 14 000 additional inhabitants for 2010. This represents around 5% of the total population. In comparison, the Canary Islands welcome every year some 10 million tourists - that is, around 5 times the total population of the archipelago.

The balance is strongly positive for the two capital islands Tenerife (almost + 6 000 inhabitants in 2010) and Gran Canaria (+5 000), also positive but in lesser proportions for Lanzarote, Fuerteventura and La Palma (less than 1000 additional inhabitants in 2010), and close to zero in La Gomera and El Hierro.



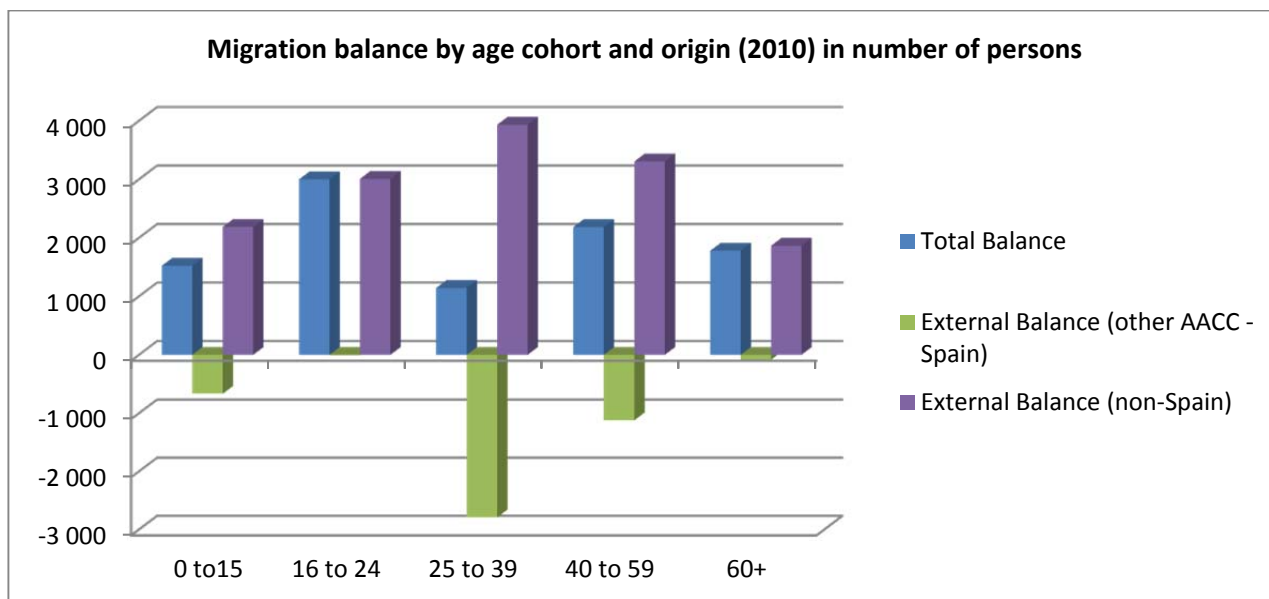
Source: ISTAC (Canarian Institute for Statistics)

This positive balance is a lessening trend: the graph above shows that the total migration balance peaked at +35 000 inhabitants in 2006 and then quickly reduced. Major contributors to this balance used to be non-EU migrants, followed by EU citizens; it is now the opposite, whereas the balance with other Autonomous Communities of Spain has turned negative in 2008 and remained so until 2010.

The ages of migrating cohorts, depending on their origin, is an excellent indicator of the reasons why the Canary Islands gain or lose inhabitants. Most migrants leaving the Canary Islands are young adults (between 25 and 39 years old) or older adults (40-59), but in any case active population probably in search of jobs. This cohort does not leave to work in Spain, which can probably be explained (at least partially) by the fact that the country severely suffered from the current economic crisis.

As for incoming migrants, they belong to all age cohorts and especially to the 25-39 cohort, which compensates departures in the population of that age. The distinction between EU and non-EU countries is unfortunately missing here. Indeed, there is a clear difference in profiles between migrants coming from EU and non-EU countries: the first ones are essentially mature or retired adults who either buy secondary homes in the Canary Islands or choose the archipelago as their main residence, whereas migrants from non-EU countries are in average very young (less than 30 years old) and come for employment reasons.

Both motivations explain that the positive migration balance is (i) well distributed among ages and (ii) very concentrated geographically on both capital islands (as well as Lanzarote), where most employment opportunities and leisure facilities are concentrated as well. Interestingly, EU citizens who buy houses in the Canary Islands are mostly German and British citizens, who also make up most of seasonal tourists.



Source: ISTAC (Canarian Institute for Statistics)

As for the less dynamic islands (El Hierro, La Gomera especially), they are also the ones where the population is ageing most quickly. A kind of vicious circle could be evoked here, that links these islands' small size and remoteness from capital islands, their relatively weak transportation connections with other islands, the limited number of tourists they attract and hence the limited number of touristic facilities that developed on their territories, the reduced employment opportunities and the overall lack of population dynamism. Of course, some of these elements could also be considered as assets, in that landscapes and natural resources are better preserved there, in that job opportunities could arise from other sectors if the archipelago's development model is to evolve towards other forms of tourism (or completely different types of activities). This could then reverse other trends such as population dynamism, connectivity, etc.

➔ Special bonds with the Americas

The Canary Islands have a specific, long-tenured migration history with the Americas: especially with the South of the US (Louisiana in particular), Central and South America.

This special bond dates back to the 15th century, since Columbus made a stop in the archipelago and before heading to the American continent and took some inhabitants with him. Canarians were then regularly sent to the Spanish colonies, both to defend them and populated them. Many of them were sent as recruits for the army in Louisiana, but also to parts of South America. At the end of the 17th century, the Spanish crown enacted the "Tribute of Blood": for each ton of cargo sent by an American colony to Spain, Spain would in return send five Canarian families (in fact, often over 10 families). Later on, mass emigration waves reinforced this historical trend: the economy of the Canary Islands, based on sugar-cane production, faced harsh competition from the Spanish colonies and suffered severe recessions. Between the 18th century and the first half of the 20th century, tens of thousands of Canarians moved to various American territories: Havana, Veracruz, Santo Domingo, Texas, Louisiana, Venezuela, Puerto Rico... These populations were clearly identified in their territories of destination, where they also preserved and developed a proper culture. They are known as "Isleños" (islanders), as opposed to continental Spanish migrants.

This migration history continued during the first half of the 20th century: prior to and during the Spanish Civil War (1936-1939) as well as during Franco's dictatorship, many Spanish citizens, including thousands of Canarians, fled to Central and South America: Argentina, Cuba, Mexico, etc. Bonds with Cuba in

particular remained particularly strong since Canarians still show gratitude to the island for having been a refugee territory in times of political and economic difficulties.

During the second half of the 20th century, the Canary Islands witnessed important return flows: emigrated Canarians came back to their country of origins. Immigration flows from Venezuela were still recently more massive in the Canary Islands than in continental Spain. Interestingly, the Spanish government has set up support programmes to help these “children of the Civil War” get back to Spain and many of their children and grandchildren living in Latin America were granted Spanish citizenship.

➔ **Relationships with African neighbours: immigration issues and cooperation opportunities**

The Canary Islands are both part of the EU and as such, face issues of irregular immigration, as do all other EU territories. Most irregular migrants arrive in the Canary Islands with tourist visas, and then overpass the allowed residence period. Migrants arrived by boat from the West-African coasts represent a very limited share of the population illegally residing in the archipelago (Godenau). This share is estimated at a maximum of 5%, but the phenomenon was granted specific attention by the media and political authorities at various levels, for various reasons.

First of course, these migrants travel in extremely dangerous conditions and a certain number of tragic incidents shed the light on this immigration flux. Second, many of these migrants (now in majority coming from Southern-Western Africa, or even from Asia) are very young, often even younger than 18. These “non-accompanied minors” come to work in the EU and, given their age, cannot be sent back to their country of origin.

Frontex - Operation Hera II Deployment (2006)



This situation gave way the Operation Hera II under the umbrella of the European Frontex agency (see image on the left). This operation was led by the Spanish Guardia civil, in cooperation with Italian, Spanish, Senegalese, Finnish and Portuguese forces: ships, helicopters and aircrafts were deployed in the Canary Islands as well as along the shores of neighbouring countries, in order to counter immigration attempts.

It can be noted that this operation was the first of its kind, and involved many countries, including non-EU partners, in a regional coordinated action. However, it is estimated that several months later (in 2008), over a thousand of irregular minors migrants were still retained in dedicated centres in the Canary Islands. The Canarian government called upon NGOs and the national government

for help in order to be able to deal with this issue.

Although migration issues are critical in the Canary Islands, developing cooperation and exchanges with the archipelago's African neighbours provide opportunities for the building up of forward looking regional relationships.

According to the Canarian Government, the archipelago exported for almost 140M€ to Africa in the sole first semester of 2011, which represents a 50% increase in comparison with 2010⁴⁰⁴. The Canary Islands mostly export oil, machines and vehicles. Their major clients for these goods are Mauritania, Liberia and Morocco. Traditional clients for the archipelago are Mauritania, Senegal, Cabo Verde and Morocco. Other strategic markets on which the Canary recently positioned themselves are ICT, the maritime, aeronautics and renewable energy sectors.

These commercial bonds are increasingly supported at an institutional level, thereby necessarily creating bonds between the Canary Islands and their neighbours. The Canarian Government has a Directory for Relationships with Africa. In 2002, this Directory developed an information platform about business in Africa (AFRICAINfomarket), in cooperation with local Chambers of Commerce and the regional Society for Economic Development. In 2011, the Corporate Council on Africa whose aim is to strengthen and facilitate the commercial relationship between the United States and the African continent, organised its first International Partnership Conference in Tenerife in 2011.

In cooperation with the Canarian Government, local universities also contribute to building these bonds. The ULPGC (University of Las Palmas de Gran Canaria) for example participates in development projects in Africa in various areas such as education, ecotourism, marine technologies, aquiculture, rural development, veterinary medicine, health, environment, etc.

Some cooperation projects are financed by the operational programme "Madeira – Açores – Canarias" that aims at building upon the specific location of these outermost regions on the EU's external borders to improve their cooperation and that of the EU with their neighbourhood.

⁴⁰⁴ Data provided by AFRICAINfomarket

2.3. Environment: treasures at risk, challenge for urban planning

Biodiversity & protected areas

The location of the Canary Islands, less than 100 km off the African coasts, their multiple climatic influences and thus micro-climates, as well as the territory's fragmentation make it a place of invaluable interest in terms of biodiversity (fauna and flora). The sole island of Gran Canaria for example hosts half of the species that unique to Spain.

→ Public response for the protection of species and land

A first 'Catalogue of Canary Endangered Species' was set up by local authorities in 2001, in order to list concerned flora and fauna species and to organise them within various categories of vulnerability. This work was pursued and a 2010 law gave birth to the Canary Catalogue of Protected Species. The document lists three categories of species: endangered species (83 in danger of extinction and 44 vulnerable), species of interest for Canary ecosystems and flora species under specific protection (not being specifically endangered or particularly important ecologically speaking, these are of scientific or cultural interest for example).

The Canary Islands are extensively protected, since 42% of the region's territory is registered as park land of a kind or another (this ratio is exceptionally high with regard to other EU territories). In these areas, economic development is reduced to controlled touristic activities. Four of the fourteen Spanish national parks are located in the archipelago: Las Cañas del Teide on Tenerife, Garajonay on La Gomera, Caldera de Taburiente on La Palma, Timafaya on Lanzarote.

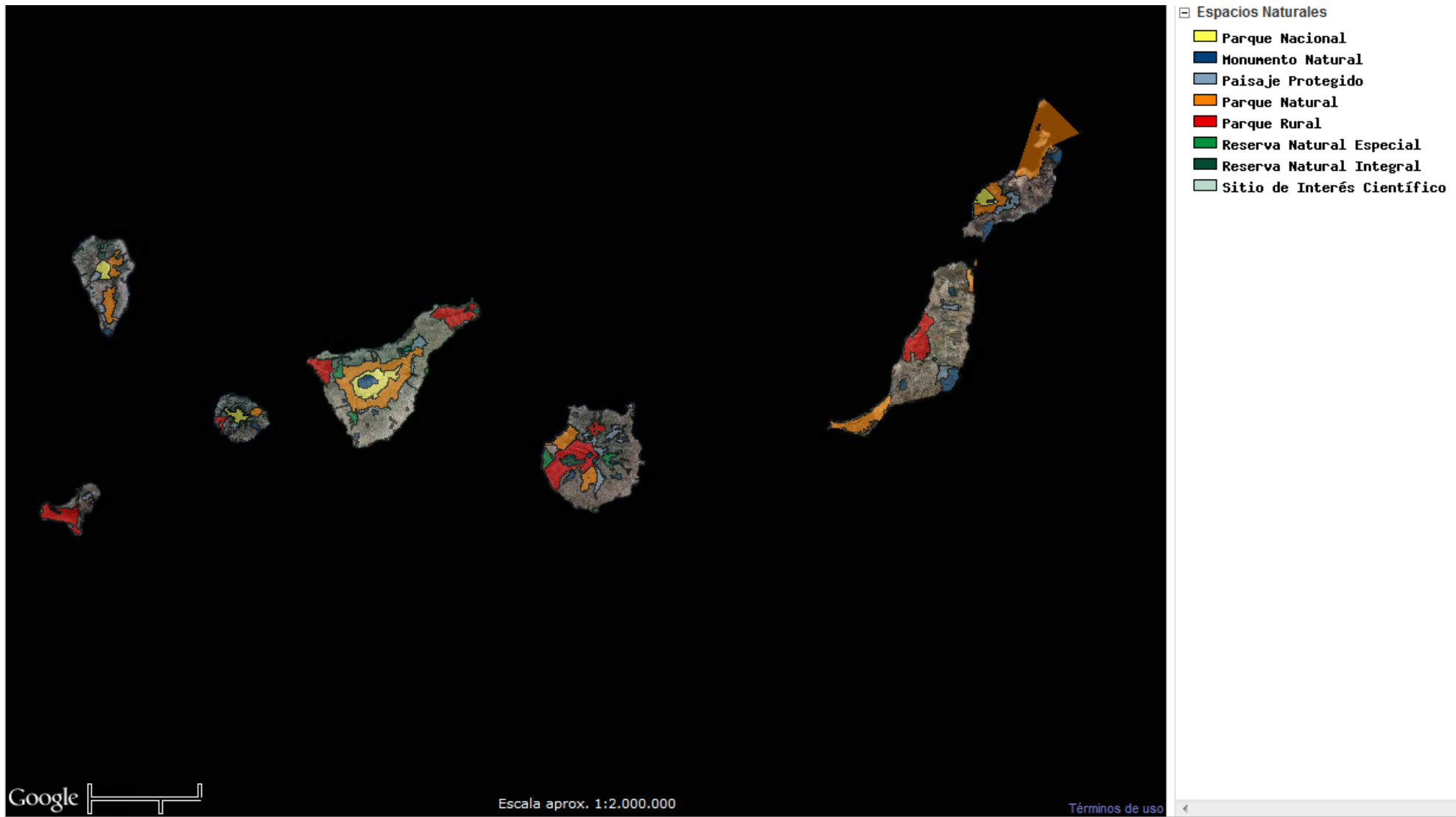
Many other areas are protected under various regimes: natural and rural parks, natural monuments, protected landscapes, special or integral natural reserves, sites of scientific interest... For example, the Canary Islands are an ideal location for astronomical observation: the archipelago is located close to the equator, yet away from tropical storms and above the temperature inversion layer. As a consequence, two professional astronomical observatories are implanted on Tenerife (Mount Teide) and La Palma (Roque de los Muchachos). The map on the next page provides a processed satellite view of these protected areas throughout the archipelago.

→ Threats to biodiversity

The protection of biodiversity sometimes collides with needs or at least projects for economic development. In the Canary Islands, this is all the more true that this protection is extensive, both in terms of species and areas protected, as described above.

In certain situations, this tension gives way to open conflicts. Early in 2010, the Canary government was suspected by some scientists and environmental groups of trying to reduce the lists of protected species, in order to cut or reduce the protection these species are granted. In this case, a certain type of seaweed is at stake: in 2009, a major economic project worth 380M€ (construction of a giant industrial port in Granadilla, Tenerife) has been stopped by a regional court because it put beds of protected seaweed located nearby.

Protected areas in the Canary Islands



Source: Spatial Data Infrastructure of Canary Islands <http://visor.grafcan.es/visorweb/>

Work on the port's site has begun however, although another court decision has suspended the declassification of this seaweed species. The situation is raising heavy protest against the Canarian government.

Environmental risks

Although in theory deliberately established, biodiversity protection rules however represent a constraint with which the Canarian authorities and population must compose. In addition to these constraints and those associated with their specific situation (outermost, double insular region), the Canarians must also take environmental hazards into account. Some of these risks are natural and can only be anticipated, some others are of human origin and could be prevented. In any case, they create threatening situation both for biodiversity and human activity.

Forest fires are probably the main threat to protected species: in some islands, a dry climate together with a large exposure to strong winds and the presence of conifer forests create high-risk situations. According to the authorities, wildfires have forced the evacuation of around 11 000 persons in a decade. In 2007 especially, major fires broke out on Grand Canaria and Tenerife, ravaging almost 25 000 hectares in total, destroying houses and seriously threatening the islands' fauna and flora (numerous species of small size vegetation species as well as bird species, including a rare type of native chaffinch). The topography, high temperatures reached and the wind make it impossible in most cases to fight the fire from the ground. Fire fighting from the air is also extremely dangerous (as well as costly) and already caused water-dumping helicopter accidents.

Apart from fires, floods and volcanic activity also count among Canarian specificities. In 2001 and 2002, two floods episodes caused 14 deaths. As for, volcanic activity, it seems that it continues to shape the map of the Canary Islands. A new submarine volcano has appeared a few month ago (October 2011) near the shores of El Hierro. A new island could appear and possibly end in extending the surface of El Hierro. The nearby town of La Restinga had to be evacuated and ships have been banned from the area.

El Hierro submarine volcano



As for Mount TEide on Tenerife, an awakening in the coming years could be a possibility : the volcano seems to have erupted about once every one hundred years for the period for which we have reliable records. Last time was in 1909. Earthquakes besides occurred in Tenerife back in 2004, which could be interpreted as signs of impending volcanic activity.

Urban planning challenges in a complex environmental context: focus on energy issues

All the environmental factors developed above increase the pressure exerted by the dense population of the archipelago on its small and fragmented territory and contribute to increasing the effective density ratio. Indeed, development choices led to a concentration of human habitat in coastal, non-protected areas. This dense population must deal with the hazards evoked above and manage basic issues such as access to drinkable water, waste management, recourse to energy... These challenges are of course of utmost importance and complexity when millions of visitors arrive during the higher touristic season.

The ERDF Operational Programme for the Canary Islands (2007-2013) dedicates three axes to these challenges:

- Axis 3, Environment, water resources and prevention of risks (total envelope 88M€): aims at improving water infrastructures and use (seawater desalination facilities extension⁴⁰⁵, improvement of water distribution plants), as well as at protecting biodiversity, notably by acquiring areas of land for the protection and regeneration of the environment.
- Axis 4, Transport and energy (145 M€): this axis was mentioned above for transport actions. As for energy, it aims at reducing the archipelago's dependency on oil (around 90% of energy consumption in 2004). Measures planned include the construction of two Liquefied Natural Gas regasification plants on Tenerife and Gran Canaria, and various renewable energy projects throughout the archipelago (wind power, solar power, biomass, hydroelectric power, geothermal power...)
- Axis 5, local and urban sustainable development (43M€): aims at implementing integrated urban and rural regeneration projects.

Among these challenges, energy is one of particular interest in the Canary Islands. The archipelago relies on six large autonomous electrical grids. Except for a submarine cable of limited power between Lanzarote and Fuerteventura, there are no connections between islands or with the continent. Since there are no conventional energy resources on the islands, the archipelago is thus almost completely dependent.

Given these characteristics and the pressure exerted by tourism on energy demand, the position adopted by the local government is a policy of energy self-sufficiency. Renewable Energy Resources must hence be developed: wind and solar energies mainly.

Economically speaking, this political orientation is expected to reduce costs currently induced by energy imports, as well as to contribute to the development of new, dynamic activity sectors.

➔ UNESCO “Biosphere Reserves” and innovative projects

The whole territories of the El Hierro, La Palma and Fuerteventura islands were declared “Biosphere Reserves” under the UNESCO ‘Man and Biosphere’ Programme. Biosphere reserves are areas that are supposed to develop innovative approaches, test them and share the results; more importantly to combine many different approaches in a vast diversity of policy and management fields, towards a balanced relationship between mankind and nature.

El Hierro is an interesting case in this regard⁴⁰⁶. The island was declared a Biosphere Reserve in 2000 in support to its natural and cultural heritage, as well as to the Sustainable Development Plan that was approved in 1997 and aims at making El Hierro completely reliant on Renewable Energy Sources. El Hierro

⁴⁰⁵ Spain's first desalination plant was set up in the Canary Islands (Lanzarote) in 1964.

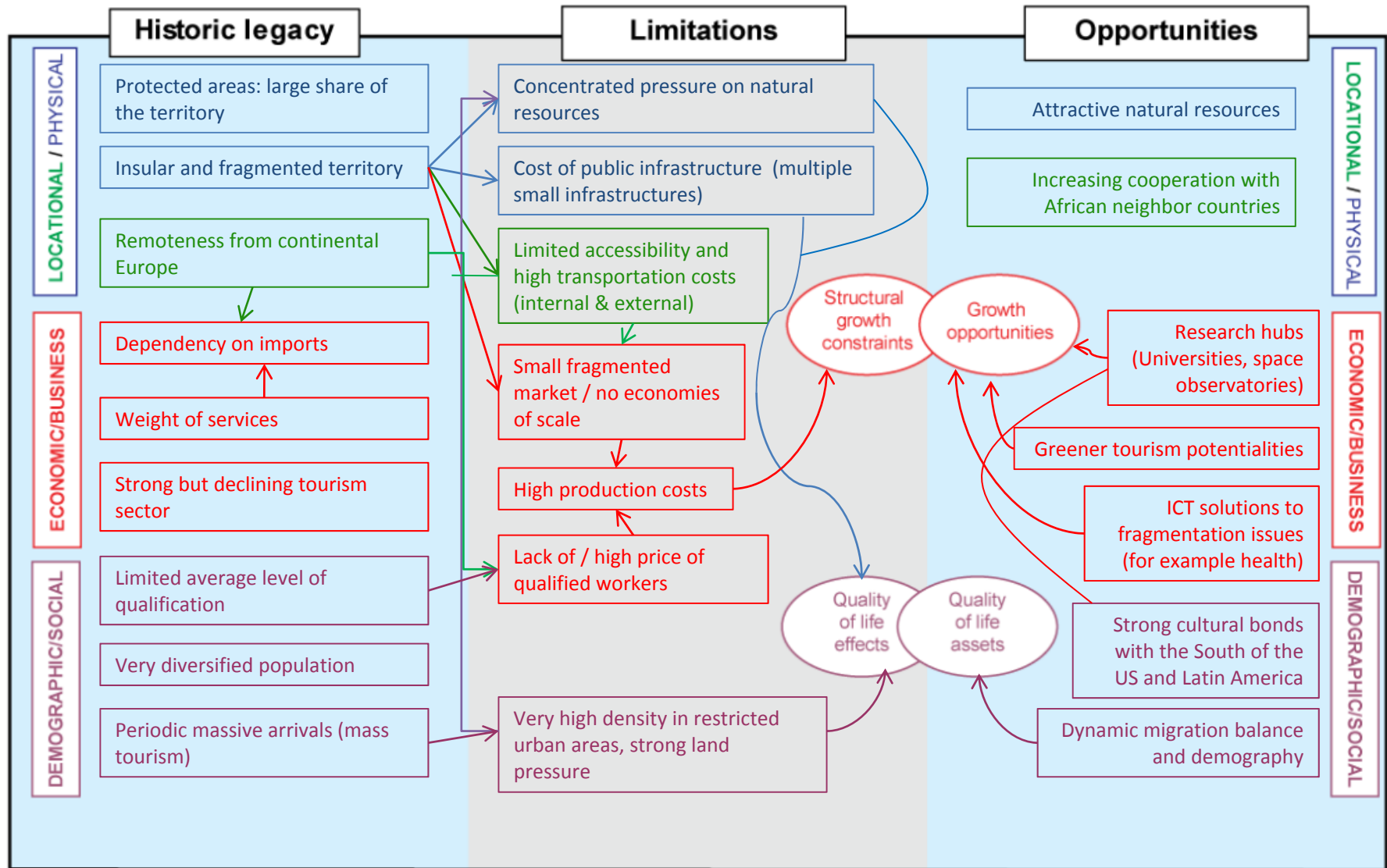
⁴⁰⁶ See www.islenet.net

would be the first of all Biosphere Reserves to achieve this goal and its example could be replicated or adapted in several hundreds of areas worldwide.

The island is very windy, which contributes to bringing enough rain to meet the 10 700 inhabitants' needs. The ongoing project is a wind farm project, to be developed near the main town of the island. Five turbines should generate a total output of 11,5 MW. The originality of the project lies in the fact that, while some of the generated electricity will be directly used through the main network, another portion of it will be used to activate another section of the farm. As stated in a Guardian article (Le Hir) "The energy will raise the water to a much larger reservoir (550,000 cubic metres) at an elevation of 700 metres, which is housed in a caldera, a volcanic crater. Three kilometres of pipes will connect the two reservoirs. If the wind drops, water will be released at the top to drive six hydraulic turbines (11.3 MW). By combining water and wind these naturally fluctuating energy sources can deliver a continuous supply of electricity."

If delays are met, the farm should be tested at the end of 2011 and fully functional in 2012. The project's cost is estimated at 65M€. It should however enable massive savings and environmental benefits, since it by making the oil-fired station obsolete.

4. Synthesis



Generalisation from case study

The Canary Islands count among the outermost regions of the European Union. As such, they show some characteristics that are common to these 7 territories, the main ones being remoteness from the European continent and small market size. These characteristics create handicaps of several types for the territory, and notably additional costs for entrepreneurs as well as in the provision of public services.

However, when one looks in more details into the Canarian situation, it appears that the territory's main characteristics stem from the fact that (i) it is an ecologically rich 7-island archipelago and (ii) it is a Spanish Autonomous Community that has followed the country's major development trends. Double insularity, the strong reliance on tourism, the large share of protected soil on this territory, land pressure and the related challenges in terms of natural resources, waste and energy management seem to better define the Canary Islands than their Outermost Region status.

Generally speaking, the Canary Islands have oriented their development strategy on a basic principle: building on the archipelago natural assets. Interestingly, the way this principle is put into practice is evolving. The first move consisted in exploiting the archipelago's attractiveness for mass tourism in a need for immediate return on investment. This was done brutally and led to critical situations in terms of land planning, resource management – that is, finally, on the conditions of life of residents as well as tourists. The new orientation adopted is that of sustainable development, in an attempt to conciliate economic as well as human and ecological constraints. Some projects seem to bear fruits in this sense, but such a reorientation at the Community's level will require complicated political choices (such as a net reduction in the number of mass tourism accommodations or an unquestionable respect of protected species and areas) and sacrifices that might be difficult to obtain.

Annex 38: Case study French Guyana

Description of the case study area and its geographic specificity



French Guiana is an Outermost region of France, located on the northern Atlantic coast of South America. It lies between latitudes 2° and 6°N, and longitudes 51° and 55°W. It is delimited as an administrative French division (region mono-départementale) and is surrounded by either foreign borders or by the Atlantic coast: Brazil 673 km (longest French border), Suriname 510 km (part of the border is still disputed) and Coastline 378 km.

With 83,846 km² and 232 223 inhabitants (but a dynamic average annual demographic growth of +4% over the last decade), the territory's population density is very low population (2,8 hab./ km²). The region consists of two main geographical areas: a coastal strip where the majority of the people live and a dense, near-inaccessible rainforest which covers 96% of the territory.

French Guiana, as an Outermost region, gathers numerous geographic specificities. The main ones are remoteness (7 500 km from Paris), external border areas with two non-EU countries (Brazil and Surinam) and a very low population density (less than three inhabitants per km²). Other specificities such as climate (inter-tropical zone), limited accessible surface area (most of its territory is covered by the Amazonian forest and rivers) or the existence of indigenous populations (Amerindians), could also be underlined.

The most acutely perceived specificity of the region is isolation, as a combination of all pre-cited geographic specificities. French Guiana is enclosed within a foreign continent (Latin America), which

makes relationships complicated: with France, with the neighbouring areas and countries, but sometimes even with inner territories.

In addition to its geographic specificities, this region has a unique historic heritage. French Guiana was first visited by Europeans in 1498, when Christopher Columbus sailed to the region on his third voyage. French merchants from Rouen opened a trade counter in Sinnamary in 1624, followed by others who founded Cayenne in 1643. The Treaty of Breda awarded the territory to France in 1667, and the Dutch, who had occupied Cayenne in 1664, were expelled in 1676.

After the Treaty of Paris in 1763, which deprived France of almost all her possessions in the Americas other than Guiana and a few islands, Louis XV sent thousands of settlers to Guiana. These were enticed with stories on gold and easy fortunes to be made. Instead, they found a land filled with hostile natives and were confronted with tropical diseases – most of these pioneers died rapidly. Later on, slaves were brought from Africa and plantations were established along the more disease-free rivers. Thanks to exports of sugar, hardwood, Cayenne pepper and other spices, the colony experienced certain prosperity for the first time in its history.

Slavery was abolished in France in 1848. Freed slaves fled into the rainforest and set up communities similar to the ones they had been stolen from in Africa. Now called Maroons, these populations formed a sort of a buffer zone between the Europeans who settled along the coast and main rivers, and the unconquered Amerindians tribes of the inland regions. Deprived from slaves labour, the plantations were soon taken over by the rainforest, and the planters ruined. The French then began using the territory as a penal colony where deported convicts were imprisoned in dreadful conditions, as exemplified by the notorious Devils Island and Saint-Laurent penal colonies. More than 70,000 French convicts were deported to French Guiana between 1852 and 1939. Sentence to penal colony was supposedly abolished in 1939 but prisoners already deported to Guiana were kept confined until the end of their penalty (or until death). As a result, the penal colonies' camp formally closed in 1951.

Another - but different - aspect of early French Guiana is given by the pioneering community at Mana (1827–46), in which one of the earliest educational systems was established for freed black slaves and women, in the spirit of French Roman Catholic humanism.

French Guiana became a “département” of France in 1946; it was given a regional status in 1974. It is thus very close to any other French region in terms of institutional arrangements.

The region's GDP per capita (€ 14 100 PPP in 2008) is the lowest of the French regions' and lowest of the Outermost regions' but still makes French Guiana the largest economy in the Guiana area (comprising Surinam, Guyana, Guyana Province in south-east Venezuela and the State of AMAPA in Brazil). The economy of French Guiana is closely tied to that of France through subsidies and imports. Besides the French space centre at Kourou, as well as construction and services (public and private) are the most important economic activities. The large reserves of tropical hardwoods, and other natural resources such as gold, are not fully exploited. Cultivation of crops is limited to the coastal area, where the population is largely concentrated; rice and manioc are the major crops. French Guiana is heavily dependent on imports of food and energy. Unemployment is a serious problem (over 20%), particularly among younger workers.

The general characterization of French Guiana is to some extent close to that of other Outermost regions: a small and closed economy with a low critical mass for key activities.

2.1. Economy

Employment and development levels

Over the 1993-2007 period, French Guiana's annual growth rate (an average of 3.9%) has been particularly high in comparison with other French Regions, including French Outermost regions. Internal demand has been the main engine of growth, due to an increase in households' disposable income supported by a relevant flow of social benefits, and to sustained and substantial infrastructure investments. To this respect, institutional status is a major influence factor of the French Guiana's economic pattern: the French region status enables to benefit from the fiscal adjustment principle and from social transfers, whereas the Outermost region goes together with specifically dedicated cohesion policy instruments.

However, while Outermost regions were catching up with their respective mainlands in terms of GDP per capita, economic growth in French Guiana was absorbed by the very fast population growth. While the region's GDP per capita amounted to 62% of the French average in 1993, it fell to 47% in 2007. The increase in active population is indeed faster than the number of jobs created each year. Consequently, the unemployment rate remains high (almost 22% in 2008), especially among women (29%), young people (33%), and people with low education levels. In addition, the gap between wages is increasing.

Unemployment and illegal immigration have contributed to the development of an *informal economy and of moonlight work*. In 2006, 4 000 Guianese declared having an informal job (people called "les jobeurs"), which represents 9% of total employment and 14% of employment in the private sector.

The structure of the Guianese economy presents some specificities with regard to that of other French regions, among which the strong weight of the public sector (44% of the total employees), and the strong relative weight of the construction sector and the agriculture sector. Industry appears to be quite strong in French Guiana in comparison to other French outermost regions, but it is essentially relies on the aerospace sector.

Following the independence of Algeria, the French military decided to move its missile testing to the Landes Test Centre near Biscarosse. However, the site was ill-suited for space launches, as the launch corridor was limited to launches toward the West, against the Earth's rotation. As a result, the French space agency, CNES, began looking for a new base near the Equator. In February 1964, a report by the CNES Scientific and Technical Directorate ranked 14 choices according to various selection criteria. The report identified five possible sites but French Guiana was the clear favourite. Amongst the acknowledged advantages, one can mention the following ones:

- The site is wide open to the Atlantic Ocean, which is advantageous for all space missions, both for launches to the East (for placing satellites on geostationary orbits) and to the North (for placing satellites on polar orbits);
- Proximity of the equator (5.3° latitude North) enables to take advantage of the catapult effect (energy provided by the Earth's speed of rotation around its polar axis);
- The site's surface area is large enough to ensure launch safety and low population density to minimize risk (45,000 inhabitants in 1964);
- The area is sheltered from cyclones and not vulnerable to earthquakes (unlike tropical areas such as the Caribbean islands);
- Political stability is ensured, the site being located in a French territory.

Following the success of Ariane, space activity became very important in this region. In the nineties, the sector accounted for more than 25% of the GDP and had a substantial multiplier effect on the rest of the economy. One Euro spent at the space centre would bring three Euros to the rest of the local economy. The impact of space activity has grown so important at that time that some said the region

faced a 'Dutch disease' syndrome, to say it was exposed to an artificial increase in wages and price levels. But demographic development (and related economic growth) as well as the slowing down of space activity reduced the weight of the latter to 16% of the GDP. The public sector is now more often deplored as contributing to the high cost of living. The additional allowance granted to civil servants is especially held for responsible of this. This allowance (which amounts to a 40% increase in wage) was initially implemented in the 50's for civil servants coming from the mainland. Later on it was extended to native employees.

As regard, the rest of the economy, it appears that many sectors such as agriculture, fisheries, gold mining, the wood sector, have reached a development limit because of a lack of modernization and illegal practices. The gold sector is obviously an attractive market. But whereas the price of gold has never been so high on the international market, the Guianese official production is declining. New environmental regulations and restrictions in the number of granted authorisations make the restructuring of the local sector necessary, as it needs more financing capacities and competences (new techniques of exploration and exploitation notably). However, the resource in gold remains important, multinational corporations are still interested in investing, and this sector offers a good potential for job creation. Its development will require a strong political impetus and a consensus among the population.

The wood sector is seriously challenged by competition from neighbouring countries with lower labour costs. It is however experiencing a promising dynamic phase, with an increase in production and the structuring of an added-value chain. This notably implies:

- Eco-certification of forestry exploitation and woods (preservation of the environment, greater quality and traceability, productivity gains...);
- Addressing local market needs, namely the construction sector (diversification of the types of wood, diversification of production);
- Development of niche market products with higher added-value for export (e.g. technical products, extracts, design furniture, music instruments, etc.).

The specificities of French Guiana's economic and geographical patterns have a great impact on the spatial distribution of economic activity. The urban area around Cayenne, the main city, concentrates $\frac{3}{4}$ of the salaried jobs – half of which are related to the public sector. Kourou, because of the space centre, is much more specialised in productive activities. Saint-Laurent du Maroni, the second administrative capital ("sous-préfecture"), is very dependent on the public sector. The lack of productive activities (except for sugar cane crops and rum production) and private services (even retail shops) in this area is notably due to competition with Albina, Surinam, located directly opposite the border. Albina is connected to Saint-Laurent by a frequent ferry service (it is even possible to cross with a canoe). The city is full of shops (with very low taxes), casinos and nightclubs, and massively attracts the French Guianese people.

Regional insertion and cooperation with neighbouring countries is a recurrent debate but still ineffective. Regional insertion faces many barriers at different levels:

- Legal: as an Outermost region of the EU, French Guiana is also part of the common market, and shares EU standards and rules for the circulation of people, goods and services. No such thing exists at the Amazonian scale (Guyana Shield⁴⁰⁷). French Guiana is equally subject to European trade agreement and tariffs. On their side, Surinam and Guyana are part of the CARICOM area and Brazil of the MERCOSUR;
- Economic: Le Guyana Shield cannot be considered as an economic area as regards flows of goods and services. Several economic barriers can be identified for French Guiana in this area, such as the lack of competitiveness of French Guiana's companies (mostly microenterprises) and low income and solvency problems on the other side (Para and Amapa count among the poorest States of Brazil). Most exchanges take place in the area of informal economy ;

⁴⁰⁷ The Guiana Shield is a 1.7 billion year old [Precambrian](#) geological formation in northeast [South America](#) that forms a portion of the northern coast. It underlies [Guyana](#), [Suriname](#) and [French Guiana](#), as well as parts of [Colombia](#), [Venezuela](#) and [Brazil](#).

- Politic: Because of institutional arrangements (French Guiana is a region), local policy-makers have limited power in terms of international relations. No agreements can be signed without the supervision and approval from the national government. Actually, national authorities often liaise directly with Brazilian authorities without any form of consultation with regional stakeholders (see transport issues below).

Although the general context is not favourable to regional insertion, interesting cooperation initiatives can be identified at a reduced scale. This includes collaboration on issues such as coastal monitoring, rainforest preservation, cultural development, healthcare, etc. Several research organizations such as CIRAD (International Cooperation Centre in Agro-Research for Development) or IRD (Research Institute for Development) are very familiar with international cooperation programmes and have direct connexions with research teams in the neighbouring countries. These types of projects often emerge on individual initiatives and totally rely on a limited number of persons. Therefore, they are likely to stop when these specific persons quit their job (or go back to the mainland). Hence, it could be argued that these projects do not contribute enough to regional *capacity building* and *knowledge sharing*.

Tourism

Unlike in other outermost regions, tourism in French Guiana is not a traditional sector. It represents only 2% of the regional added value, with 130,000 tourists in 2007. Business tourism is predominant because of the space centre but also because of the strong links with (maybe leading causing dependency on) the mainland in all business, administrative or political domains. However, recent studies show that the weight of tourism is growing in the economy. With 15% of the GDP and 3,600 jobs, the sector is registering an increasing number of tourists over the last years.

The sector is still underexploited. "Tourism products" are not well suited to the demands of clients, marketing strategies are under-developed, hosting infrastructures are insufficient in number and often also in quality (because of the climate, infrastructures need substantial and costly maintenance). Given the region's geographic features (climate, limited number of beaches, etc) and the high level of prices (in terms of transport, food, etc.), French Guiana cannot compete with other Outermost regions or neighbouring areas in terms of seaside tourism. The few cultural and historic attractions (space centre, penal colony, carnival, etc.) are not sufficient to constitute a major touristic asset. In addition, access to Amerindian communities is restricted because of sanitary reasons (these populations are very vulnerable to western diseases). However French Guiana can be appealing for "green" or "eco-tourists" with a taste for adventure, looking for expeditions in the rainforest with a guaranteed level of safety and good sanitary conditions.

Services of general interest

The French social-security system and the territorial continuity principle are effective in French Guiana. This means that the population can expect public services of a similar quality than mainland citizens. In this respect, national and regional authorities have increased public transfers to French Guiana, as well as investments in infrastructures dedicated to services of general interest (notably through ERDF funds) but it appears that this is still insufficient in comparison with the pressure exerted by demographic growth in the region.

If the "administration rate" (number of public servants for 1 000 inhabitants) is slightly superior to the same rate for mainland France, a more detailed analysis reveals that the major part of the public sector's staff is actually composed of low level employees (front desk, maintenance, etc.). Only 16% of French Guiana's civil servants workforce is composed of medium and high level civil servants , as opposed to more than 23% in the mainland.

This issue is particularly critical in domains such as healthcare. French Guiana's healthcare system lacks equipments, but also staff. Indeed, the number of skilled healthcare professionals per inhabitant is 2 to 4 times inferior to mainland figures.

The table below shows the issue that French Guyana is facing in terms of healthcare services.

Equipment rate in healthcare infrastructures 2010					
<i>Number of beds for 100 000 inhabitants in the private and public sectors</i>					
	medicine	surgery	gyneco-obstetrics (for 100 000 femmes between 15 & 49 y.o.)	Follow-up and readaptation	Psychiatry
France mainland	217	154	154	169	153
Guadeloupe	232	114	221	159	90
French Guiana	169	74	290	52	33
Martinique	203	116	186	149	95
Réunion	170	85	162	81	91
<i>source : DREES, SAE</i>					

Figures show that French Guiana is poorly endowed, particularly in certain specialized medical fields such as surgery, readaptation and even more psychiatry. To a certain extent, it could be conceivable for a region with a reduced population (although this population is quickly increasing) not to be able to provide all types of specialised healthcares – as long as a major hospital is accessible within a 200-km distance. But French Guiana is precisely isolated and patients who cannot be cared for in the region have to be transported abroad (in the best case to Martinique, 1500 km by plane, or to Paris 7000 km). This can be very disturbing for them and their family.

A noticeable effect of this situation is the development of private services, notably in surgery and gyneco-obstetrics. Guianeses who can afford it tend to turn to private institutions for benign surgery, in order to benefit from reasonable accommodation and service quality.

The figure concerning the number of beds in gyneco-obstetrics can be explained by the very high birth-rate in the region. It is also acknowledged that pregnant women frequently come from the neighboring countries (notably from Suriname) in order to access safe healthcare treatments (as well as the French nationality for their new born child).

Demographic growth is also a major challenge for the regional education system. From childcare until higher education, French Guiana needs a specific policy that is necessarily contrasting with national trends. The capacity of childcare centers in the region is limited to 350 children overall, which represents 2,5% of the children of that age (compared to a rate of 11% in metropolitan France). School enrolment increases at a rate of 3,7%, which is similar to the demographic growth rate.

The table below shows that the number of employees in the education sector (not limited to teachers) is quite high compared to the population, but inferior to mainland figures, in view of the size of the population aged between 3 and 19 years old.

Employees in French Guiana's education sector (2009)

	Premises	Employees	Employees for 1000 inhabitants	Employees for 1000 young people between 3 and 19 yo.
France mainland	178 525	1 791 488	28,7	137,6
Guyane	418	7 665	34,0	92,5

Source : Insee, Clap, Estimations de population.

Because of general demographic and social conditions, it is also worth mentioning that a significant number of pupils go to school in areas considered along French law criteria as “priority education areas”. They are 15 times more numerous than in the mainland, which obviously requires strong political commitment.

Specific transport infrastructure issues

Considering the landlocked situation of French Guiana, maritime and air transports are the main transport modes for external flows. Maritime freight transportation costs are very high (30 to 50% higher than in other outermost regions), as a result of several factors: the low volume of exports (only 10% of the containers leave French Guiana filled with merchandises), the inadequacy of port infrastructures, the level of labour costs and limited competition between operators. More specifically, the port of Degrad des Cannes, located at the estuary of the river Mahury, is not sufficiently deep to accommodate big ships. Hence, transshipment from container ships to coasters is often required. This operation takes place in Trinidad & Tobago. In addition to this depth problem, the waterway needs to be frequently dredged, in order to avoid boats getting stuck in the sand carried along by the Mahury. As a result, Degrad des Cannes is one of the most expensive ports to operate in the world.

In terms of air transport, limited competition is a factor influencing the cost of airplane travels. Indeed, only two companies offer flights between Paris and Cayenne, and a third operates regional lines. The upwards trend in oil prices has further handicapped French Guiana as production costs in the air transport sector have seen a proportionally higher increase. In the future, stronger environmental protection instruments (tax, quotas, etc.) may lead to enormous additional costs for this region, since they are extremely sensitive to the use of air transport.

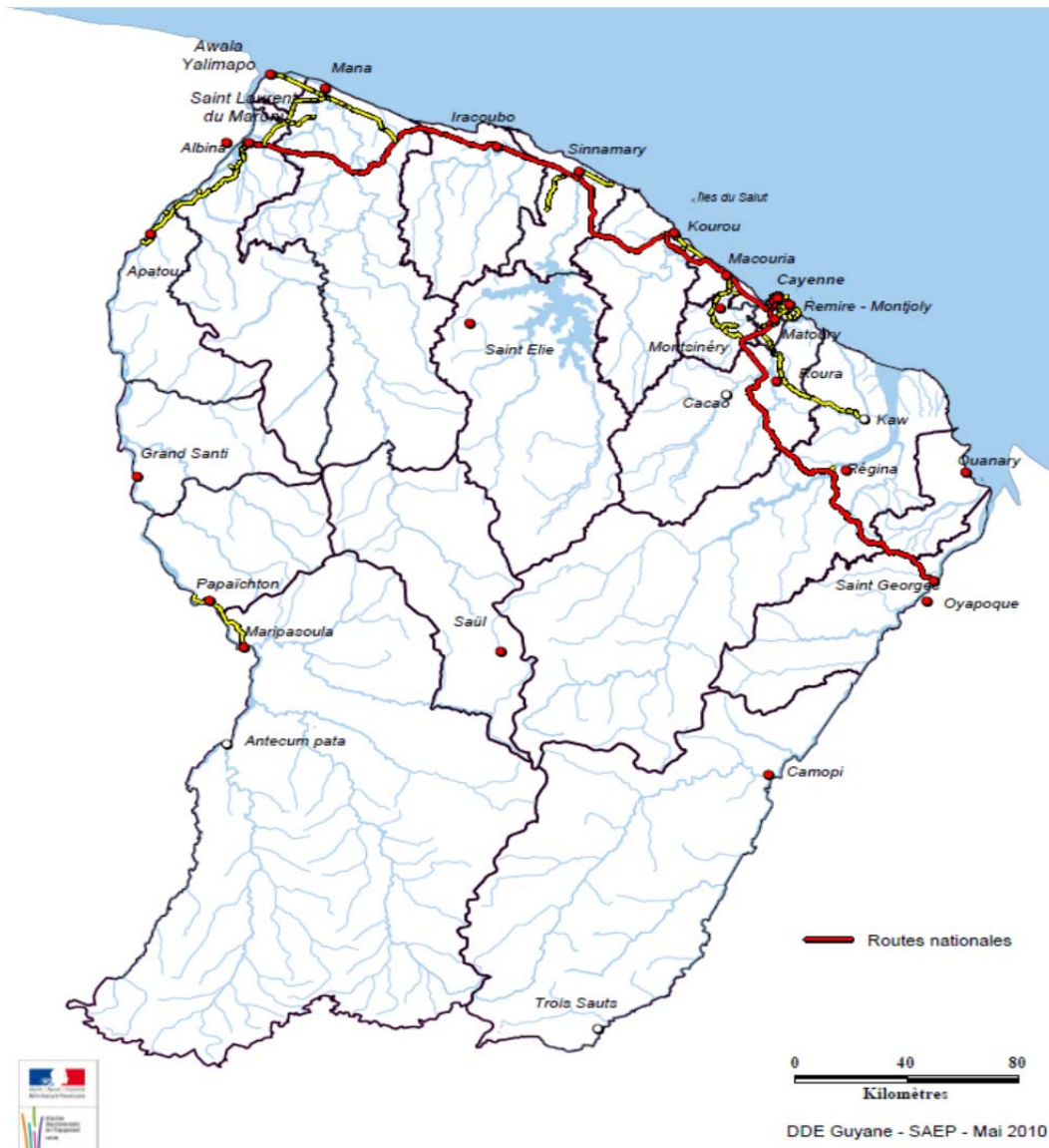


Access to the region's internal areas is difficult because of the clear separation between the coastal and the forest area. Access to the forest area is only possible by air or by river transport modes. This increases the cost of access to primary resources (wood, plants and fruits, gold, etc.), of transport to the final clients, but also delivery costs for basic public services. In addition, navigation on the main rivers is limited by numerous fast-flowing sections and cataracts. Joining Maripasoula from Saint-Laurent by the river Maroni is a 2- to 3-day trip, depending on the season (and of the water level), whereas it only takes 1 hour and 10 minutes from Cayenne with a light turboprop aircraft. It should be noted that internal air transport faces important overcosts

due notably to high European safety standards (required minimum length of the runways, set weather and traffic control equipments and procedures, etc.).

As appears on the map next page, the road network is concentrated on the coastal area. Building roads is besides very expensive (impenetrable forest areas, soil instability) and projects are limited by the existence of numerous protected areas. Due to demographic growth, road traffic is expected to increase dramatically and to strengthen traffic congestion, whereas urban public transport has not been well developed. Public transport is only operating in the Cayenne urban area (limited to seven bus lines). Intercity transport mainly consists in "collective taxis" that propose journeys in minibus.

A railway track, built by slaves, has been effective in the past but there is currently no more railway network in French Guiana. Feasibility and profitability studies (using World Bank evaluation methods) argue that such a transport mode could not be viable in this region.

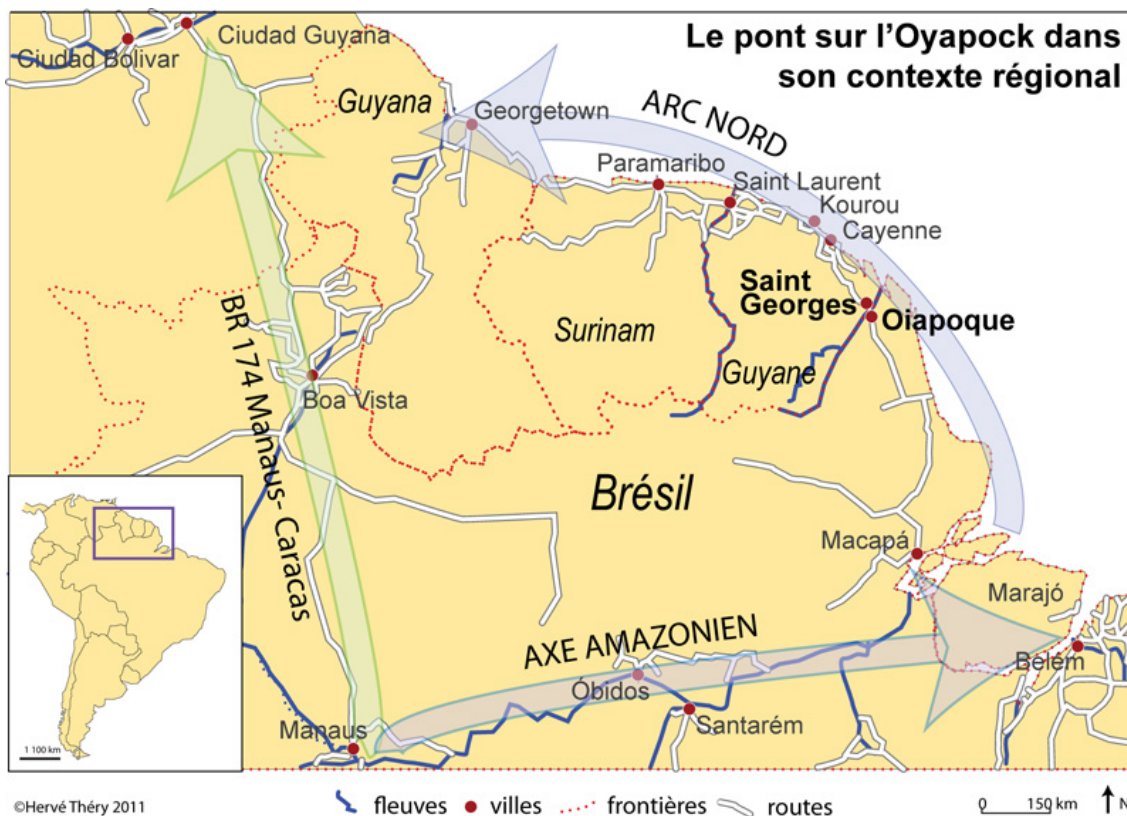


The bridge built between French Guiana and Brazil over the river Oyapock is an interesting illustration of the challenges faced by the region in terms of transport and regional integration. In 1997, Presidents Cardoso and Chirac agreed to build a bridge linking Europe (represented by French Guiana), to Brazil, member state of Mercosur. The aim was to create a road connection between the towns of St Georges in French Guiana and Oiapoque in the Brazilian state of Amapá - and further with this state's capital city Macapá. The French authorities notably intended to develop exchanges between French Guiana and Brazil, partly in order to compensate for the weak supply performances of their small and expensive port Dégrad des Cannes (see above). However, it appears that political priorities were not similar on both sides of the frontier, which impinged on the bridge project.

The inauguration should have taken place before the end of 2010 but had to be delayed because construction work came to an end only one year later in November 2011. In addition, the connection with Macapá was established lately and only partially: still today, only the first 200 km of the road between Oiapoque and Macapá are asphalted, whereas the rest of the 672km consist in a jungle track that is often disrupted because of soil movements and floods.

In fact on the Brazilian side, political priority has been given to other road connections, considered as more strategic: the connection between Manaus and Caracas in Venezuela and between Manaus and Georgetown in Guyana (via Boa Vista). As for the Oiapoque – Macapá road, it offers very few

connections opportunity. Indeed, all roads in this areas end in Macapá because of the Amazonian river. Connections between Macapá and Belem are only possible by boat (330km navigation). This can explain why the Brazilian authorities have shown little interest and invested little resources in this connection, although French Guiana hoped for more.



Other issues are still hindering effective exchanges between both sides of the Oiapock, among which standardization is particularly critical. Differences in standards and norms affect the exchange of food, electric or chemical products for example, but also the free circulation of vehicles. For example, Brazilian trucks do not respect Guianese 'norms' and no insurance company in French Guiana can cover a vehicle that drives in Brazil.

As a conclusion on this point, one could underline the fact that the bridge did radically changed local life and exchanges between the small towns of St Georges and Oiapoque. A strong relationship between them existed prior to the opening of the bridge. It mainly consisted in frequent and informal exchanges. Since the bridge opened, these exchanges have been normalised and rigidified. For example, whereas the border was relatively permeable, border controls are now systematic. According to the local population, the bridge has rather separated the two banks of the river than joined them up.

Role of Information and Communication Technologies

Regarding telecommunications, French Guiana is linked to the rest of the world by only one cable, AMERICAS II, which crosses the Atlantic. This notably means that an e-mail sent from Guiana to Guiana passes through the French mainland! This does not enable satisfactory back-up to ensure the security of data transmission and leads to severe congestions. In addition, due to the topography of the region, it is difficult and costly to provide the forest area with Internet access. As a result, the *broadband penetration rate is very low in French Guiana, with striking disparities between the different areas of the territory.*

These technical difficulties induce a lack of high speed Internet access in some areas, or poor quality access in some others. This notably prevents the region (as other ORs) from fully benefiting from all the benefits of electronic commerce. In this regard, other obstacles can be mentioned: obstacles to trade with neighbouring / non-EU countries, very high local prices due to insufficient competition, postal transport services that remain limited in certain cases...

In order to compensate for the lack of broadband coverage, a new Internet backbone linking Macapa (Brazil) and Cayenne (French Guiana) is planned for construction. This data route could then be extended to Paramaribo in Suriname. However, Wimax⁴⁰⁸ appears to be the best solution for most isolated populated areas. In addition, Satellite Internet Access (VSAT connected to a satellite hub in Cayenne) is progressively brought into service in the most remote areas.

As regards mobile communications, the penetration rate in French Guiana is very high (123,4% against 104,9% on average in France mainland). Since the standard phone network has remained underdeveloped until the nineties, telecom companies have directly invested in cellular networks. Also, a significant part of the population lives in illegal constructions and therefore, does not ask for a landline but uses cell phones.

This specific situation has led to debates on issues related to telecommunication tariffs. The current EU and national regulations recognise the specific situation of the Outermost regions. It is acknowledged that their implementation should not result in less favourable tariff treatments for subscribers using domestic roaming services compared to subscribers using European roaming services. To this respect, several actions had to be taken by competition authorities to prevent market abuses and subsequent high prices in Outermost regions.

ICTs are not enough developed yet to significantly contribute to the development of new businesses in the region. However, several initiatives benefit from the knowledge and equipment of the national space study centre (CNES). These projects mainly cover two fields of applications: remote sensing and telemedicine. They are particularly relevant and likely to contribute to the socio-economic development of French Guiana.

→ Remote sensing

The “UMR Espace-dév” in French Guiana (a mix research unit gathering several research organisations) has developed the technological platform SEAS (Satellite Surveillance of Amazonian Environment), as well as a company, Nevantropic, which is commercializing services using the SEAS platform. This station is set to become a centre of excellence to enhance the understanding and monitoring of the dynamics driving the Amazonian and Caribbean environments. The receiving station directly exploits imagery (200-300 images a day, covering an area from Cuba to Brazilia) from the Spot and Envisat satellites, and combines it with field data. Imagery allows a wide variety of applications (mapmaking, environmental studies, regional development, etc.). Currently these images benefit the following activities:

- Maritime affairs (safety, fishing, etc.)
- Forest and coastal ecosystems studies
- Illegal gold mining surveillance
- Land-use and water-resource monitoring
- Epidemiological monitoring

Until today, this initiative has not been fully exploited in terms of market opportunities.

→ Telemedicine

Since 2000, the CNES, MEDES (for MEDEcine Spatiale – Space medicine) and the Cayenne hospital (CHC) have been working together on the contribution of Space systems to public health matters in French Guiana. French Guiana is now among the leaders in the field of ICT applied to public health.

⁴⁰⁸ Worldwide Interoperability for Microwave Access

These techniques were initially developed to meet astronauts' health needs. They now make it possible for doctors to diagnose and care for patients at a distance thanks to satellite communications, by using the CNES portable telemedicine station. Twelve sites in French Guiana (11 isolated sites and one ambulatory care centre in the Cayenne prison) have been equipped with a portable station.

At the current time, it is possible for doctors to diagnose pathologies in the fields of dermatology, cardiology (by means of electrocardiograms), parasitology, obstetrics, ophthalmology and haematology by means of telemedicine. Over 34 000 teleconsultations have been carried out since December 2001. In addition to ensuring rapidity and diagnosis reliability, this method sometimes avoids costly and stressful medical evacuation for isolated patients.



As mentioned above, telemedicine involves medical diagnosis and treatment at a distance, the patient most often being in an isolated site – whether this is fixed (a region which is naturally isolated, an off-shore oil rig; etc.) or mobile (shipping, air transport, humanitarian or military ground expeditions, migrating population flows, etc.). A “telemedicine wallet” was developed in order to allow for these operations to take place in any of these situations.

As a complement to telemedicine wallets, the CNES has developed a mobile emergency care unit (PSMA - Poste de Secours Médical Avancé). This device can be transported by helicopter and enables to implement a local telecommunication

network for the organization of rescue teams. This specific mobile care unit was used during the earthquake in Haiti in January 2010.

2.2. Social

Demographic processes

The demographic growth dynamic is French Guiana's main feature. It impacts strongly on the region's socio-economic development: it had only 27,000 inhabitants in 1950 and has now over 230 000. Over the 1999-2008 period, the annual average growth rate of the total population was 3.9%, which is equivalent to Haiti's rate (much higher than the French average and even higher than in the neighbouring countries). It is expected that, by 2025, the population may exceed 500 000 people.

Demographic growth is mainly due to a high birth rate, the second reason being an important immigration rate. This situation is rather unique among outermost regions and in Europe in general (except for Mayotte which shows similar characteristics). The average number of children by woman in age amounts to 3,49 in French Guiana, which is very high in comparison with the national average, and women have their first child very young.

Fertility rates, French Guiana and France (2009)

	French Guiana	France
Between 15 and 24 years old	1,26	0,32
Between 25 and 34	1,54	1,29
Between 35 and 49	0,68	0,39
Fertility rate	3,49	2,00

Source: INSEE

This high fertility rate can be explained at least partially by cultural and sociological factors. An important part of the Guianese population is composed of foreigners or children of immigrants, mainly from Suriname and Haiti. The average fertility rate in Haiti over the 2000-2009 was 4.6. In Suriname, this rate is lower (it is below 2,5 and follows a downward trend) but sanitary, healthcare and welfare situations on both sides of the frontiers lead many Surinamese women to come to French Guiana to give birth. Recent figures show that a majority of immigrants are now women. These elements of course have an impact on regional demographic statistics and contribute to this high average fertility rate.

Population of French Guiana – structure by nationality (2008)

	Men	Women	Total	%
French	68 621	69 048	137 669	62,8
Native French	62 969	62 268	125 237	57,1
Naturalized French	5 653	6 780	12 432	5,7
Foreigners	40 052	41 545	81 597	37,2
Surinamese	15 382	15 842	31 223	14,2
Haitians	9 176	11 295	20 471	9,3
Brazilians	10 695	9 375	20 071	9,2
Guyanese	1 943	2 023	3 966	1,8
Chinese	704	663	1 367	0,6
Dominicans	215	536	751	0,3
Peruvians	273	243	516	0,2
Other foreigners from the American continent	504	698	1 202	0,5
EU foreigners	523	346	869	0,4
Others	637	523	1 160	0,5
Total	108 673	110 593	219 266	100,0

Source : Insee, RP2008 exploitation principale.

As a result of this demographic dynamic, the share of young people (under 20) is very high and has been increasing since 1999 (44.9% of the total population in 2007). French Guiana is thus not in a demographic transition phase (as are other French outermost regions). Dealing with demographic explosion is a major issue, especially for the provision of all necessary infrastructures in secondary cities (water, housing, transport, etc.) to alleviate the polarization towards Cayenne (regional capital).

The biggest challenge in French Guiana today is unemployment. The official unemployment rate among the population aged 15 to 24 is high (40%) but appears to be lower than in other French outermost regions. The reason for it is that a large share of young French Guianese is not even counted among the active population. They are unknown from the administration and thus are not included in official statistics. What

Education and training are major additional issues. Massive investments in human capital have been undertaken in recent years to improve education, training and qualification levels. Still, only 36% of the population aged 15 to 29 are registered in the education system. This means that a significant part of the youth is completely off the radar and very difficult to reach through standard policy actions – at least in the way they are conducted in most French regions.

This lack of qualification is a major handicap for the development of the region. On average, people aged between 25 and 34 are two times less qualified than they are at the national level. Deficiency in human capital resources and insufficient qualification levels call for new education and training strategy at the regional level. This strategy should notably focus in applied/technical degrees, lifelong training, *accreditation of prior learning procedures, etc.*

Migratory movements

As already underlined, immigration is an important feature for French Guiana. Historically, this region has always relied on migration flows for its development: pioneers in the XVIIth century, slaves, prisoners, etc. In 1850, several shiploads of Indians, Malays and Chinese arrived in French Guiana. They were expected to work in the plantations but, instead, they set up shops in Cayenne and other settlements. Immigration from Saint Lucia was also encouraged during the XIXth century. The 1970s saw the settlement of Hmong refugees from Laos in the county, primarily in the towns of Javouhey and Cacao. From the 80s on, immigration consisted in waves of populations fleeing difficult situations in their home country: political trouble in Haiti (and more recently the earthquake), civil war in Suriname and socio-economic problems in Guyana or north Brazil, etc.

Although there is an emigration from French Guiana toward the mainland, it is less striking than in the French Antilles or the Azores.

Gold is also a ground for immigration in French Guiana. It is estimated that over 10 000 immigrants (called *garimpeiros*) are working today in illegal gold mining camps. The city of St Georges in French Guiana, which is separated from Brazil by the Oyapock river, is one of the main points of entry for illegal immigration between the two countries. The town has learnt how to make the most of this and the related underground economy has so far been profitable to its inhabitants.

However, the development of informal exchanges and illegal gold mining also entails more dangerous traffics. French Guiana is flooded with drugs coming from Suriname, this neighbour country being a storage base for international drug dealers. The gram of cocaine is sold 10 Euros in French Guiana against 70 in the mainland and crack costs nearly nothing in the region. In addition, guns (Taurus hand pistols) are transported by illegal Brazilian migrants and gold diggers. Although restrictions are enforced by the Brazilian federal government since 2002, it is legal to buy firearms in the country (the total number of firearms in Brazil is thought to be around 17 million, of which 9 million unregistered).

Border control is very active in French Guiana. 247 members of the border patrol, 480 gendarmes (army attached policemen), 370 mobile patrol officers and even the Foreign Legion are mobilised on this specific task. But the borders are extensive (673 km with Brazil, 510 km with Suriname) and cut areas covered by the rainforest, in which illegal migrants feel much more comfortable than the French armed forces. Native Amerindians are sometimes called upon by French policemen to contribute to

their operation. Amerindians are notably willing to put an end to illegal gold mining (see section on biodiversity). In addition, specific legal dispositions enable policemen to carry out searches in vehicles (cars or boats) without any authorisation from the prosecutor. They can also escort illegal immigrants to the border immediately (whereas the Common French law imposes a delay of 48 hours).

Between ten and twelve thousand people in irregular situation are arrested in French Guiana each year. Half of these people are actually recidivists, which underlines the discrepancy between the issue faced and the solution provided. In any case, border controls conducted on the French side cannot be a satisfactory solution to this problem. The lack of cooperation with neighbor states authorities was underlined by several observers. The Maroni and Oyapock rivers are considered as international areas and police operations and interpellations on board cannot be undertaken without authorizations from the neighboring countries. Mix patrol units could be of valuable help, but no such thing exists so far. In addition, the border delimitation problem with Suriname is an important barrier to this kind of cooperation.

Identity

The population of French Guiana comprises a significant number of ethnic groups, with different types of historical connections to the Guianese territory, and various cultural backgrounds. These characteristics make the structuring of French Guiana's society very different from the "modèle antillais" that prevails in Martinique & Guadeloupe. In these territories, society is still deeply structured by the historical opposition between white people (former colonialists) and black Creole people (former slaves), although this opposition is of course simplistic and reality more complex. French Guiana is characterised by the presence of native Amerindian population, as well as by a succession of immigration waves (mainly on voluntary grounds). These factors shaped a diverse and complex social structure. In this sense, French Guiana could be compared to La Réunion, although its society is arguably less cohesive than the Indian Ocean than the latter's.

The most specific, if not unique, identical feature in French Guiana is the presence of indigenous populations. As the inland proved unattractive and difficult to explore for pioneers and other immigrants, Amerindians could easily take refuge in the forest and strike back these early colons. But European diseases found their way through the forest and did have a tragic impact on them. Ameridians were not enslaved but were pushed back into the mainland and ignored during the 19th century. Some African slaves (called the maroons), as well as some prisoners later on, escaped and started establishing relations with the natives. Today, about 7 000 Amerindians live in French Guiana; they form 6 distinct ethnic groups (self described nations): the Wayanas, Wayapis, Kalinas, Arawaks, Palikours and Emerillons. Most of them now live in the National Park (natural protected area) but some live on the coast (fishermen) or in towns.

Amerindians have always been helpful to other populations, notably serving as guides in the rainforest. They still provide this service to researchers, tourists, patrol units and some individuals even became trainers for the Foreign Legion. More recently, researchers have started to work with them on the therapeutic properties of endemic plants.

Visit of French President Sarkozy in Camopi, 2008 © Wojazer/AFP



However, Amerindians face a lot of issues. First of all, although they are authorized to live, hunt, fish and build houses in the protected areas, they do not enjoy any property rights. This makes them entirely dependent on past and future decisions taken by public authorities, with no legal options to contest them. They have the status of French citizens but cannot always enjoy access to services considered as basic in other areas (drinkable water, healthcare, polling station, etc.). In addition, younger

generations are progressively losing their traditional marks of identity and realise that their situation prevents them from accessing certain advantages of modern life. In the recent years, problems such as recklessness, alcohol, drug problems and suicide have emerged (the suicide rate is particularly high among these ethnic groups, whereas it is generally not the case in French outermost regions).



The Creole culture is by far the most prominent feature of Guiana's society. It is a mix between Caribbean identity and Latin America's influence but with French cultural influences (although it historically developed in opposition to the French / white culture). The annual Cayenne carnival (see picture below) is a good illustration of this fusion of influences.

The Creole culture is a strongly and deeply structuring element for the Guianese population, in terms of society organisation and mindsets shaping. For example, it has a great influence on the economic sphere and on working environments. Due to the weight of slavery in history, a more or less explicit connection between the notions of work and forced labour still subsists today, although the situation has obviously changed. For example, middle management functions are particularly rejected since they are compared with overseers functions in colonial plantations. Providing services in certain service sectors (hotels and restaurants) can still be associated with submissiveness.

The Creole culture is a strongly and deeply structuring element for the Guianese population, in terms of society organisation and mindsets shaping. For example, it has a great influence on the economic sphere and on working

Labour unions in French Guiana, as in the French Antilles, are very strong and pugnacious, and regularly use a rhetoric based on these regions' colonial past. These elements can partly account for the underdevelopment of the private sector, as well as for the strength of the public sector. Creole populations tend to favour public or self-employed jobs (management being a delicate issue, hiring employees can be dismissed for non-economic reasons).

The successive waves of immigrations have been a challenge for the Creole identity. In extreme cases, some kind of conspiracy theory even emerged, stating that the government had organized these waves of immigration in order to weaken the weight of the Creole population within French Guiana's society and to challenge the social advantages obtained.

This is of course beyond logic, but reveals certain aspects of society in French Guiana. More reasonably, it appears that Creole Guianese tend to have good relationships with Haitians and Brazilians, whose culture is close to their own, although the distribution of work is often at the disadvantage of the latter, who are occasionally also accused of causing sanitary problems. Although they could also be accused of diverting social transfers, figures show that it is not the case. Immigrant populations seem not to know the French welfare system in details and, hence, not to call upon it. As for African immigrants coming from France mainland, they strangely seem not to be very welcome.

The last cultural key feature in French Guiana is the Asian immigration. Chinese immigration now dates back to ancient times, and these populations are now well integrated in the society. A significant part was born in French Guiana but since the birth rate for this community is low, the population is not growing significantly. Trade (import and retail) is the main sector of activity the Asian community is involved in. Almost 60% of grocery stores are owned by Guianese of Chinese origin, although these represent only 1% of the population. Unemployment is very low among Asian population, especially in comparison to the regional average (7,5% against 20%).



Hmong people from Asia.

Even if this community is concentrated in two towns (Cacao and Javouhey), Hmongs are also very well integrated. They constitute a community of about 15 000 persons working notably in the agriculture sector. They produce almost 80% of fresh fruits and vegetables consumed in French Guiana (about 600 hectares of cultivated areas). Hmongs now wish to produce organic food even though the environment is not auspicious for such cultivation, and these crops require more land as the method is less.

This community is very active in local socio-economic activities. For example, the Hmongs have built their proper road to link the national road and Cacao (see map page 10) as public authorities were not responsive enough. Recently, as Hmongs refugees' camps are closing in Thailand, proposals have been made by the French authorities to welcome new

2.3. Environment

Protected areas

The level of biodiversity in French Guiana is among world's highest, in terms of both flora and fauna. This is due to the presence of old-growth forests (i.e. ancient / primary forests). 5,500 plant species have been recorded, including more than a thousand trees, along with 700 species of birds, 177 species of mammals, over 500 fish species, of which 45% are endemic, and 109 species of amphibians. French Guiana hosts some famous endangered species as black caimans, pumas and jaguars, leatherback sea turtles, aras (specific Macaw), red-faced spider monkeys, etc.

Since 2007, the Amazonian forest located in the most remote part of the region is part of the Guiana Amazonian Park, and hence protected. Six additional natural reserves (such as regional parks) have been created in French Guiana, in order to protect this unique place for diversity in the EU. A total area of 41 000 square kilometres, nearly half of the territory, benefits from a specific environmental status.

The Guiana Amazonian Park is one of France's nine national parks. It is the largest of French and European national parks and one of the largest national parks in the world. The protected area covers some 20,300 square kilometres for the central area (where full protection is enforced) and 13,600 square kilometres for the secondary area. The overall protected area thus represents some 33,900 square kilometres of rain forest.

The first protected area was created in 1942 by the local governor but rapidly yielded to the national forest domain. Until 1989, numerous scientists pleaded for the creation of natural parks and reserves, in vain. Some areas and species began to be seriously threatened because of deforestation, gold mining and haunting.

The creation of the Amazonian Park in French Guiana was not easy since the project was (as were all former ones) badly perceived by the local population. The project's initial and main objective was to protect the environment and mainly to preserve the biodiversity in this part of French Guiana. As soon as the project started, this objective was confronted to economic activities (mainly related to gold mining), as well as to the population's (Ameridians' and Bushinenges' mainly) strong need for arable lands.

Land use in French Guiana, 2007



A long consultation process was conducted and new regulations concerning national parks came into force, along which parks' outer edges are now considered as areas of "sustainable development". As a consequence, French Guiana's national park, named "Amazonian Park of Guiana", is no longer strictly aiming at the preservation of nature and the protection of biodiversity. It is a multi-faceted tool that combines environmental conservation and sustainable development objectives and as such does not exclude economic activities.

The park's inner delimitations between the full protection area – "le Coeur du parc" – and the secondary area where accession is voluntary, as well as the setting of its rules, appear as a compromise among the different concerned stakeholders. For one hectare strictly protected in the

heart of the park, half of an hectare is dedicated to sustainable development. Some areas are dedicated to collective use (agriculture, hunting), notably by the various indigenous populations. Unanimity against gold mining was reached, since this activity is acknowledged by all to be responsible for critical damages to both nature and human health.

Mercury is indeed used to combine gold dust, which severely pollutes the environment. Fishes inhale and concentrate mercury and hence poison the local population. In some Amerindian villages, mercury levels in blood are often found to be above the level fixed by World Health Organisation as a critical threshold. Neurological tests have even detected anomalies in children and even sometimes physical malformations. Although only 3000 kilos of gold are officially produced in French Guiana each year (under strict production control procedures), the French border control authority estimates that 10 000 kilos are produced illegally. This potentially represents 12 tons of mercury dumped in the soil and water each year.

The environment and biodiversity in French Guiana nonetheless have a potential for economic returns. The economic valorisation of biodiversity (which includes the production of local plants) is embryonic. The development of this sector depends on the capacity of the local scientific community to "market" its knowledge of Guianese biodiversity, as well as on local actors' ability to attract foreign investors. These investors, coming from various possible fields (pharmaceuticals, biotech health, cosmetology, agro-food...) could exploit biodiversity resources and generate revenues in the region.

The issue of life patenting is also a crucial one. As regards the legal protection of biodiversity, EU and French regulation apply in French Guiana. Although overall highly protective, these regulations are sometimes ill-suited for this territory which is (by far) different from most EU regions. For example, whereas it is now impossible to go and fetch natural species samples in Brazil without permission (and without paying a set financial contribution), no such ban exists in French Guiana. As a consequence, numerous researchers come to the region in search of new natural extracts, and leave the territory with these samples without even informing local scientists and authorities. Both in terms of control and valorisation, this situation is critical.

Another promising path for the valorisation of biodiversity lies in carbon sequestration. Forests store carbon, and become carbon dioxide sinks when they are increasing in density or area. The potential role forests and forestry can play in sequestering carbon to reduce the accumulation of greenhouse gases in the atmosphere is now well recognized by scientists. However, the monetary value of this property and more generally the monetary environmental value of forests, is typically ignored. A French law adopted recently has underlined the need for the financial valorization of territories that contribute to carbon sequestration. Studies on French Guiana show that the rainforest can sequester between 0.5 and 1.5 tons of carbon per year and per hectare. With a total surface of 8 million hectares and a price of 17 Euros per ton (European Union Emissions Trading Scheme's average EU carbon price between 2005 and 2010), the expected financial returns would amount to 68 to 204 million Euros a year. Such an amount would of course be very welcome to support sustainable development projects and fight illegal gold mining in the forest.

Renewable Energies

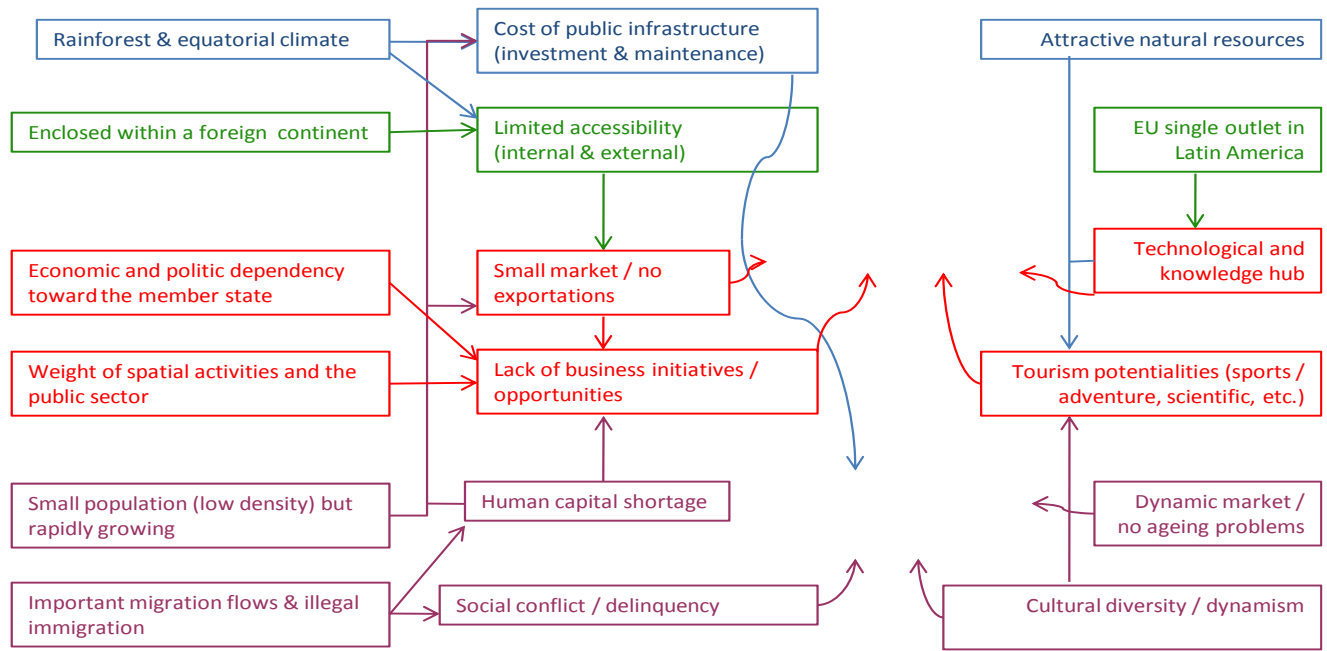
The geographical position and characteristics of French Guiana prevent the region from being connected to

European energy markets as well as to neighbouring countries' energy networks (which anyway do not cover for their own needs). Due to geographical constraints, especially forest inaccessibility, one cannot even speak of a single energy market at the 'regional' level. Indeed, 12 communal areas over 22 are not connected to the Guianese network and are subsequently heavily dependent on fossil fuels. The cost of electricity production is much higher in Guiana than on the European continent. Currently this cost is 3,9 higher in the region than the selling price, which is fixed by the public authorities (since electricity providing is a public service).

In French Guiana, 60% of the electricity comes from hydro-electric plants (115 MW) and there is still a potential to produce more by hydro-electric generation. In addition, solar energy (photovoltaic) could be a means to meet the needs of the population in isolated areas. Although projects were launched and are ongoing, this mode of energy generation is still insufficiently developed.

A third promising source of energy is biomass, as a result of forests exploitation. French Guiana produces about 2 MW per year from biomass derived from sawmill waste. Although French Guiana has extensive fuelwood resources, their value is not being fully realised at present. The process involves a proven and reliable energy conversion technology based on wood burning and the use of a steam cycle, which has been adapted to the conditions of French Guiana. The installations are capable of simultaneously producing electricity, heat and industrial air-conditioning using cogeneration or trigeneration processes. A fluidised bed cogeneration plant with a steam cycle, fuelled with 100 000 metric tons of wood per year, would produce 32 GWh/year of electricity (18 % of French Guiana's needs today) plus 65 GWh/year in power for air-conditioning. In addition, it is estimated that substituting the electric air conditioners in use today by new ones would reduce electricity consumption by 16 GWh/year.

All these projects are however threatened by the very recent prospects of oil resources. The company "Tullow Oil" claims to have made an "important new oil find" in an untapped region off the coasts of South America, more precisely the coasts of French Guiana. The oil explorer based its interest in the region on the fact that it geologically mirrors another, well across the Atlantic off the coast of Ghana, called Jubilee. Hence, once again, French Guiana's development might be threatened by the region's own natural resources...



Generalisation from case study

In many ways, French Guiana is representative of outermost regions' specificities. Its specific geographical characteristics (remoteness, tropical climate, etc.), historical background and socio-cultural features are very singular compared to most of EU regions.

The some growth constraints and opportunities are directly linked with these specificities, notably:

- Additional costs (for the private but also public sector i.e. transport and telecom infrastructures) such as transport costs, lack of economies of scale (small market and difficulties to export) or continuous maintenance of equipments (humidity, rust, etc.);
- Weight of the public sector and traditional activities;
- A unique biodiversity in EU which is attractive for researchers and tourists but which requires specific attention.

However some issues are very specific to this region notably because it is not an island but a territory enclosed in Latin America. Also this region faces a demographic explosion Demographic (Mayotte could). Also, it can be stated that French Guiana cannot develop its tourism industry such as the Canary Islands, Madeira or Saint Barthelémy which have a much better potential in terms of seaside tourism.

As regards GEOSPECS territories, French Guiana case study is particularly relevant when considering sparsely populated areas and external border regions.

Because of its very low population density (population which is sometimes inaccessible because of the rainforest), this regions faces specific issues, notably problems of access to public services. To this respect, ICT have been successfully used to improve healthcare services in the most remote areas. However, ICT cannot solve every problem on its own, especially the biggest challenge for French Guiana that is to say education. Production and distribution of energy is also an important since a standard grid cannot provide a full coverage of the territory (bigger than Scotland and covered by a protected rainforest). Solutions here consist in small production units of renewable energy.

As the territory is entirely delimited by non EU borders, regional exchanges and flows, are seriously hindered by cultural, social and economic cross-border contrasts and legal restrictions (standards incompatibility, institutional and administrative procedures, etc.). On the other hand, public authorities have notably to face problems of illegal immigration and the development of the informal economy.

Annex 39: additional case Tatra mountains

The different values of the Tatra National Parks

Introduction

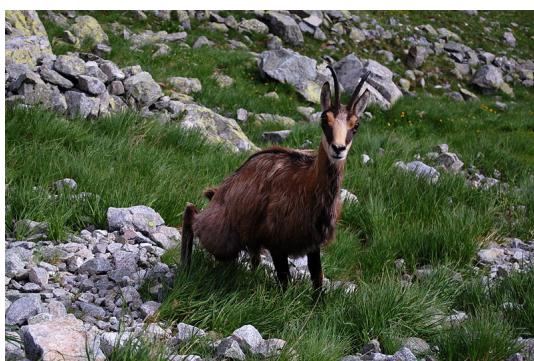
The Tatra Mountains are the highest part of the Carpathians, situated on the border between Poland and Slovakia. Some four fifths of the Tatra Mountains (which altogether cover about 750km²) lie in Slovakia.

The mountain range is almost entirely covered by two national parks: The Tatra National Park (*Tatrzański Park Narodowy*) in Poland; and the Tatra National Park (*Tatranský národný park*) in Slovakia, which is commonly abbreviated as TANAP. Additionally, the whole mountain range received the status of UNESCO Biosphere Reserve in November 1992.



As in many mountain areas, the sharp altitudinal gradients in temperature and precipitation lead to high levels of habitat and species diversity: "A characteristic feature of the Tatras is the tremendous differentiation of nature, linked to great diversity of geological structure and relief" (Taczanowska, 2004). There are many endemic or relict species including a Tatra subspecies of chamois and marmot, and important populations of bear and lynx (Dudley, 2011). Over 1.400 species of vascular plants have been counted on the Slovakian side of the mountain range, 39 of which are endemic to the Tatras (Puchala, 2011).

Source: Global Transboundary Conservation Network;
<http://www.tbcs-net/page.php?id=57>



*Chamois in the Tatra Mountains.
Picture taken by: Marcin Białek*

In Poland, the Tatra National Park has been in existence since 1954; TANAP (in Slovakia) was established in 1949. The first calls for the protection of the Tatras were already voiced at the end of the 19th century, but lack of legislation and opposition of forest-owners and hunters stood in the way of more concrete plans. The area suffered degradation of its forest and mineral resources during the Second World War, and it was only then that

the first formal "State Protected National Reserve" was realized in

Slovakia (Travis, 2011). However, there is currently no valid management plan for TANAP and no officially approved zoning – the previous plan having been valid only until 2000 (Puchala, 2011).

Incidentally, the area was the first anywhere to be proposed for a transboundary “peace park”. The Krakow Treaty of 1925 between Czechoslovakia and Poland proposed multiple peace parks between the nations to resolve a highly contentious border dispute. However, by the time the two national parks were established, the Waterton-Glacier International Peace Park had been declared in 1932 between the USA and Canada (Hsiao, 2010).

Cross-border cooperation

The collaboration between the two national parks seems to be working well, the relationship being described as “good communication and cooperation” (Svajda, 2007) or “good working relations between countries in the transition from state communism to a different economy” (Dudley, 2011). There is a common web site “GEO Portal TATRY” (www.geoportaltatry.pl) where maps of the entire area can be found (GIS layers: forest, roads, rivers,). A bilingual magazine about both national parks is periodically published. Polish children have taken part in a Junior Ranger Camp in the Slovakian Tatra National park. The administrations of both parks organize meetings with their colleagues to address joint problems (Svajda, 2007).

Nevertheless, it may be noteworthy that an abundance of sources addresses the Tatra national parks, but hardly any source mentions the Tatra biosphere reserve, i.e. the structure that encompasses both areas and should thus be a forum for cross-border cooperation.

On a broader level (considering not only the national parks), the *Euroregion Tatry* has been in existence since 1994, and has declared its intention to create an EGTC (European Grouping of Territorial Cooperation).

Value of the parks from different perspectives

Tourism is the most important economic activity for the area. In Poland, there are over 3 million visitors a year, each paying an entrance fee. The larger area of the Slovak national park receives about 5 million visitors a year, but no entrance fee is required here (Dudley, 2011). Walking and skiing are important activities, and the lower parts of the Tatra Mountains host a number of tourist resorts and hotels in both countries. The TANAP (in Slovakia) for instance offers 600km of hiking trails.

This important role of tourism was also reflected in a valuation of ecosystem services that has been undertaken for the Tatra National Park in Poland by Getzner (2009). The valuation may be similar for ecosystem

	Lower bound of value	Reasonable mean value	Upper bound of value
Values in thousands EUR per year			
<i>Forest products</i>			
Timber	0	0	0
Non-timber products	n.a.	n.a.	n.a.
<i>Water provision, supply</i>	2,585	3,700	5,280
<i>Water retention / flood protection / erosion control</i>	363	726	862
<i>Carbon sink, climate regulation, CO2 sequestration</i>	56	91	240
<i>Medicinal resources</i>	n.a.	n.a.	n.a.
<i>Agricultural products</i>			
Cattle, grazing	0	0	0
Grains, food production	0	0	0
<i>Fishing</i>	0	0	0
<i>Hunting</i>	0	0	0
<i>Recreation (based on total travel cost of visitors)</i>	435,000	519,000	601,000
<i>[Recreation (based on transport costs, entry fee, museum)]</i>	[18,000]	[21,000]	[24,000]
Rough estimate of use values	438,004	523,517	607,382
<i>Biodiversity conservation values</i>			
Existence values	65,958	92,800	119,387
Option / quasi-option values	35,040	49,300	63,424
Bequest values	54,302	76,400	98,289
<i>Cultural values</i>	n.a.	n.a.	n.a.
Rough estimate of non-use values	155,300	218,500	281,100
Rough estimate of TEV (Total Economic Value)	593,304	742,017	888,482

services on the Slovakian side, but no study has so far tried to quantify these.

Getzner (2009) attempted a rough estimate of the Total Economic Value of the Tatra National Park and concluded a figure of about €740 million annually, including €519 million for "recreational value". This figure is followed by €218 million for "non-use value", and (only) €3.7 million for the service of water provision, and even less for water retention and climate regulation.

Even though the area was formerly a major source of timber, there is nowadays no commercial harvesting of timber (selective logging only takes place in the buffer zones of the national park). For this reason, the value for this "extractive" ecosystem service is 0 – although it is one of the main services from many other ecosystems. The same is true for non-timber forest products (no commercial use, and it is even prohibited in the core zone of the park). Agricultural products from the area are negligible, as sheep grazing is mainly for ecological management purposes (and there are no other agricultural uses). Hunting is not allowed in the park either.

The figure for water provision was calculated using the average price for water in Poland, and considering that the 52 springs within the park provide fresh water, of which about 5.5 million m³ are annually used by Zakopane and other adjacent communities.

As for the recreational value: The park earns about PLN 10 million a year from ticket sales and other fees (such as parking, cave visits...), that is used for park management. However, the "recreational value" of the park was calculated differently: a survey was carried out to estimate the average daily expenditure of visitors, which was then aggregated to the total number of visitors.

The non-use value was estimated on the basis of a Willingness-To-Pay survey among visitors, aggregating this to the population of Poland.

Conflicts

Unsurprisingly, this high touristic use of such a species-rich area induces conflicts.

The Tatras are one of the most visited places of central Europe, partly due to their easy accessibility. Zakopane is traditionally Poland's premier mountain resort, and one of the country's most popular holiday destinations, in winter for skiing and in summer for hiking. Even though the Tatra National Park covers only 0.07% of the area of Poland, the visitor numbers (3 million) are equivalent to 8% of the country's population (Euroregion Karpacki, n.d.). The ensuing problems are over-development, trampling and erosion (Dudley, 2011). In Slovakia, the carrying capacity of TANAP is estimated to be between 1 and 1.4 million tourists annually, which is far exceeded (Puchala, 2011). Another study came to similar conclusions: "Computer-based simulation models were run for the whole National Park with all its 17 entry points over a 14 month period. These studies led to an optimal daily visitor limit of 10,000 persons being set for the National Park. However, 23,000 visitors per day were already being recorded, and as a result of political pressures the compromise capacity of 20,000 visitors per day was set" (Travis, 2011).



Czarny Staw in the High Tatra (Poland).

Picture taken by: Ogrodnik

On the Slovakian side, only a few mechanisms to regulate visitors have been put in place. The Polish Tatra National Park, however, implements a rather strict regime of visitor management. Apart from levying entrance fees, access to certain areas is restricted by temporal and spatial bans,

including rules for hiking, climbing, mountain biking, skiing and accessing caves. Sports competitions and paragliding are prohibited (Getzner, 2009). The park management claims to operate a “zero tolerance policy” against visitors infringing park regulations (such as skiing off track or ignoring temporal access bans).

The future of touristic development in the parks is controversial. Slovakia has, in recent years, been heavily criticized for its stance on infrastructure development in TANAP. WWF condemns a proposal to rezone the Park that would open some of the most ecologically sensitive areas to developers of ski resorts (WWF, 2010). It fears that the result of the uncontrolled expansion of tourist facilities could be the loss of TANAP’s international recognition as a national park by IUCN (International Union for Conservation of Nature). However, a spokesman for the Slovak Ministry of Environment is quoted as saying that losing international recognition as a national park “would not be good for public relations and would be a shame, but life in Tatras National Park would go on” (WWF, 2008).

In addition, the reactions to a major windstorm in November 2004 did not meet the approval of environmental organizations either. The windstorm caused dramatic changes of land cover in the Tatra Mountains, destroying more than 12,000 ha of forest and principally affected the habitat structure in TANAP (Kopecká & Nováček, 2009), also greatly affecting the landscape and the views both within the mountains and from the plains below. An international delegation sent by the IUCN recommended that the core area of the park be left untouched. However, the recommendations have not been followed and development of tourist infrastructure has moved forward even partly including the core area of the park. This resulted in an official warning from the IUCN (WWF, 2008).

Conclusion

For many protected areas, tourism is said to be the main potential for income (as other economic activities are often strongly restricted in protected areas). As this case study shows, however, the capacity for tourism is finite. If the number of tourists continually exceeds the “carrying capacity” of the protected area, the pressures from human activity (erosion, air and noise pollution, waste generation, tourist infrastructures such as hotels, roads, ski runs) risk decreases in the natural value of the area.

Annex 40: Additional case West Stara Planina

Biodiversity as a factor for development in the West Stara Planina

Is the mountainous terrain and the border between two states in the West Stara Planina region associated with high levels of biodiversity? If so, what development opportunities does biodiversity offer? Are they exploited at the moment? (If not, do mountainous terrain and border hinder exploitation?)

1) The Area

The West Stara Planina (West Balkan) mountains are situated on the border between Bulgaria and Serbia. The region covers a total area of 4043 km². About 60% of the region is covered in forests and the rest is farmland, more particularly grasslands (WWF & EFNCP, 2008). The mountainous area is characterized by exceptional biological diversity: For instance, the flora counts more than 2.000 species of higher plants, among which are 12 Bulgarian and 79 Balkan endemics (EFNCP, 2011).

These high levels of biodiversity were partly induced by historic processes: Transhumance was for centuries the traditional system of livestock production in the Balkan Peninsula. Livestock and herders moved seasonally between the northern and the southern parts of the Peninsula. Once State borders stopped these large movements, these transhumant movements were reorganized between lower and higher elevations. Forests were progressively cleared in mountain areas leaving the place for species-rich grasslands (Mileva, 2007).

Many of the activities in the area rely (directly or indirectly) on biodiversity. For Bulgaria, Mileva has found: "Urban areas benefit from the (re)development of the manufacturing industry and the expansion of services, while rural areas are confronted with strong dependence on agriculture, fishing, forestry, mining and tourism" (Mileva, 2007). All of the listed activities – except for mining – need biodiversity.

From a socio-economic perspective the region is classified as a less-developed area both in Bulgaria and in Serbia. This is linked to a significant decrease of population in recent years. In Bulgaria the overall annual decrease of population numbers in mountainous settlements is around 1,7%, and the Bulgarian part of West Stara Planina is singled out as an area with extremely old-age structure, with 25% of population aged over 60 (Mladenov, 2011). In Serbia, the number of inhabitants declined dramatically over the last 50 years from slightly over 30,000 in 1948 to 5,000 in 2002 (Ivanković, 2009).

2) Geographic specificity as a factor accounting for high levels of biodiversity

The fact that *mountain areas* are hotspots for biodiversity has been repeated often throughout literature – main factors being "the compression of thermal and climatic zones over relatively short distances,

steep slopes, the diversity of aspects, variations in geology and soils, and the fragmentation of mountain terrain” (EEA, 2010). This is undoubtedly also true for the West Stara Planina: The rich biodiversity is determined by the dynamic geological past and the resulting rich geo-diversity, leading to a variety of habitats, as well as by the preserved forest vegetation, creating habitats to a large number of species. The changing altitude entails a variation of vegetation, leading to greater biodiversity. Because of the geographic isolation and the favorable conditions, the mountain has kept many relic species, and has developed endemics (Papazova, 2008).

The *border* between the two states definitely also played a role in upkeeping high levels of biodiversity. The border areas between Bulgaria and Serbia have been “only slightly affected by anthropogenic activities due to the guarded regime in the border zones that existed until recently” (Yordanova & Mateeva, 2011). While these peripheral regions have remained to a great extent economically underdeveloped, they could now profit from their rich natural resource potential by cooperation between the countries, for instance in the tourism field (Yordanova & Mateeva, 2011).

3) Biodiversity as a factor for development

There are many different ways in which biodiversity contributes to development:

a) Ecosystem services:

The ecosystem West Stara Planina delivers a variety of services. It is a source of clean mountain and mineral water used by farmers (animals, irrigation), residents (drinking, household needs), businesses (inputs, bottling), and health centres (balneotherapy) in the region and neighbouring areas. It purifies water and air, and regulates climate, making the region a popular destination for tourism, recreation, and treatment. Some of country’s most popular natural attractions (Belogradchik Rocks, Iskar Gorge), and a number of peaks, waterfalls, and caves are situated there, enhancing cultural services of the ecosystem. The ecosystem also maintains soil quality and the widespread grasslands act as carbon sinks (Bachev, 2010).

However, apart from attracting tourists (see below), these services cannot be quantified. They only indirectly benefit economic development. In addition, degradation of the ecosystem is an issue: land abandonment, inappropriate agro-techniques, deficiency of anti-erosion measures, and uncontrolled deforestation lead to erosion, and air, soil, and water pollution affect the beauty of scenery (Bachev, 2010).

b) Agriculture

About one third of the area is farmland, of which in turn 70 % are meadows and pastures. Most of the upland is classified as *High Nature Value* land (EFNCP, 2011).

The Stara Planina region is historically rich in agrobiodiversity, particularly indigenous varieties of sheep, goats and cattle which are adapted to the harsh conditions of the high grasslands. The meat and dairy products of those breeds are part of the tradition and have very high value because of their excellent nutritional qualities. Traditional grazing patterns of these indigenous livestock varieties are, in turn, important to the wild biodiversity of these grasslands (Ivanov, 2008). Until about 50 years ago, the indigenous livestock dominated the landscape in large flocks that moved seasonally between the lowlands and highlands. However, in recent decades many people have either left the area or shifted towards more intensive livestock-rearing of introduced higher-producing breeds. Communism strongly discouraged traditional activities and lifestyles, and many peasants were turned into industrial workers. Nowadays there is little left of the old transhumance traditions. In the Serbian Stara Planina Nature Park, numbers of sheep, cattle and poultry decreased between 65% and 95% from 1975 to 1990 (Ivanković, 2009).

Only a few very small herds of the pure indigenous breeds remain, mostly on isolated farms owned by old farmers who retain them because of emotional attachment or because they cannot afford to “upgrade” to the exotic varieties. Because the introduced breeds are unable to tolerate the harsh conditions of transhumance grazing, they are kept at the lower elevations near the larger villages. The result has been overgrazing in these areas and abandonment of highland pasture – in the highland pastures, valuable grassland species are thus replaced by tree species. The absence of livestock flocks in the high pastures has also led to the decline, and in some cases disappearance, of birds of prey and other predators (Ivanov, 2008).

A targeted marketing for the products of indigenous livestock as quality products could help turn this situation around –making available income to the farmers and at the same time preserving grassland species that depend on grazing.

c) Forestry

Over 60 % of the Western Stara Planina is forested, with beech forest prevailing (EFNCP, 2011). Forests on both sides of the border are in good condition. In Bulgaria there are 20,000 hectares of highly valuable 100-year old beech forests (REC, n.d.). A sustainable strategy for the exploitation of these resources can create income without constraining future use of timber resources.

d) Hunting and forms of non-timber forest product exploitation

A great variety of wild fruits, herbs, chestnuts, mushrooms, birds, animals, and fish are picked up or hunted by population and visitors. Some are commercially gathered for processing and sales bringing additional incomes for 20% of population (Bachev, 2010).

Hunting tourism has great potential for development (Stankov, Stojanović, Dragić, & Arsenović, 2011). There are different opinions as to whether hunting tourism is a sustainable form of development, but in any case the mountains of the area are home to many game species, from

deer to hogs, from grouse to hares – which could attract a variety of international tourists.

c) Tourism

West Stara planina is an area where it is possible to develop ecotourism. The preserved natural values of these mountains form a significant part of a potential ecotourism offer. In addition, social characteristics of this area also represent an attractive basis for the development of ecotourism (Stankov, Stojanović, Dragić, & Arsenović, 2011).

However, current plans for tourism development do not focus much on ecotourism but on winter sports and mass tourism. In Serbia, significant investments from the National Investment Plan since 2006 have been concentrating on creating a modern winter tourist centre of mass tourism (Stankov, Stojanović, Dragić, & Arsenović, 2011). With the construction of the system of lifts and ski trails, as well as with the accommodation facilities and other infrastructure, Stara Planina will soon become one of the largest and most important ski centres in Serbia. Similar plans exist for the construction of a ski resort near Kom peak on the Bulgarian side of the mountain. Both areas are in territories without significant snowfall and have triggered protests by civil society in Bulgaria and Serbia (Papazova, 2008).

Even though this type of tourism also relies on a geographic specificity – mountainous terrain –it does not make use of, and even inhibits, biodiversity. In addition, the image of an area affects the type of visitors that arrive. If the image of this mountain is created as a centre of mass winter tourism, the development of ecotourism will be restricted (Stankov, Stojanović, Dragić, & Arsenović, 2011).

d) Protected areas

Admittedly, protected areas are in the first instance a measure for the protection of biodiversity and only in the second instance a factor for development. However, within a coherent marketing campaign, they can contribute to the attraction of tourists. In addition, they preserve natural resources, thus permitting development for future generations.

On the Serbian side of the mountain, the Stara Planina Nature Park (IUCN category V) was established in 1997, encompassing a territory of 1.143,3 km² (which means it comprises almost the total surface of Stara planina in Serbia, namely 1.250 km²) (Ivanković, 2009). In 1996 the Governments of Bulgaria and Serbia signed a memorandum of agreement to work towards the creation of a trans-boundary Stara Planina Peace Park. While the establishment of the trans-boundary park has not yet been achieved, active cross-border programmes supporting interaction among communities and local governments are underway (Ivanov, 2008).

Until now, local people saw protected areas as goods that have little economic value. Generally, these areas have been seen as areas with numerous limitations for use. Based on recognition of potential profit from

natural resources, it is necessary to encourage local people to get involved in the protection process (Stankov, Stojanović, Dragić, & Arsenović, 2011).

4) Geographic specificity as an obstacle for biodiversity-focussed development strategies?

Both the mountains and the border constrain potentials in some ways (however, it has to be kept in mind that stronger constraints derive from the historic decline within – and in the aftermath of – communist states).

Tourism: West Stara Planina has long received less tourist flows than other parts of Serbia or Bulgaria due to its isolated border position, but also due to inadequate transport connections in many parts of the mountain and “general backwardness of the mountain area” (Stankov, Stojanović, Dragić, & Arsenović, 2011). Although being a constraint for development, this has also permitted the area to guard its natural characteristics.

Agriculture: Reaping profits from agricultural activity is more difficult in mountain areas. Good quality infrastructure is lacking to connect producers and markets and to bring products to market (De Rijck & Erg, 2006). In mountain areas in the West Balkan, plots are typically very small and ownership is often unclear. The statistical data indicates that the land used by a mountain farm situated on rugged terrain is 3 times less than the average land used per farm for the country. This fragmentation of the agricultural lands leads to much higher production costs (Mileva, 2007).

5) Is West Stara Planina exploiting its potential?

Overall, the biodiversity of the area offers possible opportunities of development that are currently under-exploited. The reasons for this underexploitation, however, are not primarily linked to geographic specificities; they are rather to be sought in the historic development of the whole peninsula and the particularities of an economy in transition. Of course, strategies focussing on biodiversity are by no means the only paths to development. Quite the contrary, it is one element that should be valorised more vigorously, among many others (opportunities for the exploitation of renewable energies jump to mind, for instance).

A better promotion of tourism opportunities – especially sustainable tourism – may go a long way in enhancing development of the area – especially if it takes into account the particularities that the area was once famous for (products from indigenous livestock breeds, also handicrafts, etc).

In Bulgaria, the National Ecotourism Strategy and Action Plan (2004) makes a first step in this direction, but its successful implementation

depends to an exceptional degree on the initiative of local authorities, national, regional and local tourism associations, protected area and cultural site managers, NGOs, and private businesses (Mileva, 2007).

A number of projects - funded by various international actors - are aiming to assist the countries in making better use of their environmental capital. For example, the *Transitional Agriculture Reform Project*, a joint project of the International Bank for Reconstruction and Development (IBRD) and the Global Environment Facility (GEF), aims to assist the Government of the Republic of Serbia in establishing an efficient system for providing support to the agri-food sector. The project emphasises support for sustainable rural tourism, and for the development of high value products based on locally adapted livestock and crop varieties. The GEF also supports the project *Tourist Trail West Balkan – Ecotourism for the Benefit of People and Nature*, which aims to protect the globally significant biodiversity of West Stara Planina through its interpretation, training the local community and visitors. The Regional Environmental Center for Central and Eastern Europe (REC) since 2002 manages a project on preserving local animal diversity around the Stara Planina Mountain Area.

A number of initiatives also focus the *cross-border perspective* of exploiting natural capital. One player, the *Regional Environmental Reconstruction Programme (REReP) for South Eastern Europe*, promotes the exchange of experience on the management of natural resources in West Stara Planina. The project found, for instance, that there are better conditions in Bulgaria for the development of environmentally friendly tourism and crafts, whereas in the Serbian part there are better conditions for the development of environmentally friendly agriculture. The mutual transfer of good practices and experience gathered on either side were seen as a good tool for cooperation (REReP, 2003). For instance, a transboundary working group on sustainable agriculture was established which organized meetings and trainings on organic farming, while on the other hand trainings on the principles of eco-tourism were held (REC, 2007). The project was finished in 2007, and an overall positive conclusion was drawn: “the project empowered local stakeholders to approach strategically their aspirations by guiding them through the whole cycle from planning to final implementation. Through this also the long-term sustainability of results is better ensured by having a strong local ownership in the whole process and the capacities of all involved strengthened to best fulfil their responsibilities”. On top of that: “One of the major results of the project was that it served as a unifying factor, getting together local authorities not only in a trans-boundary context but in a regional context as well” (REC, 2007). These first attempts at cooperation may even have contributed to the establishment of a formalized cross-border structure, the *Euroregion Stara Planina*. It was set up in 2006 with the purpose of implementing cooperation in different fields, among which the environment. The *Strategy for Development*

contains several programmes, among which one to “create joint tourist products, based on biodiversity, the uniqueness of the natural and cultural values of West Stara Planina”, one to “design a transboundary Biosphere Reserve Stara Planina”, and another one to “raise awareness on the importance of preserving and promoting the existing natural values of Stara planina” (Euroregion Stara Planina, 2007).

These initiatives are certainly a good first step, but in the long run, the economic vitality of these areas will probably depend on whether the population embraces the natural capital of the area as a valuable resource to be protected and to be put to use in different ways.

Annex 41: Additional case Saaremaa

Saaremaa is the biggest Estonian island with a total area of 2,673 km² and with a population of approximately 40,000 inhabitants. The capital of the island is Kuressaare, which has about 16,122 inhabitants.



Saaremaa is located in the centre of the Baltic Sea region. **It is a popular tourist destination, with over 250,000 visitors per year, and frequent repeat visits by 35% of foreign and 95% of domestic tourists. The social environment is characterized by a homogeneous local population composition and there are no major strains on either social or national basis. The average islander is well educated and young.** After the university cities of Tallinn and Tartu, the percentage of the population with higher education is the highest on Saaremaa. The great majority of the inhabitants are able to communicate in a foreign language. The level of crime is 3 - 4 times lower than in Tallinn or in Estonia on the whole.⁴⁰⁹ Production costs are much lower in Saaremaa compared to those in the West European countries and also in Tallinn. Saaremaa's main economic sectors are agriculture, fishery, the food industry and tourism.

There are three main islands to the west of Estonia, namely Saaremaa, Muhu (the smaller island between Saaremaa and mainland Estonia) and Hiiumaa (the second largest island to the north of Saaremaa). All three islands are linked to the mainland by ferry connections, while Saaremaa and Muhu are connected by a 3.8 km long bridge. The links between Saaremaa and Hiiumaa are infrequent with the ferry operating every

⁴⁰⁹ http://www.saaremaa.ee/index.php?option=com_content&view=article&id=210&Itemid=271&lang=en

other day and the crossing takes 65 minutes. The trips are effected daily during the summer season.

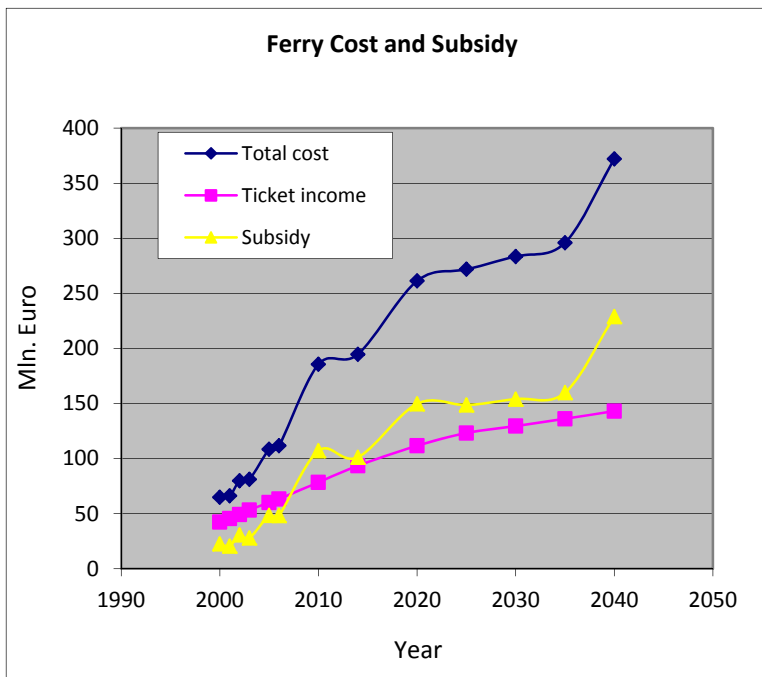
The body of water separating Muhu Island from mainland Estonia is the Suur Strait, which extends 7-8 km and reaches a depth of 24 m. The ferry connections between Saaremaa and the mainland are regular. The boats operate hourly from 5am till 11pm, with the crossing taking 30 minutes. Often, during the winter time it is possible to drive to Saaremaa from the mainland using an ice road between the mainland and Muhu or between Saaremaa and the island of Hiiumaa.

Since 1997, a task group set up by the Saaremaa county government has been studying the possibilities to improve the connection with mainland. In this process, three main strategic choices were identified:

1. Ferry connection with planned improvements;
2. Ferry connection with an extensively improved service level;
3. Fixed link (bridge or a tunnel).

An economic analysis compared the continuation of ferry traffic and various bridge options, proceeding from the costs and benefits of road users and the society. This analysis, which is based on a time horizon for the period until 2040, obtained results as summarized below.

Fixed link construction costs, Mln. Euro			
Technical solution	A bridge between Virtsu and Kuivastu parallel to the ferry route	A bridge from Virtsu to Võiküla that passes the islet of Viirelaid from the North	A shore-to-shore tunnel from Virtsu to Võiküla
Cable stayed bridge	193	153	
Cantilever bridge	185	147	
Drill and Blast type of rock tunnel			295
Bored type of tunnel			327



According to the economic analysis, the ferry line will prove to be more expensive by the end of 2040 than the most advantageous bridge options. The total cost of ferry operations in permanent prices grows much more than the revenue received from ticket sales. As a result, the state subsidy of the ferry line exhibits continuous growth.

2. Objectives and Expected Results

The Saaremaa Fixed Link project aims at improving the east-west transport corridor with emphasis on regional traffic in Estonia.

The objectives that the Government of the Republic of Estonia and Estonian Road Administration (ERA) expect the bridge to achieve are:

- To ensure the sustainable development of Saaremaa;
- To ensure the sustainable and environmentally sound mobility of persons and goods, offer high-quality transport infrastructure on acceptable economic terms and facilitate a smooth movement of passengers and goods between Saaremaa and mainland;
- To establish and develop the connections, key links and interconnections, to eliminate bottlenecks, fill in missing sections and complete major routes;
- To establish and develop infrastructure for access to the transportation network, making it possible to link islands and peripheral regions with the more developed regions in Estonia;

- To have an optimum combination and integration of the various modes of transport;
- To improve safety and network reliability;
- To reduce the travelling time and user operating costs.

The main arguments of the benefits of the presence of a bridge link above focus on the infrastructural outcomes of the bridge rather than the social and economic implications of the fixed link. Other benefits include the time savings for existing and new road users crossing the Suur Strait, the cost savings from the ferry subsidization, the reduction in CO₂ emissions from ferry operations, improved safety and reduced transport costs for companies operating in Saaremaa and residents of the island.

Residents expect that there will be a rapid increase in traffic and in the number of people crossing the Suur Strait, there will be no more waiting at the ports and no need to plan travelling according to the ferry schedule, large time savings, pollution reduction, a more stable connection with the mainland as ferry schedules are often interrupted due to difficult weather or ice conditions. The bridge is also expected to boost economic activity on the island. Worries that the island may lose its uniqueness and that security on the island may be compromised have also been expressed. Saaremaa is a calm and safe place for living and it has one of the lowest criminal offence rates in Estonia. The local inhabitants and summer cottage owners in Saaremaa believed that the growing number of tourists visiting the island will possible increase in criminal offences on the island. In addition, there is the concern of the loss of the enjoyable experience of using the ferry and some environmental considerations of the impact of the bridge construction.

Due to the current relatively low level of accessibility of the island, the group most interested in a fixed link are the residents of Saaremaa and the mainlanders who need to cross to Saaremaa. Passengers, who cross the Suur Strait on a weekly basis either for work, family or property related reasons account for about half of the current ferry passengers. This is evidenced by the results of a public opinion poll conducted by Turu-uuringud AS⁴¹⁰, which telephone-interviewed 500 residents on the island. The survey data indicates that 89% of respondents hope for the further development of the tourist industry as a consequence of the bridge project. Tourism already plays an important role for the island's economy. The tourism industry attracts different groups including bird

⁴¹⁰ Turu-uuringute AS is an independent research company locating in Tallinn, that has been operating in the Estonian market since 1994.

watchers, hunting tourists, people interested in ethnology, visitors to the Kuressaare sanatorium for mud treatment and bikers. The tourist high season is from May to August. The island is interested in expanding the health and conference tourism industry as well as in other undertakings that would enable an extension of the tourist season and reduce the seasonality of the sector.

85% of respondents pointed to new opportunities for business, 80% suggested that the islanders will benefit from new employment opportunities. This may reflect a number of considerations. Companies which have activities outside Saaremaa and which are actively involved in importing and exporting activities will benefit from the planned fixed link. A fixed link is expected to reduce transport costs and thus imply more trade and higher production, which will improve the competitive advantage of business in Saaremaa. In general, reduced cost and easier access to markets should be conducive to increasing employment possibilities for the residents of Saaremaa, either within the territory or outside of it. Most likely, the number of jobs created within Saaremaa as a result of the fixed link will be in the service sector, especially tourism, as the increased number of visitors offer good development opportunities for supporting local retail and service companies.

In general, the construction of a bridge linking the island with the mainland finds support with the islanders, with 85% of respondents in favor and 10% who are against. Development of the transport system is a matter of high importance for Saaremaa due to the advantageous geographical location of the island. People in Saaremaa believe that it will increase the role of the island in the national economic environment and in the transport scheme of the Baltic Sea region and allow them to better contribute to the national and European economy.

A number of organisations, such as Bankwatch's⁴¹¹ member group Estonian Green Movement - FoE, as well as several other Estonian Non-Governmental Organizations, are however opposing the project. One of their arguments is that the project is far too expensive for a small country like Estonia. On the basis of preliminary estimates for construction costs, it would appear that the Saaremaa bridge project would be the largest investment ever carried out in Estonia and would be possible for the government to carry out only with the support of large amounts of EU Cohesion Fund and/or European Regional Development Fund co-financing.

⁴¹¹ CEE Bankwatch Network is an international non-governmental organisation (NGO) with member organisations from countries across central and eastern Europe (CEE). Bankwatch was formally set up in 1995 and has become one of the strongest networks of environmental NGOs in central and eastern Europe.

The money could be used to more sensibly serve the island's development. Improving the existing ferry service would cost just a fraction of building the bridge.

Another reason which is cited against the project is that due to very thin soil coverage, the island's ecosystems are extremely vulnerable. The bridge route would have a significant impact on birds and sea mammals and will conflict with an important bird area that is designated as a Natura 2000 site. Constructing a bridge to the island would significantly increase the volume of tourists to the island, putting additional pressure on Saaremaa's ecosystems. Only a few years after opening of the fixed link the traffic is expected to be twice the current level, and by 2040, it is expected to increase to almost four times this amount. The site of the potential bridge lies inside the large Väinameri Important Bird Area. During the migration period more than 2 million birds fly over the Suur Strait. Protected birds which feature in the EU's Bird Directive annex I, have been found in the area. The Suur Strait is also rather shallow and the bridge could disturb the strait's tidal flows. The construction period would also add another environmental threat by impacting on seabed biota. Seabed biota have never been studied in the site. In such shallow waters the bridge may also impact fish fauna (particularly on fish migration).

Aare-Maldus Uustalu, a professor at Tallinn Technical University and logistics specialist Enno Lend, dean of the Tallinn College of Engineering argued that the government should think about implementing a fleet of newer, faster and smaller ferries for the island routes and making departures more frequent. The bulky and slow vessels that are currently being used require too much loading time. *"The money that's going to be spent on the Saaremaa bridge should be invested in the development of shipping - not in concrete,"* Lend stressed. He adds, *"I'm not against a bridge if the people of Saaremaa so desire it, but I would like to see a complex approach and detailed surveys before any decision is made."* The financial burden argument is disputed by Tiina Kimmel from the Estonian National Road Administration. He hopes that this can be countered through the use of loans or EU aid programs⁴¹².

Research, completed by business consultants PricewaterhouseCoopers in March 2001⁴¹³, refers to the famous bridge between Copenhagen, Denmark and Malmo, Sweden as a caution. This link failed to boost traffic

⁴¹² The Baltic Times, "[Debates deepen around Saaremaa bridge project](#)", Mar 14, 2002, Aleksei Gunter.

⁴¹³ Saaremaa Fixed Link Final Report, PricewaterhouseCoopers, March 2001

between the two countries to the volume expected because ferry companies lowered ticket prices.

The experience of the Scandinavian bridge project has inspired opponents of the Saaremaa bridge. *"It's caused huge losses. To break even, the Danes need tolls, and they scare potential users away. And this in the heart of the wealthy Scandinavia,"* wrote Priit Hobemagi, editor-in-chief of the daily Eesti Päevaleht. *"Saaremaa today is a dead-end from which there are not many places to go. Estonians and tourists can get along fine with the ferry line,"* he wrote.⁴¹⁴

The debate about the Saaremaa Bridge is still alive and does not seem to be finding any resolution at this time. It is furthermore important to highlight the fact that this debate is going on within the context of a number of other initiatives which could be conducive to the development of the region. Among the more relevant of these are:

1. Linking Gotland-Ventspils-Saaremaa for sustainable development

The GoveSa Link project supports the establishment of viable transportation links between the three regions of Gotland, Ventspils and Saaremaa, and also optimizes the current transport conditions. By providing enhanced accessibility to the joint region, new opportunities would be opened to develop sectors such as tourism and trade.

2. Development strategy for fisheries area of Saaremaa for 2009 – 2013

The aim of the strategy is to reach, by 2020, the goal that people from Saaremaa will carry on the sustainability and traditional values of coastal villages together with people who are involved also only part time. This will combine the traditional heritage with multiple investments into modern maritime economy (building ships), fisheries, into aquaculture and into tourism to develop fisheries. The intention is to enhance the valorization of fisheries and related activities.

3. Travel Destination Saaremaa

The project aims are to to increase the number of tourists and their spending covering. The project covers the period from 2009 to 2011.

4. Green islands in the Baltic Sea

The GREEN ISLANDS project, running between 2010 and 2013, promotes sustainable thinking and self-sufficient resource use and targets three main problem areas: nutrient runoff, energy consumption and production as well as waste management on islands.

⁴¹⁴ The Baltic Times, "Experts: Saaremaa needs investment, not bridge", Nov 25, 2004

3. Comparisons

There are a number of examples of islands with similar concerns as Saaremaa, such as Gozo (Malta) and Sicily (Italy). There are also examples of islands that have been linked to the mainland such as Öland.

Gozo

Gozo is the second-largest island in the Maltese archipelago. The island has a population of around 31,000 people. Gozo is 67 km² in size, is 14 km in length and 7.25 km in width. The two islands (Malta and Gozo) are connected by a ferry service that operates daily with trips departing twice every hour and journeys lasting 25 minutes. For a number of years debates have centred around a fixed link joining the two islands. The fixed link was originally proposed as a bridge, however in recent years the debate has shifted to an underwater tunnel. From studies conducted when the bridge link was being proposed it was found that just over 55% of residents are in favour of the building of such a bridge while 44.90% said they were against it. There are indications that public opinion has shifted more towards the fixed link in recent years⁴¹⁵.

The arguments used in favour of the development include the fact that it will facilitate travel in both directions. There would be no need to wait for the ferry or else feel sea sick whilst travelling on the ferry. University students and workers often find it necessary to rent accommodation in Malta because of the inconvenience of ferry travel and this would become unnecessary if a fixed link is constructed. Nowadays, in severe weather conditions, Gozitans have a problem coming to Malta since the ferry stops working. Many investors will be able to extend their roots in Gozo and therefore commercial activities and new businesses are expected to arise. The self-employed and the business community would save numerous man-hours and Euros on their transportation expenses.

The arguments against the bridge comes mainly from environmentalists who worry about the environmental implications of the construction and the conservatives who would prefer to keep the status quo and safeguard the 'identity of Gozo' who worry that it would lose its charm. These two groups stress that Gozo could quickly lose its uniqueness, its aura of 'Peace and Quiet', which is a rare and highly-priced asset these days, should the construction of a fixed link go ahead.

Additional worries are that more tourists will 'invade' the island. As a result of becoming a busier place Gozo might become more polluted with cars and streets will become dirtier. The natural, panoramic, beautiful

⁴¹⁵ <http://gozonews.com/6/gozo-to-malta-a-bridge-too-far/>

views of Malta and Gozo will be marred by the bridge in the middle. The visual imagery of the greenery on the periphery of the islands will no longer be appreciated.

At the same time, there is currently a long term initiative being carried out by Central Government aimed at developing Gozo as an eco-destination. This will involve expenditure in physical and human capital to enhance the environment and develop economic activities around Gozo's traditional competitiveness advantages in tourism, agriculture, culture and natural and anthropological history. Some may view the permanent link to go against the vision of Eco Gozo. Others claim that enhanced accessibility, together with positive actions effectively leading to sustainable development, will enhance the attainment of the Eco-Gozo vision.

Attempts at developing an airLink to enhance accessibility proved fruitless in past. Helisureste (the operators of the helicopter service between Malta and Gozo) embarked on operations between Malta and Gozo on March 27, 2005. It operated a round the clock schedule on a 13-seater helicopter from Ghajnsielem to the airport. But it was not uncommon for trips to be cancelled at short notice. This was also causing unnecessary delays to visitors coming to Gozo from abroad and also unnecessary early departures for those leaving Gozo to go abroad.

This Gozo Heliport would need to be transformed into an airport with a suitable airstrip. But it could entail the loss of agricultural land. The government was currently considering all types of possible connections such as replacing the plans for a bridge with those for an underground tunnel, and therefore all options were being studied.

Sicily

Sicily is the largest island in the Mediterranean Sea, comprising an autonomous region of Italy. The population is approximately 5.2 million. The size of the island is 25,706 km².

At present, travellers have to take a ferry to cross the strait of Messina. Italy's government has revived plans to build a controversial bridge linking the island of Sicily to the mainland. The structure would cross the Messina Straits, forming the world's longest single-span suspension bridge.

Supporters of the bridge list a number of factors in its favour. They believe it would aid the region's economy by providing better infrastructure, it will create thousands of jobs, making it easier to transport materials to and from the island and that it would also allow for high-speed trains that could give tourism in the region a major boost.

Opponents of the plan see myriad reasons why the bridge should not be built. First, they question whether the bridge could withstand an earthquake in this earthquake-prone area.

Secondly, that the area's ecosystem would be damaged by the construction and that it would endanger rare animal species. They also argue that the bridge would not really be economically useful to the area, claiming that north-south traffic is much better served by water-borne freight than by trains and trucks and that the current ferry service between the shores is efficient enough. Instead, they argue, the funds would be much better spent modernizing and making more efficient the infrastructure throughout southern Italy. There are also concerns that organized crime networks could hijack the lucrative project.

Öland

One example of a fixed link that has been constructed is that of Öland. Öland is the second largest Swedish island off the south eastern coast of Sweden. It has an area of 1342 km². The island is connected to the mainland by the 6 km, Öland Bridge, which opened in 1972.

The fixed links have been good for the economy and its development and for population growth. Since the construction of the bridge, the population of island has grown slightly as commuters to the mainland choose to live in Öland. Tourist arrivals have also risen. In recent years, the 25,000 residents of Öland have been receiving an estimated 2.5 million tourists every year.

There have however been a few issues that have arisen as a consequence of the construction. The environmental impact of the bridge has been minimal, with vertical structures of the bridge actually serving as hard base for development of fouling communities. The impact of bridge to migrating birds is estimated at a very low level. Birds successfully fly over it, and the only impact is that their flight route becomes a little bit longer, but this is by only 1-2 kilometers which is by means no critical impact.

A more serious, if indirect, effect of the bridge is that according to EU's definition, the bridge makes Öland part of the mainland, thereby depriving Öland of subsidies granted to other islands. *"For northern Öland, the bridge isn't any help. It is a rural area and would be greatly helped by a grant,"* said Lisbeth Lennartsson, Borgholm municipal board's chairwoman and Öland's municipal authority's vice chairwoman.

Isle of Ré

A final example is the Isle of Ré, an island off the west coast of France. It is 30 km long and 5 km wide. A 2.9km bridge, completed in 1988, connects it to La Rochelle on the mainland. Since then, touristic activities on the island have developed considerably, with real estate prices reaching very high levels. The easier transportation system has stimulated the purchase of holiday homes by people from major cities from the French West, and up to Paris, who can visit for week-ends, mostly in spring and summer.

This island with fixed link has proven to be more attractive to tourists as well as to new permanent residents, as a result of their guaranteed access.

The bridge has emphasized islandness and its difference from mainland territory and Ré is today recognized as a community under French law with strong heritage laws in place and with the tourist inflow somewhat regulated via a differential toll mechanism. This success is not without its problems, however; the resulting gentrification has made housing on the island increasingly out of reach of many of the island's own inhabitants – many of whom may, ironically, in future, be obliged to leave their own island in order to secure affordable accommodation.

4. Fixed Link Commonalities

Evaluating the information of the islands above we find common arguments in favour and against the construction of a bridge connecting them to the mainland.

The most common arguments against the construction of fixed links are those concerning the environmental impact of the construction, the impact of the high cost of such infrastructural projects and the unwillingness to change the image of islandness that would be brought about by a fixed link.

The negative environmental effects that are associated with these projects are the effects on the coastal areas identified for the development, the potential effects on birds travelling through the area, the environmental effects of a large influx of visitors on the islands.

The high cost for the construction of the fixed link is also a major concern for islands. This implies higher socio-economic costs and will lead to a significant loss of welfare when these funds are diverted from other purposes.

Ferries are often kept going in order to keep employment levels higher for island residents. The loss of jobs connected to the ferry operations is also perceived to be a threat.

Changing the nature of tourism causes islanders to worry that there will be longlasting adverse effects on the tourism industry. While many islanders want to reduce the accessibility problems associated with being an island, there is an element of charm and identity in this discontinuity that many in the tourism industry are concerned about losing. In addition to this the construction period will cause service interruptions and noise, large vehicle traffic and water pollution.

Common arguments in favour of such infrastructural projects include the growth in tourism, the creation of new economic developments to attract commercial major projects that can generate increased demand, savings in transport time and cost, the creation of new jobs linked to economic expansion and the increase in trade and economic growth.

In the same breath as worries about the effect of change on tourism are expressed the expectation of new growth of tourism due to improved accessibility are also voiced. Many expect the tourism industry to boom, perhaps the real worry is that the distribution of this new income will change from that which is currently established. Longer stays will decrease while shorter visits become more feasible. The shops and restaurants that thrive on volume will support the change while the accommodation providers that thrive on longer stays might not do as well. It is the exploitation of the new opportunities, or lack thereof, that will decide whether a fixed link is an asset to island tourism or a drawback.

There is greater consensus on the effect of a fixed link on the island manufacturing and other services sectors. The increased ease of transportation of goods and the facilitation of movement of people will result in decreased costs to businesses and will serve to encourage new enterprises to set up on islands. The benefits of a fixed link should be studied in relation to those of other alternatives for enhancing accessibility such as improved ferry services or air links.

The creation of jobs for islanders is however not guaranteed. A fixed link not only makes it easier for islanders to commute to mainland for work, but also makes it easier for people on the mainland to commute to the island for work. The fixed link not only enables students to travel to the mainland for studies, it also facilitates their departure from the island.

The net effect of a fixed link lies not with the connectivity changes that arise but rather by how the islanders make use of the link. Impact analysis reports that identify potential pitfalls of the new connection and

propose measures to mitigate against these pitfalls would greatly increase the chances that the building of a fixed link is a draw to the island and not a drain. This implies that enhanced accessibility needs to happen in a manner which is congruent with and contributing to, wider and long-term issues for development of unique island regions with important specificities.

Annex 42: Vulnerability to climate change in North-Eastern Turkey

According to the 4th IPCC Report, Türkiye is among those countries, located in the Mediterranean Basin, that will be affected by the most adverse effects of climate change. Subsequently, the Turkish Government has launched a policy process witnessing the establishment of the Climate Change Coordination Council (IDKK) and resulting in the publication of the first Climate Change National Plan⁴¹⁶ in 2011, covering the period 2011-2023. The work on climate change has been taken up especially in connection with the negotiations with the EU in the scope of the environmental chapter.

In the Turkish national climate change plan, the vulnerability to climate change is identified by type of impact, by their magnitude and also by the varying vulnerability of Turkish regions to these processes.

The case study area investigated in this short text corresponds to the eastern part of the Black Sea coastal region. According to the Climate Change National Plan of Turkey, the Black Sea region of Turkey is confronted to the following impacts related to climate change:

- ▲ *Flooding*: considered to be of medium-range magnitude, this impact will likely affect farming and public health initiatives;
- ▲ *Erosion/Salinity*: considered to be of low-range magnitude, this impact will likely affect tourism, ecosystem services and biodiversity;
- ▲ *Coastal erosion*: considered to be of low-range magnitude, this impact will likely affect fisheries;
- ▲ *Degradation of the marine ecosystem*: considered to be of low-range magnitude, this impact will likely affect ecosystem services and biodiversity;

In order to face more efficiently these issues related to climate change, the Turkish Government has suggested that new regulations, especially targeting greater cross-sectoral coordination and more territorially-focused strategies, ought to be adopted for the entire country.

A main advancement would be the legislation of a Climate Change Act. Considering the importance and the multi-disciplinary nature of the topic; coordination between ministries has to be established while taking into account the contribution from universities and community as well.

Furthermore, it is also claimed that Türkiye urgently needs a “Spatial Constitution” to prevent pollution, and plundering of soil, water, forest and biodiversity and it should contain topics such as a Frame Water Act,

⁴¹⁶ Climate Change National Action Plan 2011-2023, Ministry of Environment and Urban Affairs of Turkish Republic, July 2011

Biodiversity preservation, Administration of Basins and Environmental Management.

Finally, as climate change is likely to have territorially-differentiated impacts over the large Turkish Territory, the development of Sustainable Regional and Local Development Strategies ought to be promoted. Indeed, every region needs a specific study in which that region's development strategies, sustainable energy production potentials and natural resources are determined on a regional basis.

Annex 43: Case studies: Synthesis

Highland Council area

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>Low diversification of economy / dependence on tourism & public sector</p> <p>Long travel times (due to dispersed settlements and terrain) - deters new enterprises makes some goods more expensive</p> <p>Services of general interest are provided at lower levels (higher costs per head due to low population densities and long distances)</p>	<p>Attractive area for tourists (unique landscapes + outdoor activity opportunities + Highland image)</p>	<p>Recreation value hinging on</p> <ul style="list-style-type: none"> - unique landscape + outdoor activities - cultural elements
Society	<p>Ageing society (due to immigration of old & outmigration of young)</p> <p>High house prices (due to influx of older people) are sometimes unaffordable for younger</p>	<p>Attractive area for residents (living quality due to quality of environment and close-knit communities)</p>	<p>Unique cultural heritage including specific products (e.g. whisky), garments (e.g. kilts), traditions (e.g. Highland dances), Gaelic language + strong sense of identity: <i>cultural value</i> + <i>heritage value</i></p>
Environment	<p>Lack of grid capacity may hinder efficient exploitation of renewable energies</p>	<p>Potential for renewable energy: wave & tidal, wind (offshore & onshore), hydro</p>	<p>High levels of biodiversity supported by Highland landscape: <i>preservation value</i> / <i>intrinsic value</i></p> <p>Potential for exploiting renewable energy sources: <i>direct use value</i> + <i>option value</i></p>

Jura massif

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>Low diversification of economy</p> <p>Slight dependence on Swiss Jura due to concentration of employment (& companies) on Swiss side</p> <p>Parts of French Jura face lack of qualified workforce due to attractiveness of employment in Switzerland</p> <p>Volatility of exchange rate makes cross-border business relations unpredictable</p>	<p>Vibrant industrial sector, image of quality technology (watches, microtech), knowhow</p> <p>Many companies in Swiss Jura because of lower tax rates - employment opportunities</p> <p>Permeable border makes daily commuting easy (from France)</p> <p>Potential for tourism still under-exploited (potential to draw on quality food products and family activities)</p>	<p><i>Reservoir of know-how</i></p> <p>Recreation value hinging on</p> <ul style="list-style-type: none"> - particular half-open landscape - cultural elements <p>Cultural heritage including traditions such as cheesemaking, watchmaking: <i>cultural value + heritage value</i></p>
Society			
Environment		<p>Potential to market high-quality timber but also quality cheeses</p>	

Outer Hebrides

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>Low diversification of economy (dependence on public sector)</p> <p>Access to islands time-consuming & costly</p> <p>Dependence on mainland (for provision of goods & services)</p> <p>Goods more expensive (than on mainland)</p> <p>Services of general interest are provided at lower levels (higher costs per head due to low population densities and long distances)</p>	<p>Attractive area for tourists due to nature & landscape</p> <p>Harris Tweed as a niche product</p>	<p>Recreation value hinging on</p> <ul style="list-style-type: none"> - unspoilt "pure" landscape - remoteness from everyday "bustle"
Society	<p>Strong outmigration (particularly by young, due to lack of employment opportunities / education)</p> <p>Ageing population (+ slight gender imbalance)</p>	<p>High living quality (natural capital, strong sense of identity, close-knit communities, particular traditions)</p>	<p>Unique cultural heritage including Gaelic language: & traditions such as Tweed making + strong sense of community: <i>cultural value + heritage value</i></p>
Environment		<p>Potential for renewable energies: wind & wave</p>	<p>Potential for exploiting renewable energy sources: <i>direct use value + option value</i></p>

Sicily

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>Low diversification of economy (dependence on tourism & public administration)</p> <p>Underground economy / Mafia (deterrent for new enterprises)</p> <p>Goods more expensive (than on mainland)</p> <p>"Culture" of dependence (dependence on mainland economic centres)</p> <p>Pressure on environment from tourism (waste, infrastructure...)</p> <p>Access to island time-consuming & costly</p>	<p>Attractive area for tourists, brand as "sea and sun" destination</p>	<p>Recreation value hinging on</p> <ul style="list-style-type: none"> - climate (sunshine duration and warmth) - coast and associated "seaside" activities - cultural elements
Society	<p>Challenge of integrating high number of African immigrants that land on shore</p>	<p>Attractive living area (climate, "culture of Sicilianity", strong ties within community)</p> <p>Multicultural society</p>	<p>Rich history at the crossroads of many cultures: <i>heritage value</i></p> <p>Interface (melting pot) for many cultures: <i>cultural value</i></p> <p>Living area for unique species: <i>preservation value / intrinsic value</i></p>
Environment	<p>Lack of grid capacity may hinder efficient exploitation of renewable energy</p> <p>Water scarcity</p>	<p>Potential for renewable energy: wave, wind, hydro, solar</p>	<p>Potential for exploiting renewable energy sources: <i>direct use value + option value</i></p>

Tornedalen

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>Focus on primary production and exploitation of raw material leads to dependence on international fluctuations</p> <p>Geographical isolation of local labour markets (locally lack of skilled labour)</p> <p>Services of general interest are provided at lower levels (higher costs per head due to low population densities and long distances)</p> <p>Seasonality of employment in tourism</p> <p>High costs to access markets (mainly due to long distances but also situation close to border at margin of national transport system)</p>	<p>Availability of natural resources; mining due to increase even more in coming years</p> <p>Upcoming opportunities in mining sector will attract skilled workforce from elsewhere</p> <p>Attractive area for outdoor and "experience" tourism + skiing & ice "brand"</p>	<p>Resources of worldwide importance (forests, metals, minerals): <i>direct use value + option value</i></p> <p>Recreation value hinging on</p> <ul style="list-style-type: none"> - unspoiled natural environment - particular Arctic "attractions" (northern lights, snow, reindeer....) - cultural elements
Society	<p>Ageing population</p> <p>Gender imbalance (more male than female)</p>	<p>Sámi people as a "unique selling point"</p> <p>Strong cultural cohesiveness across the border & strong cooperation</p>	<p>Living area of the only indigenous people of the EU: <i>heritage value / intrinsic value</i></p>
Environment		<p>Potential for renewable energies: hydro, wind, biomass</p>	<p>Potential for exploiting renewable energy sources: <i>direct use value + option value</i></p>

		Living area for unique species (e.g. Reindeer): <i>preservation value / intrinsic value</i>
--	--	--

Sparsely populated areas of Spain

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>Small size does not attract investment</p> <p>Lack of agglomeration / all urban areas are outside daily commuting distance</p> <p>Benefits from resource exploitation may go elsewhere: investors from abroad</p> <p>Pollution from primary extraction reduces attractiveness of area</p> <p>Dependence on public money (importance of public services + CAP + previously coal mining subsidies)</p> <p>Services of general interest are provided at lower levels (higher costs per head due to low population densities and long distances)</p>	<p>Natural resources (construction materials, iron, forests) with potential (<i>as opposed to coal mining which relies on subsidies</i>)</p>	<p>Resources of worldwide importance (forests, iron, construction materials): <i>direct use value + option value</i></p>
Society	<p>Access difficult: high-speed infrastructure focusses on connecting agglomerations, leaving SPAs lagging</p> <p>Agriculture less profitable (access to water, temperature differences, terrain)</p> <p>Ageing population (due to previous outmigration during rural exodus and retirement migration)</p>	<p>Potential to expand tourism (cultural, historical attractions)</p> <p>Famous agricultural products (wine, oil, ham) + potential for organic farming / niche products</p>	<p>Rich history (+architectural heritage) : <i>cultural + heritage value</i></p>

	Gender imbalance (due to previous outmigration: service sector in cities attracts females)		
Environment	Lack of grid capacity may hinder efficient exploitation of renewable energy	Image as "uncrowded" living space with environmental and social capital Potential for renewable energy: particularly wind, also solar and biomass	Potential for exploiting renewable energy sources: <i>direct use value</i> + <i>option value</i>

Belgian coast

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	Environmental degradation due to overdevelopment of the coast by tourist structures	Distribution and logistics focal point (enabled by: central position in Europe, dense road network) Attractiveness of the Belgian coast as a tourist destination	Strategic position / Belgian coast as trading hub & distribution centre for all of Europe Recreation value hinging on: - activities particular to coasts (swimming, boating...) - unique landscape
Society	High land prices crowd out younger population	Attractive living space (landscape & environmental capital)	
Environment	Overfishing: depletion of a resource, but also decline of a traditional sector (of employment) Environmental degradation and decline of biodiversity due to human activities Risk of sea level rise <i>(fragmentation of management approaches as an example where "compensation does not work"?)</i>	Potential for offshore renewable energy: particularly offshore wind	Regeneration of a resource: Belgian North Sea as an important spawning and nursery ground for some commercial fish species Living area for many endangered species: <i>preservation value / intrinsic value</i> Potential for exploiting renewable energy sources: <i>direct use value</i> + <i>option value</i>

Irish Sea

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	Decline of heavy industry (steel, shipbuilding...) that was traditionally linked to coastal sites in Ireland	Ports as point of departure for all maritime transport & interface for exchange Attractiveness of coasts as tourist destinations	Recreation value hinging on: - activities particular to coasts (swimming, boating...) - unique landscape
Society	Environmental and social pressures from the high number of second homes and holiday homes ("ghost estates") Ageing society (high share of elderly)	Attractiveness of coasts as living areas (high scenic value)	
Environment	Overfishing: depletion of a resource, but also decline of a traditional sector (of employment) Destruction of habitats & environmental degradation by extensive human activity Predicted sea level rise	Potential for offshore renewable energy: particularly offshore wind	Resource of worldwide importance (fish): <i>direct use value + option value</i> Unique habitats for many species: <i>preservation value / intrinsic value</i> Potential for exploiting renewable energy sources: <i>direct use value + option value</i>

Geneva CBMR

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>Competition for space leads to high land/real estate prices</p> <p>Public transport network across border insufficient</p>	<p>International finance centre Concentration of international organizations Research cluster</p> <p>Many opportunities for (well-paid) employment in the canton Geneva (also for residents of surrounding areas) Image of natural charms in combination with historic & architectural assets</p> <p>Projects to improve public transport network</p>	<p>Recreation value hinging on: - landscape - cultural elements</p>
Society	<p>Border as a limit for spatial planning: in Geneva city development of housing does not keep up with rapidly increasing population</p> <p>High number of internationals / commuters creates slight exclusionary sentiments among some parts of Genevan population</p>	<p>Strong links between both sides of border via commuters: French areas function as "suburbs" for Geneva city without border being an obstacle</p> <p>International & multilingual environment: creativity</p>	<p>Multicultural society: learning process: <i>cultural value</i></p>
Environment	<p>Urban sprawl (consumption of natural areas) + high resource use and waste production</p>		

Luxembourg CBMR

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>Competition for space leads to high land/real estate prices</p> <p>Service provision restricted to national boundaries in many cases</p>	<p>Concentration of knowledge-intensive activities (financial services)</p> <p>Attractiveness for highly qualified workforce (opportunities + high wages)</p>	
Society		<p>Multilingual setting makes access to labour market easy for different nationalities</p> <p><i>borders highly permeable for workers (EU rules on free circulation as example where "promotion works"?)</i></p>	<p>Multicultural & multilingual society: <i>cultural value</i></p>
Environment	<p>Urban pressure on natural environment</p>		

« Black Triangle » : Border between Poland, Germany and the Czech Republic

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>After 1989, loss of industry & mining activities (heavy industry sites historically often in periphery of countries) Strong differences in activity structure along borders (structural change more advanced in DE than in PL or CZ) Strong differences in GDP along borders</p> <p>Accessibility across border insufficient: low number of cross-border rail connections</p>	<p>Ecotourism as a potential: attractiveness of the middle mountain range + cycling route along Elbe Accessibility catching up: number of road crossings increased significantly in last years Position at the crossroads (between Berlin, Prague and Wroclaw) could make it an important transit region (but risks of ecological degradation) Cross-border cooperation advancing: e.g. mutual recognition of diplomas has improved since CZ and PL became EU members</p>	<p>Recreation value hinging on: - mountainous landscape + outdoor activities</p> <p>Strategic position</p>
Society	<p>Services of general interest declining: e.g. decreasing number of students makes maintenance of decent education difficult</p> <p>Language differences along borders</p> <p>Cultural "barriers" at borders</p> <p>Outmigration (in German part: particularly young people emigrate and leave old behind)</p>		<p>Interface for different cultures: learning process: <i>cultural value</i></p>

Environment	Strong air pollution (due to mining & industry) in 80s with repercussions still today (forests)		
-------------	---	--	--

Polish-Ukrainian border

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>Fortification of EU external border after Poland joined Schengen makes cross-border contacts difficult (although contacts had been flourishing in 90s)</p> <p>Only 6 road and 4 railroad crossing points exist along the border - not sufficient for handling the large transport flows across the border</p> <p>Border crossing takes long time due to customs requirements, queues, visa requirements....</p> <p>For both nations, these areas are among the economically weakest (70% of national GDP) due to peripherality</p>	<p>Strategic position for trade</p> <p>EURO 2012 football championship as trigger for modernization of border crossings</p> <p>LBT (Local Border Traffic Agreement) improves options</p>	
Society	<p>Visas hard to obtain for Ukrainian citizens since PL joined Schengen - some lost basis of livelihood</p> <p>Decrease of population (outmigration)</p> <p>Ageing population</p> <p>Lack of identification with border area</p>	<p>Diverse culture, ethnicities</p> <p>Common history, cultural affinities, similar languages, cultural events involving both sides of border</p>	

Flow of illegal immigrants (& asylum seekers) to EU (and sometimes harsh reaction thereto: detention centres); arising xenophobic sentiments		Gateway between EU and non-EU countries
--	--	---

Canary Islands

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	<p>Remoteness (generates costs especially for transport)</p> <p>Limited size of market (no economies of scale)</p> <p>Dependency on imported products (higher costs)</p> <p>Overreliance on one sector: tourism</p> <p>Hardly any industry (as a result of remoteness + small size of market)</p> <p>Hardly any qualified workforce (+ lower wages compared to Spanish mainland)</p> <p>Limited transport options within islands (e.g. no trains) + dependence on air or sea travel to approach islands</p>	<p>Area extremely attractive for tourists due to climate (=> GDP close to EU27)</p> <p>Building relations with African neighbours: trade increasing</p> <p>Strategic "outpost" for EU (economic + political relations)</p> <p>Research hub (space observatories)</p>	<p>Recreation value hinging on:</p> <ul style="list-style-type: none"> - climate (sunshine duration + warmth) - coast and associated "seaside" activities <p>Strategic location</p> <p>Knowledge generation</p>

	Infrastructure (hospitals, ports...) not efficient as they operate on small scale and on several islands in parallel		
Society	Illegal immigration & drug traffic	Multicultural, diverse society (immigrants of different ages & backgrounds)	Exchange node for cultures / multicultural society: <i>cultural value</i>
Environment	High costs for water provision (reliance on desalination plants) & energy provision (dependence on outside energy) Environmental degradation (overdevelopment of touristic and other infrastructure) Risks: fires, floods (& volcano)	Potential for renewable energies: mainly wind and solar	Potential for exploiting renewable energy sources: <i>direct use value</i> + <i>option value</i> Ecological richness: <i>preservation value</i> / <i>intrinsic value</i>

French Guyana

	Leverage for "territorial justice" (Compensation of constraints)	Leverage for "territorial development" (Promotion of assets)	Non-economic values
Economic structure	GDP per capita of only 47% of French average and high unemployment rates Reliance on public sector Lack of modernization in primary sector Limited number of cultural & historic attractions limit tourism Cooperation with neighbouring countries still ineffective (legal barriers and economic discontinuities) High cost for maritime freight (due to low export volumes + inadequacy of port infrastructures)	Resources (gold, wood) Aerospace sector Tourism sector still has potential	Knowledge generation

	<p>Road network concentrates on coast, forest area hardly accessible</p> <p>Broadband coverage very low (due to physical geography but also remoteness from mainland)</p>		
Society	<p>Illegal immigration (linked to underground economy and drug traffic)</p> <p>Population largely with only low qualifications</p> <p>Service provision lagging: Number of healthcare specialists & number of teachers per pupil lower than on mainland</p>		<p>Exchange node for cultures / multicultural society: <i>cultural value</i></p>
Environment		<p>Potential for renewable energies: mainly hydro and solar, but also biomass</p>	<p>Ecological richness: <i>preservation value / intrinsic value</i></p> <p>Extraordinary importance of rainforests as carbon sinks</p>

Annex 44: Transversal theme: Vulnerability of human-environment systems to climate change

Introduction to the transversal theme

Climate change and its various adverse impacts on natural and socio-economic systems are widely recognized as a main challenge to global society in the coming decades. **Mitigation** of the speed and magnitude of climate change by reducing greenhouse gas (GHG) emissions and **adaptation** to unavoidable climatic changes constitute the two major strands of response options of societies to cope with climate change. Compared to mitigation, which has been at the centre of global and European climate policy since more than two decades, adaptation is still rather an emerging policy field, which has however been quickly evolving during the last years. Though being still in a pre-mature stage of the policy cycle, adaptation has by now been established as the second main pillar of climate policy, and since its inception has become a central and priority task on the international and European policy agendas. In general, adaptation to climate change aims at actions that reduce vulnerabilities, avoid or mitigate adverse climate change impacts, strengthen resilience of human-environment systems, increase adaptive and coping capacities and implements adaptation measures.

The recognition that there is an urgent need to adapt to a changing climate, besides fortifying efforts to reduce driving GHG emissions, is based on the growing body of robust scientific evidence that climate change is already happening and accelerating, and that a considerable rate of global warming is already unavoidable nowadays, even if GHG emissions would be kept constant at today's emission levels or would be significantly reduced from today onwards. Given recent observations that the rate of growth of GHG emissions and many climate impacts are approaching the upper boundary of the IPCC range of projections (implying that the magnitude of future climate change is likely to have been underestimated) (EEA, 2010g; Allison et al., 2009), it must be anticipated that the UNFCCC and EU target of limiting the global mean temperature increase to 2°C above the pre-industrial level is likely to be missed before the mid 21st century (European Commission, 2009a). In addition, even the (rather policy- than science-driven) assumption that a 2°C guardrail could avoid unmanageable and irreversible disruptions of anthropogenic systems is subject to uncertainties and does not provide any guarantees (EEA, 2010g), which is why the recent UNFCCC Copenhagen Accord calls for considering rather a 1.5°C than a 2°C target (UNFCCC 2009).

The following sections of the project report focus on the vulnerability and adaptation side of climate change.

1.1 The concept of vulnerability to climate change and definitions

In its ordinary use, the term "vulnerability" refers to the capacity to be wounded, i.e., the degree to which a system is likely to experience harm due to exposure to a hazard (Turner et al., 2003). Especially in recent years, the multidimensional concept of vulnerability has increasingly been established and applied in international climate change impact research and adaptation research (Patt et al., 2009). Although there is an increasing wealth of meta-analytical literature on differing conceptualizations of vulnerability in a climate change context (e.g., Füssel, 2007, 2005; Füssel & Klein, 2006; Brooks, 2003; Luers, 2005), in recent

years the vulnerability concept applied and advocated by the Intergovernmental Panel on Climate Change (IPCC) has been most widely recognized and used by the climate change impact and adaptation community. Though not being undisputed, the IPCC vulnerability concept has also been embraced and applied by the European Environment Agency, EU policy making institutions, and in the recent ESPON CLIMATE project (ESPO & IRPUD, 2011). In its Third and Fourth Assessment Reports (IPCC, 2001, 2007b), the IPCC has moved more and more from a climate impact-oriented view to a broader, integrated perspective on vulnerability that puts less emphasis on climate science, but embraces stronger the social, economic and institutional determinants of vulnerability (Patt et al., 2009). By now, vulnerability has been recognized as a key concept in decision-making contexts of climate change adaptation, because knowledge of the differentiated climate-driven vulnerabilities of socio-economic sectors and systems, and of the ecosystem services they are sustained by, (i) allows detecting their most climate-sensitive elements, processes and critical damage potentials, i.e. the identification of particularly vulnerable regions, sectors, systems or social groups; (ii) supports identification of corresponding needs for action on adaptation; (iii) informs adaptation policy design; and (iv) guides prioritisation of resource allocation for adaptation and decision-making on type, scope, design, planning and implementation of adequate and cost-effective adaptation measures. In brief, knowledge about vulnerabilities provides a useful and necessary evidence base for informed decision-making on adaptation.

Following Füssel (2005), any assessment of a vulnerable situation requires answering the multidimensional question "Who or what is vulnerable to which hazard or impact, and where, in what time frame, and on what scale?" That question comprises the following dimensions that are needed to characterise a vulnerable situation:

- a vulnerable system (region, sector, group) of concern;
- the valued attributes of that system;
- hazard (the external stressors of concern the system is exposed to);
- place-based reference and scale (e.g. geographical area that comprises vulnerable populations or elements);
- temporal reference (time period of interest);
- whether internal and/or external factors of vulnerability are considered.

The Intergovernmental Panel on Climate Change (IPCC) defines **vulnerability** as *"...the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity"* (IPCC 2007c).

Vulnerability is, hence, to be understood as a function of three main components, the **exposure** of a system to climatic changes, including climate variability, its **sensitivity**, and its **adaptive capacity** (IPCC, 2007b; Turner II et al, 2003; Füssel, 2007; Füssel & Klein, 2006; Zebisch et al., 2005). This definition comprises several distinctive and constituting components of vulnerability. It incorporates an external dimension relating to the exposure of a system to climate impacts, and an internal dimension corresponding to a system's sensitivity and its adaptive capacity. As opposed to climate change impact projections, it may be regarded as a particular strength of the IPCC vulnerability concept that it relies to a larger extent on information about present internal characteristics of a system of concern,

e.g. relevant aspects of the socio-economic status and related processes of a territory, because this helps to reduce unavoidable uncertainties connected to future climatic development.

Exposure is defined as "*...the nature and degree to which a system is exposed to significant climatic variations*" (IPCC, 2007c). It describes the expected regional expression of future changes in climatic stimuli, such as temperature increase, decrease of summer precipitation, decrease of winter snow fall etc. Exposure can also be viewed as the regional or local manifestation of global changes in climate, i.e. it describes the exposition of defined geographical areas to future changes in climatic stimuli. Exposure to climate change is usually characterized by means of projections and scenarios of future climate change based on numerical climate models (regional climate models driven by global circulation models) and according to different emission scenarios.

The **sensitivity** is "*the degree to which a system is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea level rise)*" (IPCC, 2007c). Thus, sensitivity can also be circumscribed as the degree to which a system is affected by or responsive to climatic stimuli (Stern, 2006). Assessment of sensitivity is usually strongly based on information about the current status of a system, including observed impacts, current climate-related problems, past experiences in coping with climate- or weather-triggered challenges, and other external drivers and pressures (e.g. market demands in tourism, demographic change, land use change). In theory, it would be desirable to consider not only present but also future sensitivity, because climate change, for example, affects future territorial development, but future development paths also affect the vulnerability of a region to climate change because sensitivity and adaptive capacity are also subject to dynamic changes over time. However, economic, physical or social projections for long-term time horizons such as until 2100 are rarely available and would also be extremely uncertain. Besides it would raise considerable methodological problems to consider future changes in sensitivity in any vulnerability assessment, because both variables affect each other. Thus, such problems are mostly evaded by applying predominantly the approach of focusing on current climate sensitivity.

Exposure and sensitivity are functionally combined (e.g. via pre-defined rules) in order to determine the **potential impacts** of climate change. Therefore, the potential impact can be explained as the expected effects of a given exposure (in the future) on a given system taking into account its sensitivity in its actual state. The potential impact can be a direct impact (e.g. decreasing snow reliability for winter tourism due to decreasing snow fall) or an indirect impact with a long cause-and-effect chain (e.g. decrease in crop yields due to lower water availability due to higher evapotranspiration due to increasing temperatures). Figure 1 below shows an example of a climate change impact chain describing general cause-effect relations between climatic stimuli and sectors of concern for the energy sector (CLISP & EURAC, 2011a). Combining exposure and sensitivity thus provides information about a system's likely responses to changes in climatic stimuli. For example, a region that is highly exposed to climatic changes may not exhibit severe socio-economic impacts because it is sparsely populated. In contrast, a region that is only moderately exposed and may be densely populated may thus have a higher climate change impact in comparison to aforementioned example.

Climate change impacts on social and economic systems through a chain of events. Changes in climate, often coupled with other change processes, cause first-level and rather direct changes to natural systems, ecosystem services and the built environment, which in turn may cause second-level, indirect changes and knock-on effects in economic and social

systems, e.g. by affecting the provision of services, resulting in economic and social impacts (DG REGIO, 2009).

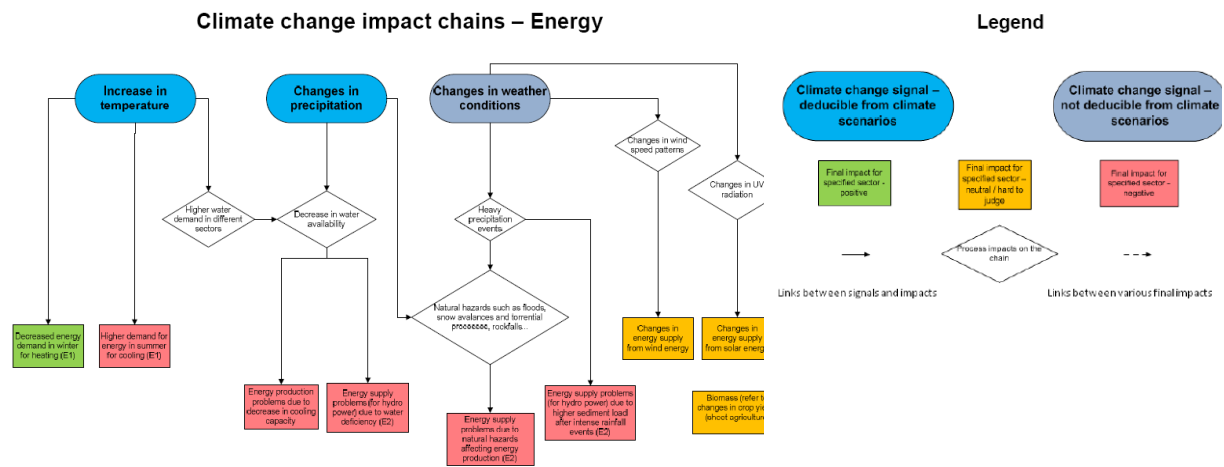


Figure 1: Example of a climate change impact chain for the energy sector (CLISP & EURAC, 2011a; prepared by the European Academy of Bolzano for the ETC Alpine Space CLISP project).

The third component of vulnerability – the **adaptive capacity** – is "the ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences" (IPCC, 2007c). It can also be circumscribed as the ability to prepare for, respond to and tackle the effects of climate change (Stern, 2006).

The existence of adaptive capacity has been shown to be a necessary prerequisite for the design and implementation of adaptation strategies that effectively reduce the likelihood of adverse effects from climate change (Brooks, Adger & Kelly 2005). Adaptive capacity also enables society to take advantages of the opportunities that are created through changes in the climate. Adaptive capacity is defined as the ability or potential of a system to respond successfully to climate variability and change, and includes adjustments in both behavior and in resources and technologies (IPCC, 2007b). Defined in this manner, adaptive capacity has a distinctly context or a place specific flavour. Thus, a system's adaptive capacity is fore mostly determined by a locally determined set of resources and conditions that constrain or facilitate the ability of the system to successfully adapt to the changes in climate (Adger, Arnell & Tompkins 2005; Smit & Wandel 2006).

The IPCC's Fourth Assessment report also outlines adaptive capacity to have two dimensions, a generic one and a specific one (IPCC 2007b). Generic adaptive capacity refers to the general ability and capacity of a system to respond to climate change, reflecting its socio-economic status. Whereas specific capacity relates to a specific climate change impact, such as a drought or a flood that poses a threat to the system. This is closely related to the idea that adaptive capacity refers not only to the ability of a system to plan for hazards and opportunities in advance (anticipatory adaptation) but also its ability to respond or cope with the effects (reactive adaptation) (Smit & Pilifosova, 2001).

At a generic level, adaptive capacity is determined strongly by socio-economic, institutional, governance- and resource-related factors, including e.g., political willingness to adapt, problem awareness, knowledge and financial resources, institutional barriers, governance structures, etc. For instance, at the local level the ability to undertake adaptations can be influenced by factors as managerial ability, access to financial, technological and information resources, infrastructure, the institutional environment within which adaptation occurs, political influence, kinship networks, etc. (Smit & Wandel, 2006; Kelly & Adger, 2000; Adger et al., 2001). Usually, high economic strength and

prosperity of a region as well as good access to various relevant resources is considered to increase adaptive capacity.

Figure 2 below shows aggregate dimensions, determinants and indicators of adaptive capacity.

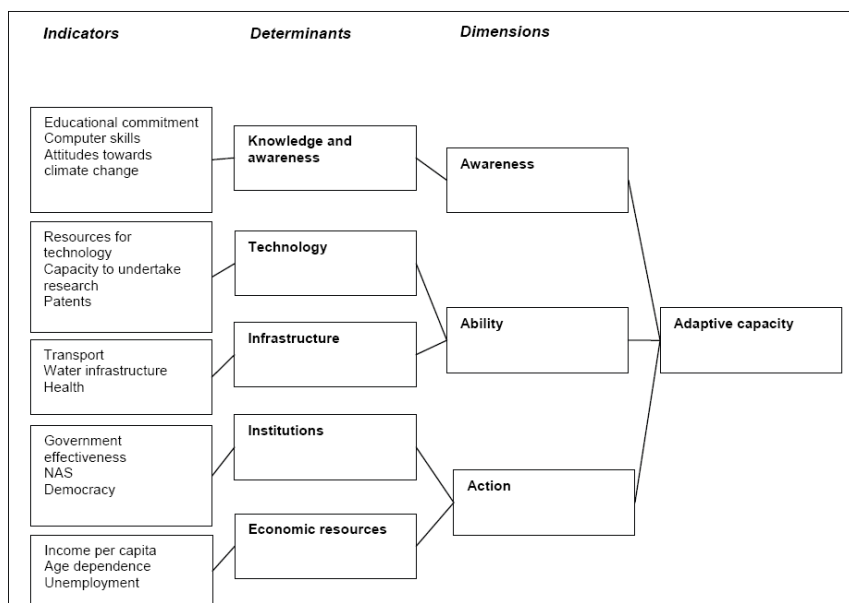


Figure 2: Dimensions, determinants and indicators of adaptive capacity (Schröter et al., 2004).

Finally, overall **vulnerability** represents the synthesis of the four abovementioned elements with a focus on potential impact and adaptive capacity of a given sector or system in relation to a given exposure. Vulnerability is thus a functional combination of the potential impacts with the adaptive capacity. Figure 3 shows how the single components of the vulnerability concept are connected. The conceptual model integrates also the concepts of resilience, planned and autonomous adaptation as well as the cost dimension. Within this framework, a highly vulnerable system would be a system that is very sensitive even to modest changes in climate, where the sensitivity includes the potential for substantial harmful effects, and for which the ability to adapt is severely constrained (IPCC 2001). In other words, a system with a high adaptive capacity will be less vulnerable (more resilient) than one with a lower adaptive capacity. Therefore, reducing vulnerability would involve reducing the impacts or increasing adaptive capacity, resulting in higher resilience.

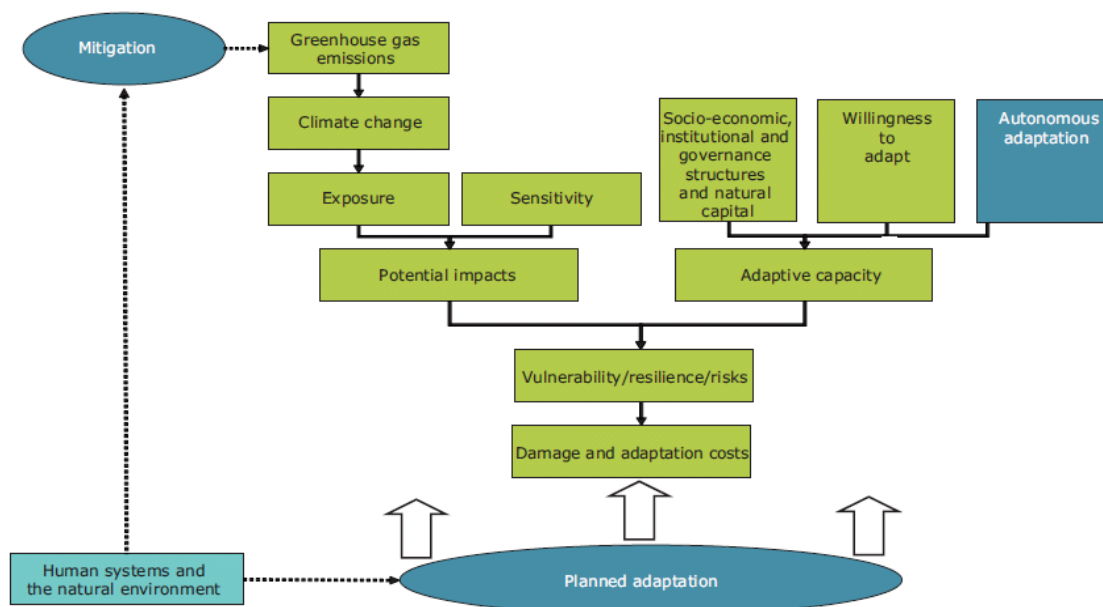


Figure 3: **Conceptual framework for climate change impacts, vulnerability, disaster risks and adaptation options** (EEA, 2010a; Source: Isoard, 2010; IPCC, 2007b; Füssel & Klein, 2006).

The vulnerability concept broadly indicates the way in which vulnerabilities of communities are shaped. It does not necessarily imply that all the single elements (exposure, sensitivity, adaptive capacity) can be measured in order to numerically compare the relative vulnerability of communities, regions or countries. Rather, the vulnerability concept provides an analytical framework that allows analyzing vulnerability by using and integrating quantitative and qualitative information, scientific and non-scientific knowledge. Vulnerability and its determinants are dynamic and vary over time, over type and are place- and system-specific (Smit & Wandel, 2006).

The final purpose of any vulnerability assessment is to provide knowledge for informed and evidence-based decision-making on **adaptation** to climate change. The IPCC defines adaptation to climate change as the "*adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities*" (IPCC, 2007c). Adaptation is seen as a response strategy to the impacts and consequences of climatic changes that are already unavoidable from today's perspective, involving the adjustments to reduce vulnerability of communities, regions, or activities to climate change. Adaptation comprises the processes, practices, actions, measures, or structures to moderate or offset potential damages or to take advantage of opportunities associated with the changing climate (Smit & Pilifosova 2001). Actions on adaptation to climate change are manifestations of adaptive capacity (Smit & Wandel, 2006) and shall contribute to reducing vulnerability and to building resilience to climate change.

Various types of adaptation can be distinguished, including **anticipatory**, **autonomous** and **planned adaptation** (IPCC, 2007a, 2007b). Moreover, adaptation research has also shown that often **maladaptation** is taking place (EEA, 2009). Maladaptive actions and processes do not succeed in reducing vulnerability to climate change impacts but instead increase it and/or reduce the capacity to cope with the negative effects of climate change. Maladaptation may deliver short-term benefits (e.g. financial profit), but lead to harmful consequences in the medium and long-term perspective (Prutsch et al., 2010).

1.2 Overview of the different vulnerabilities of European regions to climate change

The following subsections give an overview of available knowledge on the distribution patterns of exposure, sensitivity, potential impacts, adaptive capacities and vulnerability to climate change in Europe. The information presented here is, of course, selective and by no means comprehensive.

Regional distribution of climate change impacts across Europe

Cumulated across a range of climatic stimuli and expected climate change impacts on natural and socio-economic systems, among the European macro-regions south Europe with the Mediterranean basin and the Balkans, north-western and central-eastern Europe and the Arctic are particularly affected by climate change.

A synthesis of the main past and projected climate change impacts and their effects on sectors in the main bio-geographical regions of Europe is shown in more detail in Figure 4 and box 1 below. The contents are reproduced here from the recent State of the European Environment Report 2010 (EEA, 2010f).

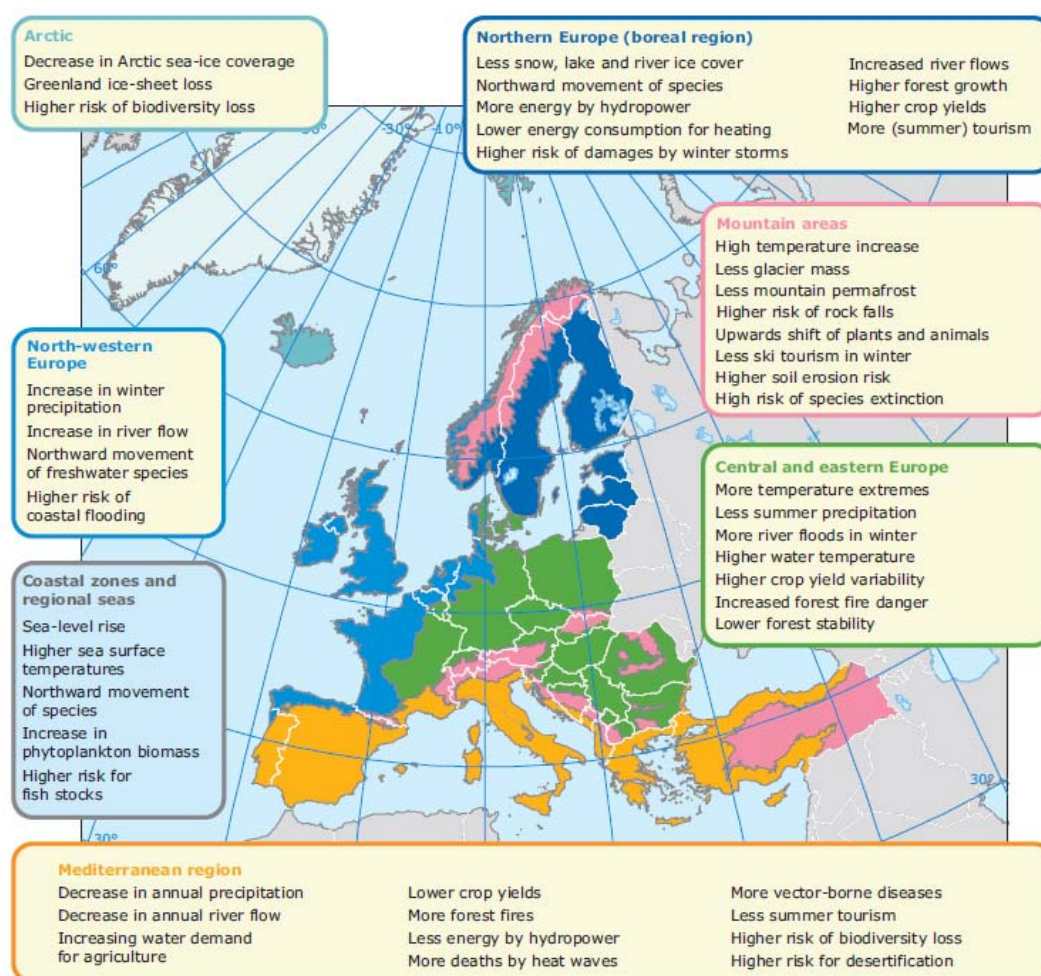


Figure 4: Overview of key past and projected impacts of climate change and effects on sectors for the main bio-geographical regions of Europe (EEA, 2010f; source: based on: EEA/JRC/WHO, 2008).

Box 1: Summary of past and project climate change impacts, vulnerabilities and hotspots in large-scale regions of Europe (EEA, 2010f)

Mediterranean basin

The Mediterranean basin has been subject to major impacts over recent decades as a result of decreased precipitation and increased temperature, and these are expected to worsen as the climate continues to change. The main impacts are decreases in water availability combined with an ever-increasing demand from the agricultural and the domestic sectors, lower crop yields, increasing risks of droughts and biodiversity loss, forest fires and heat waves. In addition the hydropower sector will be increasingly affected by lower water availability and increasing energy demand, while the tourism industry will face less favourable conditions in summer.

North-western Europe

Coastal flooding has impacted low-lying coastal areas in north-western Europe in the past and the risks are expected to increase due to sea-level rise and an increased risk of storm surges. North Sea countries are particularly vulnerable, especially the United Kingdom, Belgium, the Netherlands, Denmark, and Germany. Increases in winter precipitation are projected to increase the intensity and frequency of winter and spring river flooding, although to date no increased trends in flooding have been observed.

The Arctic

The Arctic faces substantial challenges including a decrease in summer sea ice cover, which is accelerating and projected to continue to impact the local natural and human systems as well as open up business opportunities that could put an additional burden on the environment such as enhanced oil and gas exploration and the opening of new shipping routes. Thawing of permafrost has the potential to seriously affect human systems, by, for example, creating infrastructural problems. The fragile ecosystems have suffered significantly from above-average temperature increases and this is expected to continue, even at the 2 °C limit of global temperature increase.

Central and eastern Europe

Temperature extremes are projected to be a key impact in central and eastern Europe together with reduced summer precipitation, increased risk of droughts, increasing energy demand in summer and increased intensity and frequency of river floods in winter and spring although so far no increased trends in river floods have been systematically observed. Climate change is also projected to lead to higher crop-yield variability and increased occurrence of forest fires.

Northern Europe

Less snow and lake and river ice cover are projected to combine with increased winter and spring river flows and greater damage by winter storms. Climate change could offer opportunities in northern Europe, at least in the short and medium terms, such as increased crop suitability and yields, enhanced forests growth, more energy generated by hydropower, lower energy consumption for heating and possibly more summer tourism. However, more frequent and intense extreme weather events in the medium to long term might adversely impact the region, for example by making crop yields more variable.

Coastal zones and European seas

The projected sea-level rise and possible increased frequency of severe storm surges may have major impacts on low lying coastal areas across Europe. Observed and projected increases in sea surface temperature will lead to the northward movement of species and changes in the distribution of phytoplankton biomass. Fish stocks in many seas are already under pressure from over-fishing. Allocations of quotas are based on historic catch patterns and these may need to be revised due to climate change.

Mountain areas

The increase in temperature is particularly high in mountain regions, where loss of glacier mass, reduced snow cover, thawing of permafrost and changing precipitation patterns including less precipitation falling as snow have been observed and are expected to increase further. This could lead to an increase in the frequency and intensity of natural hazards such as floods and rock falls that will impact people and the built environment. Key vulnerabilities include reduced winter tourism, less energy supply from hydropower, a shift in vegetation zones, invasive alien species and extensive biodiversity loss. Plant and animal species face the risk of becoming extinct due to natural and artificial barriers not allowing them to move upwards or northwards to more suitable areas. The retreat of the vast majority of glaciers also affects water availability in downstream areas.

Cities and urban areas

European cities are expected to continue to be vulnerable to heat waves, flooding and droughts which may have significant wide-ranging knock-on effects on infrastructures, public health and the economy. The water, energy, building and transport infrastructures are particularly vulnerable.

Within and across the large-scale regions of Europe, which are affected by climate change in different ways and with different severity, there are specific types of areas that can be expected to be vulnerability hotspots. Areas exposed to climate-driven hazards and extreme events as well as areas with a high concentration of population, infrastructure, and material assets are among the most vulnerable types of locations. It follows that low-lying coastal zones, areas prone to river floods, mountain areas prone to mass movement-related natural hazards, and cities and densely populated areas are particularly vulnerable to climate change (EEA, 2010f; EEA/JRC/WHO, 2008; DG REGIO, 2009).

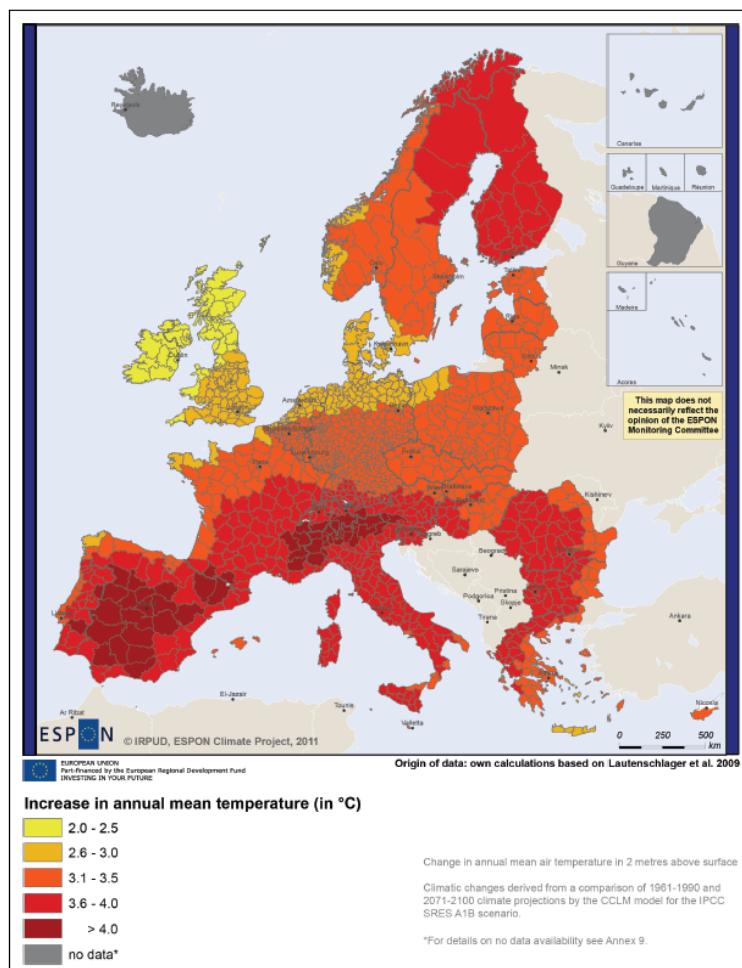


Figure 5: Change in annual mean temperature (ESPON & IRPUD, 2011).

Changes in precipitation show more spatially variable trends across Europe. Annual precipitation changes are already exacerbating differences between a wet northern part (an increase of 10 to 40 % during the 20th century) and a dry southern part (a decrease of up to 20 % in some parts of southern Europe) (EEA/JRC/WHO, 2008). In the future, southern Europe will experience lower rainfalls all year round. In Atlantic and continental Europe, there will be a shift in precipitation amounts from summer to winter, causing higher water stress and drought periods during summer and higher risk of river floods during winter and spring. Annual mean precipitation is projected to increase by 2071–2100 compared to 1961–1990 by about 10 to 20 % in northern Europe and to decrease by 5–20 % in southern Europe and the Mediterranean. Seasonally, models project a large-scale increase in winter precipitation in mid and northern Europe and a decrease in many parts of Europe in summer by up to 40 % (EEA 2010f). Decreases in annual average precipitation in southern and central Europe can be as high as 30-45%, and as high as 70% in the summer in some regions (DG

Exposure

Europe is warming faster than the global average. The observed increase in annual average temperature over European land by 2009 was 1.3°C above pre-industrial levels, and for the combined land and ocean area 1°C above (EEA, 2010g), compared to +0.8°C in the global average (IPCC, 2007a). The rate of warming has been accelerating over the years. Projections suggest further temperature increases in Europe to be in a best estimate range of 1.0–5.5 °C by the end of the century, which is also higher than projected global warming (1.8–4.0 °C) (IPCC 2007a; EEA, 2010f; EEA/JRC/WHO, 2008). South Europe and mountain areas, especially the Alps, will be most affected and could see up to 7°C temperature increase under strong emission scenarios.

According to results of the ESPON CLIMATE project, annual mean temperatures are projected to increase between 2 and over 4.1 °C in the ESPON territory (cf Figure 5). The UK, Ireland, Denmark, parts of the Netherlands and Germany exhibit the lowest temperature changes of up to 3 °C. Southern and South-Eastern Europe as well as northern Scandinavia and Finland are projected to experience higher temperature changes with absolute changes of more than 3.5 °C. Spain, parts of Portugal and the Alpine region will even experience temperature changes of more than 4 °C (ESPON & IRPUD, 2011).

REGIO, 2009). The changes in seasonal precipitation amounts projected by the CLIMATE project are very similar (ESPON & IRPUD, 2011), as can be seen from Figure 6 and Figure 7 below.

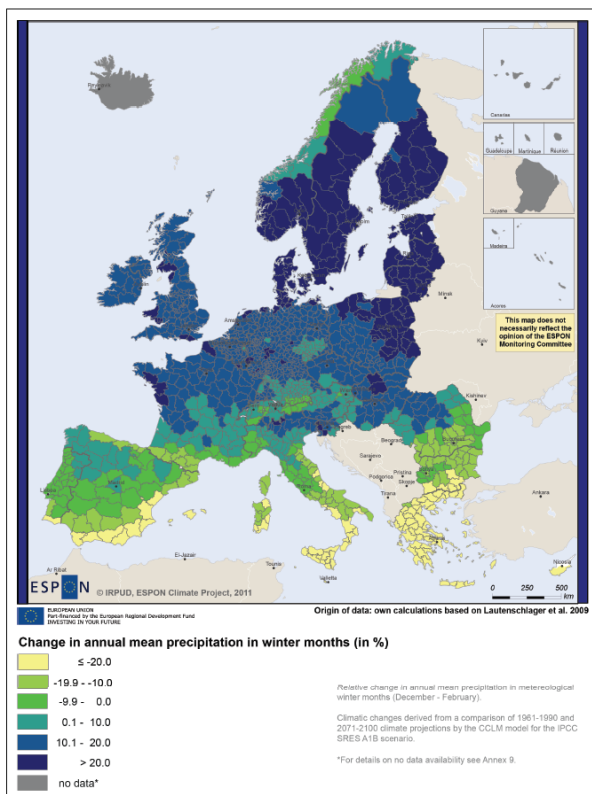


Figure 6: Change in annual mean precipitation in winter months (ESPON & IRPUD, 2011).

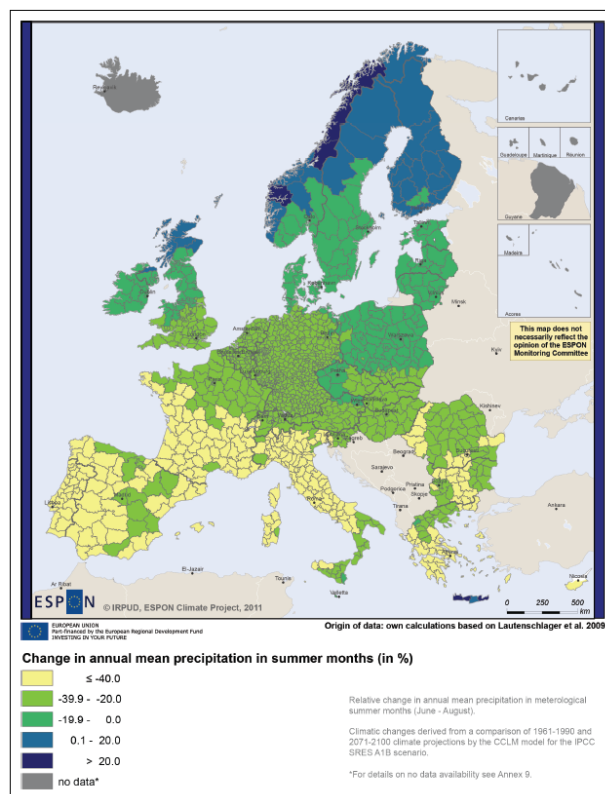


Figure 7: Change in annual mean precipitation in summer months (ESPON & IRPUD, 2011).

Besides gradual climatic changes in temperature and precipitation regimes, extreme events are projected to become more frequent and more severe. The effects of droughts, heat waves, storms, coastal and river floods and other climate-driven natural hazards will be felt in the short term and cause most of the future economic losses and damage costs (EEA, 2010f).

Sensitivity

According to key results of the ESPON CLIMATE project, the regions exhibiting the highest physical sensitivity are mainly concentrated along the coastline, where high concentrations of buildings and infrastructure are sensitive to extreme weather events like flash floods, large-scale river floods and coastal storm surges. Regarding economic sensitivity, particularly those local economies which are dependent on tourism, agriculture and forestry have been highlighted to be most sensitive: the Mediterranean region, the Alps, large parts of Eastern Europe, but also Scandinavia due to changes in energy demand for heating (ESPON & IRPUD, 2011).

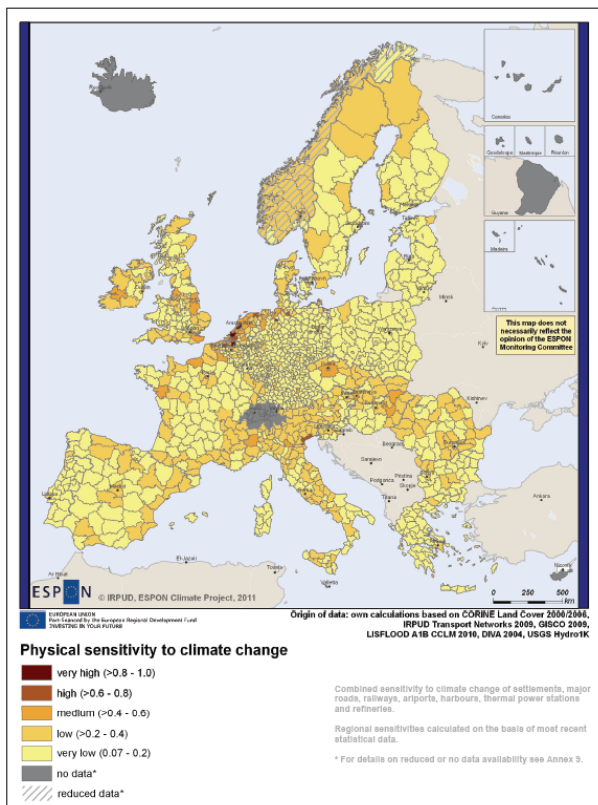


Figure 8: Combined physical sensitivity to climate change (ESPON & IRPUD, 2011).

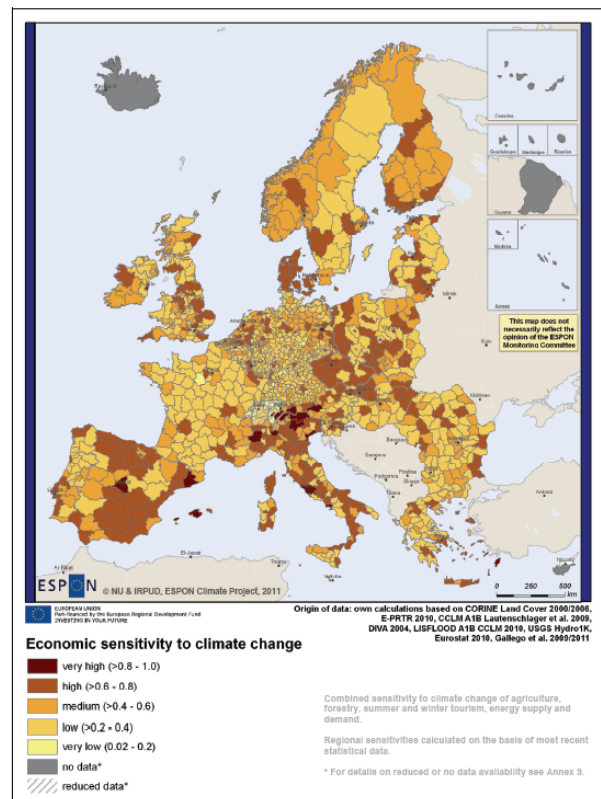


Figure 9: Combined economic sensitivity to climate change (ESPON & IRPUD, 2011).

Potential impacts of climate change

Based on changes in inundation depths of a 100 year river flood event, changes in inundation depths of a sea level rise adjusted 100 year coastal storm surge event, changes in flood potentials on settlements as well as transport and energy infrastructure, it has been included by the CLIMATE project that the overall hot spots of *physical impacts* are almost all located on or in close proximity to coasts, and especially at river mouths, and are located in the North of Europe. In contrast, practically all regions projected to benefit from climate change in regard to settlements and infrastructures are inland regions that will benefit from decreasing river floods due to declining precipitation. The assessment of the combined *economic impacts* of climate change (agriculture, forestry, tourism, energy) show a clear south-north gradient: "Many economically important countries like large parts of the U.K. may expect only a low to marginal negative impact on their economy or even a positive impact, which is particularly the case for wide parts of Germany, Poland and almost the whole Scandinavia. However, large parts of Southern Europe are dependent on (summer) tourism, but also agriculture. Both are projected to be negatively impacted due to the increase in temperature and decrease in precipitation, while the environmental conditions for agriculture in North-Eastern Europe tend to be improved. Moreover, energy demands come into

play through the increased need for cooling. The Alps as a premier tourist dependent region are also identified as hotspot, which mainly results from the projected decrease in snow cover. The economic impact in South Eastern Europe is a consequence of the impact on agriculture – which is still important there” (ESPON & IRPUD, 2011).

Regarding the aggregated potential impacts of climate change (cf. Figure 10), the following regions emerge as hot spots: the South of Europe, i.e. the big agglomerations and summer tourist resorts along the coast, mountains, e.g. in Norway, but also the densely populated Dutch coastline (sea level rise, economic dependency on summer and/or winter tourism). While generally marginally affected, there are some Scandinavian regions with a moderate or even high negative impact, which results mainly from the sensitivity of the environment and flood prone infrastructure (ESPON & IRPUD, 2011).

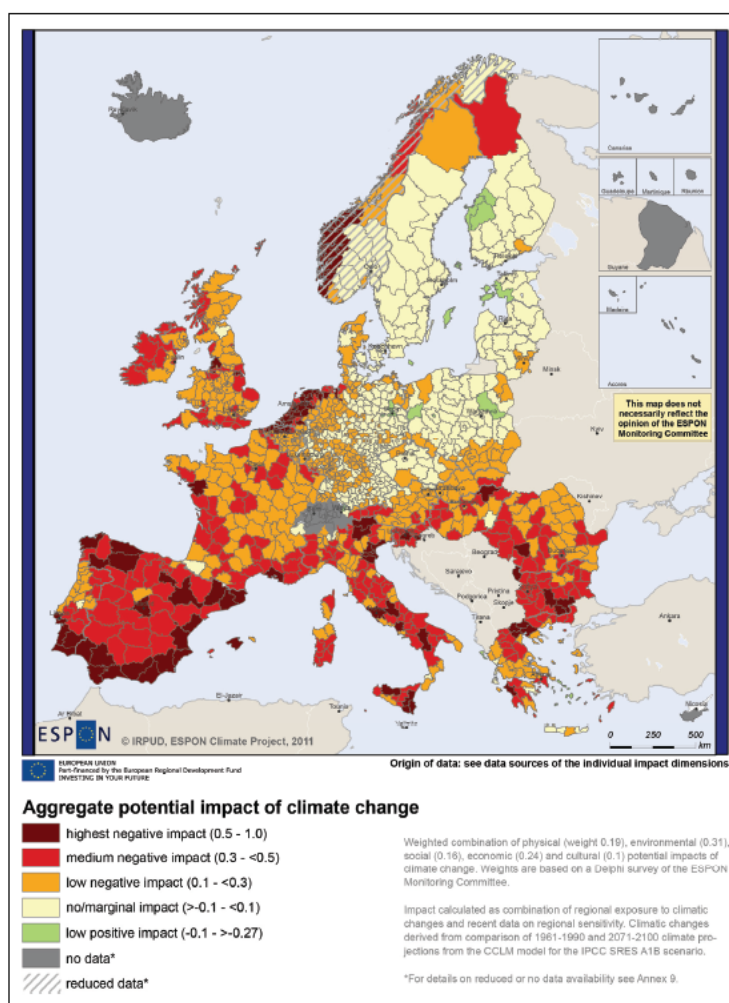


Figure 10: Aggregate potential impact of climate change (ESPON & IRPUD, 2011).

Adaptive capacities

As Figure 11 shows, a significant difference in adaptive capacity can be distinguished between Northern Europe and Southern Europe, with the Nordic countries having overall much higher adaptive capacity than most the Mediterranean and South-Eastern European countries. Most of Western and Central Europe have a relatively high capacity in relation to the European average. In comparison, Eastern European countries, on the whole, have a lower capacity than Western and Northern countries. However, there is also considerable variation between regions within countries. Capital cities also emerge as having generally high adaptive capacity (ESPON & IRPUD, 2011).

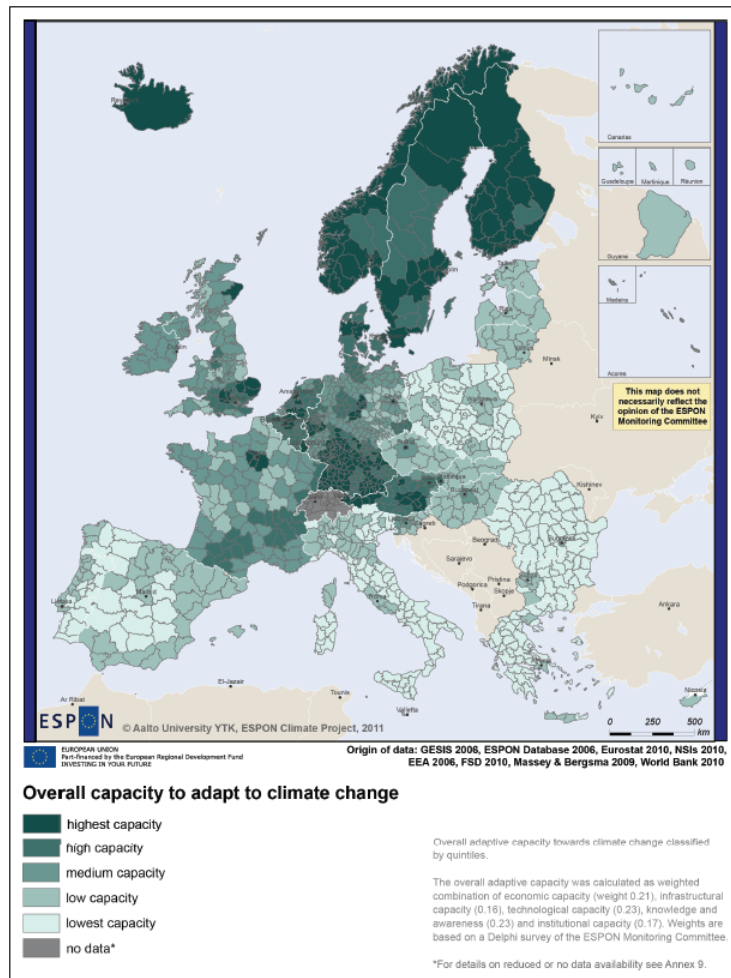


Figure 11: Overall adaptive capacity (ESPON & IRPUD, 2011).

Overall vulnerability to climate change

Figure 12 shows the overall vulnerability distribution across Europe, as assessed in the CLIMATE project. The North-South gradient is here even more visible than in the aggregate impact map, which is due to Northern and Western European countries having a higher adaptive capacity than the Mediterranean and South-East Europe. However, coastal areas in Western Europe and Norway as well as the Alps are also highlighted as very vulnerable. In general, those countries for which a high to medium impact is projected seem to be less able to adapt than others for which the severity of impacts is less (ESPON & IRPUD, 2011).

Compared to a previous pan-European vulnerability assessment, which employed a much smaller number of indicators and has been published by DG REGIO (2009), the distributional pattern across Europe is rather similar, but the gradient in vulnerability levels between the European center and its periphery is even more distinct in the ESPON CLIMATE assessment (Figure 13).

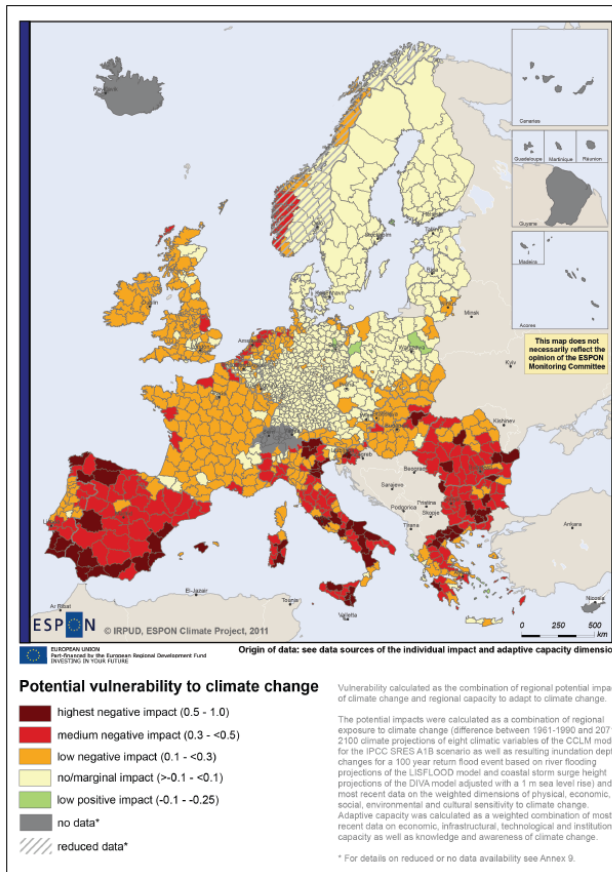


Figure 12: Overall potential vulnerability to climate change according to the ESPON CLIMATE project (ESPON & IRPUD, 2011).

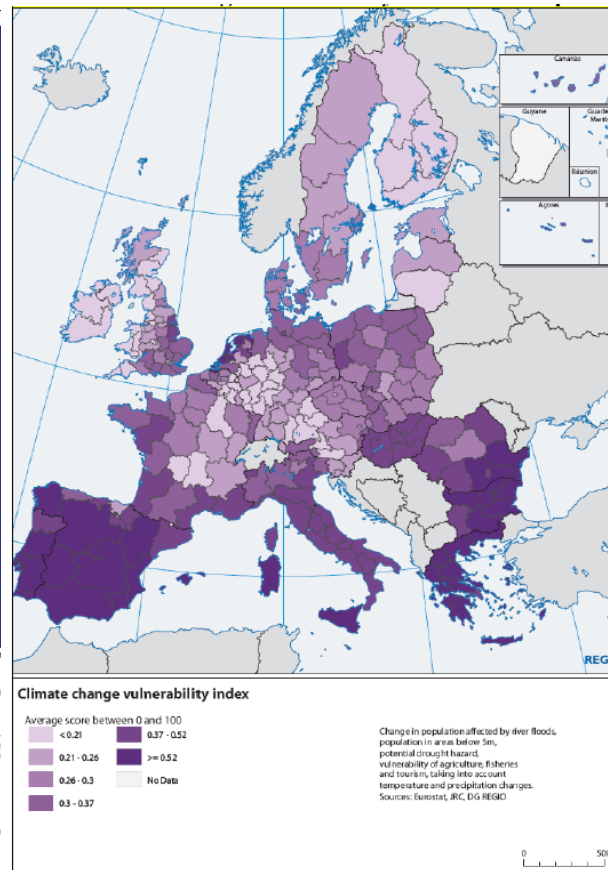


Figure 13: Map of the climate change vulnerability index in European regions according to a DG REGIO assessment (DG REGIO, 2009).

The impacts of climate change are thus not only distributed unevenly across Europe, causing different, and potentially severe, effects on socio-economic development, growth potentials, welfare of regions and human wellbeing (DG REGIO 2009), but in many cases those regions that are already less developed today and have lower adaptive capacities will be affected more severely. This scenario clearly runs counter to the objectives of territorial cohesion policy.

1.3 Vulnerability from the sector perspective

In previous pan-European assessments, the following economic sectors, systems and types of regions have been identified to be most climate-sensitive and most important in the context of territorial development: **agriculture; forestry; energy; tourism; water management; cities, the built environment, and infrastructure; human health; coastal areas; and mountains.** Based on recent information, the most important key impacts and vulnerabilities of these climate-sensitive sectors and systems of concern, as well as an overview of the rough spatial distribution of vulnerabilities across Europe, is summarized in the Annex to this synthesis note (cf. chapter 3). The information given in that Annex provides also important background information against which findings of the case studies on geographical specificities (cf. chapter 1) are discussed.

1.4 Current policy processes

In its **Europe 2020 Strategy**, the European Commission puts forward the three mutually reinforcing priorities of smart, sustainable and inclusive growth, defines headline targets and announces a number of flagship initiatives addressing a wide range of actions. Challenges related to climate

change are addressed repeatedly throughout the Strategy. While a strong focus is laid on accomplishing the climate change mitigation objectives of the European Union, the document also addresses the need to take action on adaptation to climate change. Recognizing that the effects of climate change constitute a threat to economic, territorial and social cohesion within the European Union and need to be tackled in order to safeguard realisation of growth potentials, the Commission commits itself to combating climate change, including by *“strengthening our economies’ resilience to climate risks, and our capacity for disaster prevention and response”* (European Commission, 2010a: p.15). Under the priority of sustainable growth, the Europe 2020 Strategy announces a flagship initiative aiming at a resource efficient economy that is also climate resilient, including via *“disaster prevention and response and by harnessing the contribution of cohesion, agricultural, rural development, and maritime policies to address climate change, in particular through adaptation measures (...)”* (European Commission, 2010a: p.16).

The European Commission is currently in the process of preparing a **European Adaptation Strategy** with the general aim to enhance the preparedness and capacity to respond to the impacts of climatic change of the EU, its Member States and regions, down to the local level. The planned EU adaptation strategy has three objectives, namely:

- *The knowledge objective:* Furthering the understanding of adaptation, improving and widening the knowledge base and enhancing access to adaptation related information. In this context it is important that the Strategy outlines paths from knowledge generation to knowledge use.
- *The policy and market objective:* Developing adaptation action and mainstreaming of adaptation into policies at EU level as well as capturing the potential of the market, market-based instruments and the private sector in strengthening adaptive capacity and climate impact preparedness and responses.
- *The facilitation and cooperation objective:* Facilitating and cooperating with Member States, regions, cities and all other relevant stakeholders in order to provide support and guidance.

The EU adaptation strategy is planned to be adopted in spring 2013. It shall be noted that the EU Adaptation Strategy will give high consideration to the issue of subsidiarity and will not re-invent the wheel, but mainly focus on using existing mechanisms to mainstream adaptation.

The preceding EU **White Paper on Adaptation to Climate Change** (European Commission, 2009a) presented the EU Adaptation Framework. It points out the need to promote strategies which increase the resilience of health, property and the productive functions of land, inter alia by improving the management of water resources and ecosystems (European Commission, 2009a). It is stressed that action at the EU level is necessary, although most adaptation measures will have to be taken at the national, regional and local level, because many impacts and adaptation measures have a cross-border dimension, affect single market and common EU policies, and because the most disadvantaged regions require solidarity from Member States. In a first phase (2009-2012), the basis for preparing a comprehensive EU Adaptation Strategy will be laid. This strategy will then be implemented in a second phase from 2013 onwards. The White Paper recognizes that adaptation is a cross-sector, cross-level and cross-scale policy and governance issue that requires integrating top-down policy strategies with bottom-up adaptation activities on regional level. In particular, it focuses on integrating adaptation into EU key policy areas and relevant policy measures.

Over the next years, EU Member States are expected to develop or expand their research in support of, and to take action on, **National Adaptation Strategies (NAS)** and policies. The EC is significantly supporting this through its White Paper. A regularly updated overview of progress towards the development and implementation of National Adaptation Strategies (NAS) is given online by the EEA (EEA, 2012). So far, twelve EU countries have adopted NAS: Belgium, Denmark, Finland, France, Germany, Hungary, Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom. Several others are expected to adopt an adaptation strategy in the next few years: Austria, Estonia, Ireland,

Latvia, and Switzerland in 2012 (EEA, 2010f). In most countries, existing NAS focus on impact or vulnerability assessments, identification of policy concerns and/or on (non-binding) policy recommendations; up to the time being, formulation of (binding) action plans is much rarer and appears to be left to a follow-up implementation phase. Even fewer NAS have inbuilt systems for monitoring and evaluation of implementation. The crucial questions of how adaptation actions can be designed, organised and financed, including the allocation of roles and responsibilities of actors on different governance levels, is to a large extent still unanswered in most countries (Swart et al., 2009).

Regional initiatives on climate change adaptation, hereafter called **Regional Adaptation Strategies (RAS)**, are a relatively recent development in Europe. Swart et al. (2009) have identified at least 29 existing regional and local adaptation strategies in Europe. Ribeiro et al. (2009) have studied 31 RAS in six selected European countries in order to develop guidelines for the process design and the elaboration of regional adaptation strategies. The emergence of RAS appears to be happening through two processes. Their development can be triggered by National Adaptation Strategies, which either provide the political legitimation for RAS or exert political pressure to respond to provisions stipulated by NAS (Greiving et al. 2010). On the other hand, there is evidence that many RAS are developed in parallel to NAS and often without clear governance linkages between the regional and national level (Ribeiro et al. 2009), which may indicate a gap and coordination deficit between top-down and bottom-up adaptation initiatives.

1.5 Analytical framework for analysing vulnerability to climate change across case studies

The following section outlines considerations on the interplay between geographic specificities, the socio-economic characteristics, processes and associated development opportunities and constraints in GEOSPECS areas, and the vulnerability of these territories to climate change.

Generally speaking, the vulnerability of territories to climate change is determined by the following main determinants:

- the exposure of territories to future changes in climatic stimuli;
- the presence and socio-economic role of climate-sensitive sectors, systems, and social groups within these territories, and the degree of their climate-sensitivity;
- potential changes, which can be positive or negative, to climate-sensitive sectors, systems, population groups and related processes resulting from their exposure to changes in climatic stimuli or to direct effects triggered by these climatic changes (such as sea level rise, floods and other natural hazards);
- the capacities within the affected territories to adapt to the expected effects of climate change.

Exposure to climate change is determined by two main factors: Firstly, by the geographic position of a territory in terms of longitude, latitude and elevation, and thus by its location in relation to the large-scale climate zones of Europe. On a more local level, exposure is modified by topographical and terrain features. Secondly, exposure is determined by the magnitude and rate of future anthropogenic climate change, which depends on future global development paths in terms of greenhouse gas emission levels and thus on the effectiveness of climate change mitigation efforts. From the viewpoint of vulnerability and adaptation, exposure is an external driving force impacting on territorial economies that can not be influenced by regional development, but only mitigated. It follows that socio-economic characteristics and processes related to geographic specificities do neither affect exposure nor its regional variation across Europe. In fact, all territories are exposed to external stresses caused by different climatic changes, with the differences in regional expressions of

exposure depending on physical factors of the climate system and geographical position of a territory.

Information on exposure to climate change will be taken from existing climate scenarios. Regarding regional distribution of changes in climatic stimuli across Europe, the climate projections produced within the ESPON CLIMATE project will be used as reference frame. The project has modeled the future exposure to climate change by using the CCLM model, driven by the global climate model ECHAM5/MPI-OM, and for the A1B emission scenario. It should be noted that the A1B SRES emission scenario (Nakicenovic et al., 2000) describes a too optimistic future emission pathway and is not realistic anymore, because actual human greenhouse gas emissions have in fact already reached the high-end of the IPCC emission scenarios. The model results can thus be interpreted as low-end estimations of future climate change in Europe.

Sensitivity describes the responsiveness of the valued attributes of a territory to climatic stimuli and their future changes. Not every element of a system of concern is sensitive to every climate-related stimulus, and the elements of a system are usually not equally sensitive to a given climatic stimulus. Moreover, the same stimulus may affect the same element differently, depending on the present climatic situation and various local factors within a given territory. Judgments about climate sensitivities emerging from the case studies will thus build on theoretical cause-effect relationships between a given climatic stimuli, its projected change trends, and defined elements of territorial development within a region of concern, i.e. based on literature it will be evaluated in a qualitative way which stimulus affects which element of the system, and in what way.

Depending on the system under consideration, different dimensions of sensitivity may be distinguished. For instance, in the ESPON CLIMATE project physical, social, environmental, economic and cultural dimensions of sensitivity have been investigated.

Physical sensitivity to climate change is strongly determined by the physical exposure of populations, settlements, infrastructure, and material assets to climate-driven hazards and extreme events, such as coastal flooding and storm surges in coastal areas, flood hazards in flood-prone river basins, flash floods, and gravitational mass movements (landslides, debris flows, rockfall, avalanches etc.) in mountain areas. The higher the damage potential and the exposure to climate- or weather-triggered hazards, the higher regional sensitivity will be. It is assumed that in some types of regions characterized by geographical specificities, such as coastal areas, exposure of high-density physical structures and population to climate-triggered extreme events will regularly be higher than in other area categories.

While physical structures are particularly sensitive to extreme weather events and disaster situations triggered by these, the *economic sensitivity* can be conceptualized as being to a large extent dependent on changes in the other dimensions of sensitivity. The economic sensitivity of a region can thus be regarded as second order effects of other climate-sensitive responses of other dimensions. For instance, a region that is physically sensitive to climate change because its infrastructure is exposed to increased risks from floods or coastal surges is assumed to be also economically climate-sensitive, because damages to e.g. transport systems will have consequences on the regional economy, such as damage and repair costs, reductions of accessibility, economic losses to businesses, etc. Due to the close correlation in particular between the impacts of extreme events on physical and also social dimensions on the one hand and economic sensitivity on the other hand, in fact often the same indicators can be used as a proxy for the economic sensitivity of a region. When analysing the case studies (cf. chapter 2), an increasing vulnerability of the built environment and infrastructure to climate-induced extreme events is thus regarded as an indication that also economic vulnerability of a region is likely to increase.

Furthermore, some economic sectors are in general more climate-sensitive than others. Due to direct biophysical impacts of climate change, this applies particularly to all economic activities that are building on natural resources and ecosystem services. Above all, the primary production sector,

i.e. forestry, agriculture and fisheries, is highly climate-sensitive because its production possibilities are strongly dependent on environmental conditions. Further climate-sensitive key sectors include tourism, energy, and water management. In previous pan-European climate change assessments (e.g., Schröter et al., 2004; EEA 2010f; EEA/JRC/WHO, 2008; DG REGIO, 2009; ESPON & IRPUD, 2011), the aforementioned sectors have thus been identified to be the most climate-sensitive key sectors in the context of territorial development. Other sectors will be affected by climate change in a more indirect way through the supply and demand chains. In the analysis of the case studies (cf. chapter 2), a strong presence and important role of the agriculture, forestry, tourism, energy, and water sectors within regional economies will thus be evaluated as a determinant of economic vulnerability. Also, regions with a high share of employment in these sectors will face broader social effects from climate change because the larger workforce dependent on these sectors will be directly affected. Provided that there is relevant exposure to climate change, a high dependency of regional economies on one of these sectors, which can be measured in terms of share in regional GVA, share in GDP per capita, employment share etc., is thus regarded as an indication of economic vulnerability to climate change.

Environmental sensitivity relates to the status of natural habitats, ecosystem functioning and ecosystem services. As regards biodiversity, all present biotic communities have evolved and established their current distribution patterns under climate conditions of the past. It can thus be assumed that there is considerable sensitivity of most plant and animal species communities to *any* climatic changes. Among the most-climate sensitive species are endemic and highly specialised species, i.e. species with a small ecological amplitude, small distribution areas, and limited options for re-distribution. All types of territory that are rich in biodiversity, have a high share of endemic and specialised species and rather isolated habitats are thus regarded as highly climate-sensitive. Based on the double premise that each protected area is established to protect specific habitats and their species communities as they are today, and that climatic changes indeed alter these habitats and biotic communities (although they are not equally sensitive to climate change), the size and area share of protected areas (such as Natura 2000 sites) can be used as a further proxy indicator of environmental sensitivity to climate change, as it has been applied in the ESPON CLIMATE project (ESPON & IRPUD, 2011).

In general, if a sector or system has been sensitive to weather- and climate-related impacts in the past and is continuing to do so under present climate conditions, this is a strong indication that sensitivity is likely to increase in the future, provided that climatic stimuli are expected to change further in the same direction. Information on past and present climate sensitivities and impacts emerging from the case studies will thus be interpreted as indicating an increase in vulnerability.

Summing up, the search pattern used in analysing sensitivity to climate change in the case studies will mainly rely on the following attributes of case study regions to identify territorially relevant climate-sensitivities:

- Physical exposure of settlements, infrastructure, populations, and material assets to climate-driven extreme events and hazards;
- Role and importance of climate-sensitive natural resources, natural assets and ecosystem services for socio-economic processes within a region;
- Presence and role of climate-sensitive economic sectors (agriculture, forestry, tourism, energy, water management) within a region, and a region's socio-economic dependency on these sectors;
- High levels of biodiversity and high area share of protected nature conservation areas;
- Past and current climate sensitivities, including past experiences from coping with their effects.

Potential impacts of climate change result from combining relevant climate change signals, i.e. future exposure to climate change according to available climate projections, with indications of climate sensitivity. In the discussion of the case studies, this will be done in a mainly qualitative way. Significant impacts on specific economic activities or systems, such as winter tourism, coastal cities, or mountain habitats, will be examined as to the specific roles these sectors and systems of concern play in socio-economic processes and associated development potentials and constraints within a region. By cross-analysing case studies from the same and different GEOSPECS territories, the search pattern will be focused on interactions with geographic specificities, i.e. on whether there are regular and systematic patterns of interrelations between climate change impacts on the one hand and socio-economic processes that are typical of territories with geographic specificities on the other hand.

Adaptive capacity is the ability or the potential of a system to respond successfully to climate variability and change, and includes adjustments in both behaviour and in resources and technologies. Adaptive capacity also enables regions to take advantage of opportunities or benefits from climate change, such as a longer growing season in agriculture or improved climatic conditions for summer tourism (IPCC 2007b). A high adaptive capacity can decrease overall vulnerability to climate change, although there may be severe potential impacts. On the other hand, a low adaptive capacity combined with only moderate impacts can result in high vulnerability. Among all components of vulnerability, adaptive capacity has the strongest linkage to socio-economic characteristics and processes. The capacity to adapt is influenced by economic resources, financial capital, social capital, institutional capital, governance structures, government effectiveness, human resources, technology, and political willingness to take adaptive action. Also socio-cultural attributes like traditions, values, perceptions, and levels of cognition affect adaptive capacity (Kelly & Adger, 2000; Jones, 2001; Yohe & Tol, 2002; Smit & Wandel, 2006). In addition, quality and performance of infrastructure (e.g. health services, emergency services, transport infrastructure, communication infrastructure) influence the coping capacity, i.e. the ability to respond to and recover from occurrence of disaster and damage events (ESPON & IRPUD, 2011). Generally speaking, it is assumed that the higher the level of economic, technological, human, social, infrastructural, and institutional resources is, and the more social groups and individuals within a region have access to these resources, the larger adaptive capacity will be. Adaptive capacity is seen as a necessary prerequisite of designing and implementing adaptation strategies, but a high adaptive capacity does not necessarily translate into successful adaptations to climate change (Adger et al., 2007). Adaptive capacity is a potential that needs to be realised and exploited, but which may be inhibited by various barriers, constraints and limits to adaptation.

Adaptive capacity is highly differential. i.e. it is usually unevenly distributed across and within countries and societies, across and within regions, as well as between human populations, e.g. in terms of age, class, gender, health and social status (IPCC, 2007b). The distribution of adaptive capacities is strongly determined by social and economic processes and specific contextual factors, which can be highly localized.

Literature distinguishes generic and specific adaptive capacity. Generic adaptive capacity of a region is influenced by factors related to e.g. economic performance, income, education, and health levels within a region, whereas specific adaptive capacity relates to more concrete adaptation options that are available to respond to specific climate change impacts on specific sectoral aspects (Adger et al., 2007). In the analysis of the case studies, estimations of the capacity to adapt to climate change will mostly be based on information related to generic aspects of adaptive capacity. However, it should be noted that respective conclusions drawn from the case studies should be interpreted with appropriate caution, because single indications of generic adaptive capacity, such as high income per capita, are neither necessary nor sufficient indicators of adaptive capacity within a region (Moss et al., 2001). According to Tol & Yohe (2007), some elements of adaptive capacity are not substitutable: an economy will be as vulnerable as the “weakest link” in its resources and adaptive capacity.

Judgments of adaptive capacity will also make use of indications from case studies whether any actions of adaptation have already been implemented, or whether national or regional adaptation strategies exist.

Overall **vulnerability** to climate change results from combining the expected impacts with present levels of adaptive capacity. Due to the predominantly qualitative style of analysis, in the discussion of the case studies there is not always a sharp distinction drawn between sensitivities, impacts, and vulnerabilities.

As all components of vulnerability – exposure, sensitivity, and adaptive capacity – vary between regions, as do the environmental and socio-economic conditions that determine these components of vulnerability, it follows that also the resulting vulnerabilities are expected to be unevenly distributed in space and to vary considerably between regions and sectors. This expectation is confirmed by literature and previous pan-European impact and vulnerability assessments (e.g., EEA 2010f; EEA/JRC/WHO, 2008; IPCC, 2007b; ESPON & IRPUD, 2011). Vulnerabilities to climate change depend considerably on relatively specific geographical and sectoral contexts (IPCC, 2007b). In some sectors and regions, also new opportunities may occur. The case studies will be examined as to whether there are vulnerabilities that are specific to areas with geographic specificities, and whether there are GEOSPECS areas that appear to be regularly more or less vulnerable than EU “mainstream” territories.

Climate change is in many cases an additional stress that exacerbates existing pressures by other environmental change and socio-economic development trends, and vice versa (EEA 2007; IPCC 2007b). For example, problems of water scarcity due to climate-induced lower water availability may be aggravated by high water consumption levels from tourism or by rising water demand of society due to population growth; or threats to coastal habitats from sea level rise may reinforce existing land pressures and environmental impacts from intense human utilisation and development of coastal zones. Vulnerability to climate change thus typically occurs within a multiple stress and multiple-cause environment, i.e. it interacts with other sources of stress and drivers of change. These will thus be taken into account when discussing the case studies.

1.6 Research questions

1. Are there climate change related vulnerabilities that are specific to certain areas with geographic specificities? Are there GEOSPECS territories that are in certain regards more vulnerable compared to the European average? Or is vulnerability rather governed by other factors than geographic specificities?
2. Are there common patterns in the ways that socio-economic processes, development opportunities and constraints related to geographic specificities interact with climate change impacts and vulnerabilities?

1. Review of relevant findings from the case studies

In the following section, the case studies conducted within the GEOSPECS project are analysed in a qualitative way against the background of existing information on future exposure to climate change and on climate change impacts and vulnerabilities in Europe. Assessment results provided by the ESPON CLIMATE project (ESPON & IRPUD, 2011) are used as an important reference frame and are referenced, wherever helpful; all respective footnotes refer to the Main Scientific Report of the CLIMATE project. Selected quantitative evidence supporting specific judgments has been referenced and added throughout the text, wherever available and useful. The Annex (cf. chapter 3) provides a summary of further background information on climate change impacts on specific economic sectors that has been used in the analysis of the case studies.

Coastal areas

A common key vulnerability of European **coastal areas** that is inherent to their geographical specificity, i.e. to their location in the transition zone between the land and the sea, results from their exposure to **sea level rise**, **coastal storm surges** and **flooding of low-lying coastal zones**. A significant and increasing share of the European population – 19% or 86 million people – lives within a 10 km coastal strip (EEA, 2006, 2010a). The expected number of people at risk of being flooded is simulated to grow annually, reaching 0.8 million in 2100 under the A2 scenario, which is 70 times higher than in 2000 (EEA 2010f) (cf. Figure 14). The concentration of physical structures and economic activities in parts of the European coastline accounts for a high damage potential. Figure 15 shows an estimation of the potential economic losses to coastal flooding in Europe under current climate (Barredo et al., 2009). However, the severity of potential impacts differs by region, depending much on e.g. geographic position, physiographic, geological and morpho-dynamic features of the coastline, and density of settlements, infrastructure, and population in exposed areas. While the potential impacts may not be severe for many parts of Europe's coastline, there are, however, coastal regions in e.g. Germany, France, Belgium, the Netherlands, Denmark, Norway, and Northern Italy, where due to high concentrations of population and physical structures the physical sensitivity to climate change is very high. As has been confirmed by the ESPON CLIMATE project, in comparison between European regions the highest potential impacts of climate change on the built environment, material assets, and the population are located in close proximity to the coast and are closely related to sea level rise adjusted coastal storm surges and coastal riverine inundations (ESPON & IRPUD, 2011)⁴¹⁷. The highest risk occurs in those areas where exposure to both hazard sources coincides. Due to the very dense and intense urbanised development, including in polders on the landward side of the coastal zone, in particular the Belgian coastal area is highly vulnerable to sea level rise, increased storm frequency, coastal erosion, and river floods caused by more winter precipitation. The resulting risks affect all economic sectors and activities in the coastal zone. Since the Belgian coastline with its ports, port-related developments, and the high capacity road network connecting to the hinterland is a logistics and distribution focal point of national and even European economic significance, there is high economic vulnerability

⁴¹⁷ ESPON & IRPUD (2011): Map 9: Change in regional exposure to coastal storm surge events, p. 29; Map 12: Combined physical sensitivity to climate change, p. 80; Maps 17 – 21: Potential physical impacts of climate change, pp. 86-90; Map 24: Potential impact of sea level rise on population, p. 93.

beyond the scale of the case study area itself. Due to lower physiographic exposure towards storms and extreme waves of the North Atlantic, and because of the concentration of population centres in a limited number of coastal locations, the overall exposure of settlements and infrastructure to coastal storms may be less severe in the Irish Sea coastal area, but nevertheless it is affected by similar, albeit less strong climate change impact processes as the Belgian coastline. In particular port towns, which are the centres of economic and settlement activities and function as “growth engines” of regional economy, could be affected.

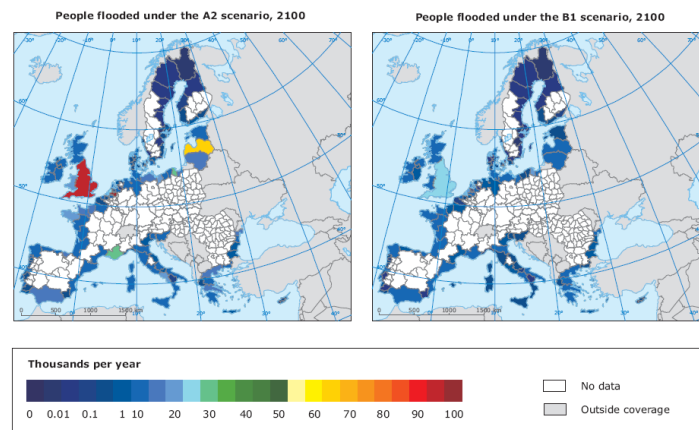


Figure 14: People expected to be at risk of coastal flooding without adaptation until 2100 under two different climate scenarios (EEA, 2010f; source: Hinkel et al., 2010, 2009).

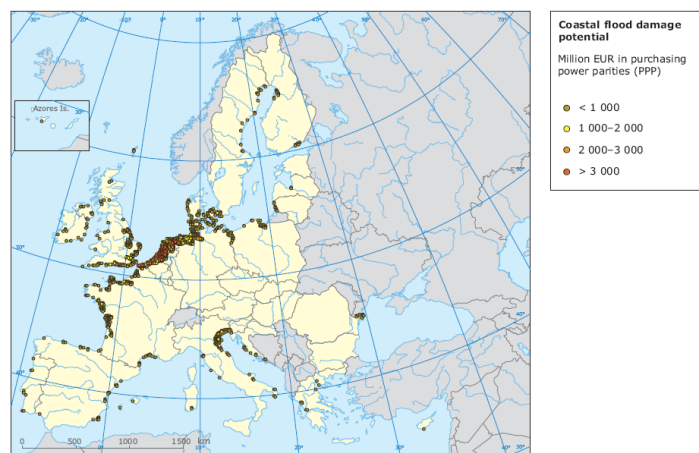


Figure 15: Estimated coastal flood damage potential in Europe for a 100-year return period storm surge, without defences and under current climate conditions (EEA, 2010f; source: Barredo et al., 2009).

In both the Belgium and the Irish case study areas, **beach erosion** and changes to siltation and sedimentation processes will increasingly alter **coastal ecosystems**, cause losses of land resources, habitats and biodiversity, and impact on a range of ecosystem services. In many cases, climate change is likely to exacerbate existing environmental pressures on coastal regions. In particular along the Belgian coast, many coastal habitats have already been lost to structural defence measures. It is also expected that on more local levels coastal aquifers and estuaries could be negatively affected by increasing **saltwater intrusion**. Resulting threats to groundwater quality will negatively affect drinking water supply in densely

populated coastal agglomerations, which are mostly areas where water consumption levels already exceed natural water availability within the same regions by multiple factors.

Measured on the basis of a range of socio-economic indicators, **adaptive capacity** in both case study areas is considered to be comparatively high (ESPON & IRPUD, 2011)⁴¹⁸. This is particularly the case in Belgium, where coastal defence structures have been built in the past and are at present partly being upgraded. Both maintenance and new investments in coastal protection structures entail considerable annual financial costs. Because of the associated environmental impacts, in the future a need for “softer”, i.e. more environmentally sustainable coastal defence measures is seen. The presence of an integrated master plan for the future coastal safety of Flanders as well as climate change adaptation policies that are in place in the UK and Northern Ireland (although not in the Republic of Ireland) indicate the presence of problem awareness and response capacity. In the Irish Sea region, a general lack of coordinated cross-border and cross-sector governance approaches may be seen as a barrier to adaptive action. In general, instruments specifically available to coastal areas, such as Integrated Coastal Zone Management and Maritime Spatial Planning, provide appropriate entry points for action on adaptation to climate change, but the full potential of these instruments still remains to be exploited. Despite comparatively high levels of adaptive capacity, due to the magnitude of potential climate change impacts especially on the Belgian coastal area the overall vulnerability remains high⁴¹⁹. In general, coastal regions are among the most vulnerable regions in Europe.

Outermost areas

Europe’s outermost areas are located in different global climate zones and are thus outside the model area usually covered by European climate projections. Due to the lack of climate scenario data on the outermost territories in European climate change assessments, the following information on recent climatic trends, future exposure to climate change and projected impacts is extracted from the 4th Assessment Report of the IPCC (2007a, 2007b). Based on the assumption that the climate responses of the Canary Islands will occur within the larger picture provided by climate projections for the Mediterranean and North Africa, it is very likely that warming on the Canary Islands will be larger than the global annual mean warming in all seasons. On the African continent, warming will be strongest in drier, subtropical regions. Based on the moderate A1B emission scenario, simulated median temperature increase in Mediterranean Africa and the Northern Sahara until 2100 lies between 3°C and 4°C (Boko et al., 2007), but warming values could be lower on the Canary Islands due to the moderating effect of the ocean (cf. Figure 16). The Canaries are very likely to also be affected by a robust drying signal, which prevails in entire Mediterranean and Northern Africa, extends down to lower latitudes along the African West Coast, and is expected to cause a significant decrease in annual rainfall amounts. Like in most other semi-arid regions, the further drying trend is anticipated to be stronger than in currently moister climatic regions (cf. Figure 16). A proportionally larger decrease in the modelled number of rain days indicates compensation between intensity and frequency of rainfall events, making thus an increase in the intensity of high-rainfall events on the Canaries possible

⁴¹⁸ ESPON & IRPUD (2011): Map 48: Overall capacity to adapt to climate change, p. 137.

⁴¹⁹ ESPON & IRPUD (2011): Map 49: Potential vulnerability to climate change, p. 147.

(Boko et al., 2007). The main climate change impacts to be expected for the Canary Islands are thus heat-related impacts, decreasing water availability and increasing water stress for both ecosystems and society, and a possible increase in hazard potentials related to extreme weather events. In addition, like other islands, the coastal zones of the Canaries are likely to be exposed to higher risks related to mean sea level rise and extreme sea level events (Parry et al., 2007).

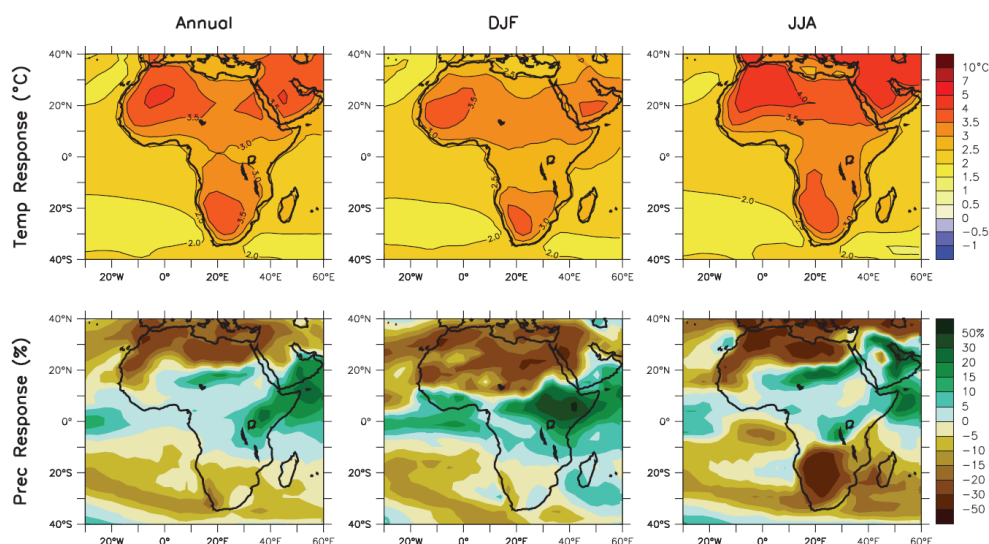


Figure 16: Temperature and precipitation changes over Africa from the MMD-A1B simulations. Top row: annual mean, winter (DJF) and summer (JJA) temperature change between 1980 to 1999 and 2080 to 2099, averaged over 21 models. Bottom row: same as top, but for fractional change in precipitation (Source: Parry et al., 2007; in IPCC, 2007a: Chapter 11, p. 869).

Warming in almost entire South America during this century is also very likely to be stronger than the global mean warming. Projected temperature increase for the northern part of South America varies from 1.8°C to 5.1°C under the A1B scenario, with a median warming value of 3.3°C (cf. Figure 17). Change of annual mean precipitation over northern South America, including the Amazon rain forests, is subject to marked regional variations and considerable uncertainty, but in particular near the Caribbean Coasts annual rainfall could decrease by up to -10 to -15 % (Magrin et al., 2007), which implies a significant risk of declining precipitation also for large parts of French Guyana (cf. Figure 17). Over the recent decades, Latin America has been subjected to climate-related impacts of increased El Nino occurrences, and highly unusual extreme weather events (droughts, floods, hailstorms, hurricanes) have affected different parts of the sub-continent. Historically, climate variability and extremes have had negative impacts on populations and economies in affected areas (IPCC, 2007b). Climate change studies assessed in the last IPCC Assessment Report indicate that the frequency in the occurrence of extreme events will increase in the future (Magrin et al., 2007). Sea-level rise on Latin American coasts has accelerated over the past decades, which suggests an increase in the vulnerability of low-lying coastal zones, which are already subjected to increasing storm surges, including intensifying tropical cyclone and hurricane activity. Low-lying coastal areas with intense human utilisation are identified as key vulnerability hotspots in Latin America by the 4th IPCC Assessment Report (Nicholls et al., 2007; Parry et al., 2007).

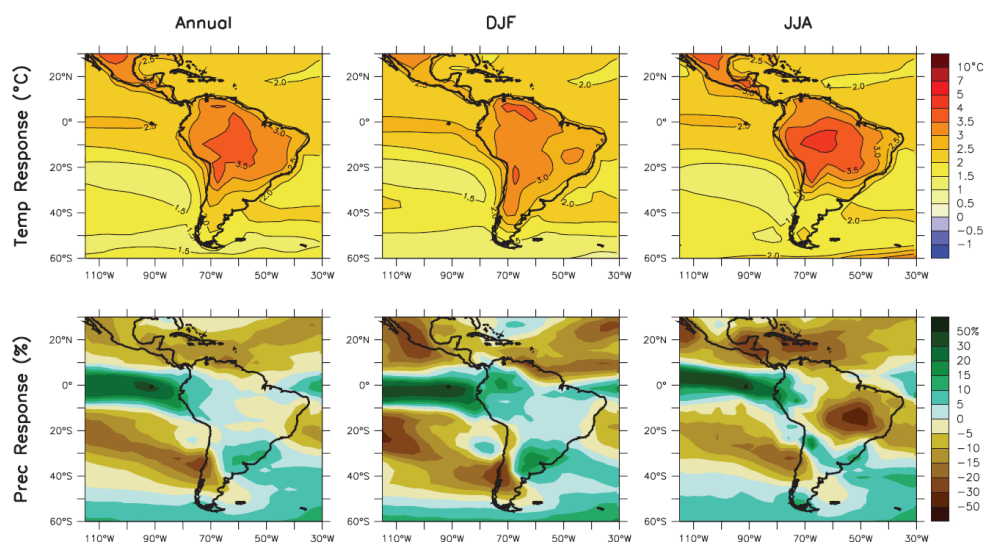


Figure 17: Temperature and precipitation changes over Central and South America from the MMD-A1B simulations. Top row: annual mean, winter (DJF) and summer (JJA) temperature change between 1980 to 1999 and 2080 to 2099, averaged over 21 models. Bottom row: same as top, but for fractional change in precipitation (Source: Magrin et al., 2007; in IPCC, 2007a: Chapter 11, p. 895).

Despite many differences, common characteristics of both case study areas that are relevant to their vulnerabilities to climate change comprise the following: concentration of population, urban development, infrastructure and economic activities in coastal areas; extremely high biodiversity richness and a high area share of protected areas; and socio-economic development constraints resulting from their status as outermost areas, in particular smallness and isolation of markets with strong external dependencies, which decrease their adaptive capacity and may make their economies more vulnerable to the socio-economic consequences of climate change impacts.

In both French Guyana and the Canary Islands, the vast majority of population, settlements, infrastructure, and industrial and trade facilities are concentrated in the **coastal zones**. Urbanisation and high population densities make these coastal areas highly vulnerable to gradual sea level rise and to extreme climate-triggered events that are adjusted by the rise of mean water tables. Potential physical impacts from extreme waves and their increasing landward reach, storm surges, tropical cyclones (in the case of French Guyana), coastal inundations, and new or accelerated coastal erosion increase the risk of damage to the built environment, material assets and human lives. This in particular applies to French Guyana, where almost the entire population and transport infrastructure is located within a small and low-lying coastal land strip. The possible intensification of heavy rainfall events, which appears likely in both French Guyana and the Canary Islands, could further amplify the risk of floods and flash floods in coastal areas from increased surface and river run-off from interior areas (especially from steep mountain slopes on some of the Canary islands). Protection and defence measures against coastal impacts as well as the occurrence of serious damage events can imply considerable financial costs. It also implies the risk of additional burdens on regional economies that are already affected by higher production and transport costs and by low(er) GDPs per capita. In both case study areas, lack of habitable terrain due to prevailing mountainousness and rainforests prevent large-scale retreat or relocation of population and settlements to more interior areas. Coastal and marine ecosystems in both case study areas are already under increasing and multiple

pressures from urban development, intense tourism, agriculture, and other human activities. These human-induced pressures will in the future be exacerbated by climate change impacts from coastal erosion, altered coastal morphodynamics, sea surface water warming, and local saltwater intrusion in coastal aquifers and estuaries.

In particular in mountainous inner island areas of the Canaries, higher rainfall intensities in combination with contracting forest land cover (due to water stress and forest fires) could in the future result in higher **hazard potentials** to infrastructure and settlements from **gravitational mass movements**, such as landslides, debris flows and rockfall. Possible consequences may include aggravation of existing accessibility problems and therewith of residential attractiveness in inner island territories, increased road infrastructure maintenance costs, costs for structural hazard protection measures, and decreasing attractiveness for tourists.

The most imminent and most severe impact of climate change on the Canary Islands is expected to be a significant increase in **water stress**, resulting from the combined effects of higher mean and extreme temperatures, reduced annual precipitation, and higher evapotranspiration. Against the backgrounds of a semi-arid subtropical climate as well as population growth, decreasing water availability on the one hand and increasing water demand from residents and about 10 million tourists per year on the other hand will increase current water provision and distribution problems on the archipelago. It appears almost inevitable that the need for extending desalinisation capacities will increase, which is likely to raise water prices, production costs and energy demand. Higher energy demand for desalinisation of drinking water, but also to satisfy an increased demand for cooling, will in turn be responsible for an even stronger dependency on energy imports than is the case today. Higher water and higher energy prices would fortify existing problems of high production costs that are inherent to the economies of small, isolated and fragmented markets.

Apart from the current moratorium for **tourism** growth, bottlenecks in water supply could in the future very well be a major constraining factor for further development of the tourism sector on the Canary Islands. Besides its effects on water consumption, due to its outstanding economic importance tourism is one of the most climate-sensitive economic sectors on the Canaries. Similar to the Mediterranean, due to extreme summer heat the climatic conditions are likely to become less favourable for tourism during previous peak summer months, whereas conditions during spring, winter and autumn could gain in attractiveness. At present, it remains uncertain whether such expected seasonal shifts in visitor flows will mean a net loss or net gain for the Canaries, and whether they could help to balance touristic capacity utilisation better over the year.

More severe drought-like conditions will also increase the risk of **forest fires**, which are reportedly becoming more frequent in recent years on the Canary Islands, but also in the Amazon area (Magrin et al., 2007). Higher frequency of wildfires causes risks to settlements and infrastructure, and it accelerates landscape degradation. Agriculture and forestry would in principle be strongly affected by generally drying conditions, in particular on the Canaries, but potential impacts of climate change on these sectors are considered to be low because their economic importance is at best only marginal. However, with a view to French Guyana, it must not be overlooked that the vulnerability of small-scale, subsistence-oriented farming is in general very high due to low adaptive capacity. An assessment of climate responses of

crop productivity has come to the conclusion that rice yields in Guyana would decrease by 3% until 2040 and by 16% until 2100; for sugar cane the respective reductions in yields would be 30% and 38% (Magrin et al., 2007). Possible responses of the Amazonian rainforests to climate change are subject to high uncertainties and a matter of scientific dispute (IPCC 2007a), not the least because of their crucial role in the global carbon cycle and potentially strong feedback effects with the global climate system, which in the worst case could constitute potential tipping points for the earth's climate as such.

Climate change may impact on **human health** primarily via heat stress effects on the Canary Islands and primarily via new or additional climate-related, e.g. food- and vector-borne diseases in French Guyana. Reduced quality, coverage and accessibility of health services, including of emergency services, may contribute to increasing the vulnerability of the population in both outermost territories.

Outermost regions are rich in **biodiversity** and have more endemic species than the whole of continental Europe (European Commission, 2010g). As they are situated in other biogeographic zones than continental Europe, their habitats and species are markedly different. Very high biodiversity levels and presence of a large number of endemic species are favoured by the fact that most outermost regions are islands, such as the Canary Islands. Many of the plant and animal species are already at risk from multiple human-induced pressures, such as touristic development-related land pressures on the Canaries. Climate change will in many cases exacerbate these existing pressures and is anticipated to significantly increase the risk of species extinction and biodiversity loss, especially regarding many highly specialized species on the Canary Islands. The dimension of risks to biodiversity in French Guyana is highlighted by assessments from Latin American rainforest ecosystems: By 2100, 43% of 69 tree plant species studied could become extinct in the Amazonia (Miles et al., 2004). Up to 40% of the Amazonian forests could react drastically to even a slight reduction in precipitation, meaning a rapid shift from tropical ecosystems to an entirely other steady state (Magrin et al., 2007). Only very limited adaptation options are available to respond to climate change impacts on ecosystems and their biodiversity.

From the information provided by the case studies, it can be concluded that **adaptive capacity** levels differ considerably between both areas, but that adaptive capacity in outermost territories is generally lower than on the European average. Due to the comparatively best economic performance among all outermost territories, adaptive capacity on the Canary Islands is considered to be much higher than in French Guyana. Favourable factors include the highest GDP per capita of all outermost territories, relatively good public service offers, and higher education standards. However, compared to continental European standards, the adaptive capacity on the Canaries is rather limited, which appears often closely connected to socio-economic disadvantages related to the geographic specificity of outermostness. In contrast, French Guyana combines many attributes typical of developing countries, such as low income levels, widespread poverty, high unemployment rates, lack of access to education, lack of a qualified work force, low penetration rate of ICT, low-capacity infrastructure, etc. Altogether, limited access to various relevant resources (financial, human, knowledge, technology, institutional) indicates a low adaptive capacity. Particular strengths that could be used to generate leverage effects regarding adaptation include French government structures and governance traditions as well as the presence of the highly qualified space flight sector and of a remote sensing and monitoring research cluster.

Mountain areas

It has been shown that in many mountain areas observed temperature trends and anomalies have an elevation dependence, causing stronger temperature increase in higher elevations (IPCC, 2007a). Many European mountain areas are thus more strongly exposed to climatic changes than other types of territories. For example, the observed trend of warming in the Alps has been considerably higher than the European average. In Austria, the increase in average annual temperature over the last 150 years was approximately 1.6 – 1.8°C (CLISP, 2011a; Kromp-Kolb & Formayer, 2005; Umweltbundesamt, 2007a), compared to 1°C over land and sea in the European average. This makes the European Alps one of the fastest warming regions in the world. Projections of future temperature increase in the mountain case study areas are influenced by the larger-scale pan-European pattern of exposure to climate change. Under the moderate A1B scenario, the strongest warming with temperature increases up to 3.5°C until 2100 is projected for the West Stara Planina in South-East Europe and the Jura Massif in Central Europe, whereas temperature change in the Scottish Highlands is expected to be lower (up to 2,5°C) (ESPON & IRPUD, 2011)⁴²⁰. However, under a stronger emission scenario summer mean temperature in the Highlands could increase by the same value already until 2050 (UKCP 2009). In comparison to the case study areas, even under optimistic greenhouse gas emission pathways the Alpine Space could see an increase in annual mean temperature by 3.5°C already at 2050, with an upper warming range at 7°C under high-emissions scenarios until 2100. The Tatra Mountains, the Jura Massif and the Scottish Highlands are very likely to experience significant increases in winter precipitation amounts by up to 20%, while summer precipitation is projected to decrease strongly in the Tatra and the Jura and could decrease moderately in the Highlands⁴²¹ (ESPON & IRPUD, 2011; UKCP, 2009). The seasonal shift in maximum precipitation amounts from summer to winter, which will affect entire Central and Eastern Europe, increases considerably the likelihood of winter and early spring floodings in these areas, and it decreases water availability and average run-offs of many river systems during summer. Like most of South-East Europe and the Balkans, the West Stara Planina is very likely to face significant decreases in overall annual precipitation amounts, which affects all seasons and will be strongest in summer⁴²² (ESPON & IRPUD, 2011). Combined with a more pronounced warming trend, this will create more frequent and more severe drought-like conditions and can cause significant increases in water stress for ecosystems and society. Heavy precipitation events are expected to become more likely in all case study areas⁴²³, regardless of changes in number of rainfall days, i.e. although it may rain less often in summer, when rainfall does occur, it may tend to be more intense. The annual mean number of days with snow cover is projected to decrease strongest in Scandinavia, the Baltic

⁴²⁰ ESPON & IRPUD (2011): Map 1: Change in annual mean temperature, p. 21.

⁴²¹ ESPON & IRPUD (2011): Map 4-5: Relative change in annual mean precipitation in winter months and in summer months, pp. 24-25.

⁴²² ESPON & IRPUD (2011): Map 5: Relative change in annual mean precipitation in in summer months, p. 25.

⁴²³ ESPON & IRPUD (2011): Map 6: Change in annual mean number of days with heavy rainfall, p. 26.

states and the Alpine countries, but decreases of up to 30 days and more are also likely to occur in all of the mountain case study areas⁴²⁴ (ESPON & IRPUD, 2011).

Figure 18 and Figure 19 illustrate projections for temperature and precipitation change for the Alps, which are not represented in the case studies, but are mentioned here because they are one of the most important mountain areas in Europe. Temperature shows a clear warming trend in all seasons with an acceleration of warming after 2030. The strongest warming is expected for summer with increases between 1.3 °C and 3°C until 2050. In line with the temperature trend of the past, the central Alps are in most scenarios warming faster than the foothills of the Alps (Figure 18). Model projections about future changes in precipitation patterns are in general more uncertain, which holds particularly true for complex mountain topographies, and nowadays as in the future, variation in precipitation patterns between regions can be high. Five out of six scenarios processed in the ETC Alpine Space project CLISP show a trend toward a decrease of precipitation of up to -55mm for summer. Like most of Central Europe, the Alps will see an increasing seasonal shift in precipitation amounts, with summers becoming generally drier and winters tending to become wetter. Trends in average yearly precipitation amounts are less pronounced and are expected to differ between the Northern and the Southern part of the Alps, reflecting on a more regional scale the large-scale dipole character of the climate in Europe: annual precipitation could slightly increase in the North, whereas it could significantly decrease in the South (Figure 19) (CLISP & EURAC, 2011a, 2011b).

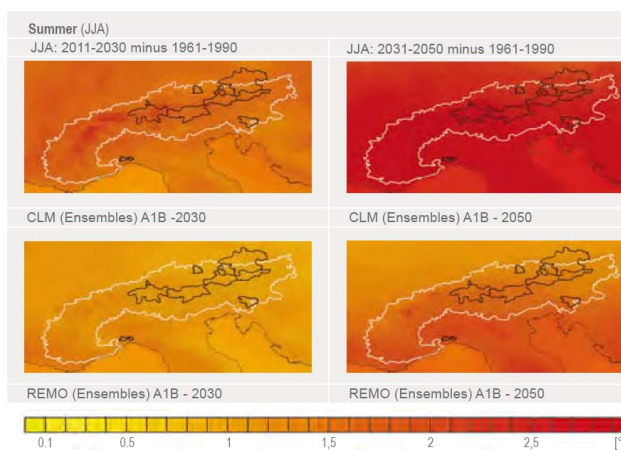


Figure 18: Seasonal (Summer, JJA) absolute temperature changes in the Alps for two climate scenarios. Left: 2011-2030 minus 1961-1990; right: 2031-2050 minus 1961-1990 (CLISP & EURAC, 2011b; processing: European Academy Bolzano, CLISP project; data source: ENSEMBLE project).

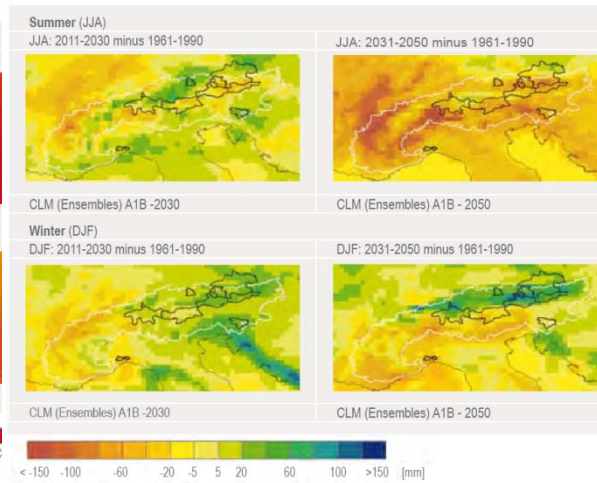


Figure 19: Seasonal absolute precipitation changes for summer (JJA) and winter (DJF) in the Alps for one climate scenario. Top: summer (JJA); bottom: winter (DJF). Left: 2011-2030 minus 1961-1990; right: 2031-2050 minus 1961-1990 (CLISP & EURAC, 2011b; processing: European Academy Bolzano, CLISP project; data source: ENSEMBLE project).

The Scottish Highland case study highlights that already today mountain areas are very sensitive to **natural hazards** induced by extreme hydro-meteorological events. Flashfloods, flood hazards and gravitational mass movements, such as landslides, debris flows, torrential processes and rockfall, which are triggered by heavy precipitation, storms and other extreme weather events, are causing frequent damages and disruptions to transport infrastructure even under today's weather conditions. While the road network affected in

⁴²⁴ ESPON & IRPUD (2011): Map 8: Change in annual mean number of days with snow cover, p. 28.

sparingly populated mountain areas may not represent high material values in itself, what matters here is their vital importance as “life-links” for the rural population, e.g. for the delivery of essential goods and services and for providing access to health care and for emergency services. The sparser the transport infrastructure network is, the stronger the effects of service interruptions and loss of access potentially are for the population affected. Climate-induced damages to infrastructure also can have considerable second level effects on businesses and regional economies, including on transport services for the tourism sector. Moreover, perceptions of safety and reliability of access functions can strongly impact on the willingness of business operators to invest in areas that may increasingly be perceived to be unsafe and inaccessible, and likewise it can have negative effects on residential attractiveness of territories and can easily reinforce existing trends of outward migration and population decline. The case study area of the Jura Massif, whose economy depends strongly on large daily (cross-border) commuter flows, exemplifies both the importance of safe transport connections for an entire regional economy and its sensitivity to disturbances. The risk that damage to infrastructure due to climate-induced natural hazard events may cause adverse knock-on effects on local economies and populations is common to sparsely populated areas and mountain areas. Because of the generally higher hazard potential in mountain areas this risk is, however, highest in areas where both geographic specificities overlap. Significant increases in winter precipitation, more rainfall instead of snow during winter season, an earlier set-in of snow melt, and an anticipated increase in extreme weather events, as are projected for the Scottish Highlands, the Jura Massif and the Tatra Mountains, will in the future significantly increase risks from natural hazards to settlements and infrastructure. Also in most other European mountain regions, with the possible exception of South Europe and the Mediterranean, hazard events are expected to cause considerable annual damage costs and economic losses. These impacts hold the potential to extend beyond the boundaries of mountain areas themselves, because riverine flood risk is likely to increase also in low-lying basins and downstream valley areas, as may be the case in the greater Alpine Space area. In that context it has to be considered that in many mountain areas hazard and risk zones are already a major constraining factor for economic development today. Especially in many intra-mountain locations, safe and habitable space for economic development is already a scarce resource and depends strongly on public investments in hazard protection measures. Even in relatively peripheral mountain locations where population numbers are in decline (e.g. in many rural areas and rather remote valleys of the Alps), land development is often progressing due to socio-economic change trends, which raises the damage potential and further confines land resources for future spatial development. It is anticipated that in the future economic development potentials will be further restricted from the combined effects of expanding hazard zones due to climate change, regulatory restrictions on land use from natural hazard management, additional land demands for structural and non-structural protection measures, and cut-downs in public investments in these because of overstrained public budgets. This constellation of factors poses serious threats to future development opportunities and growth potentials in many mountain areas (CLISP, 2011b).

Though not covered by the selected case study areas because of the limited elevation of the respective mountain ranges, **glacier ablation**, **permafrost thawing** and changes to the freezing-thawing cycle will contribute to the increase in risk from mountain hazards in higher mountain areas, such as the Alps, as well as in Northern Scandinavian mountain ranges. Glacier melt creates risks of glacial lake outbursts, and degradation of permafrost

soils can cause destabilisation of mountain slopes and is related to higher danger from landslides and rockfall, threatening settlements in mountain valleys (e.g., Lermer et al., 2011, in: CLISP & EURAC, 2011a). Until 2100, the lower elevation of permafrost is likely to rise by several hundred meters (IPCC 2007a).

Less summer precipitation combined with higher evapotranspiration as well as reduced water storage in snowpacks in winter is likely to negatively affect the water balance and reduce **water availability** in some mountain areas. Due to the projected significant decrease of annual precipitation, water scarcity may in particular become a problem in the West Stara Planina case study area. Increasing water stress and more frequent seasonal bottlenecks in water supply are, however, also expected in Southern parts of the Alps and in inner-alpine dry valley locations (e.g. in South Tyrol). As Figure 20 illustrates for the Alps, in higher and more central parts of the Alps increased precipitation suggests positive changes in the meteorological water balance. On the Southern and less elevated sides of the Alps, however, increased potential evapotranspiration indicates the possibility of conditions where water availability becomes limiting for e.g. crop growth. Based on the Drought Index (de Martonne), Figure 21 suggests generally more arid conditions throughout the Alps as of 2050, with the exception of some central and more elevated parts where the trend could be inverse. The variation of the index, which is of comparative nature, provides the relative intensity and sign of aridity changes across the region (CLISP & EURAC, 2011a).

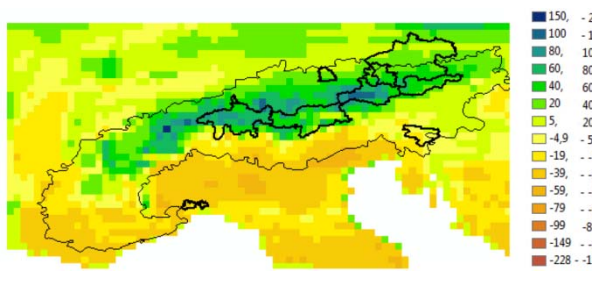


Figure 20: Maximum meteorological water balance changes (mm/year) as of 2050, according to a range of climate scenarios considered in the project CLISP (CLISP & EURAC, 2011a; processing: European Academy Bolzano, CLISP project; data source: ENSEMBLE project).

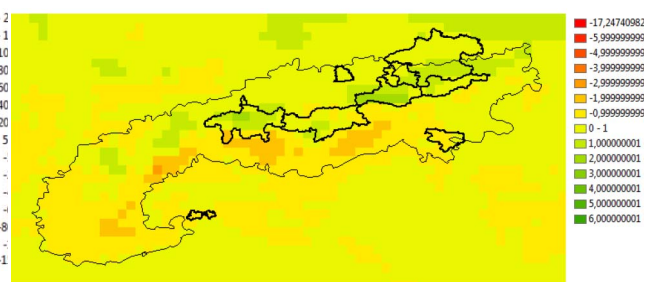


Figure 21: Change in the Drought Index (de Martonne) as of 2050 (mm/year), according to a range of climate scenarios considered in the project CLISP (CLISP & EURAC, 2011a; processing: European Academy Bolzano, CLISP project; data source: ENSEMBLE project).

Since mountains have an important function as water providers for large parts of Europe, more pronounced drought periods may also affect water supply in downstream regions on a transnational scale, e.g. at the foothills of the Alps and in adjacent lowlands such as the North-Italian basin, which holds some potential of creating new interregional conflicts over water use. With the exception of Northern Europe, low water levels during summer will in general tend to be more frequent and lower than today. In Southern Europe and some parts of Central and Eastern Europe, summer river flows may be reduced by up to 80% until 2100 (Alcamo et al., 2007). Accordingly, the hydropower production potential of Europe as a whole is expected to decline on average by 6% (Alcamo et al., 2007), with significantly higher losses predicted for e.g. the Alpine area and South Europe. Both more frequent low water flows and flood events after heavy rainfall threaten hydro-energy security supply during summer, which due to increasing cooling degree days is also the season when future energy demand will be higher than today. As indicated by the Highlands case study, where variability in river run-offs has been observed to increase, climate change could threaten

feasibility and profitability of planned hydropower development schemes in mountain areas.

Tourism, which is obviously closely linked to climate both in terms of the source and destination countries of tourists, is an important economic sector in all mountain regions. Mountain areas relying predominantly on summer tourism, such as the Scottish Highlands, could in the future benefit from an extension of the summer season into spring and autumn. Similarly, in many European mountain regions, including all other case study areas, summer tourism could gain in attractiveness due to their relative coolness in comparison to more southerly destinations; a lengthening of the tourism season would also allow for a flattening of the tourism season, thus alleviating pressures on water supply and energy demand (Alcamo et al., 2007). In contrast, mountain areas relying more strongly on snow-based winter tourism are very likely to be negatively affected by a partly very strong decrease in annual days with snow cover, which can amount up to 40 days and more by 2100⁴²⁵ (ESPON & IRPUD, 2011). For every degree celsius increase in temperature, the snow line will on average rise by about 150 m in elevation. Hantel et al. (2000) found at the most sensitive elevation in the Austrian Alps (600 m in winter and 1400 m in spring) and with no snowmaking adaptation considered, that a 1°C rise leads to four fewer weeks of skiing days in winter and six fewer skiing days in spring. Beniston et al. (2003) show that a 2°C warming with no precipitation change would reduce the seasonal snow cover at a Swiss Alpine site by 50 days/year. In the case of a 4°C shift in mean winter temperature, snow duration is likely to be reduced by 50% at altitudes near 2,000 m and by 95% at levels below 1,000 m. Even when artificial snowmaking is considered, the impacts on skiing resorts and associated winter tourism potentials can be severe, as is illustrated by Figure 22. There, the line of artificial snow-reliability has been simulated for skiing resorts in South Tyrol. For artificial snow-reliability, the so called 100-day rule has to be fulfilled (30 cm of snow depth for at least 100 days per season), and the upper half of the altitudinal range of a ski area has to be located above this line to be classified as artificial snow-reliable (CLISP & EURAC, 2011c). The likely reductions in snow reliability and duration of snow cover given, the economic viability of existing winter sport resorts, in particular at lower and medium elevation levels, as is the case in most of the case study areas, is at serious risk. In mountain areas that are currently strongly dependent on winter tourism, such as the Alps, the vulnerability of regional economies to climate change is thus very high⁴²⁶. Currently, e.g. in the Tatra and in the West Stara Planina, large investments in development of snow-based winter tourism infrastructure are planned. However, in the face of climate change these investments do not appear sustainable, are subjected to high risk of failure, and may even be classified as maladaptation. This serves as an example that climate change impacts can lead to a loss of previously perceived development opportunities, and that adaptation may in some cases indeed require taking new and different development pathways.

⁴²⁵ ESPON & IRPUD (2011): Map 8: Change in annual mean number of days with snow cover, p. 28; Map 28: Potential impact of climate change on tourism, p. 97.

⁴²⁶ ESPON & IRPUD (2011): Map 28: Potential impact of climate change on tourism, p. 97.

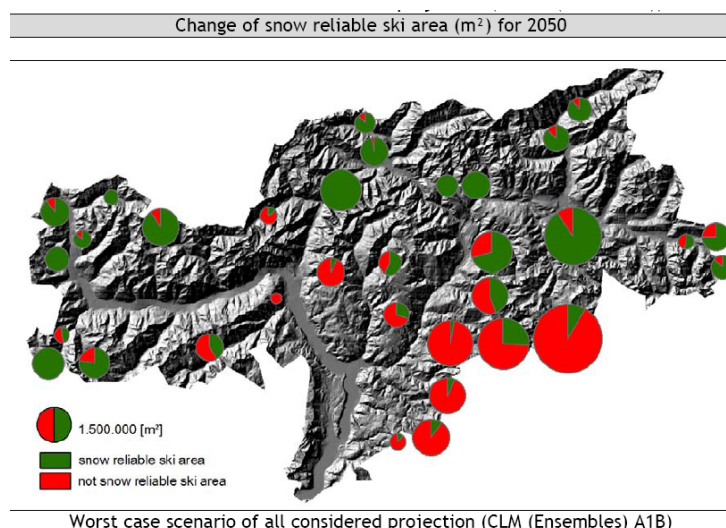


Figure 22: Change in snow-reliable skiing area, based on the line of artificial snow-reliability, for skiing resorts in the South Tyrol Alps for 2050 under the A1B emission scenario (CLISP & EURAC, 2011c).

A major windstorm that destroyed more than 12,000 ha of forest in 2004 in the Tatra Mountains provides an example of the potential impacts of climate change on **forest ecosystems** and **forest management**. The forest sector is particularly important for many European mountain areas due to a number of reasons: forests tend to be a predominant land cover category in mountainous terrain; the forest sector is often of high economic importance; and forest ecosystems provide a range of ecosystem services that are especially vital in mountain areas, including water retention and flood prevention, protection of soils against erosion, and protection from mass movement-related hazards. In particular in Central, Eastern and South Europe, many forest ecosystems are already affected by multiple climate stresses today. While over the medium term forests in Northern Europe could benefit from increased forest growth due to a longer growing season and the CO₂ fertilisation effect, in most other parts of Europe decreasing summer water availability will on the contrary reduce forest productivity⁴²⁷. In the future, forestry will continue to face increased losses and damage costs from multiple climate-induced effects such as higher tree mortality, more pest species calamities, higher water stress, higher forest fire frequency, and large-scale forest damage through increasing frequency and magnitude of storm events (Umweltbundesamt, 2007b). This will cause substantially higher costs for forest management operations and severe economic losses for the entire forest-wood-production chain. Especially in mountain areas, destabilisation of the ecological functioning of forest ecosystems can considerably deteriorate their protection functions against natural hazards, which indicates the risk of adverse feedback effects between ecosystem responses to climate change and other climate change impacts on socio-economic systems.

As is demonstrated by the high levels of **biodiversity** in all mountain case study areas, many 'hotspots' of biodiversity in Europe are in mountain areas (EEA, 2010). A number of factors interact to cause these high levels of biodiversity, including the compression of thermal and climatic zones over relatively short distances, steep slopes, variations in geology, soils, and micro-climates, and the fragmentation of mountain terrain. Due to relative isolation, there is usually also a high level of endemism in many mountains, including those on islands.

⁴²⁷ ESPON & IRPUD (2011): Map 27: Potential impact of climate change on agriculture and forestry, p. 96.

Traditional human interventions have also been important for fostering and maintaining populations of many species and particular habitats in spatially diverse cultural landscapes. Mountains also host a particularly high proportion of protected areas, as is evidenced by the case study areas. Of the total area designated as Natura 2000 sites in the EU, 43 % is in mountain areas, compared to 29 % for the EU as a whole. These sites cover 14 % of the mountain area of the EU (EEA, 2010). However, some of the reasons that account for the biodiversity richness of mountain areas, e.g. specialisation to highly differentiated environmental conditions, are also responsible for their strong sensitivity to climatic changes. In general, species with a high degree of specialisation have much lower tolerance and are more vulnerable to changes in ecological conditions, including climatic changes, than more generalist species with wider ecological amplitudes. Resulting changes in competitive relationships between species will contribute to shifts in species composition and distribution patterns. Overall trends like earlier phenology and shifts in species distribution towards higher elevations are already being observed (Alcamo et al., 2007). Under conditions of climate change, a large percentage of the European mountain flora is expected to become vulnerable, endangered or committed to extinction by the end of this century. Even a moderate increase in mean annual temperature of 1°C is equivalent to northward shifts of climatic vegetation zones by several hundred kilometres and an isotherm shift of up to 300 m uphill. Especially for species occurring within a limited geographical area or at the edge of their distribution range, extinction becomes very likely. The IPCC concludes that European mountain plant communities face up to a 60% loss of species under high emission scenarios (Alcamo et al., 2007). High-altitude plant species face the highest extinction risk, because upward migration is not possible. Apart from establishing larger and new conservation sites as well as enhancing ecosystem resilience by reducing other human-induced stresses, there are no obvious adaptation options for especially high-elevation mountain vegetation⁴²⁸.

Among all case study areas, ***adaptive capacity*** is certainly highest in the Jura Massif, because it is an economically prosperous, high-income region with very good access to financial, knowledge, and institutional resources. Combined with the overall low climate sensitivity of the Jura, which is due to the dominance of the industry sector and the only marginal economic role of primary production and tourism, this is very likely to result in a low overall vulnerability. As argued in the context of other geographic specificities, the adaptive capacity of the Scottish Highlands is at overall medium levels⁴²⁹. This is supported in particular by the existence of regionalized climate impact studies and by the presence of a climate change adaptation strategy, which indicates a high level of awareness as well as political willingness to take action on adaptation. Adaptive capacity would appear to be considerably lower in the Tatra region and lowest in the West Stara Planina, which is economically “under-developed” in European standards. However, this aspect does not relate to their geographic status as mountain areas, but is in fact more directly related to their overlapping geographic specificity of being cross-border areas at the periphery of their respective countries. It is worth noting that in both case study areas cross-border cooperation appears to be well established; this especially applies to a range of trans-

⁴²⁸ ESPON & IRPUD (2011): Map 35: Potential impact of climate change on Natura 2000 protected areas, p. 104.

⁴²⁹ ESPON & IRPUD (2011): Maps 40-48: Adaptive capacity maps, pp. 129-137.

boundary cooperation projects and initiatives in the West Stara Planina. The existence of cross-border development cooperation provides a good potential starting point for tackling also adaptation challenges in a transnational approach.

Sparsely populated areas

A traditionally strong role of natural resources and the primary sector in regional economies and development potentials is a common characteristic of many sparsely populated areas. Since **agriculture** and **forestry** are in general very climate-dependent sectors, strong reliance of local economies on ecosystem services delivering biomass production makes these types of territories in principle more climate-sensitive than regions with a more diversified economic structure. However, the two case study areas also demonstrate that similar socio-economic challenges caused by a common geographic specificity can result in quite different outcomes in terms of vulnerability to climate change if, due to large-scale differences in geographic position, the respective regions are exposed to substantially different climatic change trends. In fact, climate scenarios project rather opposed climate signals for Scandinavia and the Iberian Peninsula as regards precipitation trends⁴³⁰.

In the Torne Valley, a strong increase in precipitation amounts in all seasons as well as an extended vegetation period is expected to benefit forest growth, which offers opportunities for forestry, the entire forest-wood production chain and the provision of forest biomass for renewable energy production. A similar impact chain in principle also offers increased crop suitability and yields for most of Scandinavia, but agriculture is at present rather insignificant in the Torne Valley⁴³¹ (the only notable exception being traditional reindeer herding, which is in fact impacted adversely by climate change).

On the contrary, lack of water supply to agricultural crops and to forest ecosystems as well as increasing frequency of forest fires represent constraining conditions for primary production in the Spanish case study areas (Cuencia, Soria, Teruel) already today. In the future, the Spanish sparsely populated areas along with the entire Mediterranean will be severely affected by a further strong decrease of annual precipitation, an even stronger decrease in summer rainfall, and a heavy increase in hot summer days, resulting in strongly decreasing water availability and an intensification of drought conditions (EEA 2010f; IPCC 2007b; DG REGIO, 2009). In general, drought-related climate change impacts, including increasing soil erosion, forest fire risk⁴³², and tendencies towards desertification, will adversely affect the dominating forest and agricultural land covers, their ecosystem services, and the biodiversity levels these habitats sustain. Due to the predominance of small-scale, extensive farming, the comparative climate change vulnerability of agriculture in the Spanish sparsely populated areas may be rated lower than in many other Spanish regions. However, climate change will make it difficult, if not impossible, to realize perceived development opportunities based on natural assets, such as renewable biomass energy and ecological

⁴³⁰ ESPON & IRPUD (2011): Maps 4-5: Relative changes in annual mean precipitation in winter and summer months, pp. 24-25.

⁴³¹ ESPON & IRPUD (2011): Map 27: Potential impact of climate change on agriculture and forestry, p. 96.

⁴³² ESPON & IRPUD (2011): Map 15: Combined environmental sensitivity to climate change, p. 83.

farming products, which narrows down future economic development options for these areas.⁴³³

The Torne Valley, with its dependency on the mining sector, also highlights that continuous reliability of the **transport infrastructure** is crucial for economies with high external market dependencies, and that there is already a high sensitivity to disturbances of transport connections today. Corresponding to the future changes to precipitation patterns described above, Scandinavia will in the future be much stronger exposed to **inundations from river flooding** and other **extreme events** triggered by strong increases in winter and annual precipitation amounts and by possibly more heavy precipitation events (IPCC 2007a, 2007b; EEA 2010f). According to the assessment by the ESPON CLIMATE project, large parts of the Torne Valley region are among the regions in Europe most negatively affected by potential physical impacts of climate change (e.g., on settlements, roads, railways, power stations)⁴³⁴ (ESPON & IRPUD, 2011). Consequently, there will be an increasing risk of damage to the built environment in general and to critical infrastructure, including the transport system, in particular. In the case of regional economies with high external dependencies, damage events and interruptions of transport connections can have considerable knock-on effects on the regional economy, and they can adversely affect perceptions of safety and accessibility on the part of investors. On the other hand, higher risks to the land-based transport infrastructure may to some extent be counterbalanced by chances that ice-free accessibility to important ports in the Bothnian Gulf could improve under conditions of global warming.

With regard to **demographic dynamics**, it may be assumed that the present trends of outward migration, declining population and ageing demographics that characterize many sparsely populated areas can easily be accelerated by the more frequent occurrence of climate-triggered disaster and damage events within a region (e.g. flooding in the Nordic and forest fires in the Spanish case study areas). More frequent disruptions of transport connections make both service provision and access of disaster relief to scattered settlements more difficult. A similar unfavourable scenario logic is conceivable especially with regard to water supply to households in the Spanish sparsely populated areas, which in the future are likely to be affected by increasing water shortages. In short, changes in climatic stimuli may reduce the quality and continuity of delivery of essential services, which in turn could have negative effects on residential attractiveness of affected areas.

In both the Nordic and the Spanish sparsely populated areas, the overrepresentation of older inhabitants in the rural population contributes to higher potential **social impacts** of climate change. This applies especially to the Spanish case study area, where an above-average share of older people will be increasingly susceptible to summer heat⁴³⁵.

A number of socio-economic attributes characteristic to sparsely populated areas have a negative influence on their **capacity to adapt to climate change**. Generally speaking, and in comparison to more “mainstream” territories, these phenomena incorporate below-

⁴³³ ESPON & IRPUD (2011): Map 27: Potential impact of climate change on agriculture and forestry, p. 96.

⁴³⁴ ESPON & IRPUD (2011): Map 21: Potential physical impact of climate change, p. 90.

⁴³⁵ ESPON & IRPUD (2011): Map 25: Potential impacts of changes in summer heat on population, p. 94.

average economic performance, higher unemployment rates, lack of access to education, ICT and technological resources, lower qualification levels, an ageing demographic, and lower infrastructure capacities. Based on the assessment by the ESPON CLIMATE project, the overall adaptive capacity of the Torne Valley is much higher than in the Spanish case study area⁴³⁶ (ESPON & IRPUD, 2011). Also, the existence of strong cross-border social capital in the Torne Valley, e.g. as expressed in a lot of transnational projects and initiatives, may be considered a particular strength in regard to adaptive capacity. On the other hand, the adaptive capacity of the Spanish sparsely populated area has been assessed as one of the lowest in a pan-European context (ESPON & IRPUD, 2011). While the marginalized position of the Spanish case study area in relation to established governance systems may be viewed as a particular weak point, on the other hand the recent occurrence of local “grass-root movements” could provide a potential starting point for regional adaptation strategies.

Islands

In previous pan-European assessments (e.g., ESPON & IRPUD, 2011), all island case study areas have been assessed to be more vulnerable to climate change impacts than many other parts of Europe. In comparison, it would appear that Sicily will have to expect more severe aggregate impacts on territorial development than the Outer Hebrides and the island parts of the Highland Council area⁴³⁷. However, due to differences in exposure and sensitivity to climate change, the aggregate vulnerability of the case study areas is partly to be attributed to specific causes and impact chains that differ between the three regions.

Due to its main physiographic feature, i.e. being in the main part surrounded by the sea, the coastal zones of islands are generally exposed to **sea level rise, coastal storm surges and inundations of coastal zones** (EEA, 2010f; Nicholls et al., 2007). Extreme sea level events are adjusted by the long-term process of sea level rise and may be exacerbated by more frequent and more severe storm events in the future. Since on many islands, in particular on those islands where mountainous terrain predominates in the interior territory, the main parts of the population, maritime transport hubs, and the centres of settlement and economic activities, including many touristic resorts, tend to be concentrated in proximity to the coast line, the future physical vulnerability to damages caused by coastal storm surges can be substantial. Especially on the Outer Hebrides and in the Scottish Highland Council area, as in many other parts of North-West Europe, the combined potential impact of coastal storm surge events and coastal flooding on settlements and transport infrastructure is projected to increase significantly, as has been simulated in the ESPON CLIMATE project based on the assumption of a fixed one meter sea level rise⁴³⁸ (ESPON & IRPUD, 2011). Apart from the increase of risk to human lives, the stronger economic activities on an island are gravitated towards exposed coastal zones, the more severe the effects of serious damage events to the internal economic system of island territories potentially are. Apart from extreme events, sea level rise is expected to contribute on many islands to coastal

⁴³⁶ ESPON & IRPUD (2011): Map 48: Overall capacity to adapt to climate change, p. 137.

⁴³⁷ ESPON & IRPUD (2011): Map 49: Potential vulnerability to climate change, p. 147.

⁴³⁸ ESPON & IRPUD (2011): Maps 17-21: Potential physical impacts of climate change, pp. 86-90.

erosion and progressive salinization of coastal aquifers, which increasingly affects ecosystems, freshwater supply and infrastructure sites.

Inadequacy of the **transport infrastructure** and resulting accessibility problems, especially in connection with dispersed settlement patterns and low population densities in sparsely populated and mountainous parts on islands, are at present a major constraint to economic development and to some extent a social problem on many islands, including the Outer Hebrides, Sicily and the Highland Council area. Lack of redundancy makes the transport infrastructure highly vulnerable to failures and service interruptions, e.g. caused by extreme events. In the future, debris flows, local floods, and landslides triggered by more and more intense extreme weather events, such as heavy rainfall and storms, are expected to cause more frequent disruptions of roads and railway networks. Sensitivity of the transport system to extreme weather events is already high under today's climatic conditions on the Outer Hebrides and in the Highland Council area, and related vulnerability is expected to increase further as precipitation amounts and intensities are projected to increase in the entire Northern UK⁴³⁹ (ESPON & IRPUD, 2011). Frequently occurring failures of irreplaceable transport connections acting as "life lines" of poorly accessible areas can cause considerable knock-on effects in the socio-economic system, including strong perturbations of daily lives, an overall increase in infrastructure maintenance and operation costs, and negative effects on economic performance of a region; it can also affect safety perceptions, and therewith the willingness of business owners to invest in regions that are perceived as inaccessible. In disaster situations, even temporary loss of access to health, disaster relief and other services can pose serious problems to remote settlements. In both Scottish island case study areas as well as in Sicily, the regularity of maritime transport connections to the mainland and to smaller neighbouring islands is already subjected to harsh weather conditions today. If ferry connections should become unserviceable more often in the future, this would reinforce existing development constraints that are connected to the traits of insularity and double-insularity, respectively. It remains subject to more detailed assessments whether fixed links to the mainland, as discussed in the Saaremaa case study, are less vulnerable to extreme weather impacts than ferry connections.

As regards **tourism**, which is an important economic sector in all island case study areas, global warming will generally lead to an extended summer tourist season, which could contribute to mitigating current economic problems related to seasonality. However, due to higher extreme temperatures and more pronounced extremely hot periods, the entire Mediterranean, including Sicily, are expected to lose competitive touristic advantage in terms of comfortable climatic conditions during the peak summer months. Based on the Tourism Comfort Index, the overall attractiveness of Sicily as a summer tourist destination is simulated to decrease (Ciscar et al., 2009; Amelung & Moreno, 2009) over the long term. In principle, more summer days, warmer summers and milder intermediate seasons could mean that more northerly regions, such as the Scottish island case study areas, could be on the winning side of the European tourism market. Exploitation of that potential will, however, to some extent depend on the preservation of the "typical" landscape and nature, which is the most important resource base of the Scottish tourism market, and which could be exposed to unfavourable alterations under conditions of strong climate change.

⁴³⁹ ESPON & IRPUD (2011): Map 4: Relative change in annual mean precipitation in winter months, p. 24: Map 6: Change in annual mean number of days with heavy rainfall, p. 26.

The generally added **environmental sensitivity** of islands, both in terms of terrestrial and marine ecosystems, will in many cases be exacerbated by additional pressures caused by climate change. For example, warming of sea surface temperature may change distribution and abundance of marine fish species, adding up to already observable depletion of fish stocks in consequence of unsustainable fish harvesting rates, as is the case in Sicily and on the Outer Hebrides. Due to their isolation, islands regularly sustain above-average **biodiversity** levels, but are at the same time more vulnerable to biodiversity losses than many other types of territories. Due to the high share of endemic species, isolation of populations and lower re-colonization rates, lack of alternative habitats, and higher vulnerability to invasions of alien species, climate change will unavoidably lead to higher rates of species extinction and biodiversity loss on islands than in “mainstream” territories. Based on the double premise that each **protected area** is established to protect specific habitats and their species communities as they are today, and that climatic changes indeed alter these habitats and biotic communities (although they are not equally sensitive to climate change), the size and area share of protected areas (Natura 2000 sites) has been used as a proxy indicator of environmental sensitivity to climate change in the ESPON CLIMATE project (ESPON & IRPUD, 2011). Following that logic, each of the island case study areas, the Outer Hebrides, the Highland Council area and Sicily, have high shares of protected areas, which in most cases makes them ecologically more vulnerable to climate change than their respective mainland⁴⁴⁰.

One of the most tangible and imminent impacts of climate change emerging from the case studies is, however, not directly related to insularity, but to geographic position and to the generally uneven distribution of climatic change trends on the European continent. Due to strong reductions of annual precipitation amounts, drought- and desertification-related problems on Sicily, which are already a problem today, are projected to worsen significantly in the future⁴⁴¹. This will imply severe limitations to economic development in the future. Strong increases in **water scarcity** will cause economic losses to the entire agricultural sector, are likely to affect also other economic sectors, in particular the water-intense tourism sector, and could intensify conflicts over water use. Reduced water availability will strengthen the need for desalination to keep up water supply, resulting in higher energy consumption, higher production costs, and in higher water prices. To some extent, the risk of water scarcity is reinforced by insularity, because it largely prevents long-distance water transport from other areas. The combined effects of droughts and more intense soil erosion due to higher rainfall intensities make especially **agriculture** an extremely vulnerable sector in Sicily⁴⁴². Proneness to droughts also implies that forest or bush fire risk will be on the rise in the future. Strong climate change impacts on agriculture and forestry are, however, projected for the entire Mediterranean and are not a consequence of insularity.

Sicily also serves to illustrate the particular issue of **transcontinental migration flows**, which may - to an unquantifiable extent, and besides many other reasons - be partly attributed to

⁴⁴⁰ ESPON & IRPUD (2011): Map 15: Combined environmental sensitivity, p. 83; Map 35: Potential impact of climate change on Natura 2000 protected areas, p. 104.

⁴⁴¹ ESPON & IRPUD (2011): Maps 4-5: Relative changes in annual mean precipitation in winter and summer months, pp. 24-25.

⁴⁴² ESPON & IRPUD (2011): Map 27: Potential impact of climate change on agriculture and forestry, p. 96.

recent climatic changes on the African continent. In the future, global climate change could cause even larger influxes of immigrants, e.g. from Africa, to Europe.

Evidence provided by the case studies supports the statement that the **capacity to adapt to climate change** is comparatively low on many islands⁴⁴³. Many of the attributes that are regularly used to measure adaptive capacity appear rather underdeveloped on islands, although there are differences between the case studies. For instance, on Sicily factors related to insularity that are generally seen to contribute to a lack of adaptive capacity include weaknesses in governance structure and government effectiveness, a lack of institutional capital, higher unemployment rates, lower income per capita, lower educational levels, less access to technological resources, outward migration of younger age cohorts, and a lack of ownership and entrepreneurial culture. To a lesser extent, several of these factors also occur on the Outer Hebrides. The transport and health infrastructure, which is an important resource in terms of coping capacity and is itself often vulnerable to climate impacts, are usually less developed on islands than on the respective mainland. On the other hand, the social capital provided by tight-knit communities on all of the studied islands as well as an ICT infrastructure that is partly developed above national average levels (e.g. on the Outer Hebrides) may be seen as favourable to adaptive capacity. Also, the presence of some adaptation strategy processes on local levels in Sicily indicates a favourable level of awareness. However, the overall capacity to adapt to climate change has been ranked “lowest” in Sicily and ranging from “low” to “lowest” in the Scottish case study areas by the ESPON CLIMATE project⁴⁴⁴. Accordingly, a low adaptive capacity combined with partly strong climate change impacts results in high to medium levels of vulnerability⁴⁴⁵ (ESPON & IRPUD, 2011).

Border regions, cross-border metropolitan regions

The case studies on border regions and cross-border metropolitan regions provide some insights into the role of adaptive capacity in the forming of vulnerability and serve to indicate different aspects related to the capacity to adapt to climate change. In addition, although this is not covered explicitly in the case study reports, the examples of cross-border metropolitan regions will be used here to address climate change impacts that are either specific or more significant in cities and urban agglomeration areas. Due to the density of populations, physical structures of the built environment, infrastructure and material assets metropolitan areas are in principle highly sensitive to specific climate change impacts. This applies especially to urban regions that are exposed to coastal floods, river floods and other climate-related hazards and extreme events. Apart from potentially substantial direct damage costs, extreme events threaten the continuity of essential services, especially in connection with transport, health services, water supply and sewage systems (EEA 2009, 2010f; IPCC 2007b). In general, urban agglomerations are also particularly sensitive to heat waves and heat-related effects on human health, which are intensified by factors specific to urban environments, such as high degrees of soil sealing,

⁴⁴³ ESPON & IRPUD (2011): Maps 40-48: Adaptive capacities, pp. 129-137.

⁴⁴⁴ ESPON & IRPUD (2011): Map 48: Overall capacity to adapt to climate change, p.137.

⁴⁴⁵ ESPON & IRPUD (2011): Map 49: Potential vulnerability to climate change, p. 147.

heat absorbing surfaces, and often poor air exchange with surrounding areas (“urban heat island effect”) (EEA 2010f; DG REGIO 2009). As the summer heat wave of 2003 with a death toll of more than 70 000 people has shown (WHO, 2009), the consequences of heat stress for human health can be very severe, which also puts additional strains on health and emergency services. Elderly, very young, sick and socio-economically deprived social groups are at higher risk (EEA 2010f). Heat waves in cities can also worsen ozone and air quality-related health problems (EEA 2010f).

However, despite often strong potential climate change impacts on physical and social systems, usually the vulnerability of metropolitan regions is ranked lower than in non-metropolitan regions. With the important exception of urban centres along parts of the European coasts, also the aggregate vulnerability assessment provided by the ESPON CLIMATE project shows on average overall low or marginal vulnerability scores for the large European metropolises⁴⁴⁶ (ESPON & IRPUD, 2011). This is due to the generally much higher adaptive capacity in metropolitan areas, which reduces their overall vulnerability levels. This is illustrated by the Luxembourg and Geneva cross-border metropolitan regions, which are high-income, knowledge-intensive, innovation-oriented economies characterised by highly-qualified work forces, excellent economic performances, and both economic and population growth. The strong status of financial, institutional, knowledge-related, technological and infrastructural resources accounts for one of the highest adaptive capacity levels among European regions⁴⁴⁷ (ESPON & IRPUD, 2011), which – within the framework of the vulnerability concept - in turn reduces their overall vulnerability to climate change. With regard to the geographic specificity of being border areas, the case studies indicate that in both metropolitan areas the cross-border setting holds great potential to intensify and deepen trans-boundary economic integration and to stimulate cross-border projects and actions. These cooperation opportunities appear to outweigh by far the potential obstacle of different regulatory and governance frameworks on both sides of the border. Successful exploitation of resulting development opportunities would further contribute to increasing adaptive capacities, and cross-border cooperation offers the opportunity to be capitalized in terms of targeted adaptation strategies that are coordinated across borders.

However, the case studies on the Polish-Ukrainian and the German-Polish-Czech border regions illustrate that borders also can be a constraint for economic development, and therewith for the building of adaptive capacity. From both the case studies, a lack of cross-border cooperation and transnational coordination becomes apparent, although attributable to partly different reasons. While in the German-Polish-Czech border region historical, cultural and language barriers are a major obstacle to the improvement of cross-border economic cooperation, in the Polish-Ukrainian border region the EU external border regime with its focus on border security considerably impedes socio-economic and socio-cultural cross-border development. The lack of cross-border cooperation thus currently also prevents transnational approaches to governance of climate change adaptation. Since climate change, by definition, is a transnational issue with strong trans-boundary dimensions, this may considerably reduce the capacity to adapt in some border regions. Moreover, climate change vulnerabilities often may be different between adjacent areas of

⁴⁴⁶ ESPON & IRPUD (2011): Map 49: Potential vulnerability to climate change, p. 147.

⁴⁴⁷ ESPON & IRPUD (2011): Map 48: Overall capacity to adapt to climate change, p.137.

one cross-border corridor⁴⁴⁸ (ESPON & IRPUD, 2011). This may be caused by differences in climate sensitivity due to disparities in economic development, settlement patterns, or population concentrations on different sides of borders, or it may be the result of adaptive capacities varying considerably across borders, as is the case e.g. between Germany on the one hand and Poland and the Czech Republic on the other hand. This suggests that there is a need for policy interventions targeted at improving cross-border cooperation in a way that takes full account of climate change issues.

Quantitative evidence

Selected quantitative evidence from other external sources has been included and referenced throughout the text.

Below are some further ideas on indicators that could be useful to produce maps that illustrate some of the findings:

Indicator	Purpose, rationale
<i>Share of protected areas in GEOSPECS areas</i>	<i>Proxy for sensitivity of biodiversity to climate change</i>
<i>Population potential in coastal areas and in coastal LAU2 of islands</i>	<i>Proxy for social and physical sensitivity of coastal zones to effects related to sea level rise, coastal surges, coastal inundations</i>
<i>Age structures</i>	<i>Socially differentiated vulnerability of populations to heat stress (older people and very young people are most vulnerable)</i>
<i>Land use / CORINE land cover: forest land use / forest land cover</i>	<i>Economic sensitivity of forestry to climate change (assumption: forest land cover should be higher in SPAS and mountain areas)</i>
<i>Land use / CORINE land cover: agricultural land use / land cover</i>	<i>Economic sensitivity of agriculture to climate change (assumption: agricultural land cover should be higher in SPAS and mountain areas)</i>
<i>Employment by sector: primary sector</i>	<i>Economic sensitivity of agriculture and forestry to climate change (assumption: employment share should be higher in SPAS and mountain areas)</i>
<i>Employment by sector: tourism sector</i>	<i>Economic sensitivity of tourism to climate change (assumption: employment share should be higher in some GEOSPECS areas)</i>

⁴⁴⁸ ESPON & IRPUD (2011): Map 49: Potential vulnerability to climate change, p. 147; Map 66: Comparison with typology on border regions, p. 263.

2. Summary and conclusions

4.1 Synthesis of findings from the case studies

Findings from the case studies generally confirm that climate change impacts and vulnerabilities are distributed unevenly across the regions of Europe. Roughly speaking, regions that are in terms of economic development and growth potentials less advantaged and facing serious development constraints already today appear to be more vulnerable in the future in comparison to the European average. The case study regions appear to blend in the larger picture of a prevailing core-periphery pattern and of a North-South and West-East gradient in vulnerability levels, as it has been ascertained in previous assessments (e.g., ESPON & IRPUD, 2011; EEA 2010f; EEA/JRC/WHO, 2008; DG REGIO, 2009; Alcamo et al., 2007). That large-scale distribution of vulnerability is to a considerable extent caused by factors that are not directly related to geographical specificities. These factors include: different strength and, sometimes, different direction of climate change signals due to different exposure, which depends mostly on geographic position within Europe; a traditionally higher importance of climate-sensitive sectors, in particular the primary production sector (agriculture), in the Mediterranean and Eastern and South-Eastern Europe, which is influenced by the predominating economic structure and the current transition state of the respective national economies; and by large-scale differences in adaptive capacity, which are to a large extent related also to the general development status of national economies, causing a North-South gradient similar to that of overall vulnerability. In many respects, the large-scale differences in these factors across Europe appear to act as a generic pattern driving differences in vulnerability across different categories of territories, causing different climate change sensitivities, impacts and vulnerabilities also across and within areas with geographic specificities. There is thus a considerable diversity of impacts and vulnerabilities also within the same GEOSPECS categories.

However, there also appear to be strong interrelations between the constituting geographic specificities of a number of GEOSPECS areas and their vulnerability to climate change. In particular, there are climate change impacts and vulnerabilities that are either rather specific to certain areas with geographic specificities or are more relevant to them than to other types of regions:

Coastal areas, including the coastal zones of **islands** and **outermost regions**, are particularly sensitive to effects caused by gradual sea level rise and by extreme sea level events, such as coastal storm surges, coastal erosion, and local salinization of coastal aquifers, as well as to inundations of coastal zones caused by river floods. Combined with high concentrations of populations, infrastructure, economic activities and material assets in many parts of the European coastline, in particular along the British, German, French, Dutch, Belgian, North Italian and Norwegian coasts, this accounts for a high vulnerability of coastal areas, despite an often rather high adaptive capacity. In general, sea level rise adjusted extreme events will impact on all economic sectors and activities within coastal areas. Occurrence of damage events is expected to significantly impact on the entire economies of coastal regions, including knock-on social effects. Beach erosion and salinization of estuaries are expected to cause progressing loss of coastal habitats and their biodiversity. These impacts are a consequence of physical exposure to climate-driven hazards that are specifically linked to coastal areas and do not occur in any other geographical type of region. In addition, often

high densities of population and physical structures make many coastal areas also vulnerable to a range of other climate change impacts, e.g. such related to seasonal water scarcity and urban heat stress. As the case studies demonstrate, the impacts of climate change are often likely to exacerbate other existing stresses that are characteristic to coastal zone with intense human utilisation, such as land pressure, environmental pollution, and dependency of water supply on transfer from other regions, causing multiple-stress vulnerability situations. Although not all coastal areas within Europe are equally vulnerable, the factor constellation described above makes many coastal areas vulnerability hot spots within Europe.

Mountain areas are particularly vulnerable to specific impacts of climate change. Moreover, in general they are more vulnerable than most non-mountainous areas because of a number of specific reasons that are closely related to the geographical specificity of being mountains. Mountain areas have *stronger exposure* to climatic changes because temperature increase has been observed to be stronger in higher elevations. Meeting upon specific mountainous terrain features, many projected changes in climatic stimuli, including more winter precipitation in Northern and Central Europe, earlier set in of snow melt, more frequent extreme weather events, permafrost thawing, and glacier ablation, will contribute to increase significantly *natural hazard potentials*. Besides higher flood risk in mountain valleys, settlements, infrastructure and populations in mountain areas will become increasingly vulnerable to mass movements triggered by climate change, such as debris flows, landslides, torrential processes, and rockfall. Expanding hazard zones are expected to restrict future spatial and economic development options. Against the background of a constantly increasing damage potential due to on-going land development for settlement and business purposes, an increasing frequency of hazard events is expected to cause a growth in damage costs and economic losses on an annual basis. Damage events could also negatively affect perceptions of safety and accessibility, thus reducing residential attractiveness and attractiveness for investors. While not being restricted to mountain areas as defined in the GEOSPECS project, these gravitational hazard processes are much more relevant in mountain areas than elsewhere. Obviously, a range of consequences related to glacier ablation and permafrost thawing, which include alteration of hydrological and run-off regimes in glacier-fed catchment areas, detrimental effects on hydropower generation, and increasing risk to settlements and infrastructure from destabilisation of mountain slopes due to permafrost degradation, are exclusively linked to high-elevation mountain areas.

The economy of many mountain areas, especially of the Alps, is strongly reliant on snow-based *winter tourism*. Decreasing snow reliability causes high vulnerability of the winter tourism sector, and in many locations its economic viability is severely threatened even in the short to medium term. As is demonstrated by some of the cases studies, this could cause the loss of development ambitions related to investments planned in the winter tourism industry.

Due to lack of other land use possibilities in rough mountainous terrain, forests tend to be the dominating land cover, and *forestry* an important economic sector, in many European mountain areas. This makes the entire forest-wood production chain in mountain areas particularly vulnerable to adverse climate change impacts on ecological stability of forest ecosystems and on forest productivity, which are projected to occur throughout Central, Eastern and South Europe. Via impairment of the protective function of forests,

destabilisation of forest ecosystems could have reinforcing feedback effects with natural hazard potentials.

Due to a higher natural *hydropower production potential*, hydropower generation is, in principle, more important in mountain areas than in other types of territories. Decreasing summer precipitation, more frequent and more extreme low water levels during summer and more frequent high run-off volumes after heavy precipitation events are projected to significantly decrease the hydropower production potential in European mountain regions, except in North Europe. Combined with increased sedimentation in high-alpine hydropower reservoirs and higher risks to energy supply infrastructure from natural hazards, this threatens continuity and reliability of energy supply in some mountain regions, in particular during summer, when energy demand for cooling purposes is expected to increase.

Mountains are among the regions richest in *biodiversity* in Europe. Due to a lack of re-dispersion opportunities, biodiversity in mountains is at the same time more vulnerable to climate change than in most other types of regions. Species communities in the highest elevation zones are most vulnerable.

In consequence of the range of mountain-specific impacts and their potential consequences on territorial development, it can be concluded that mountain areas in fact represent vulnerability hotspots within Europe.

A common characteristic of **sparsely populated areas** is the strong dependency of their economies on the *primary sector* and on the economic use of *natural resources*. Since agriculture and forestry are highly climate-sensitive sectors, as are the ecosystem services they capitalize on, this makes the economies of sparsely populated areas highly sensitive to climate change. However, it must be noted that this overall higher sensitivity does not automatically translate into higher economic vulnerability, because due to large-scale differences in exposure to climate change the agriculture and forestry sectors in Northern Europe could potentially benefit from climate change, while in the Mediterranean and in South-East Europe impacts will be strongly negative.

Almost *all GEOSPECS areas* have higher levels of **biodiversity** and, correspondingly, a higher share of protected areas than in the European average (cf. the transversal theme “biodiversity” in this report). Since it is assumed that *any* climatic change alters habitat conditions and affects their biotic communities (although they are not equally sensitive to climate change), it follows that biodiversity as such is highly vulnerable to climate change, and that the biodiversity within GEOSPECS areas is more vulnerable than in other areas. At the same time, also the conservation objectives of the respective protected areas are at threat. In addition, a general lack of effective adaptation options available to mitigate the effects of climate change on species communities and ecosystems further increases their vulnerability.

Evidence provided by the case studies support the judgment that in **sparsely populated areas**, including the sparsely populated parts of **mountains, islands, and outermost areas**, the *transport infrastructure* and their functions for providing access to services of general interest are particularly vulnerable to damages and disruptions triggered by extreme weather events. While the usually sparse transport network in sparsely populated areas may not represent high material values in itself, what matters here is their vital importance as “life-links” for the rural population, i.e. for delivering essential goods and services to populations in scattered settlements, as well as their logistical function in regional

economies that are often highly dependent on continuous export of natural resources. The greater the lack of redundancy in the transport infrastructure network is, the potentially stronger the effects of service interruptions and loss of access are for the population affected. More frequent disruptions of accessibility hold the potential to decrease residential attractiveness, resulting in acceleration of existing depopulation trends. Climate-induced damages to the transport network can also have severe knock-on effects on businesses and regional economies, impacting also on perceptions of accessibility, reliability and safety of transport connectivity on the part of business investors, and thus on their willingness to invest in areas that are perceived as inaccessible. In disaster situations, even temporary loss of access to health, emergency, and disaster relief services can pose serious problems to remote settlements. Increasing maintenance and repair costs for damaged infrastructure can put an additional financial burden on economies that already have to face higher transport costs and higher costs for supplying services of general interest.

The increase in vulnerability of the transport infrastructure and the socio-economic functions it fulfils within sparsely populated areas illustrates that in many cases **existing development constraints** that are characteristic of GEOSPECS areas are **exacerbated by climate change**. Moreover, it emerges from the case studies that different kinds of climate change impacts can cause similar consequences in terms of reinforcing existing development challenges within and across GEOSPECS areas. For instance, on the one hand an increase in winter precipitation and heavy rainfall events is likely to increase the risk of damage to transport connections in the Scandinavian sparsely populated areas, reinforcing existing problems related to poor accessibility, high transport costs, and lower residential attractiveness. On the other hand, the sparsely populated areas in the Mediterranean and the island areas of the Canaries and Sicily will be affected by severe drying trends and increasing water scarcity, causing bottlenecks in water supply to households and raising the need for desalinisation, which is likely to result in higher water prices, higher energy demand from external sources, and higher production costs for businesses. Though the climate-triggered causes are different between abovementioned types of territories, the effects may be comparable in so far as they tend to exacerbate existing socio-economic development constraints that are closely associated to their constituting geographic specificities.

Findings emerging from the case studies also demonstrate that climate change vulnerabilities may sometimes **contest existing development ambitions**. This is obvious for planned investments in the development of winter tourism infrastructure and regarding hydropower development schemes in mountain regions, whose feasibility and sustainability is threatened in the face of climate change. Also in rural areas prone to decreasing water availability, realisation of development opportunities related to natural assets such as development of renewable biomass energy sources or of eco-farming appears difficult to achieve against projected climate trends. In such cases, adaptation to climate change may require developing alternative and more sustainable future development paths.

Climate change can, on the other hand, also bring about **new development opportunities**. This is most evidently illustrated by summer tourism, which could in many European regions benefit from an extended tourist season, with mountain areas and more northerly regions gaining in touristic attractiveness in general, and with more traditional summer destinations in the Mediterranean potentially benefitting from a better balancing of touristic capacity utilisation over the year. However, these opportunities need to be exploited by developing

alternative tourism offers, and within Europe there will be regions with a net gain and such with a net loss in overall touristic demand.

The levels of **adaptive capacity** show some marked commonalities and differences between the GEOSPECS categories. Although there is considerable diversity within the same area categories, overall there is evidence that generic adaptive capacities of *islands, outermost areas, sparsely populated areas, some mountain areas, and peripheral border regions* tend to be lower than on the European average. Comparatively low generic adaptive capacity in these area types appears to reflect existing socio-economic difficulties and development constraints that are specific to these often less advantaged territories, such as isolation, distance to economic and governance centres, smallness of markets, and strong external dependencies in the case of outermost regions and islands. On the contrary, the *cross-border metropolitan regions* are among the regions of Europe with the highest adaptive capacity, which is closely related to these areas being high income, knowledge-intensive, innovation-oriented economies. Coastal areas, in particular those densely inhabited, appear to also have high adaptive capacity, but due to strong climate change impacts they are still vulnerable. The examples of *islands* and *sparsely populated areas* show that some characteristics that are closely connected to their geographic specificities, such as a strong social capital arising from tight-knit communities, can actually increase some determinants of adaptive capacity. Interestingly, borders can both increase and decrease adaptive capacity, depending on whether the cross-border setting is being utilized as a stimulus for trans-boundary socio-economic development or rather acts as a constraint for cross-border cooperation, which may be due to historical, cultural and language barriers or to the EU external border security regime. A lack of trans-boundary cooperation can be particularly problematic for adaptation to climate change in cross-border regions if vulnerabilities vary largely on both sides of a cross-border corridor (ESPON & IRPUD, 2011).

Generally speaking, it becomes obvious that all policies that have a positive effect on regional economic growth and territorial and social cohesion should be beneficial also to improvement of adaptive capacity. However, since a high adaptive capacity does not automatically translate into effective adaptation to climate change, there is still a need to effectuate adaptive capacity via targeted adaptation strategies.

4.2 Policy implications

Analysis of the transversal theme across the case studies confirms that vulnerabilities to climate change are unevenly distributed across Europe's regions. Uneven distribution of climate change impacts and their consequences on territorial development across the EU territory should be a major concern for territorial cohesion policy as such. In addition, as both the GEOSPECS project and previous assessments have shown, the large-scale core-periphery pattern displaying a North-South and West-East gradient in vulnerability levels imply that in many cases those regions that are less advantaged in terms of economic development and growth potentials already today will be more negatively affected by climate change in the future. These regions are thus at risk of suffering regional welfare losses. Without targeted actions on adaptation, disparities in socio-economic development between regions are likely to grow. This constitutes a threat to **economic, territorial and social cohesion of the European Union** and represents an additional challenge for EU territorial policy.

In its **Europe 2020 Strategy**, the European Commission recognizes that need for action and has committed itself to combat climate change, including by *“strengthening our economies’ resilience to climate risks, and our capacity for disaster prevention and response”* (European Commission, 2010a: p.15). Under the goal of sustainable growth, the Europe 2020 Strategy announces a flagship initiative aiming at a resource efficient economy that is also climate resilient, including via *“disaster prevention and response and by harnessing the contribution of cohesion, agricultural, rural development, and maritime policies to address climate change, in particular through adaptation measures (...)”* (European Commission, 2010a: p.16).

In accordance with these goals of the Europe 2020 Strategy, there is a strong need to **mainstream adaptation to climate change** into all relevant **EU sector policies**. Special priority should be given in regard to those economic sectors and those systems that are most vulnerable to climate change, i.e. the agriculture, forestry, tourism and energy sectors as well as coastal areas and mountain areas. Hence, there needs to be a mainstreaming of climate issues into the respective sector policies, including e.g. the Rural Development Policy and the Common Agricultural Policy.

Vulnerability assessments provide an evidence base for informed decision-making that should be used in **allocating funds within territorial cohesion policy**. Regions that are expected to be hit severely by climate change and at the same time have low adaptive capacity to cope with these impacts need targeted assistance to enhance their capacities. However, appropriate caution should be applied when interpreting results gained from top-down indicator-based vulnerability assessments based on high-level, macro-scale statistical datasets. As has been shown previously (Naess et al., 2006, 2009; Aall & Norland, 2004; Lexer et al., 2010), assessment information from such macro-scale assessments often lacks validity, relevance, and acceptance on sub-regional and local levels, which is due partly to limitations in terms of spatial resolution and predictive capacity of climate scenarios and partly to negligence of more local determinants of vulnerability. As a result, there is often a considerable mismatch between the information that macro-scale vulnerability assessments are able to produce and the information that is needed for decision-making on adaptation on more local levels, which is where most concrete adaptation actions need to be taken. Results of macro- and micro-scale vulnerability assessments have also been shown to be often not consistent. Thus, in order to better capture causal mechanisms and interdependencies driving vulnerability at local levels, in the future top-down, macro-scale assessments should be supplemented by bottom-up vulnerability assessments that employ tailor-made sub-regional and local indicators, that make use of qualitative knowledge and interpretive information gained from engagement with stakeholders, and that reflect stronger local specificities, concerns, decision-making processes, and related adaptation barriers (Naess et al., 2006, 2009; Aall & Norland, 2004; Lexer et al., 2010).

One means of assisting regions in assessing their vulnerabilities and building capacities to adapt could be via criteria that take account of climate change issues in the selection of projects within the **European Territorial Cooperation Programme** lines. A particular focus here could be cross-border regions that show strong discontinuities in vulnerability levels on both sides of the border. As has been shown, a number of territories with geographic specificities are affected by specific types of climate change impacts, and certain types of areas have similar underlying economic and social drivers of vulnerability and are likely to face similar climate change-related development challenges. Analysis of the transversal

theme across the case studies has confirmed that vulnerability is highly context-dependent, and that the distribution of vulnerabilities is often strongly influenced by socio-economic characteristics and processes that are closely related to geographic specificities. Stronger consideration of these geographic specificities and their interplay with vulnerability to climate change can thus **inform territorially differentiated adaptation strategies**.

The future **EU Adaptation Strategy** should encourage territorially specific responses to different adaptation needs. Up to now, existing **national adaptation strategies** do to a large extent not take into account differences in adaptation needs caused by geographic specificities, i.e. they do for example not have a separate set of recommendations or actions focussed specifically on mountain areas within their national territories. That gap could be filled by **regional adaptation strategies**, which are increasingly being developed. Above all, tailored regional adaptation strategies would appear the most appropriate level to take account of the context-dependent nature of vulnerability, including intraregional differences in vulnerability that cannot be captured sufficiently by top-down indicator-based assessments, and to respond to the recognition that there cannot be a “one-fits-all” approach to adaptation. Future allocations of funds within EU policies should thus also be directed at supporting the development and implementation of regional adaptation strategies that are tailored to regionally specific adaptation requirements, including those deriving from geographic specificities.

3. Annex

The following sections summarize available information on climate change impacts and vulnerabilities for selected economic sectors that have been identified to be most climate-sensitive and particularly relevant within a European territorial development context.

5.1 Agriculture

The climate change impacts on agriculture will differ significantly between the regions of Europe, with vulnerability of the agricultural sector being strongly determined by the economic dependency of regional economies on that sector. The agriculture fraction of total domestic production differs considerably between the European countries. Especially in the southern and eastern parts of Europe, which are the ones to be most affected by climate change, farming plays an important role. Thus, the economic dependency of these regions' economies, combined with the general climate-sensitivity of agriculture, make it a highly vulnerable sector in South and East Europe.

Agriculture is directly affected by climate change through changing production possibilities. Generally, a longer growing season will lead to yield improvements of certain agricultural crops in northern Europe. On the contrary, shorter growing seasons in southern Europe will lead to a decrease in crop productivity (EEA, 2010f). In addition, agriculture will also have to cope with decreases in annual precipitation in the entire southern half of Europe and with strong decreases in summer precipitation, i.e. during the vegetation period, especially in the Mediterranean basin and the Balkans, where summer water availability is projected to decrease by 20-30% under a 2°C warming scenario, and by 40-50% under a 4°C scenario. The resulting decrease in crop yields in south Europe, where crop yields are already water limited today (Alcamo et al., 2007), could be as high as 30% by 2100 (DG REGIO, 2009). Decreasing water availability for agriculture on the one hand and increasing water demand for irrigation on the other hand will imply that competition for water use between sectors and users will increase. On the contrary, crop yields in north Europe are likely to benefit from higher annual precipitation amounts, but may be affected by increasing extreme weather events.

As extreme events (droughts, extreme temperatures, storms, and heavy precipitation) are projected to increase in frequency and magnitude, and due to stronger inter-annual and inter-decadal variability of the precipitation regimes, crop yields are likely to become more variable, and thus less reliable, even in the short term (EEA, 2010f). A higher risk of frost damage from delayed spring frosts and likely higher soil erosion rates from more frequent heavy precipitation events adds up to the vulnerability of the agriculture sector.

Compared to other European regions, the negative impacts of climate change on the agriculture sector in South Europe, combined with the high economic relevance of the sector, will probably impose larger income losses in these regions (DG REGIO, 2009).

5.2 Forestry

European forest ecosystems provide a wide range of environmental and socio-economic services, which vary regionally (EEA, 2010f). Environmental services include for example regulation of climate and freshwater, protection of biodiversity and soils as well as the protective function of forests against mass movement risks. Socio-economic services include inter alia provision of jobs and income, raw materials for industry and renewable energy or improvement in the quality of life (recreational functions).

Forest ecosystems in Europe are very likely to be strongly affected by climate change (Alcamo et al., 2007), with many consequences being already observable today. Forest area is expected to contract

in the south of Europe and to expand in the north as well as to higher elevations. Simulations show that over the short term increased forest growth due to the CO₂ fertilization effect and a longer growing season may be possible in the North, but that in the long-term decreasing summer water availability, particularly in south, central and east Europe, acts as a limiting factor. Many forests in south and central Europe are already under water stress today. Generally, changes in vegetation and shifts in forest types are expected to occur (Casalegno et al. 2007, EEA, 2010f). Many economically relevant tree species that are adjusted to cooler and wetter conditions will lose their suitability for site conditions, resulting in higher mortality rates, decreased forest growth, reduced vitality, and higher susceptibility to other stressors such as infestations by pathogenic organisms. In Central Europe, increasing calamities caused by bark beetle infestations have already caused severe economic losses (Umweltbundesamt, 2007b). Especially in southern and central Europe, high temperatures and drought will increase forest fire risk and may lead to a reduction in wood production and timber values (EEA, 2010f). Furthermore, the projected increase in the intensity and frequency of heavy storms may have serious economic consequences within the forestry sector. Storms Lothar and Martin in 1999 caused about 200 million m³ of wind-thrown timber; storm Gudrun in 2005: 66 million m³; storm Kyrill in 2007: about 59 million m³.

In mountain areas and alpine terrain, impairment of the protective functions of forest ecosystems increases natural hazard risks to settlements and infrastructure; similarly, reduction of the water retention capacity of protection forests destabilized by climate change impacts may contribute to the build-up of river floods.

Climate change impacts on forests and the forestry sector may also lead to indirect economic effects on the entire forest-wood production chain; the wood, pulp and paper industry is almost twice as large as the forestry sector.

5.3 Energy

Energy demand is closely linked to climatic and weather conditions. Projections of climate change suggest reductions in heating degree days in Europe, but increases in cooling degree days (Alcamo et al., 2007, EEA, 2010f). In particular, there will be an increasing electricity demand due to cooling in the summer in southern Europe and reduced heating energy demand due to more moderate winters in northern Europe, resulting into a likely net benefit to the north and net losses to the south (Greiving et al., 2010).

Regarding the energy production side, the projected change in river runoff due to climate change will result in an increase in hydropower production by about 5% and more in northern Europe and a decrease by about 25% or more in the south (EEA, 2010f). More frequent and higher fluctuations of water levels at rivers, due to more frequent heavy precipitation events on the one hand and more persistent summer droughts on the other hand, threatens reliability of hydropower generation and will increase the risks of power failure at times of high demand. Downstream thermal power plants could face cooling problems if intake water becomes insufficient or too warm, as happened to some French nuclear power plants during the 2003 heat wave (EEA, 2010f). Also hydropower production in the Alpine region will be affected by an increase in sediment discharge into the reservoirs.

Energy generation and supply infrastructure is vulnerable to damage from climate-triggered extreme events and natural hazard events, such as mass movements, permafrost thawing, etc., which are expected to increase.

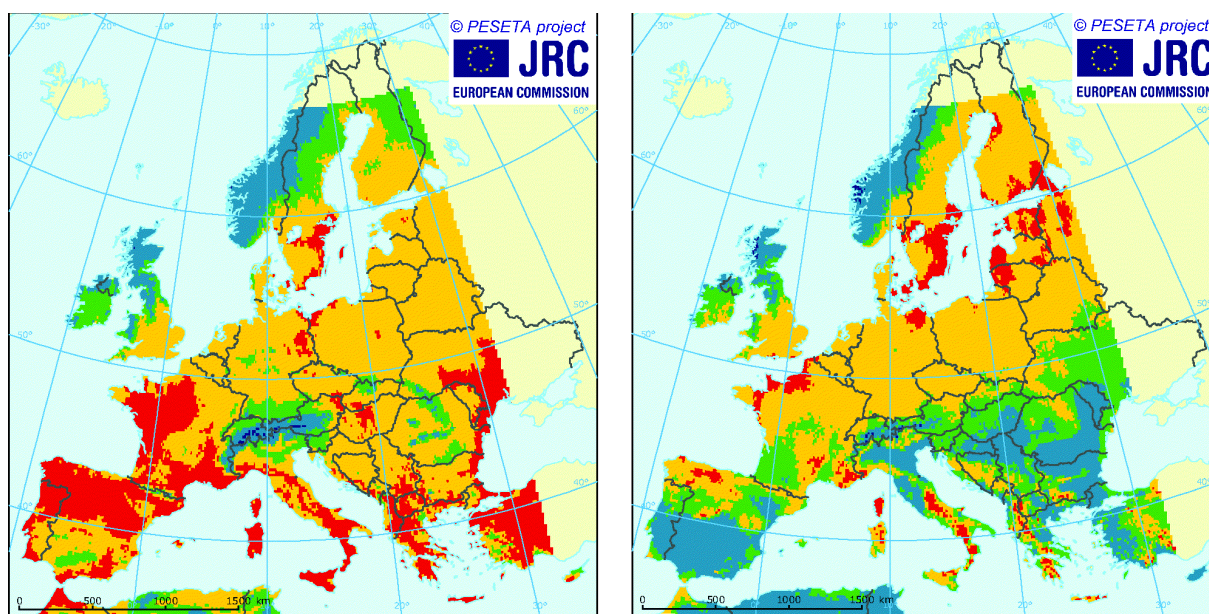
5.4 Tourism

Tourism is obviously closely related to weather and climate, and large-scale and seasonal climatic differences in Europe are driving the demands on the tourism market (Alcamo et al., 2007). Whereas changes in the climate are improving the attractiveness of some regions in Europe, they are starting to affect the attractiveness of many of the Mediterranean regions (EEA, 2010f). Particularly during

the key summer months, the suitability of the Mediterranean for tourism will decline, although there may be an increase during other seasons. In general, a shift in the major flows of tourism within the EU is likely to take place.

Also winter tourism will be affected by climate change. Since snow is the most important resource of winter tourism, its future depends directly on snow reliability. Snow cover is projected to contract further in European mountain regions (IPCC, 2007a). The common meteorological and physical rule says that for every 1°C increase in temperature, the snow line rises by 150 metres in the average. As a consequence, while there could be greater snow accumulation in some regions above the freezing line due to increased winter precipitation (EEA, 2004; IPCC, 2001), less snow is expected to accumulate at lower altitudes.

As a consequence of decreasing snow reliability, the EEA expects that nearly half of all ski resorts in Switzerland, and even more in Austria, will face severe economic difficulties in the future (EEA, 2004). Usually, it is assumed that at least 100 days of natural snow reliability per year are required to warrant economic viability of ski resorts. In case of an increase in temperature by 1°C, which is expected to occur in many parts of Austria by 2030, the '100-day-limit' of natural snow reliability could rise by an average 150 metres in elevation. This would imply that more than 30% of all existing Austrian ski resorts would have lost their economic viability by then or would face an imminent end of operation (Abegg, 2006). The economic sensitivity of winter sports industry in Europe is high, generating nearly EUR 50 billion in annual turnover (OECD, 2007).



Simulated conditions for summer tourism in Europe for 1961–1990 (left) and 2071–2100 (right) according to a high-emissions scenario (IPCC SRES A2)

Tourism comfort index (TCI)

Unfavourable (TCI: 0–40)	Good (TCI: 60–70)	Excellent (TCI: 80–100)
Acceptable (TCI: 40–60)	Very good (TCI: 70–80)	

Figure 23: Modelled conditions for summer tourism in Europe for 1961 – 1990 and 2071 – 2100 (EEA, 2010f, Source: CISCAR et al. 2009, AMELUNG & MORENO 2009)

5.5 Built environment and Infrastructure

The main potential impacts on infrastructure and the built environment are extreme events such as floods, mass movements, storm events but also heat waves and droughts. Storms are among the

impacts with the highest damage costs (Stern, 2006). In addition to direct costs to infrastructure, a series of indirect costs to industry and businesses may be caused by disruption of services and transport connections, leading, e.g., to increased delays and cancellation in transportation of people and goods (especially for just-in-time production) and problems with communication and power infrastructure. Especially in populated areas the continuity of essential services is threatened by extreme weather events, specifically in connection with water supply and sewerage, health services and transport (EEA, 2010f).

Exposure to sea level rise is a major threat to coastal zones across Europe. Sea-level rise and changes in the frequency and/or intensity of extreme weather events, such as storms and associated surges, can lead to increased coastal flooding. A significant share of the European population lives in low-lying, and often densely populated, coastal zones, making them highly vulnerable to climate change (EEA, 2010f). Vulnerability of a coastal area to the effects of climate change depends on altitude above sea level, tidal ranges, density of population, infrastructure and the built environment. 140,000 km² of land in Europe is within 1m of sea level. Under sea level rise scenarios of around 50 cm, the number of people flooded annually may reach between 0.1 and 1.3 million, and 2,000 to 17,000 km² of land may be permanently lost by 2080. The economic costs of such a scenario are estimated at EUR 18 billion (EEA/JRC/WHO, 2008).

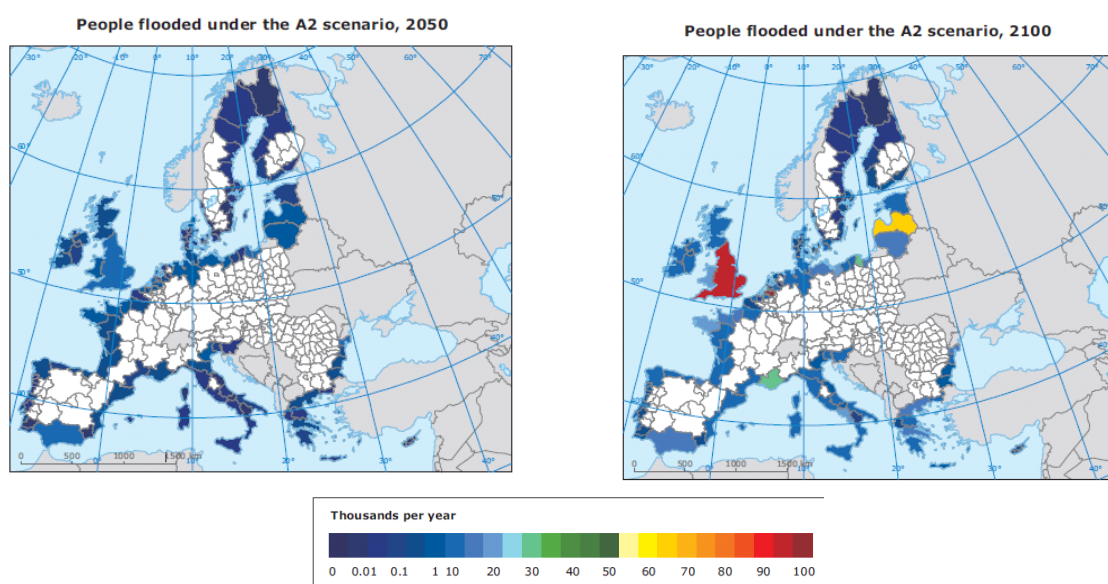


Figure 24: People expected to at risk of coastal flooding without adaptation in the medium to long term under the A2 SRES emission scenario (EEA, 2010f; source: Hinkel et al., 2010, 2009)

5.6 Water management

Water is a special domain, as impacts here have a cascade effect reflecting the wide variety of water use (EEA, 2009) in other sectors like agriculture, energy or tourism. Generally, changes in precipitation, combined with rising temperatures and reduced snow cover will have large impacts on the water sector, in particular on water quality and quantity. This requires water managers to incorporate climate change in their planning and investment decisions (EEA, 2009). The dominant climate change impacts are flooding in central Europe, hydropower, health and ecosystem concerns in the northern countries, and water scarcity in southern Europe (EEA, 2007).

Regarding the water scarcity problem, also high economic losses are expected. According to IPCC (2007c) the percentage area under high water stress in Europe is likely to increase from 19% today to 35% by the second half of the century.

Various climate change-driven processes as changing precipitation regimes, glacier melt, and snow cover, in interaction with land use changes and land management practices, are likely to result in increase in flood risk on many European river systems. Observed annual river discharges have partly increased and partly decreased. It is expected that this trend will continue and even accelerate, causing strong reductions in annual discharges particularly in South Europe and increases in particular in North and North-East Europe (EEA 2004). Various studies and projections show an increase in magnitude and frequency of intense precipitation events in most parts of Europe, especially in the central and northern parts (Christensen & Christensen 2003, EEA, 2007). This will contribute to an increase of flood events or mass movements triggered by rainfall.

The number of recorded river floods in Europe is increasing, but this may be strongly influenced by improved monitoring and reporting systems. In the years 1998–2008 floods have resulted in more than 700 fatalities, 2.2 million affected people and direct economic losses of more than EUR 55 billion. Twenty-two major disasters occurred in the period 2003–2008 alone. Economic losses from floods in Europe have risen over the years, but evidence suggests that most of that upward trend in flood losses is attributable to socio-economic development and increasing exposure (EEA, 2010f).

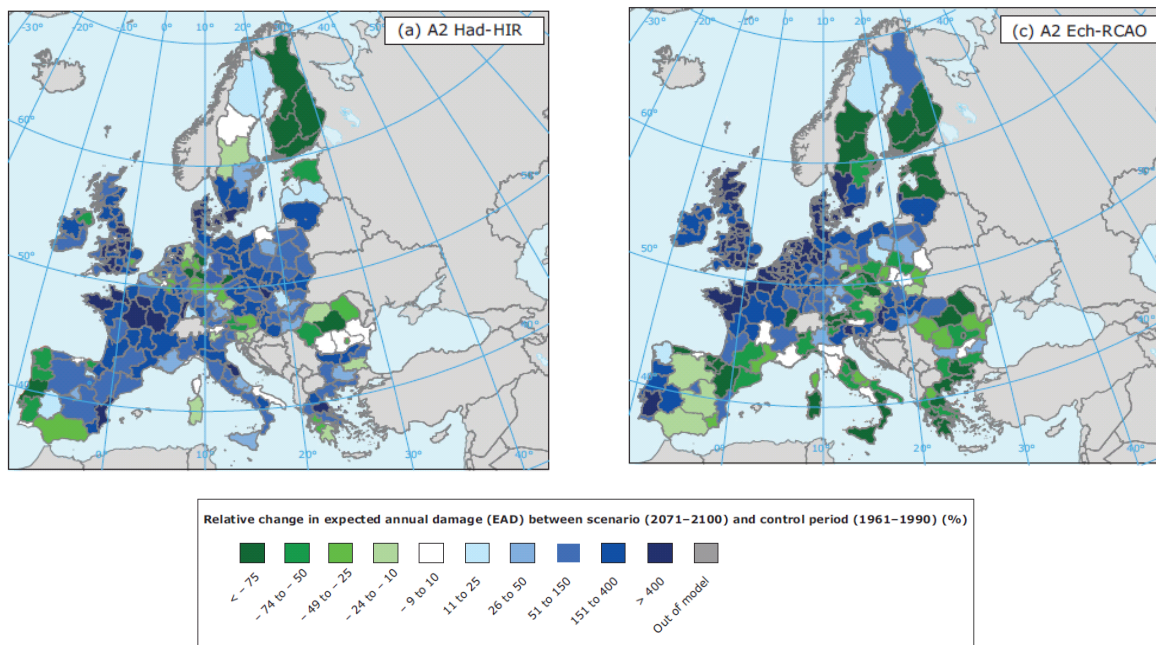


Figure 25: *Expected impact of climate change on future flood damage under the A2 scenario for two different Global Circulation and Regional Climate Models (EEA, 2010f; source: Feyen et al., 2010).*

5.7 Health

Climate change is likely to affect human health, either directly related to the physiological effects of heat and cold, or indirectly, for example, through the increased transmission of food-borne or vector-borne pathogens (EEA, 2007). Climate change can multiply existing health problems and risks. In general, the effects depend on a large amount on the sensitivity of population and its adaptive capacity. For populations in the EU, mortality has been estimated to increase by 1-4% for each degree increase in temperature above a locally specific cut-off point (WHO, 2008). Especially people in the southern European regions are affected to heat-related risks (EEA, 2010f).

5.8 Damage costs

According to the estimations of Munich Re, the number and impacts of weather and climate triggered events increased considerably between 1998 and 2009. In comparison, the number of geophysical hazards appeared to remain more stable (EEA, 2010f) (see Figure 26). Around 81% of the

economic losses that have occurred in Europe since 1980 are caused by hydro-meteorological hazards (EEA, 2010f). About half of all losses can be attributed to a few large events such as storms Lothar in 1999 and Kyrill in 2007, and the floods in Central Europe in 2002 and in the UK in 2007. Overall average economic losses show a significant upward trend. A causal relationship towards climate change is difficult to prove and remains disputed. Very likely, upward trends in disaster losses can be explained better by increasing exposure due to changes in economic development, which increase the value and density of human and physical capital in hazard-prone areas (EEA, 2007), partly also by better reporting of extent of losses.

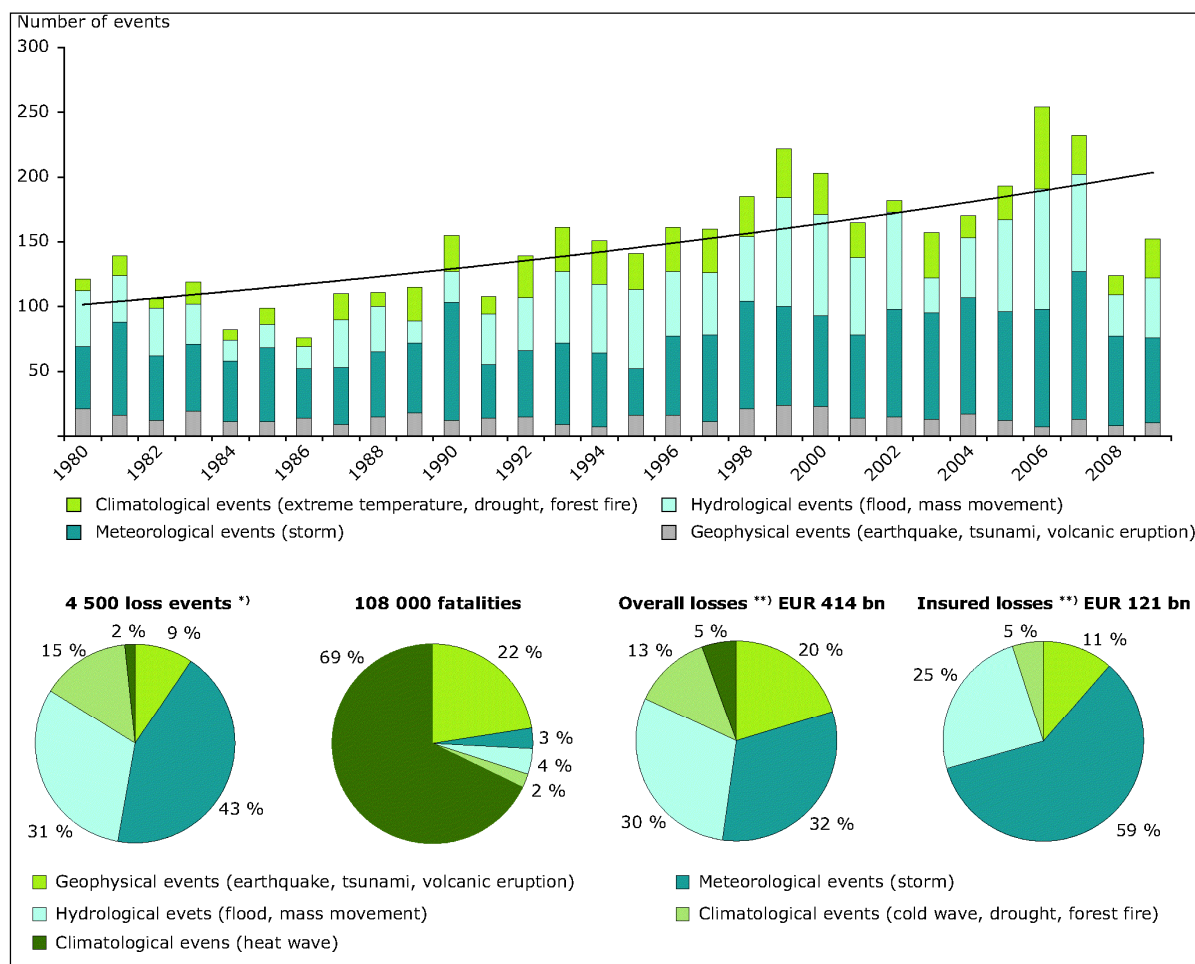


Figure 26: Natural disasters in EEA member countries, 1980-2009 (EEA, 2010f, Source: NatCatSERVICE, Munich Re, 2010 – August 2010).

In general it is very difficult to project the future development of extreme events because there is less confidence in the climate model predictions in that regard. In an initial integrated economic assessment of future damage costs undertaken by the PESETA project, the annual damage to the EU economy in terms of GDP losses due to climate change was estimated to be between EUR 20 billion for the 2.5°C warming scenario and EUR 65 billion for the 5.4°C scenario, with the highest damage occurring in south Europe and northern central Europe, and slight increases in GDP in northern Europe. The assessment is based on the premise that no public adaptation takes place and that the climate of 2080s would occur today (EEA, 2010a).

Various studies come to consensus, that **cost of adaptation** measures against the impacts of climate change in Europe could potentially be large. But they also suggest that timely and proportionate adaptation makes economic, social and environmental sense, and is likely to be far less costly than inaction (EEA, 2007, EEA, 2010a).

Annex 45: Difference between proportion of employment in selected sectors in coastal areas and national average

Coast	Agriculture and Fisheries		Manufacturing		Tourism		Transport and storage	
	LAU2 contiguous to coastline	LAU2 within 45 minutes from coastline	LAU2 contiguous to coastline	LAU2 within 45 minutes from coastline	LAU2 contiguous to coastline	LAU2 within 45 minutes from coastline	LAU2 contiguous to coastline	LAU2 within 45 minutes from coastline
BE_northsea	-65%	33%	-14%	20%	40%	4%	57%	5%
BG_blacksea	-58%	-42%	-23%	-17%	20%	20%	12%	13%
CY_meditsea	-20%	-3%	-18%	0%	71%	0%	50%	0%
DE_baltsea	-60%	-24%	-22%	-14%	17%	3%	17%	7%
DE_northsea	-61%	-25%	-6%	-3%	6%	-5%	24%	9%
DK_baltsea	4%	0%	-2%	0%	7%	0%	1%	0%
DK_northsea	37%	43%	29%	32%	-3%	-6%	-18%	-19%
EE_baltsea	-48%	-41%	-9%	-1%	13%	3%	13%	4%
ES_Bay of Biscay	3%	-10%	-1%	7%	-13%	-15%	3%	4%
ES_Gulf of Cadiz	24%	28%	-46%	-45%	28%	21%	-15%	-14%
ES Canary islands	-15%	-15%	-69%	-68%	122%	117%	10%	11%
ES_meditsea	-17%	-17%	-24%	1%	19%	-1%	4%	3%
FI_baltsea	-48%	-30%	-11%	-6%	5%	2%	9%	6%
FR_atlantic	-10%	10%	-3%	11%	38%	2%	-10%	-3%
FR_meditsea	-69%	-48%	-49%	-41%	56%	30%	12%	12%
FR_northsea	-56%	-13%	16%	43%	38%	-5%	0%	-7%
GR_meditsea	4%	-14%	-10%	2%	24%	2%	5%	4%
IE_atlantic	-10%	-30%	-3%	-2%	19%	5%	4%	6%
IS_atlantic	-30%	-30%	0%	0%	-1%	-1%	6%	6%
IS_bargreen	155%	155%	-6%	-6%	-3%	-3%	-27%	-27%
IT_meditsea	27%	9%	-44%	-16%	18%	4%	21%	6%
LT_baltsea	-47%	-24%	-7%	-7%	32%	22%	33%	19%
LV_baltsea	-75%	-46%	-13%	-5%	18%	8%	15%	13%
NL_northsea	22%	0%	-26%	-16%	0%	-1%	15%	8%
NO_bargreen	75%	75%	2%	1%	0%	0%	3%	3%
NO_northsea	-39%	-37%	-3%	-4%	0%	1%	-3%	1%
PT_atlantic1	-9%	-28%	-27%	5%	38%	2%	13%	6%
PT Azores	172%	139%	-71%	-69%	19%	31%	-9%	-7%
RO_blacksea	-59%	-34%	9%	8%	28%	16%	16%	11%
SE_baltsea	-15%	-10%	-16%	-10%	11%	7%	4%	6%
SE_northsea	-27%	-22%	3%	10%	18%	8%	8%	6%
SI_meditsea	-21%	31%	-49%	-9%	165%	72%	95%	40%

Annex 46: Core border areas where a border is reached within 45 minutes

Name	Code	Border area (km2) 45 minutes only	Percentage border area	Border area population	Percentage border population
Albania	AL	NA	NA	NA	NA
Austria	AT	31.446	37%	5.421.157	66%
Belgium	BE	28.063	92%	8.822.337	84%
Bulgaria	BG	9.705	9%	763.748	10%
Switzerland	CH	20.359	49%	5.996.337	75%
Cyprus	CY	0	0%	0	0%
Czech Republic	CZ	40.636	52%	5.020.266	49%
Germany	DE	91.183	25%	20.594.235	25%
Denmark	DK	3.435	8%	233.475	4%
Estonia	EE	10.160	22%	240.341	17%
Spain	ES	20.827	4%	2.038.371	5%
Finland	FI	18.188	5%	261.762	5%
France	FR	46.954	7%	9.611.952	15%
Greece	GR	19.304	15%	547.041	5%
Croatia	HR	NA	NA	NA	NA
Hungary	HU	38.865	42%	4.503.636	45%
Ireland	IE	6.796	10%	371.465	9%
Iceland	IS	0	0%	0	0%
Italy	IT	13.944	5%	6.675.322	11%
Liechtenstein	LI	160	100%	35.168	100%
Lithuania	LT	28.121	43%	1.639.883	45%
Luxembourg	LU	2.596	100%	469.086	100%
Latvia	LV	26.849	42%	655.289	29%
Montenegro	ME	NA	NA	NA	NA
Malta	MT	0	0%	0	0%
Netherlands	NL	21.438	60%	8.274.888	51%
Norway	NO	3.744	1%	86.494	2%
Poland	PL	62.650	20%	6.603.042	17%
Portugal	PT	16.676	18%	645.766	6%
Romania	RO	34.606	15%	4.180.510	19%
Serbia	RS	NA	NA	NA	NA
Sweden	SE	12.655	3%	75.424	1%
Slovenia	SI	14.615	72%	1.372.276	68%
Slovakia	SK	29.737	61%	3.564.742	66%
Turkey	TR	NA	NA	NA	NA
United Kingdom	UK	7.200	3%	639.102	1%
Kosovo	XK	NA	NA	NA	NA
Europe		660.911	14%	99.343.115	20%

Annex 47: Core border areas where 45-minutes or more are needed to reach a border

Name	Code	Border area (km ²)	Percentage border area	Border area population	Percentage border population
Albania	AL	NA	NA	NA	NA
Austria	AT	36.404	43%	5.501.562	67%
Belgium	BE	28.063	92%	8.822.337	84%
Bulgaria	BG	14.239	13%	981.685	13%
Switzerland	CH	22.419	54%	6.027.386	76%
Cyprus	CY	0	0%	0	0%
Czech Republic	CZ	40.636	52%	5.020.266	49%
Germany	DE	91.183	25%	20.594.235	25%
Denmark	DK	3.435	8%	233.475	4%
Estonia	EE	10.160	22%	240.341	17%
Spain	ES	26.605	5%	2.225.308	5%
Finland	FI	100.092	30%	347.448	7%
France	FR	94.776	15%	9.707.924	15%
Greece	GR	19.529	15%	553.289	5%
Croatia	HR	NA	NA	NA	NA
Hungary	HU	38.865	42%	4.503.636	45%
Ireland	IE	6.831	10%	371.968	9%
Iceland	IS	0	0%	0	0%
Italy	IT	19.166	6%	6.741.455	11%
Liechtenstein	LI	160	100%	35.168	100%
Lithuania	LT	28.121	43%	1.639.883	45%
Luxembourg	LU	2.596	100%	469.086	100%
Latvia	LV	26.849	42%	655.289	29%
Montenegro	ME	NA	NA	NA	NA
Malta	MT	0	0%	0	0%
Netherlands	NL	21.438	60%	8.274.888	51%
Norway	NO	81.351	25%	263.712	6%
Poland	PL	62.674	20%	6.604.432	17%
Portugal	PT	17.470	19%	651.673	6%
Romania	RO	42.907	18%	4.545.514	21%
Serbia	RS	NA	NA	NA	NA
Sweden	SE	176.165	39%	249.701	3%
Slovenia	SI	14.615	72%	1.372.276	68%
Slovakia	SK	29.869	61%	3.566.577	66%
Turkey	TR	NA	NA	NA	NA
United Kingdom	UK	7.200	3%	639.102	1%
Kosovo	XK	NA	NA	NA	NA
Europe		1.063.819	22%	100.839.616	19,9%

Annex 48: The difference between “land cover” & “land use” and approaches to assess the “degree of naturalness” for a given territory

A special report to the “Intergovernmental Panel of Climate Change” (IPCC) of the United Nations Environment Programme (UNEP)⁴⁴⁹ highlights that the terms “land cover” and “land use” are often confused.

- **Land cover** is the observed physical and biological coverage of a given territory (e.g. by vegetation and/or man-made features).
- **Land use** describes how people interfere in a certain land cover type through all sorts of arrangements, activities or inputs and by this modify [natural environment](#) or [wilderness](#) into fields, pastures and built environment (i.e. individual buildings, or settlements and the supporting infrastructure etc).

The observable pattern of land cover can in principle also be used for making assumptions about the level of “naturalness” or “artificialness” of a given area.⁴⁵⁰ This is important as territorial development is closely related to the question of how land is actually used and because territorial development policy increasingly considers a high degree of naturalness to be an asset.

As a consequence, **the notion of “naturalness” also plays an important role in the context of EU-wide territorial research.** In some early outcomes of the ESPON 2006 programme⁴⁵¹, the degree of naturalness of a territory was defined as being an aggregate of 3 indicators⁴⁵²:

- **Artificial surfaces:** The share of man-made or artificial surfaces of a region is used as an indicator for the relative size of the built-up area (high shares of artificial surfaces are considered as negative).
- **Natural surfaces:** A territory’s share of natural and semi-natural surfaces is used to illustrate how much of the land has not been turned into man-used areas (high shares of natural surfaces are considered as positive).
- **Agricultural intensity:** The output/input ratio of agricultural production is used as an indicator for the intensity of agricultural land use (high agricultural input/output ratios are considered as negative).

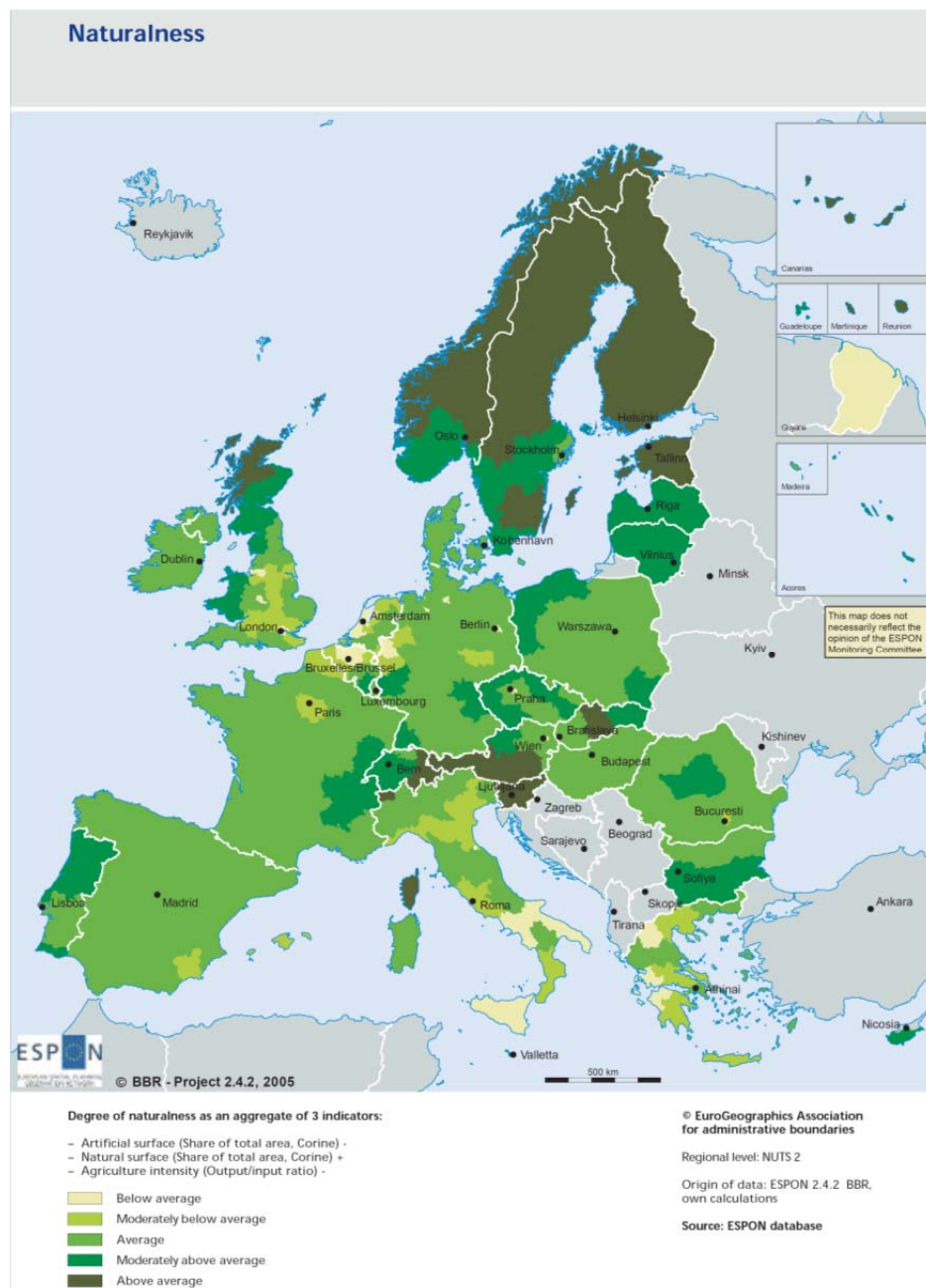
⁴⁴⁹ **UNEP - United Nations Environment Programme (2001):** *Special Report on land use, land-use change and forestry.* Intergovernmental Panel of Climate Change (IPCC) Special Report Series. GRID-Arendal (GRIDA), 2001. On-line access of section 2.2.1.1 of the report at: http://www.grida.no/publications/other/ipcc_sr/?src=/climate/ipcc/land_use/045.htm

⁴⁵⁰ This depends, however, much upon the overall quality of the available land cover data and their level of territorial differentiation.

⁴⁵¹ **ESPON (2005):** *In search of territorial potentials. Midterm results by spring 2005.* Esch-sur-Alzette, 2005. **ESPON (2006):** *ESPON Project 2.4.2 Integrated Analysis of Transnational and National Territories Based on ESPON Results.* Final Report. Bonn, May 2006.

⁴⁵² A decisive component in this composite indicator is the share of the total land use that a certain type of land use has in a region.

On ground of this overall approach, an EU-wide map was established which displays a general picture of the naturalness of the EU-territory.



A territorially much more differentiated perception of “naturalness” exists in the context of conservation biology, where the concept of naturalness was originally developed.⁴⁵³ Although the conceptual approach is still subject to some mostly philosophical and semantic debate, conservation biology uses naturalness basically in two different but closely related ways: naturalness

⁴⁵³ By taking as the point of departure that the term “natural” can be considered the antonym of “artificial”, naturalness - or in other words the quality of being natural - thus expresses the level at which something occurs without artificial influence.

is considered (1) from a normative viewpoint as a “conservation value” and (2) from an objective viewpoint as a parameter or state descriptor of ecosystems.

Especially in the latter perspective, the naturalness concept serves frequently as a basis the development of various diagnosis and problem evaluation tools which aim to provide support to the operational management of natural resources or ecosystems. Concrete examples are

- the establishment of land descriptions (e.g. visualising the state of conservation & giving a general idea of human intervention)
- the elaboration of environmental impact studies (e.g. evaluation of alternatives & the impact of fragmentation)
- land use planning and natural resource planning (e.g. assessment of the conservation interest for particular subsystems, assessment of leisure options)
- the management of protected areas (e.g. selection of areas & networks of areas, design of limits and zones)
- wildlife management (e.g. guidance to translocations, introductions or re-introductions of living organisms, assessment of habitats for species recovery)
- ecological restoration (e.g. definition of priority initiatives or baseline states and restoration objectives).

An interesting approach to recognise and differentiate naturalness along a continuum or gradient in a given territory was **developed in 2004 by Antonio Machado**.⁴⁵⁴ His index defines a qualitative scale of naturalness (**see: Box 1**) which moves from an extreme situation of being “absolutely natural” (“10” in the box 1 table) down to the opposite situation of being “absolutely artificial” (“0” in the box 1 table). In addition, a table with differentiated criteria at the level of each category was developed in order to facilitate the diagnosis process (**see: Box 2**).

⁴⁵⁴ See for further details: **Machado, A. (2004): *An index of naturalness***. In: *Journal for Nature Conservation* 12/2004: pp. 95—110.

Box 1: The “scaling of naturalness” in the index developed by A. Machado

-
- [10] Natural virgin system; only natural elements and processes. Possible anecdotal presence of negligible or hardly noticeable anthropic elements, or totally insignificant physical-chemical pollution coming from exterior anthropic sources
 - [9] Natural system; presence of few exotic biological elements (no qualitative effects); minimal artificial infrastructure, temporary or removable. Physical-chemical pollution absent or of no significance
 - [8] Sub-natural system; possible extended presence of wild exotic species, but not dominant (low impact); artificial elements located, not extensive. Occasional pollution processed by the system (does not go beyond resilience). Possible minor extraction of renewing resources. Fragmentation irrelevant. Natural dynamic little altered
 - [7] Quasi-natural system; extensive anthropic activities of low physical impact; facilities if present, dispersed, not connected; wild exotic species well established but not dominant; natural structures modified but not distorted (re-location of physical or biotic elements). Moderate extractions, if present. Little alteration of water dynamics
 - [6] Semi-natural system; anthropic infrastructure scarce or concentrated; possible dominance of wild exotic species; native elements considerably reduced. Occasional addition of energy and/or extraction of renewable resources or of non-relevant materials. General dynamic still controlled by natural processes. It may include abandoned cultural systems undergoing natural recovery
 - [5] Cultural self-maintained system; processes conditioned by extensive activities of man; biological production not too forced. Native species altered, occasionally managed. Little or no presence of constructions or artefacts. Little or no management of water cycle (passive)
 - [4] Cultural assisted system; important infrastructures and/or conditioning of the physical environment; forced biological production; moderate addition of matter (usually with pollution associated). Natural elements intermixed, in patches or corridors. Active management of water
 - [3] Highly intervened system: still areas with biological production (natural/cultivated/breeding) mixed (mosaic) with buildings and infrastructures. Natural biodiversity severely reduced; its elements rather isolated (intense fragmentation). Water dynamic manipulated. Geomorphology usually altered; soils eventually removed
 - [2] Semi-transformed system; biological production not dominant, disarticulated. Predominance of constructed elements. Occasional moderate vertical development of facilities. Intensive input of energy and matter (food, water) from the outside. Intensive control of water
 - [1] Transformed system; anthropic processes governing; clear dominance of artificial elements; frequent intensive vertical development; vestiges of natural elements; those exotic confined, decorative or not visible. Full dependence of external inputs of matter and energy. Absolute control of waters
 - [0] Artificial system; high closure; without self-maintained macroscopic life; microscopic life absent or in containers
-

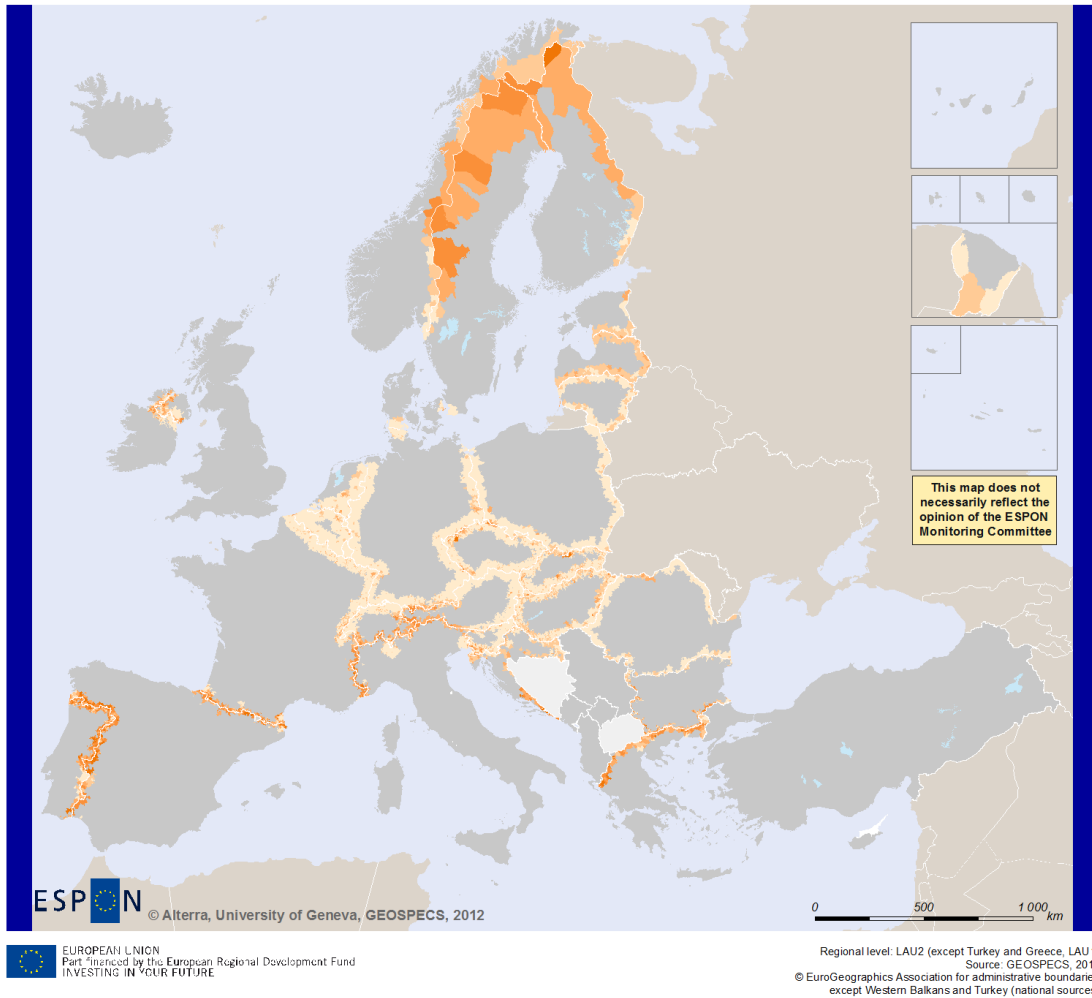
Box 2: Aspects relevant for a diagnosis of naturalness in the index developed by A. Machado

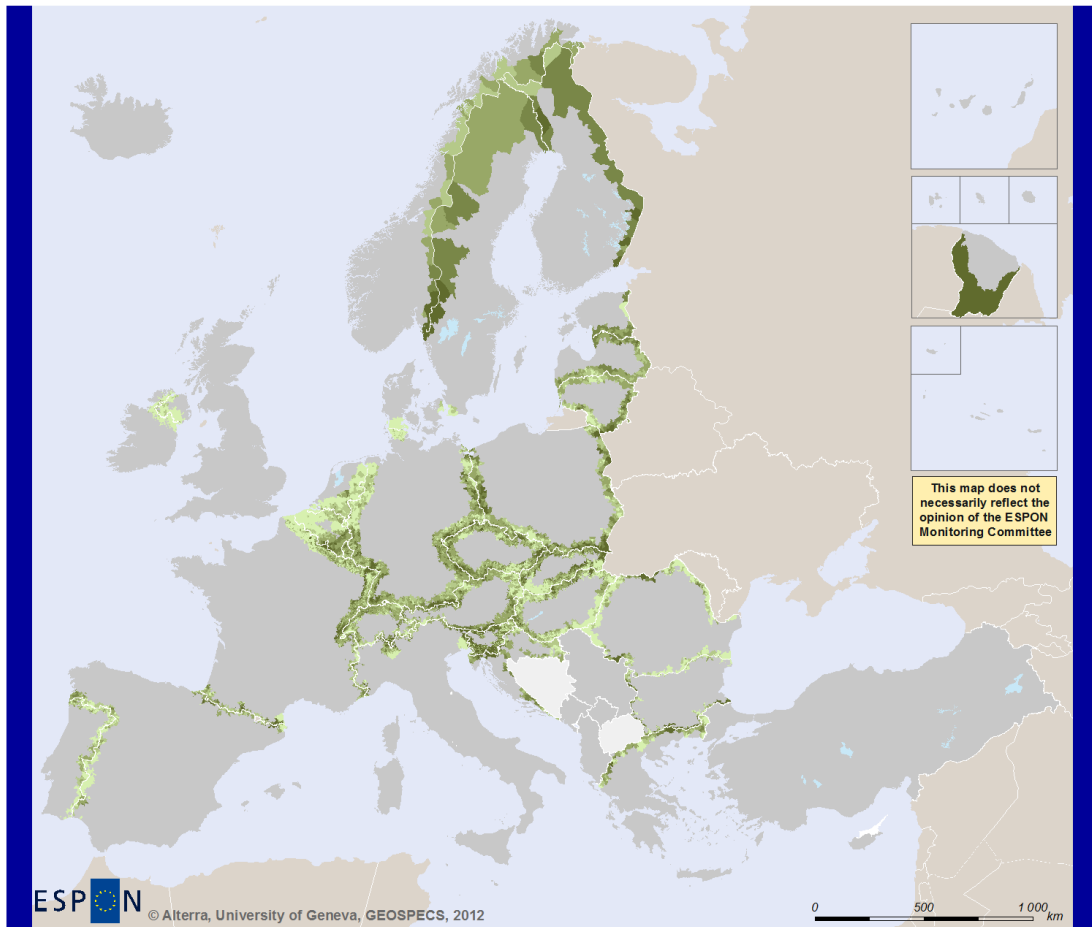
Index	Biotic elements		Artificial elements		Inputs of energy and/or matter	Physical alterations	Extraction of elements	Level of fragmentation	Dynamics		
	Native	Exotic	Artefacts	Pollutants					Water	General	
[10]	Exclusively/ almost excl.	None or insignificant	None or insignificant	None or insignificant	None, only natural	None	Only natural vectors	None or insignificant	Free running, natural	Natural	NATURAL
[9]	Dominant	Some, irrelevant effect	Punctual, irrelevant	Possible, irrelevant	None, only natural	None or irrelevant	None or irrelevant	None or insignificant	Free running, natural	Natural	
[8]	Dominant, but altered	Concentrated, or extended, low impact	Occasional, some roads	Occasional, biodegradable	None, only natural	None or irrelevant	None or some renewing resources	None or irrelevant	Free, natural, irrelevant use	Natural, irrelevant alteration	
[7]	Diminished, but dominant	Settled, not dominating, widespread	Scarce, (i.e. roads and/or buildings)	Occasional/regular biodegradable	Irrelevant	None or scarce	Moderate renewing resources	None or low, no qualitative effects	Minor alterations	Natural, little alteration	
[6]	Reduced, possible minority	Wild, occas. dominant, widespread	Scarce or aggregated	Low impact, biodegradable	Occasional, not dominant	None or minor (i.e. roads)	Renewing resources, limited matter	None or moderate	Deviation, no significant management	Natural, eventually accelerated	
[5]	Managed, much altered	Cultivated/ranged but not forced	Conspicuous, but not dominant	Water and soil slight	Low, regular, occasional or periodic	Moderate (i.e. stone-walls)	Sustainable, possible matter (low)	None or relevant (patchwork)	None or little management, passive	Oriented, but self-sustained	
[4]	Intermixed, patchy or in corridors	Dominant, usually forced	Important presence	Water and soil moderate	Moderate, determining factor	Important (i.e. channels terraces)	Regular, more intense (i.e. export)	Moderate, with or without corridors	Important management, event. inputs	Forced by man	CULTURAL
[3]	Notable loss	Abundant or not, patchwork	Abundance	Water and soil intense, air moderate	Intensive, determining factor	± Extended, excavations included	Moderate to very intense (i.e. mining)	Intense, very extended	Soft or hard management, extra inputs	Very forced; unconnected, dependent	
[2]	Scarce	Abundant or not,	The majority	Water and air permanent	Intensive, important dependence	Extended, excavations included	Variable (i.e. waste)	Very intense, no corridors	Intensive management extra inputs	Dependence from external inputs high	
[1]	Vestiges or absent	widespread In gardens, confined	Clear dominance	Water and air severe	Very intensive, absolute dependence	Almost full modification (little soil)	Variable (i.e. waste)	Maximal	Full control, extra inputs	Full external dependence	
[0]	Absent/irrelevant	Absent/irrelevant	Almost/all	Variable	Total dependence	Variable	Variable	Not applicable	Variable or closed	Artificial, conducted	

If one uses within GEOSPECS the classification of Machado's index for achieving a linguistically more differentiated characterisation of the degrees of naturalness prevailing on a given territory, then the following approach is proposed:

- **A very high degree of naturalness:** The spatial unit under examination consists of "natural virgin systems" or "natural systems". These natural environments are not affected or disturbed by humans and their animals.
- **A high degree of naturalness:** The spatial unit under examination consists of systems which are either "sub-natural", "quasi-natural" or "semi-natural". Here, man-made interventions can already be observed but they still have an insignificant or low impact on the natural environment.
- **A medium degree of naturalness:** The spatial unit under examination consists of "cultural self-maintained systems" or "cultural assisted systems". Here, man-made interventions are already significant (e.g. constructions, human inputs, physical alterations & extraction of elements) and have led to an alteration of biotic elements and to a relevant or moderate fragmentation of natural habitat.
- **A low degree of naturalness:** The spatial unit under examination consists of "highly intervened systems" or "semi-transformed systems". Here, all sorts of man-made interventions are very intense and have led to a significant alteration of biotic elements and also an intense/very intense fragmentation of natural habitat.
- **A very low degree or even a complete absence of naturalness:** The spatial unit under examination consists of "transformed systems" or of "artificial systems". Here, man-made interventions are extreme and have led to a nearby complete or complete loss of biotic elements as well as to an extreme fragmentation of natural habitat or even a complete loss of natural habitat.

Annex 49: Individual mapping of selected land cover categories



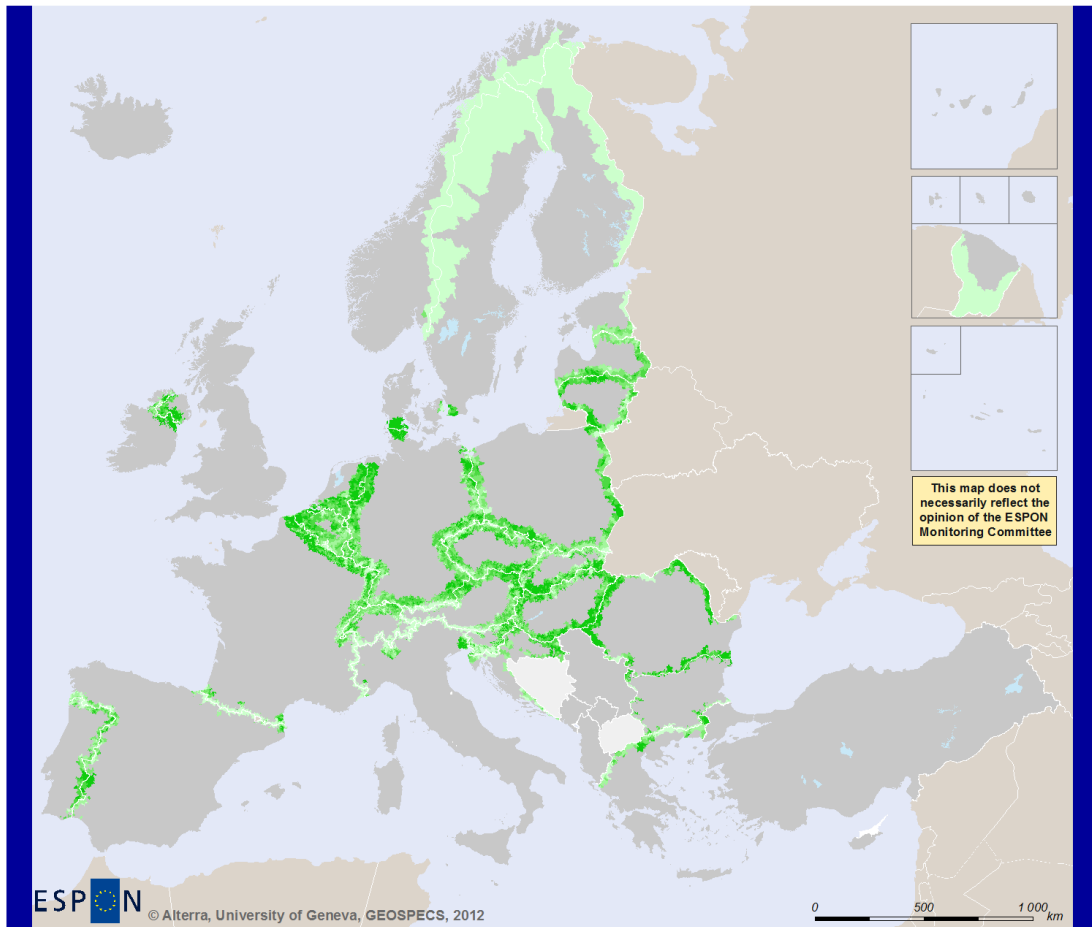


EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey and Greece, LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Percentage of grid cells classified as forests
in border LAU2





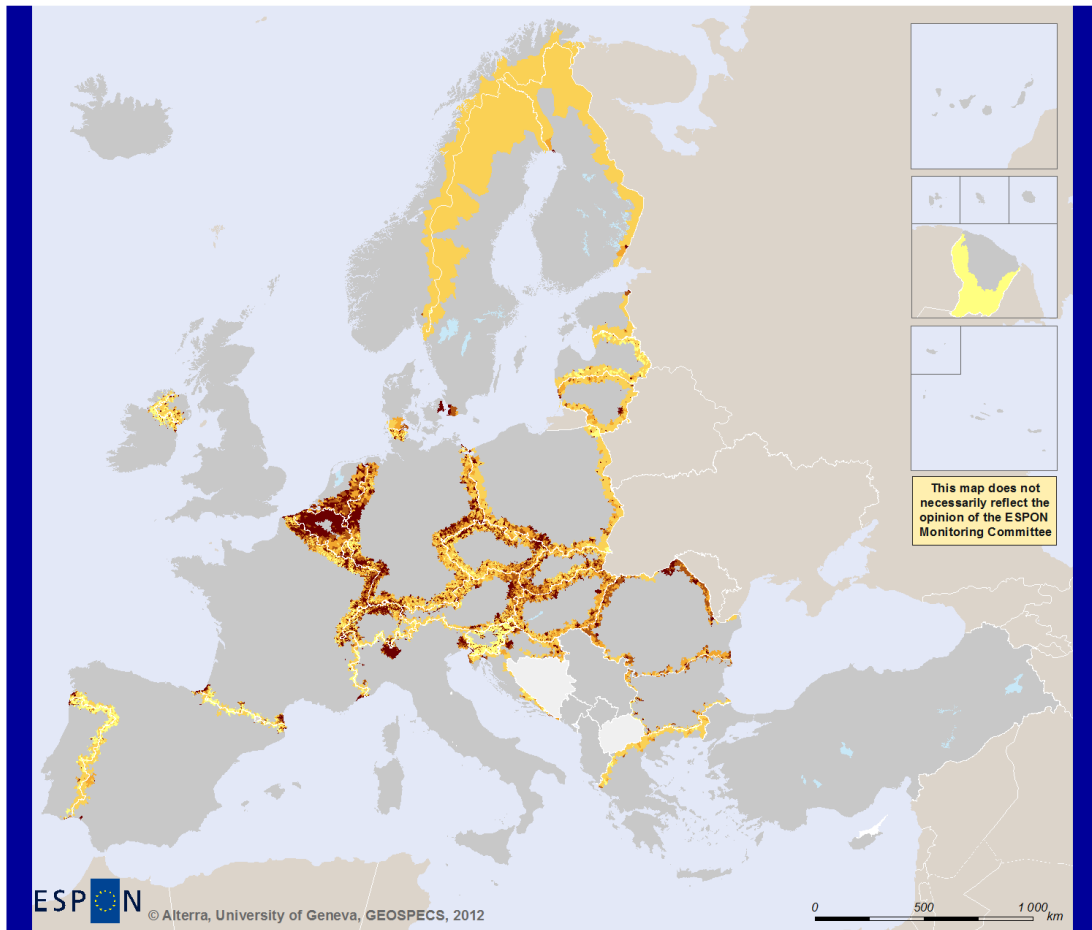
EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey and Greece, LAU1)
Source: GEOSPECS, 2011
© EuroGeographics Association for administrative boundaries
except Western Balkans and Turkey (national sources)

Percentage of grid cells classified as agricultural area
in border LAU2

- 0,0 - 20,0 %
- 20,1 - 40,0 %
- 40,1 - 60,0 %
- 60,1 - 80,0 %
- 80,1 - 100 %

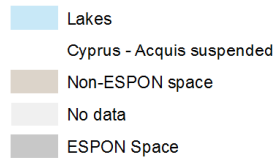
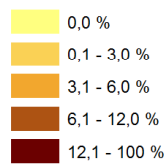
- Lakes
- Cyprus - Acquis suspended
- Non-ESPON space
- No data
- ESPON Space




 EUROPEAN UNION
 Part financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

Regional level: LAU2 (except Turkey and Greece, LAU1)
 Source: GEOSPECS, 2011
 © EuroGeographics Association for administrative boundaries
 except Western Balkans and Turkey (national sources)

Percentage of grid cells classified as artificial surfaces
in border LAU2



Annex 50: Weighted distance between border areas belonging to the same border within the matrix of the factor analysis

BORDER	distance_weighted	ranking
GRBG	544,0647257	1
PTES	402,0075141	2
SIHU	358,6594748	3
ROBG	257,1803135	4
LVEE	220,5544744	5
SIAT	163,7476646	6
LUBE	139,9958552	7
ROHU	135,5173681	8
LUDE	129,0340316	9
DECH	128,8542004	10
All borders	111,6915326	Average
ITFR	110,8653475	11
LVLT	105,2182866	12
LICH	86,80810168	13
FRCH	79,96779343	14
LUFR	77,82065253	15
DEAT	76,35840716	16
SKAT	73,92450617	17
SENO	69,33209392	18
SIIT	65,63839841	19
SEFI	64,42406187	20
UKIE	62,96546106	21
ITCH	61,60790495	22
DKDE	60,30211825	23
LIAT	59,14312499	24
HUAT	57,60842244	25
SKHU	50,74973813	26
FRES	50,20078942	27
NOFI	47,89975169	28
NLDE	45,53664827	29
CHAT	44,4579919	30
ITAT	35,91484047	31
NLBE	35,32022819	32
DEBE	34,10064401	33
DKSE	33,99239827	34
FRBE	32,91972111	35
FRDE	18,20211879	36

Annex 51: Definition of the urban potential & classification procedure

1. Definition of the urban potential

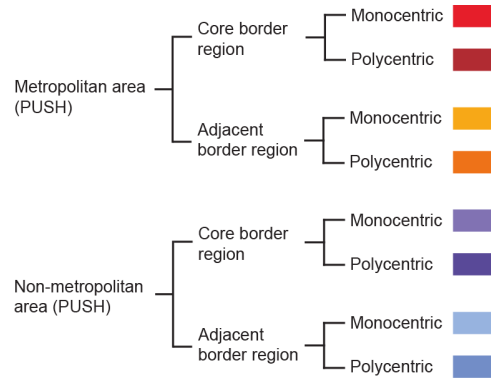
The urban potential of border areas is assessed in relation to the notion of PUSH (Potential Urban Strategic Horizons). PUSH areas are defined as all the municipalities that are located not more than 45 minutes away from a Morphological Urban Area (MUA).

One strong limitation of the PUSH notion is that the range of influence is the same whatever the size of the urban centre. In order not to overestimate the influence of small cities and rather focus the study on those urban centers that have a 'real' potential in polarizing their hinterland, a selection criteria has been applied and only MUAs with at least 100,000 inhabitants in 2006 have been taken into account. The potential influence of smaller cities is thus not included in the analysis. The notion of MUA was preferred to that of FUA (Functional Urban Area) to the extent that the latter is relatively unreliable in border areas due to biases in national statistics as far as cross-border commuters are concerned.

Among the 212 PUSH that are linked to a MUA that has at least 100,000 inhabitants, a distinction is made between metropolitan areas and non-metropolitan areas. The hypothesis underlying this analytical distinction states that the potential offered by a city with metropolitan functions is likely to be higher than the potential of a city that is not considered as a metropolitan center. The categorization of the PUSH selected is following a two-step methodology. A first set of cities has been selected according to a functional index elaborated in ESPON 1.4.3 and called 'global score' (ESPON 2007). This index computed for 1221 FUAs in Europe is based on 5 functions (administration, decision, transport, knowledge, tourism) plus the population (at FUA level). The threshold between the two types of PUSH has been fixed at 4. In a second step, the selection of the metropolitan areas has been refined according to empirical comparisons with other metropolitan/city indexes (BBSR 2011, Rozenblat and Cicille 2003). This two-step procedure was necessary in view of statistical inconsistencies for some cities and the contradictory results that it generates.

2. Classification procedure for establishing the typology of border areas according to their urban potential

The classification of the municipalities located within the entire border area is conducted following a descending hierarchical method. The implementation of this supervised classification is done according to the following decision tree:



Starting with all the municipalities (LAU2) located in the border areas under scrutiny (both 45 and 90 minutes travel distance to border), the first splitting path is based on whether they are located within a metropolitan area (PUSH) or within a non-metropolitan area. In case of an overlap between the two categories, the decision favors the former at the expense of the latter as the influence of an urban centre with metropolitan functions is prevailing. The second splitting path is depending on the location of the urban areas within the core border region or the adjacent border region. A third splitting path will be applied according to the monocentric or polycentric pattern of the urban areas considered. A monocentric configuration means that a given border region is influenced by one urban centre only whereas a polycentric configuration means that there are at least two. In case of an overlap between urban areas belonging to the two types of border areas, the influence of the core border region is prevailing (polycentric setting).

To sum up, it is important to mention that this typology highlights the urban potential of border areas according to (1) the metropolitan function of the urban centers and (2) their location vis-à-vis land borders (within the core border region or within the adjacent border region). As such, the influence of borders is considered in an indirect way through the location of the urban activities that are polarizing space. The basic assumption is that a city located close to a border (in terms of time distance) is more likely to develop border dependent activities than a city located further away, and this specificity will also affect the development potential of its hinterland.

Annex 52: Resident population in core border areas (2006)

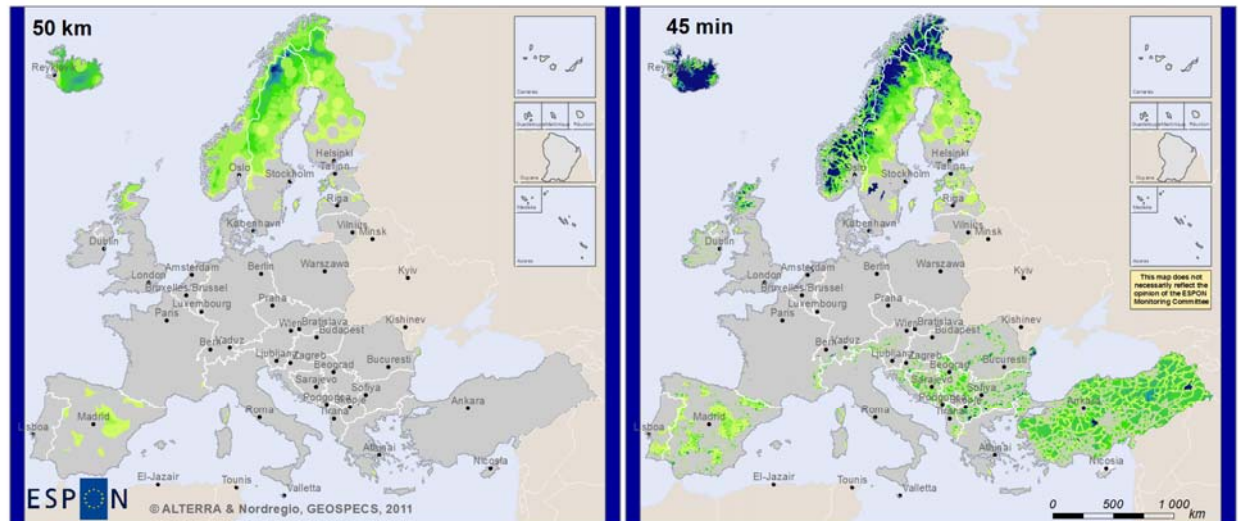
	Metropolitan potential		Urban potential		Low urban potential		Total
	Inhabitants	%	Inhabitants	%	Inhabitants	%	
AT	2,444,393	45.1	1,725,126	31.8	1,251,638	23.1	5,421,157
BE	6,816,449	77.3	1,881,391	21.3	124,497	1.4	8,822,337
BG	21,528	2.8	207,836	27.1	537,996	70.1	767,360
CH	4,101,594	73.5	618,721	11.1	859,097	15.4	5,579,412
CZ	102,959	2.1	3,427,922	68.3	1,489,385	29.7	5,020,266
DE	9,234,652	45.0	7,609,437	37.1	3,677,612	17.9	20,521,701
DK	2,005,778	83.6	.	.	393,073	16.4	2,398,851
EE	.	.	.	.	213,679	100.0	213,679
ES	.	.	1,735,217	85.1	303,154	14.9	2,038,371
FI	.	.	.	.	261,762	100.0	261,762
FR	6,757,452	70.6	2,246,615	23.5	574,177	6.0	9,578,244
GR	.	.	91,103	16.7	455,938	83.3	547,041
HU	1,587,771	35.3	1,749,698	38.9	1,166,167	25.9	4,503,636
IE	72,314	19.5	.	.	299,151	80.5	371,465
IT	5,478,278	82.1	813,014	12.2	384,471	5.8	6,675,763
LI	.	.	.	.	35,168	100.0	35,168
LT	629,729	38.4	105,794	6.5	904,360	55.1	1,639,883
LU	461,583	98.4	.	.	7,503	1.6	469,086
LV	130,389	19.9	161,415	24.6	363,485	55.5	655,289
NL	3,994,412	48.2	4,267,648	51.5	21,142	0.3	8,283,202
NO	14,184	16.4	.	.	72,310	83.6	86,494
PL	15,615	0.2	3,898,981	59.0	2,688,446	40.7	6,603,042
PT	21,517	3.3	217,521	33.5	409,692	63.2	648,730
RO	11,077	0.3	3,395,070	81.2	775,328	18.5	4,181,475
SE	559,691	49.9	390,317	34.8	170,764	15.2	1,120,772
SI	272,008	19.4	703,204	50.2	425,791	30.4	1,401,003
SK	960,678	26.9	711,241	20.0	1,892,823	53.1	3,564,742
UK	.	.	269,028	39.8	406,905	60.2	675,933
Total	45,694,051	44.8	36,226,299	35.5	20,165,514	19.8	102,085,864

Annex 53: Population change in core border areas (2001-2006)

	Metropolitan potential			Urban potential			Low urban potential			Overall change (%)
	Pop change	Pop 2001	%	Pop change	Pop 2001	%	Pop change	Pop 2001	%	
AT	131,101	2,311,249	5.7	53,543	1,660,174	3.2	13,789	1,208,505	1.1	3.8
BE	146,570	6,658,910	2.2	35,022	1,846,369	1.9	3,018	121,479	2.5	2.1
BG	-1,260	22,788	-5.5	-7,202	215,038	-3.3	-34,265	570,230	-6.0	-5.3
CH	158,242	3,938,022	4.0	30,034	586,861	5.1	25,282	832,685	3.0	4.0
CZ	-1,187	103,889	-1.1	-15,154	3,432,882	-0.4	-4,291	1,484,104	-0.3	-0.4
DE	49,800	9,163,420	0.5	-30,975	5,360,997	-0.6	-1,152	3,446,975	0.0	0.1
DK	34,609	1,948,398	1.8	.	.	.	6,693	386,380	1.7	1.8
EE	.	.	.	.	.	.	-6,313	215,185	-2.9	-2.9
ES	.	.	.	78,701	1,650,183	4.8	11,178	287,985	3.9	4.6
FI	.	.	.	.	.	.	-3,330	265,092	-1.3	-1.3
FR	200,322	6,546,262	3.1	64,161	2,171,345	3.0	5,333	566,768	0.9	2.9
GR	.	.	.	404	90,699	0.4	-18,922	466,938	-4.1	-3.3
HU	-19,179	1,545,789	-1.2	-55,089	1,732,119	-3.2	-58,519	1,198,892	-4.9	-3.0
IE	5,559	38,616	14.4	.	.	.	9,759	255,904	3.8	5.2
IT	227,661	5,238,538	4.3	10,291	802,723	1.3	8,962	371,841	2.4	3.9
LI	.	.	.	.	.	.	1,305	33,863	3.9	3.9
LU	20,987	432,483	4.9	.	.	.	447	7,056	6.3	4.9
LV	1,527	128,862	1.2	-8,731	170,146	-5.1	-23,373	382,962	-6.1	-4.5
NL	73,688	3,866,953	1.9	57,908	4,209,740	1.4	416	20,726	2.0	1.6
NO	562	13,622	4.1	.	.	.	1,118	71,192	1.6	2.0
PL	244	15,371	1.6	-31,821	3,930,802	-0.8	-33,916	2,722,362	-1.2	-1.0
RO	-872	11,949	-7.3	-81,673	3,368,746	-2.4	-16,604	779,011	-2.1	-2.4
SE	18,185	541,506	3.4	12,362	377,955	3.3	616	170,148	0.4	2.9
SI	7,023	244,230	2.9	15,107	681,127	2.2	5,504	416,448	1.3	2.1
SK	8,763	951,178	0.9	-21,121	704,114	-3.0	-4,393	1,879,026	-0.2	-0.5
All countries (except LT, PT and UK)	1,062,345	43,722,035	2.4	105,767	32,992,020	0.3	111,658	1,8161,757	-0.6	1.1
AT, BE, CH, DE, DK, FR, IT, LI, LU, NL, ES, FI, GR, IR, NO, SE	1,067,286	40,697,979	2.6	311,451	18,757,046	1.7	64,512	8,513,537	0.8	2.1
BG, CZ, EE, HU, LV, PL, RO, SI, SK	-4,941	3,024,056	-0.2	-205,683	14,234,973	-1.4	176,170	9,648,220	-1.8	-1.4

Annex 54: Sparsely populated areas

This series of maps of this annex provides additional insights to socioeconomic patterns in sparsely populated areas



ESPON
 © ALTERRA & Nordregio, GEOSPECS, 2011
 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE
 Regional level: GRID
 Source: ESPON Database 2013
 Origin of data: ALTERRA 2011
 © EuroGeographics Association for administrative boundaries

Areas with Low Population Potential

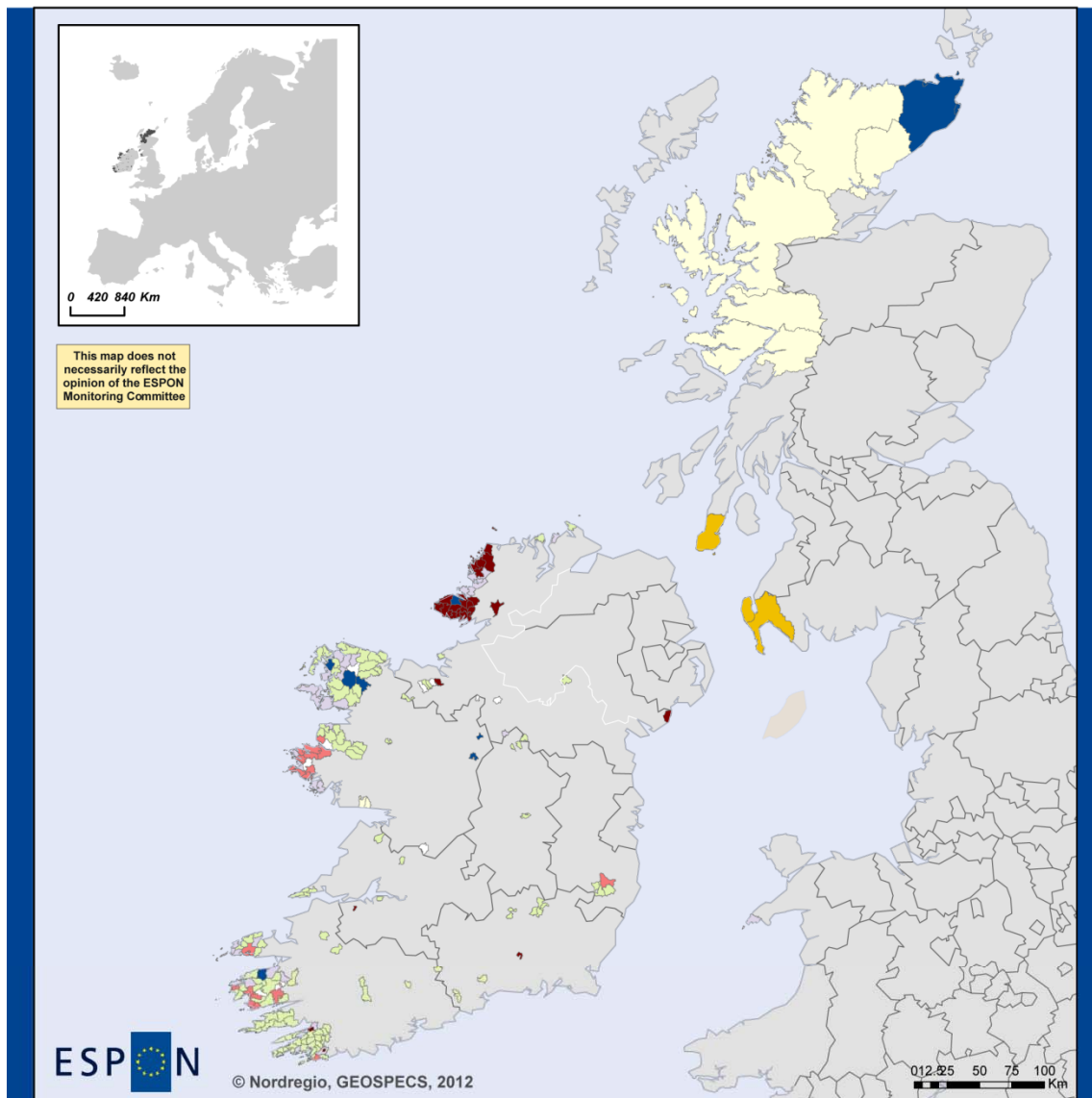
Population Potential in Persons i Areas below 100 000 Inhabitants according to 50km and 45 min Delineations



Map 1: Areas with low population potential

Population potential represents an approximation to the daily commuting catchment area available around each place in the European territory. In the GeoSpecs project, population potential is calculated the total population residing either within a 50km as-the-crow-fly radius or within 45 minutes of car-travel.

Cluster analysis of employment in British and Irish LAU2



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Local level: LAU2
Source: Geospecs 2011
Origin of data: NSIs

© EuroGeographics Association for administrative boundaries

Ascendant Classification of Sparsely Populated and Poorly Connected Localities in Great Britain and Ireland (LAU2)

Major deviations from average profile -
Overrepresented activities

- Mining and Energy
- Hotel and Restaurant
- Transport, Telecom and Public Administration
- Manufacturing

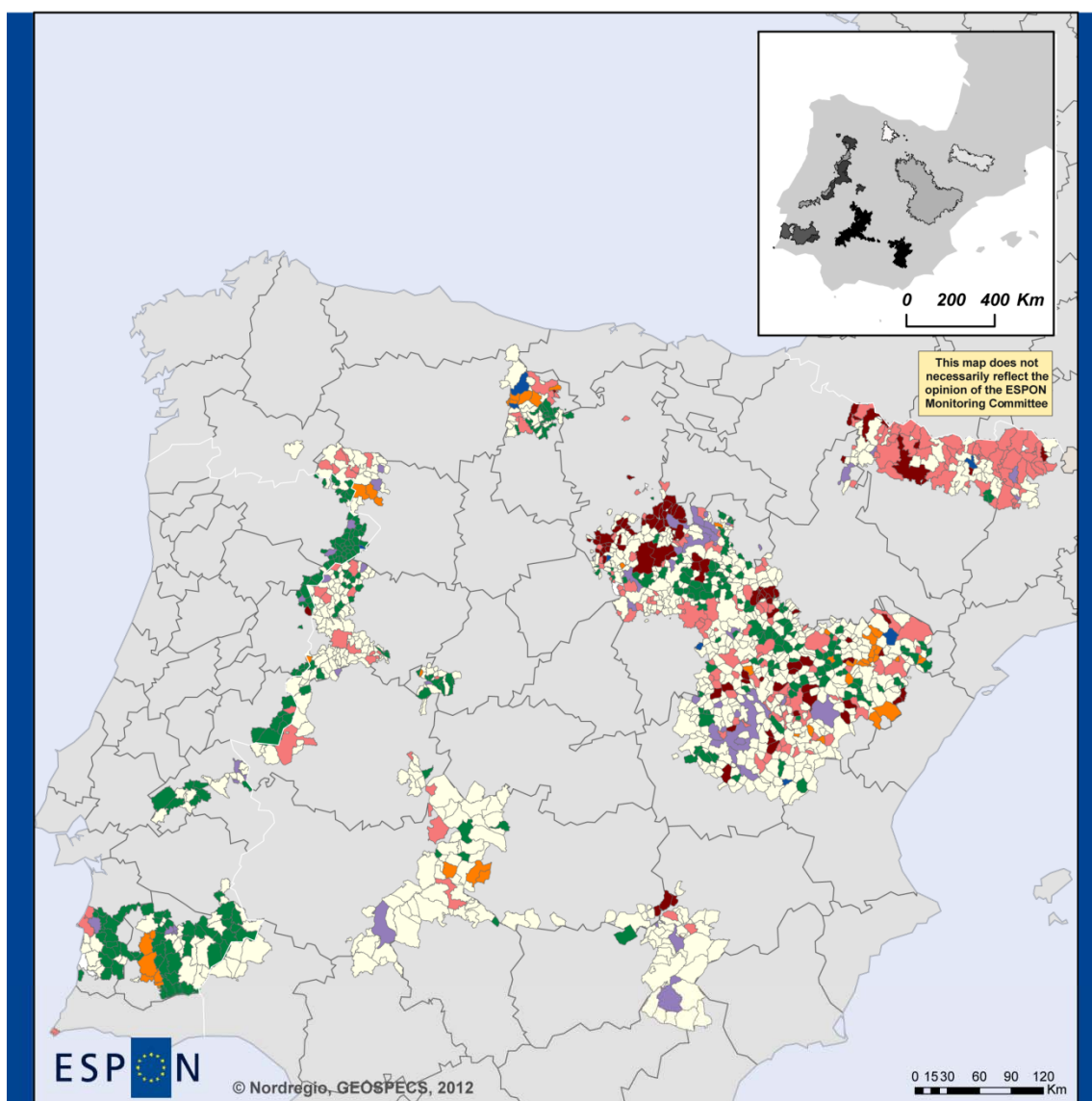
Minor deviations from average profile -
Overrepresented activities

- Close to average - Agriculture
- Close to average - Communication and Public Services
- Close to average - Public Services
- No data

Map 2: Cluster analysis of employment in British and Irish sparse LAU2s

Cluster analysis identifies the main distinctive feature of a locality's economic profile, in employment terms, compared to its 'peers', i.e. the ensemble of sparse localities in Great Britain and Ireland. It provides an important insight for local and regional stakeholders for understanding the competitive advantage of different localities at this territorial level.

Cluster analysis of employment in Iberian LAU2



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Local level: LAU2
Source: Geospecs 2011
Origin of data: NSIs
© EuroGeographics Association for administrative boundaries

Ascendant Classification of Sparsely Populated and Poorly Connected Localities in Iberian Peninsula (LAU2)

Major deviations from average profile -
Overrepresented activities

- Agriculture, Forestry and fishing
- Mining
- Public Services (Education, Health, Administration)
- Manufacturing
- Energy and Mining
- Hotel and Restaurant

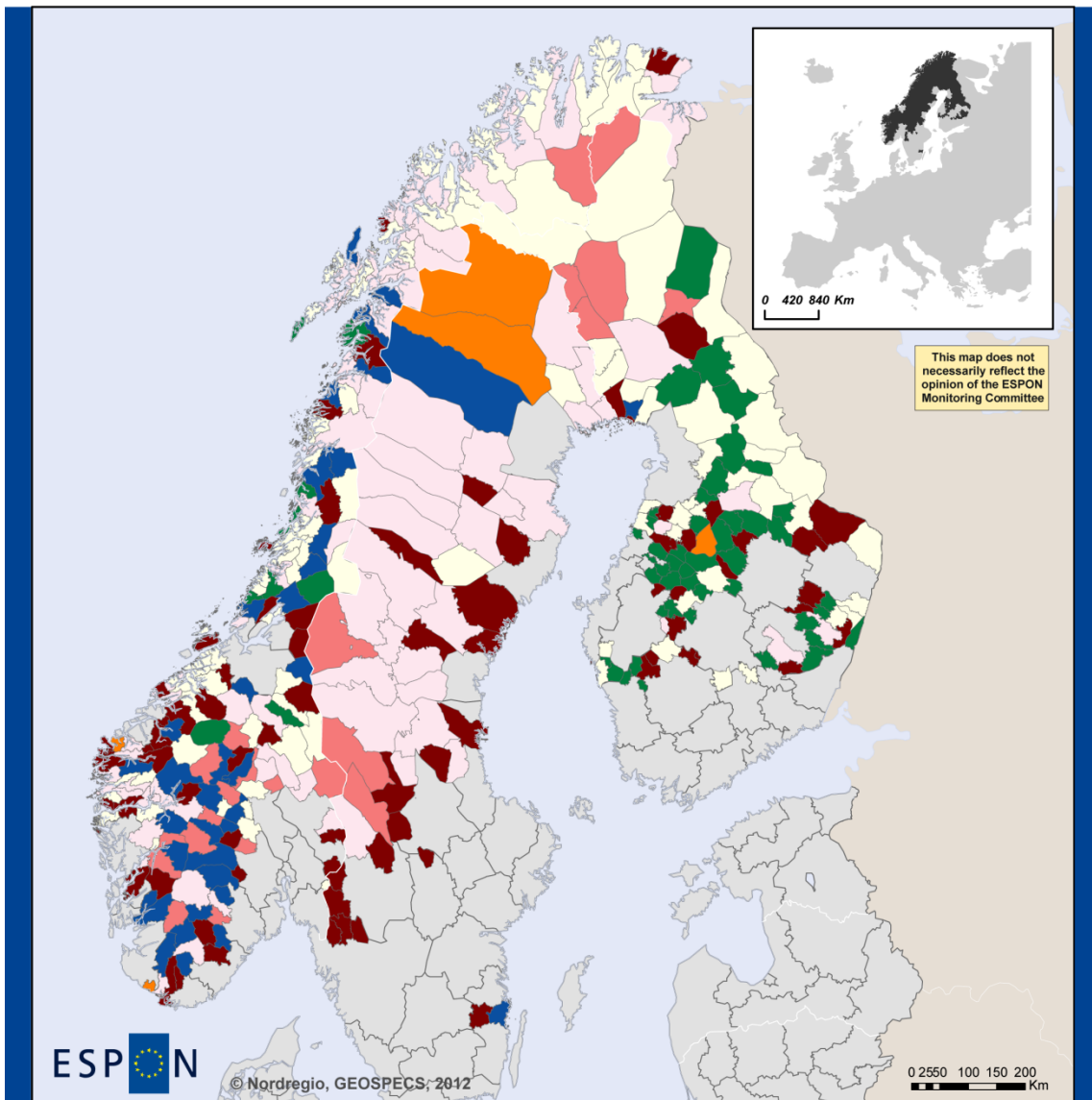
Minor deviations from average profile -
Overrepresented activities

- Close to average - Construction

Map 3: Cluster analysis of employment in Iberian sparse LAU2s

Cluster analysis identifies the main distinctive feature of a locality's economic profile, in employment terms, compared to its 'peers', i.e. the ensemble of sparse localities in Spain and Portugal. It provides an important insight for local and regional stakeholders for understanding the competitive advantage of different localities at this territorial level.

Cluster analysis of employment in Nordic LAU2



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Local level: LAU2
Source: Geospecs 2011
Origin of data: NSIs
© EuroGeographics Association for administrative boundaries

Ascendant Classification of Nordic Sparsely Populated and Poorly Connected Localities (LAU2)

Major deviations from average profile -
Overrepresented activities

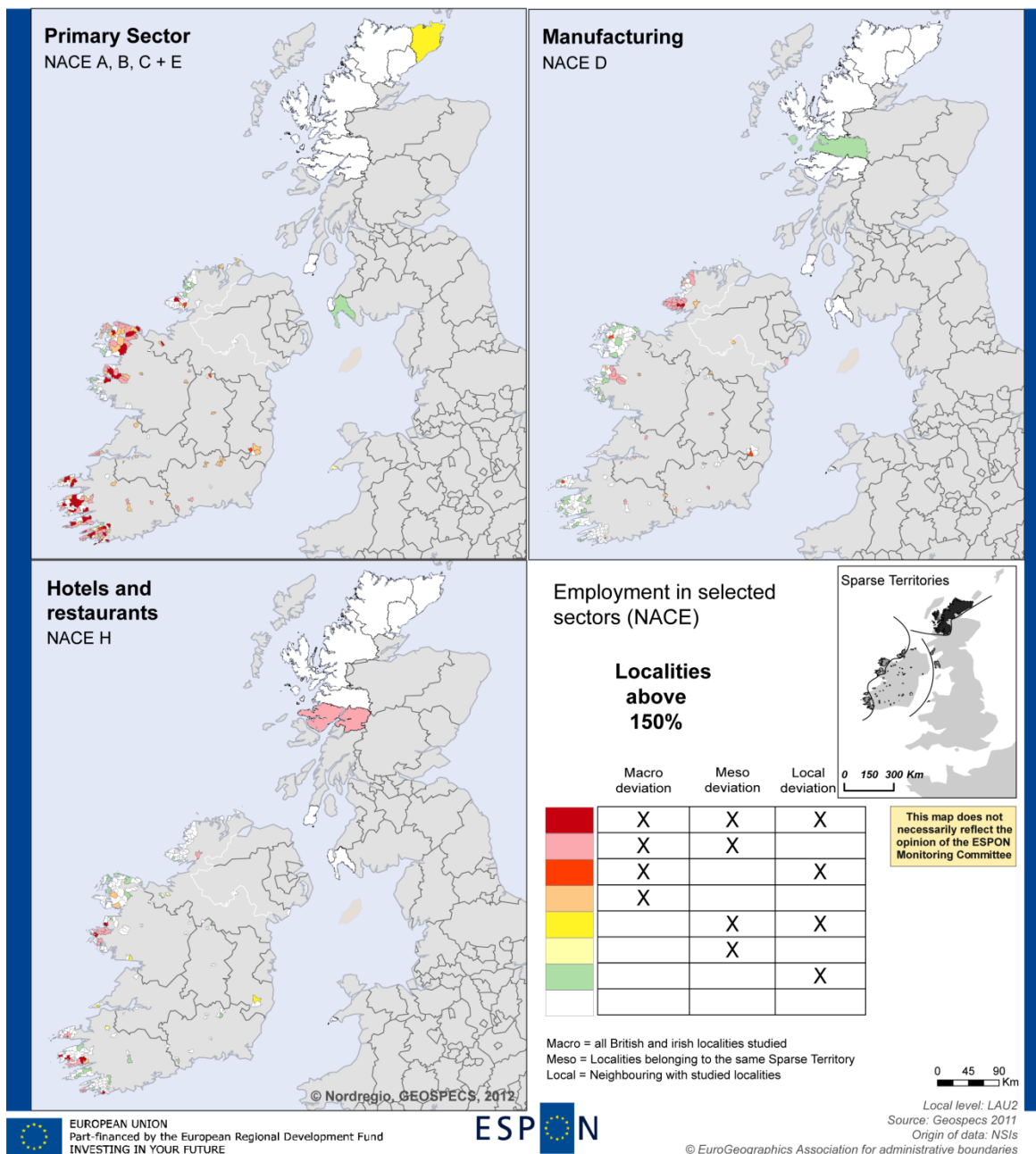
- Energy
- Mining
- Agriculture, Forestry and fishing
- Manufacturing
- Hotel and Restaurant; Personal Services

Minor deviations from average profile -
Overrepresented activities

- Trade and Business Services
- Agriculture, Construction and Finance
- No data

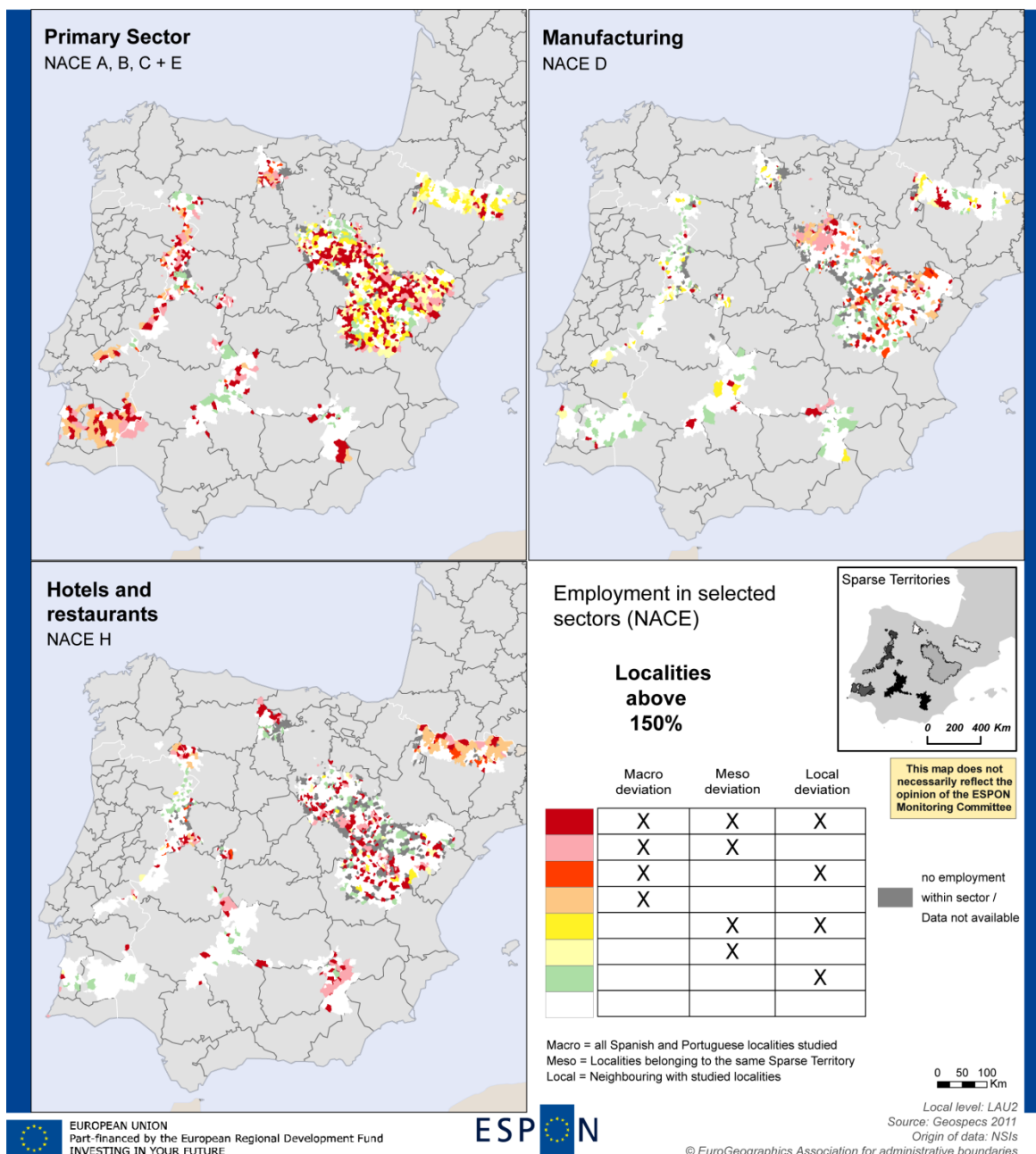
Map 4: Cluster analysis of employment in Nordic sparse LAU2s

Cluster analysis identifies the main distinctive feature of a locality's economic profile, in employment terms, compared to its 'peers', i.e. the ensemble of sparse localities in the Nordic countries. It provides an important insight for local and regional stakeholders for understanding the competitive advantage of different localities at this territorial level.



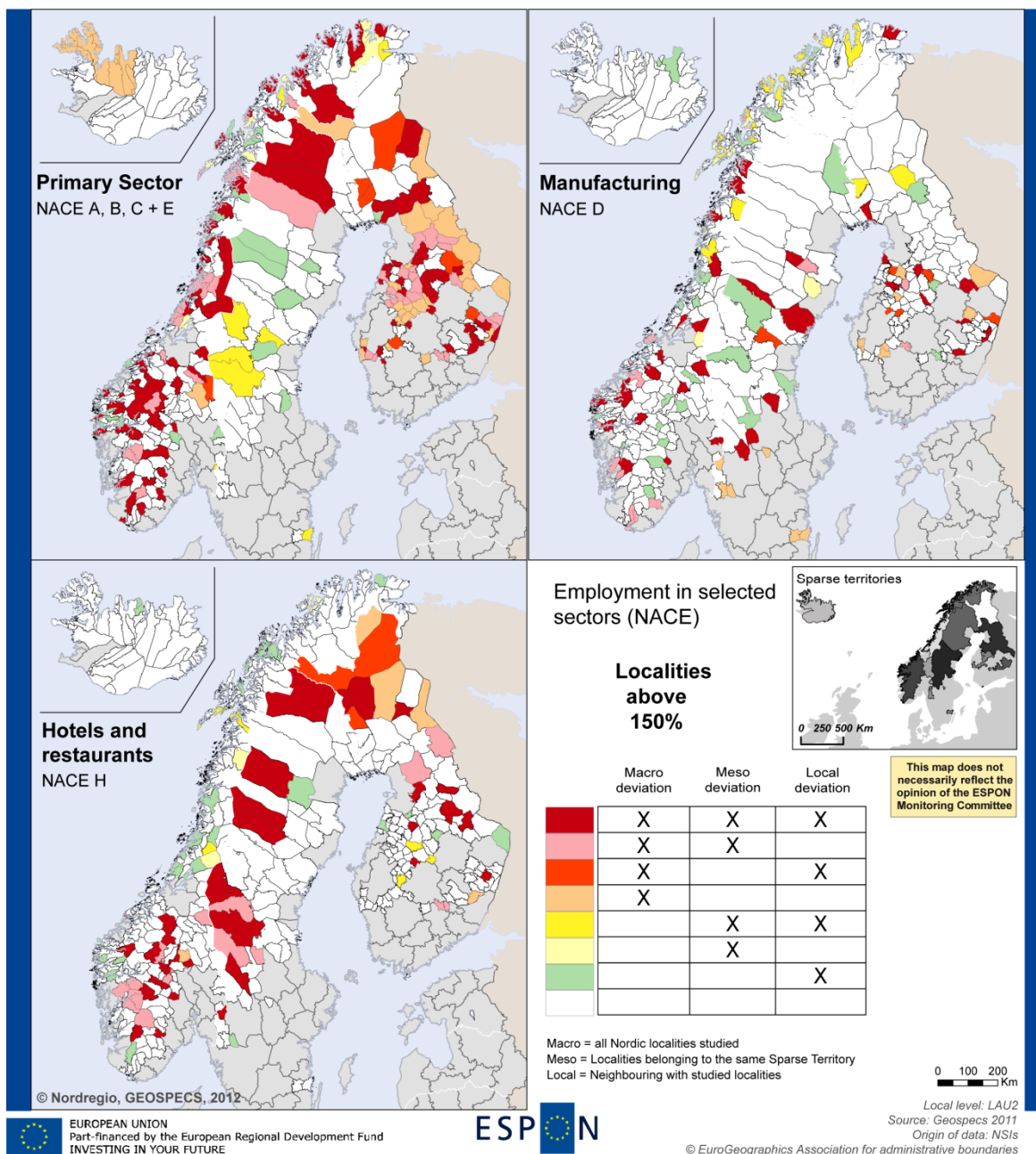
Map 5: Multiscalar analysis of employment in British and Irish sparse LAU2s

Multiscalar analysis enables to identify the localities that can draw on a particularly strong clustering of activities, in terms of employment, compared to other localities at three different levels: macro, consisting of all sparse LAU2 in Britain and Ireland, meso, consisting of all localities belonging to the same Sparse Territory, and micro, consisting of contiguous localities. The analysis is performed for three types of activities that are central for development in sparse territories: Primary sector, Manufacturing and Hotels and Accommodation. The localities in dark red are the ones that host a marked employment clustering in the respective activity at all three levels.



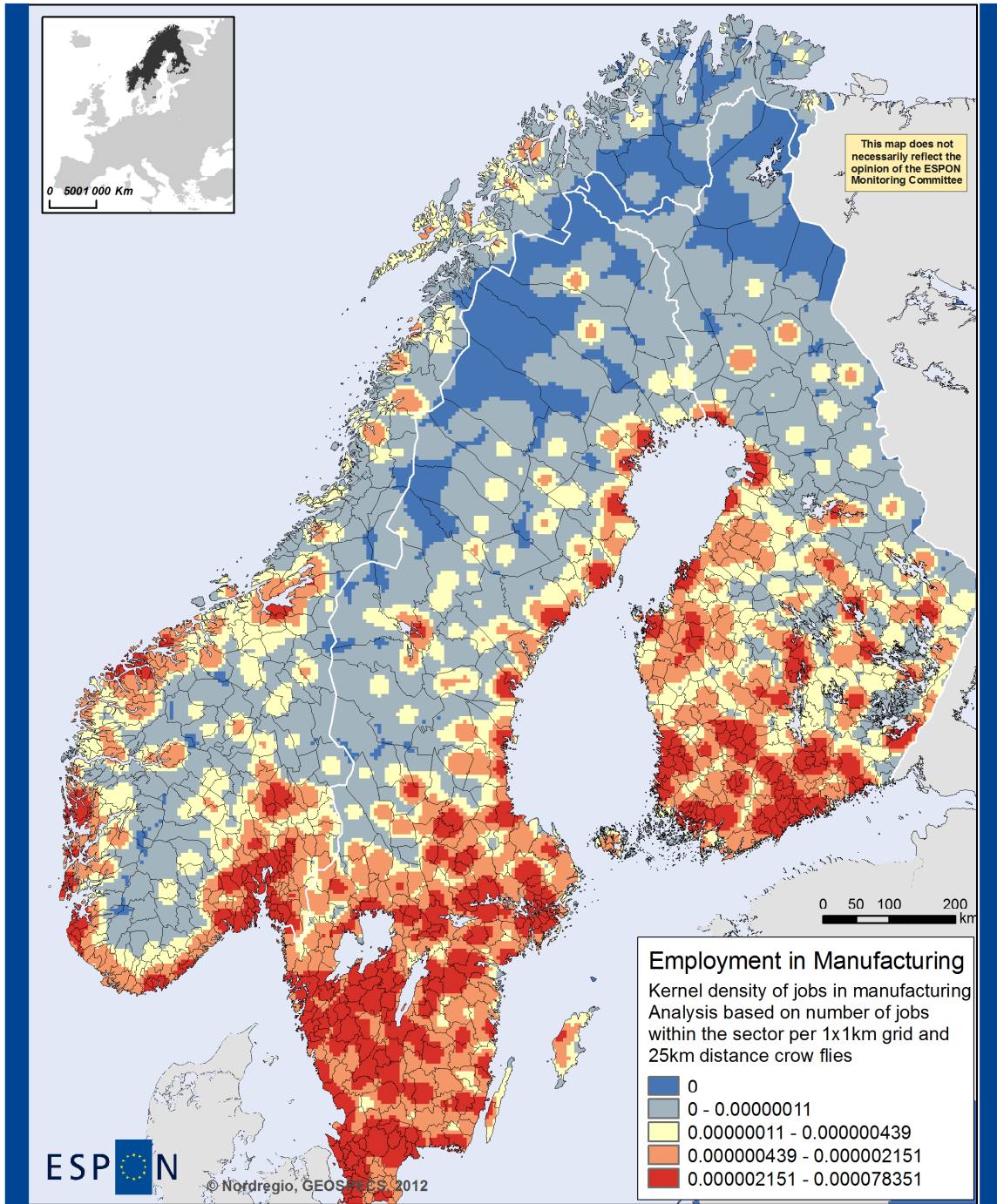
Map 6: Multiscalar analysis of employment in Iberian sparse LAU2s

Multiscalar analysis enables to identify the localities that can draw on a particularly strong clustering of activities, in terms of employment, compared to other localities at three different levels: macro, consisting of all sparse LAU2 in Spain and Portugal, meso, consisting of all localities belonging to the same Sparse Territory, and micro, consisting of contiguous localities. The analysis is performed for three types of activities that are central for development in sparse territories: Primary sector, Manufacturing and Hotels and Accommodation. The localities in dark red are the ones that host a marked employment clustering in the respective activity at all three levels.



Map 7: Multiscalar analysis of employment in Nordic sparse LAU2s

Multiscalar analysis enables to identify the localities that can draw on a particularly strong clustering of activities in terms of employment compared to other localities at three different levels: macro, consisting of all sparse LAU2 in the Nordic countries, meso, consisting of all localities belonging to the same Sparse Territory, and micro, consisting of contiguous localities. The analysis is performed for three types of activities that are central for development in sparse territories: Primary sector, Manufacturing and Hotels and Accommodation. The localities in dark red are the ones that host a marked employment clustering in the respective activity at all three levels.



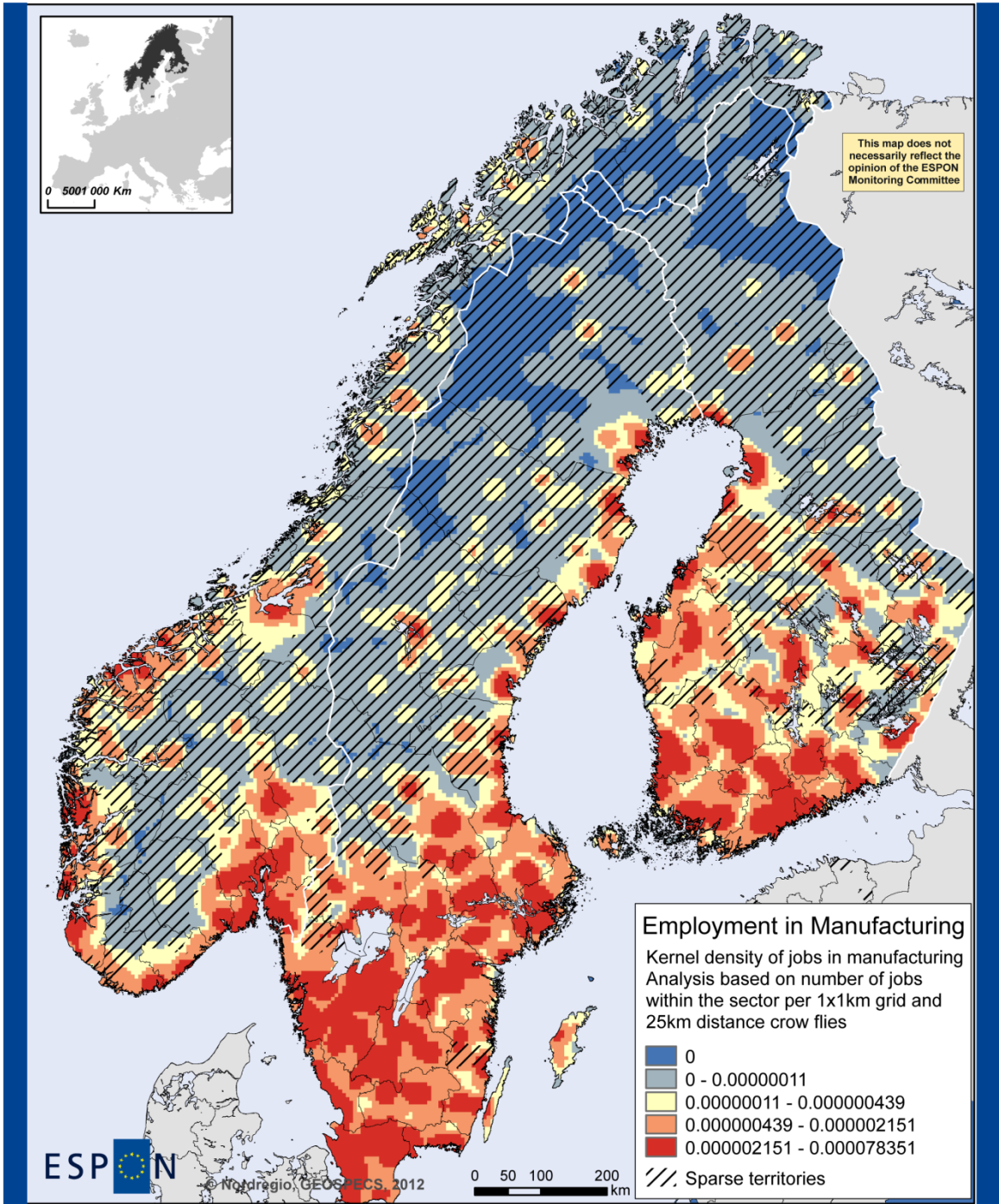
EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Local level: GRID
Source: Geospecs 2011
Origin of data: NSIs
© EuroGeographics Association for administrative boundaries

Map 8: Employment in manufacturing in the Nordic Countries, kernel density analysis

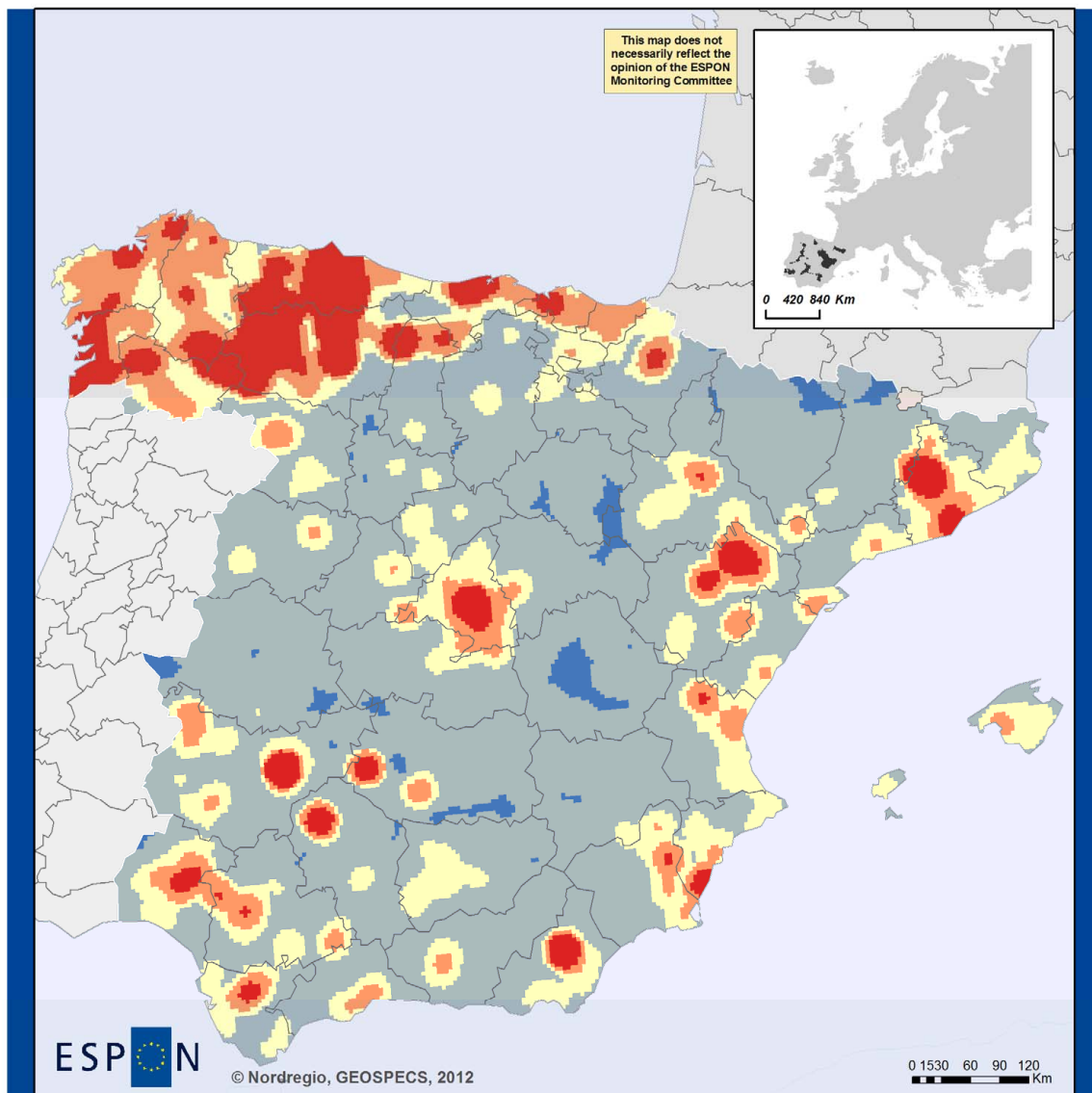
The map displays the density of employment in manufacturing within a 25km radius of each location in the Nordic countries. While it tends to stress the urban structure of the Nordic countries, it also enables to pinpoint that the sparsely populated areas are not areas devoid of industrial and manufacturing potential. In the North Swedish inland and in Eastern Finland there are areas that show local concentrations of employment in manufacturing. An adapted industrial policy for the SPA should seek at reinforcing the internal connectivity of these places both physically, i.e. transport, and through business networks.

The economic aspects of climate change and adaptation have been assessed in a number of studies and projects, *inter alia* in: Mendelsohn 2000, Mendelsohn et al. 2000, Tol 2002a, Tol 2002b, Stern 2006, EEA 2007, Agrawala & Fankhauser 2008, Parry et al. 2009, Watkiss 2009, Ciscar 2009, Osberghaus & Reif 2010.



Map 9: Employment in manufacturing in the Nordic Countries, kernel density analysis

The map displays the density of employment in manufacturing within a 25km radius of each location in the Nordic countries. While it tends to stress the urban structure of the Nordic countries, it also enables to pinpoint that the sparsely populated areas are not areas devoid of industrial and manufacturing potential. In the North Swedish inland and in Eastern Finland there are areas that show local concentrations of employment in manufacturing.



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

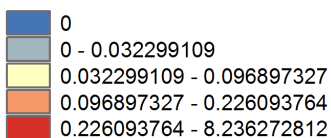
Local level: LAU2
Source: Geospecs 2011
Origin of data: NSIs

© EuroGeographics Association for administrative boundaries

Employment in Manufacturing

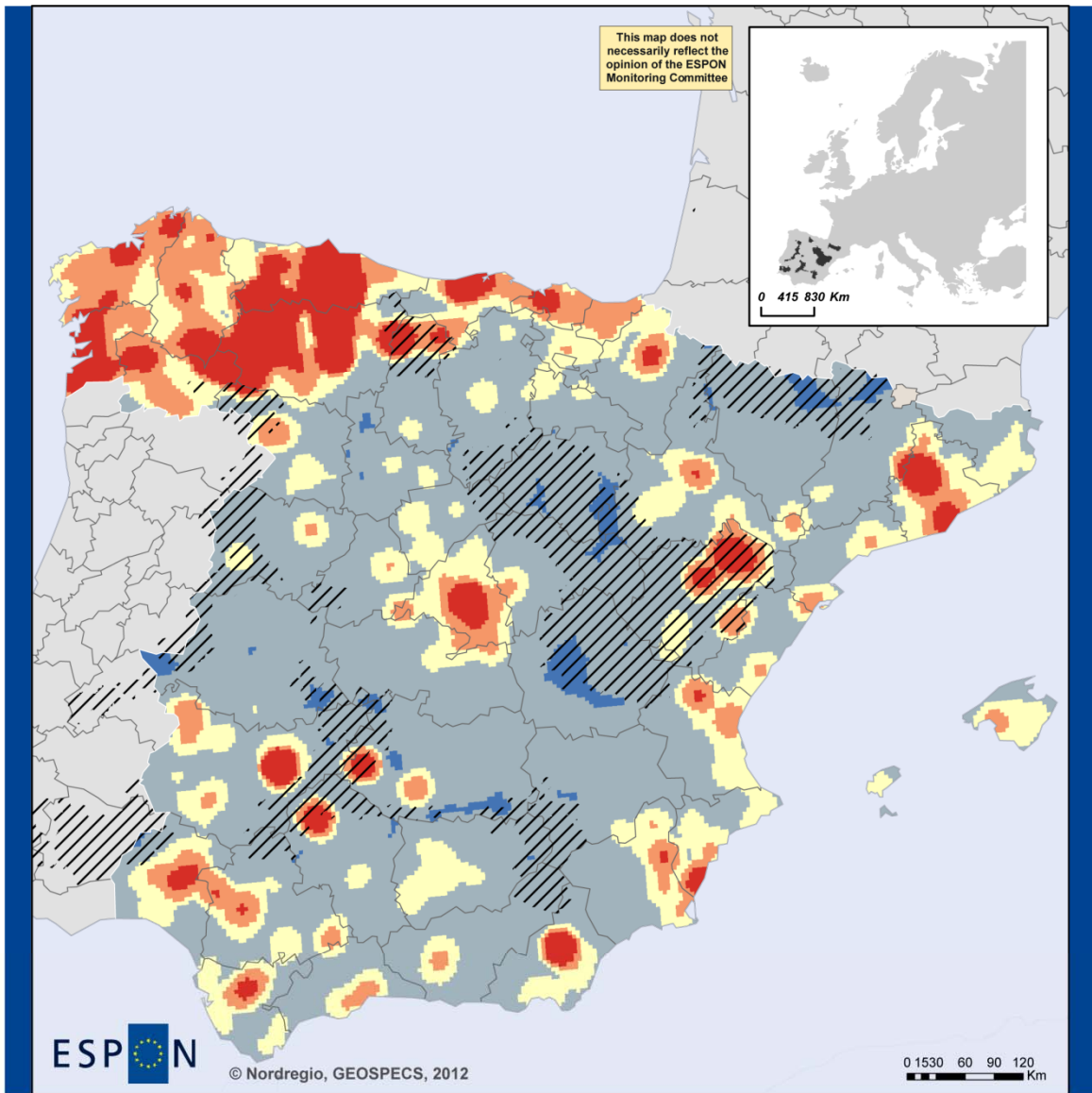
Kernel density of jobs in manufacturing

Analysis based on number of jobs within the sector per LAU2 and 25km distance crow flies



Map 10: Employment in manufacturing in Spain, kernel density analysis

The map displays the density of employment in manufacturing within a 25km radius of each location in Spain. Major industrial concentrations can be found in North-West of Spain (Galicia) as well as in the main agglomerations.



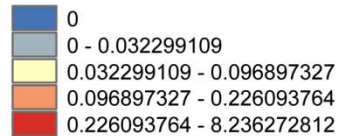
EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Local level: LAU2
Source: Geospecs 2011
Origin of data: NSIs

© EuroGeographics Association for administrative boundaries

Employment in Manufacturing

Kernel density of jobs in manufacturing
Analysis based on number of jobs within the sector per LAU2 and
25km distance crow flies

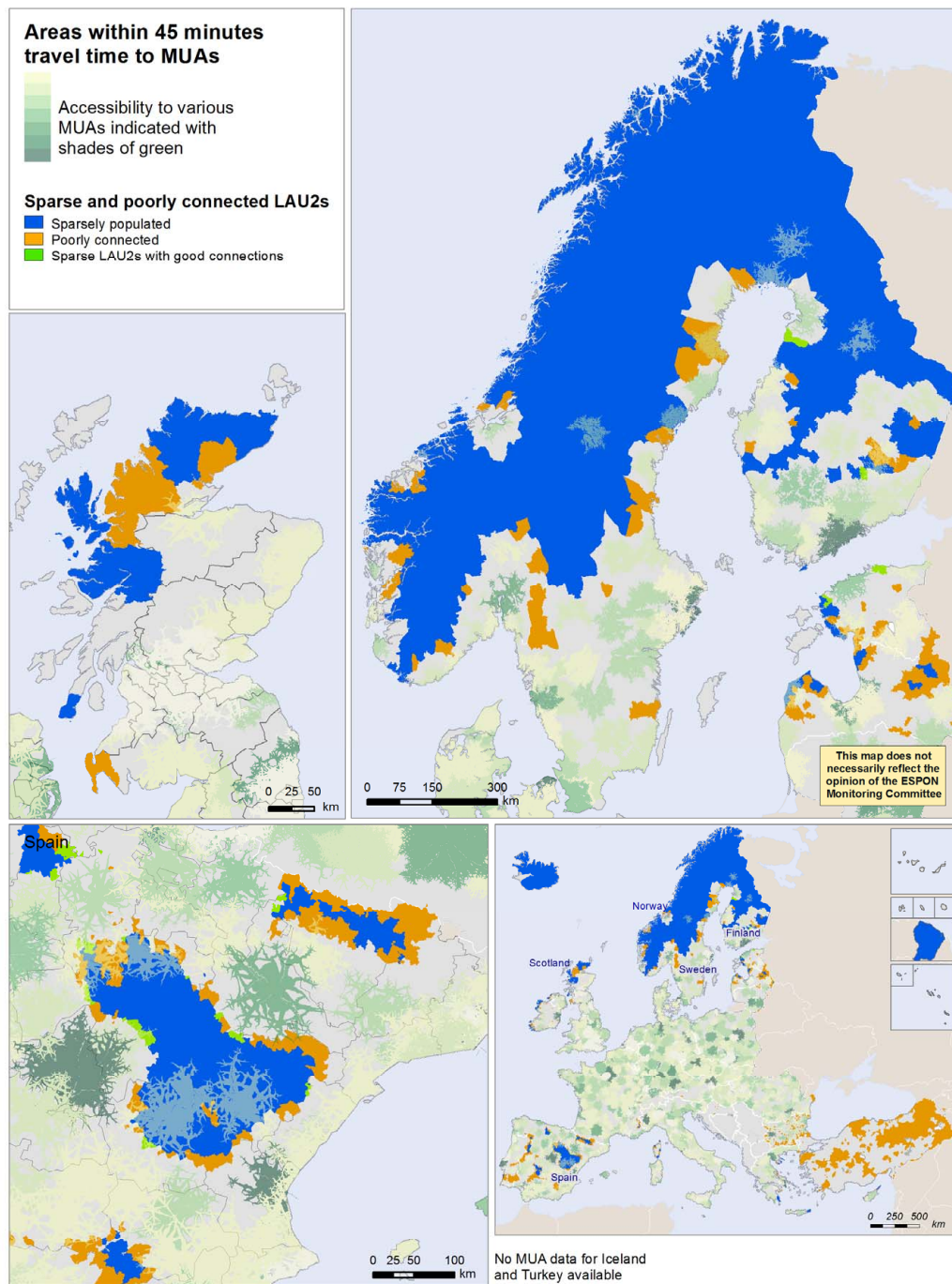


/// Sparse territories

Map 11: Employment in manufacturing in Spain, kernel density analysis

The map displays the density of employment in manufacturing within a 25km radius of each location in Spain. Major industrial concentrations can be found in North-West of Spain (Galicia) as well as in the main agglomerations. As for sparsely populated areas, it appears that several sparse territories host important local concentrations in manufacturing, for instance at the north-east end of the sparse territory between Madrid and Catalonia, or at the northern tip of the Palencia province in the North.

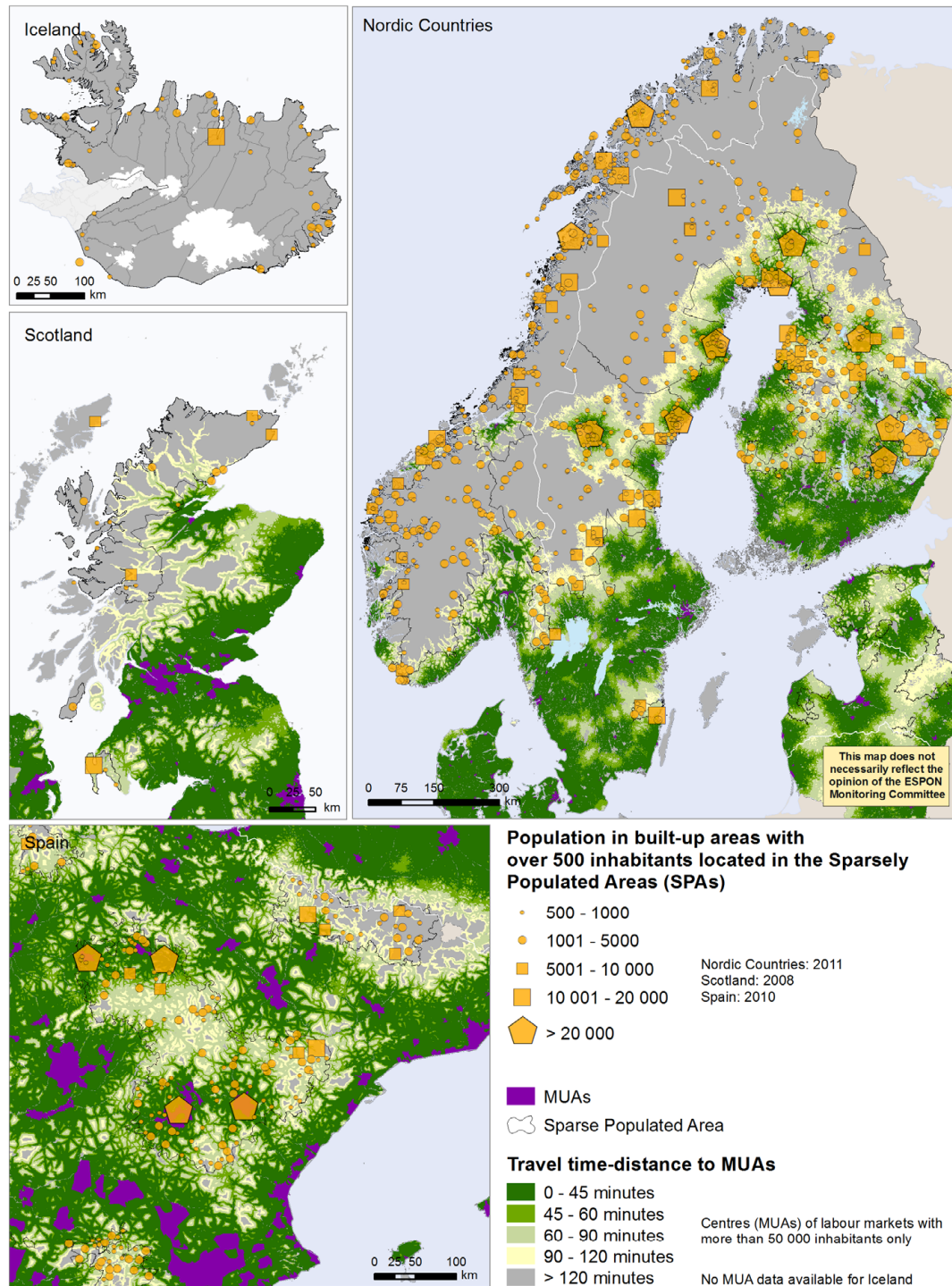
Sparsely Populated Areas - Access to MUAs



Map 12: Areas within 45 minutes travel time to MUAs and sparsely populated and poorly connected LAU2s in the main sparse territories

Large portions of sparsely populated areas are located far beyond the commuting catchment areas of the main urban centres of Europe. Hence, territorial development in sparsely populated areas cannot be based on agglomeration economies as in other parts of Europe, thus leading to the development of alternative paths to growth.

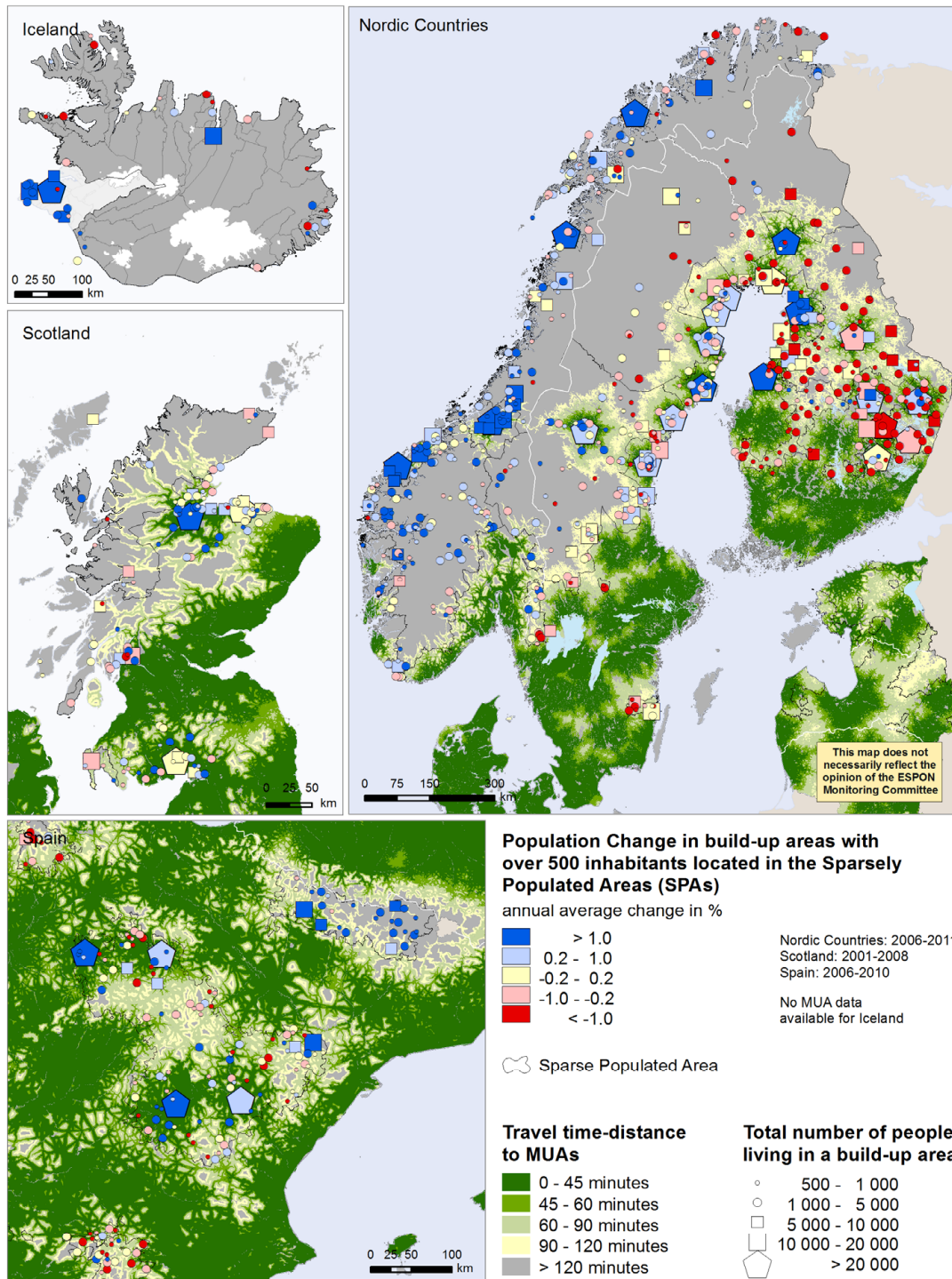
Settlements & Access to MUAs in SPAs



Map 13: Population by size of settlements and areas within 120 minutes travel time to MUAs in the main sparse territories

Most settlements in sparsely populated areas of the Nordic countries are located beyond the daily commuting catchment areas of the main regional and national centres. Settlement patterns are more concentrated in the Spanish case.

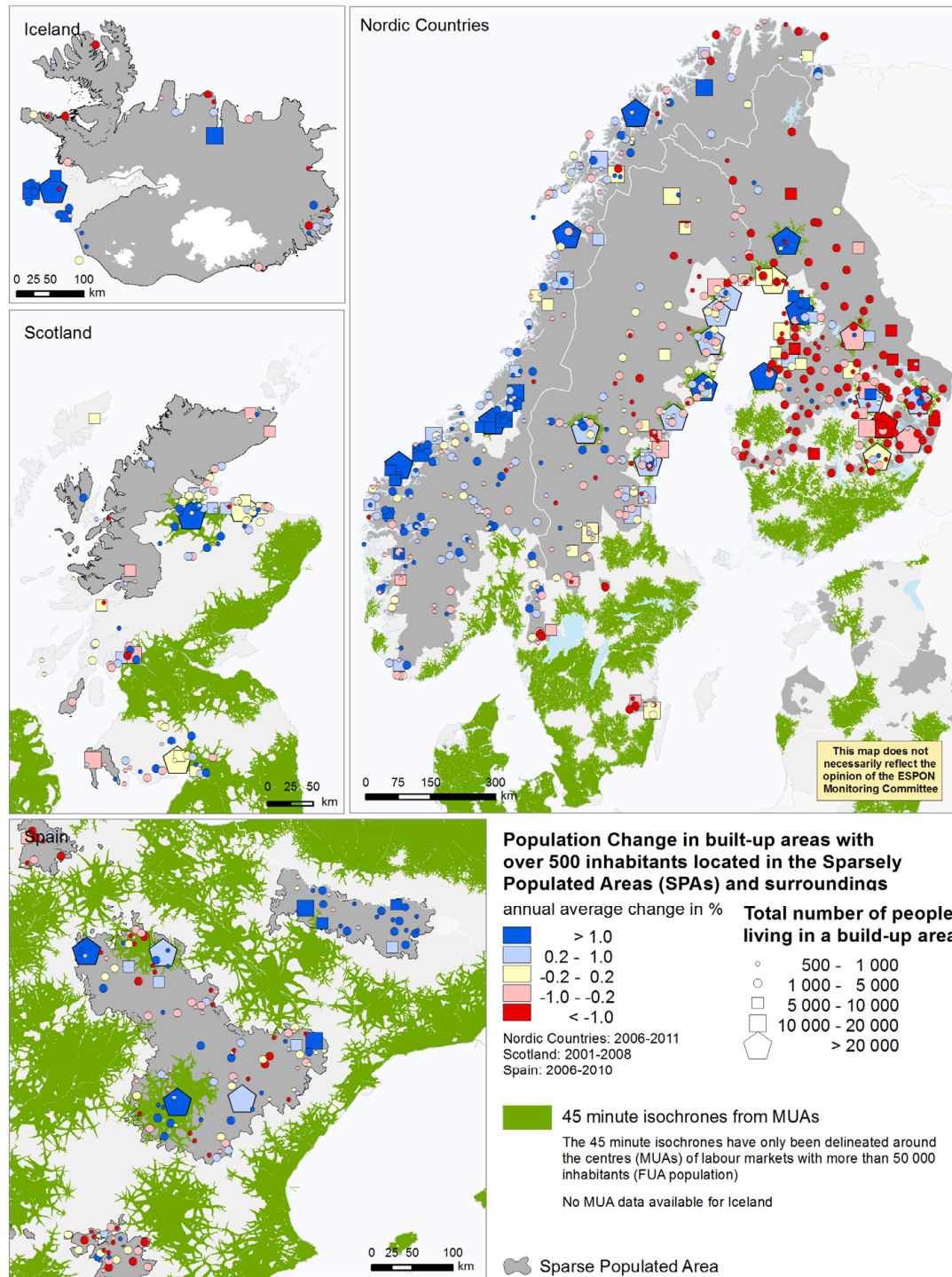
Population Change & Access to MUAs in SPAs



Map 14: Population change by size of settlements and areas within 120 minutes travel time to MUAs in the main sparse territories

Population growth is concentrated around the main urban centres.

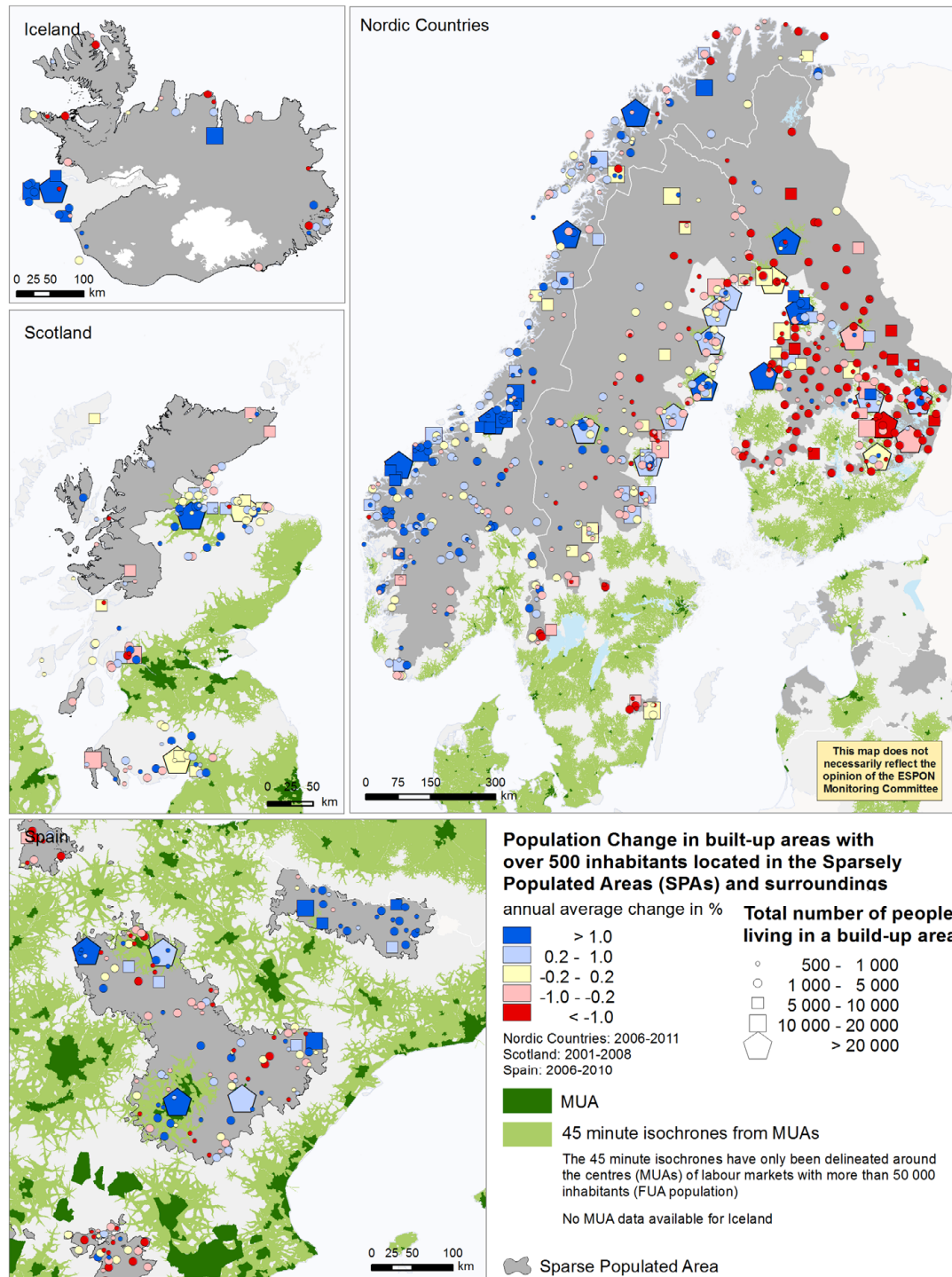
Population Change & Access to MUAs in SPAs



Map 15: Population change in the various sized settlements and areas within PUSHs around MUAs with more than 50 000 inhabitants in the main sparse territories

Small settlements located beyond the 45-minutes commuting catchment areas of larger regional centres are declining in population.

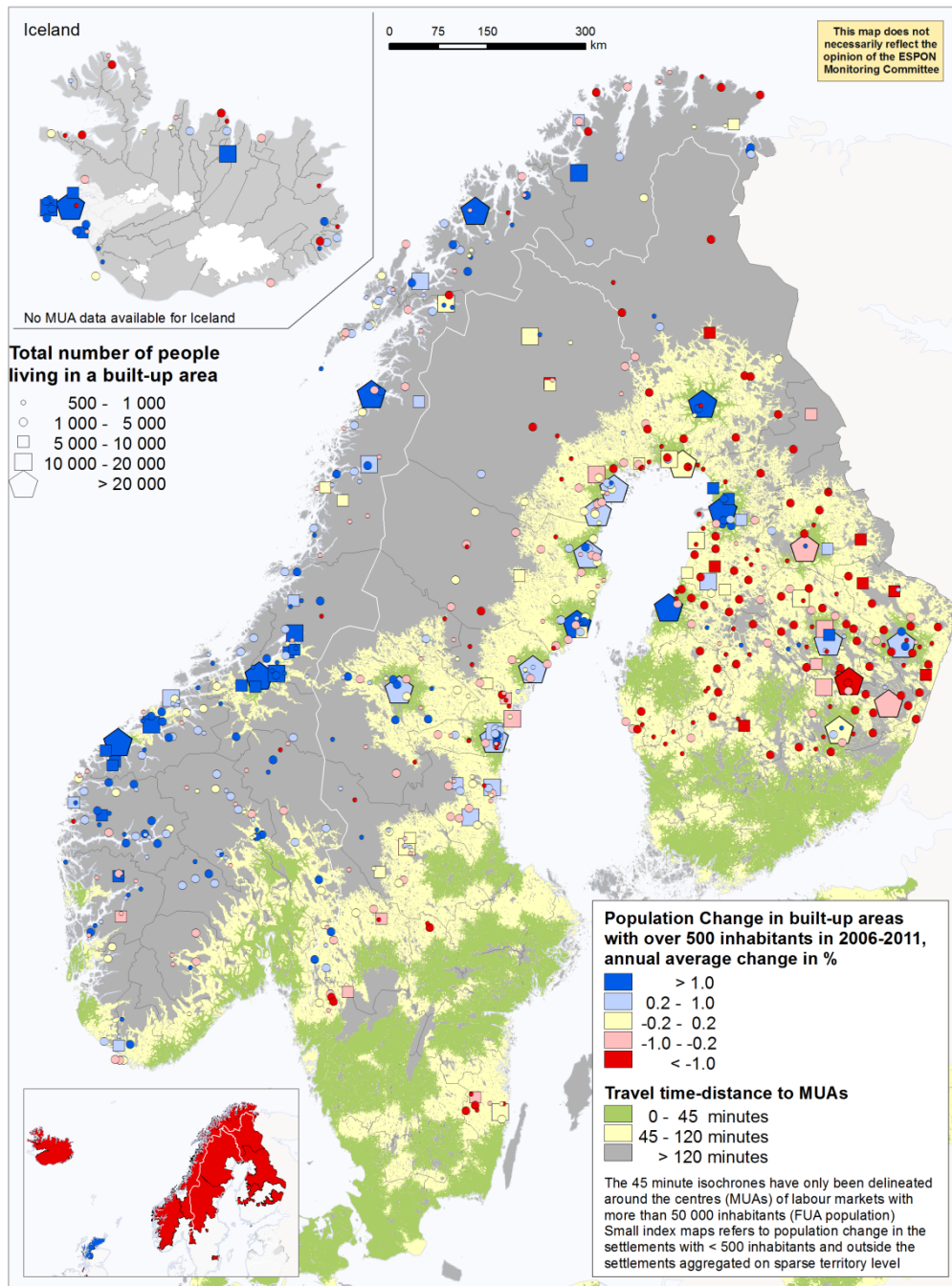
Population Change & Access to MUAs in SPAs



Map 16: Population change in the various sized settlements and areas within PUSHs around MUAs with more than 50 000 inhabitants in the main sparse territories

Small settlements located beyond the 45-minutes commuting catchment areas of larger regional centres are declining in population.

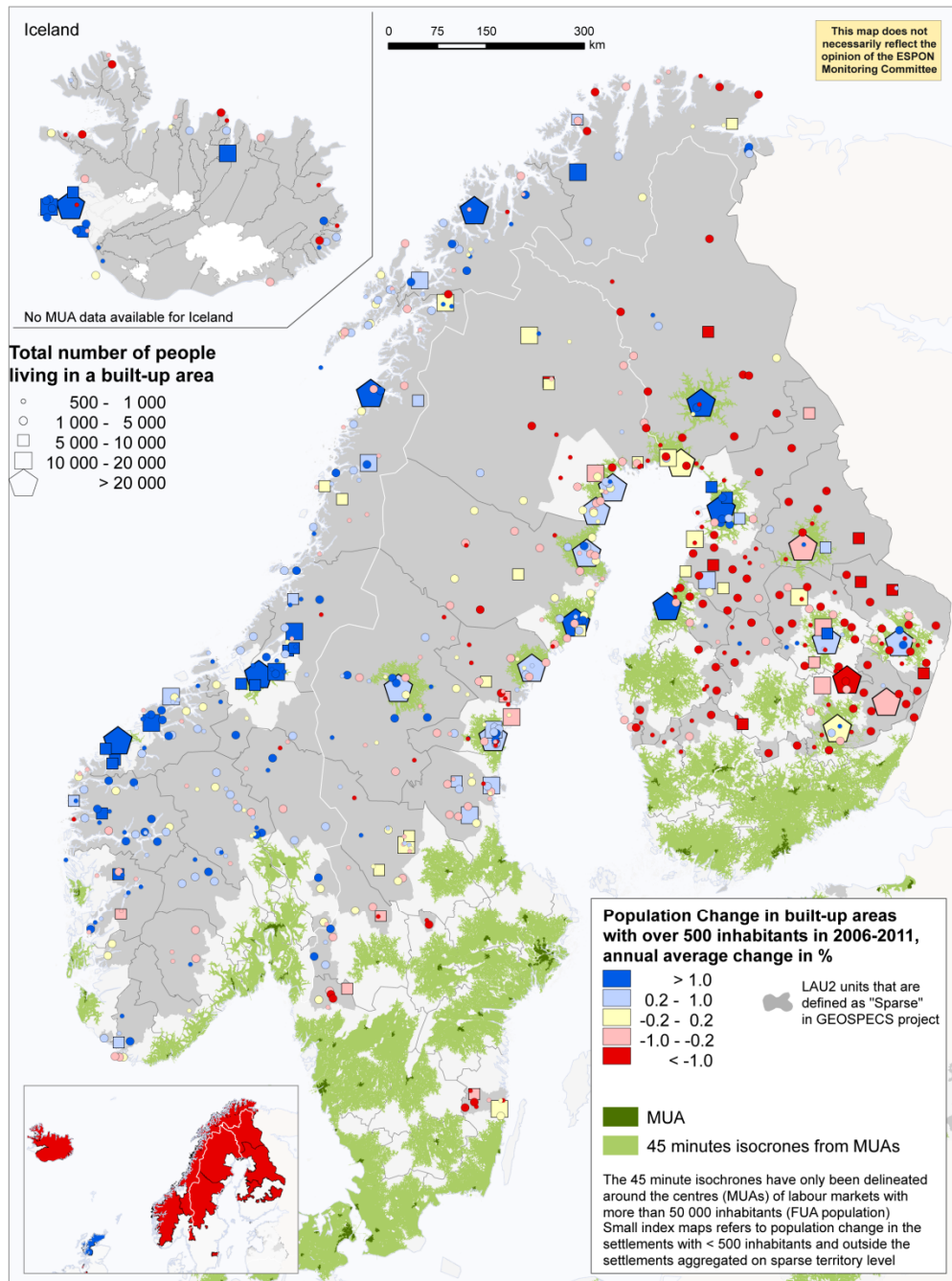
Population Change in Settlements in Northern SPAs



Map 17a: Population change in the various sized settlements and areas within 120 minutes travel time to MUAs in the Nordic sparse territories

In Finland and Sweden, only a few large settlements, often located near the coast, are growing. In Finland even the large settlements of the inland, e.g. Varkaus, Mikkeli or Kajaani, are also losing population. In Norway, most settlements are growing. However, a common trend for all Nordic countries is the decline or remote rural areas (see bottom-left corner map)

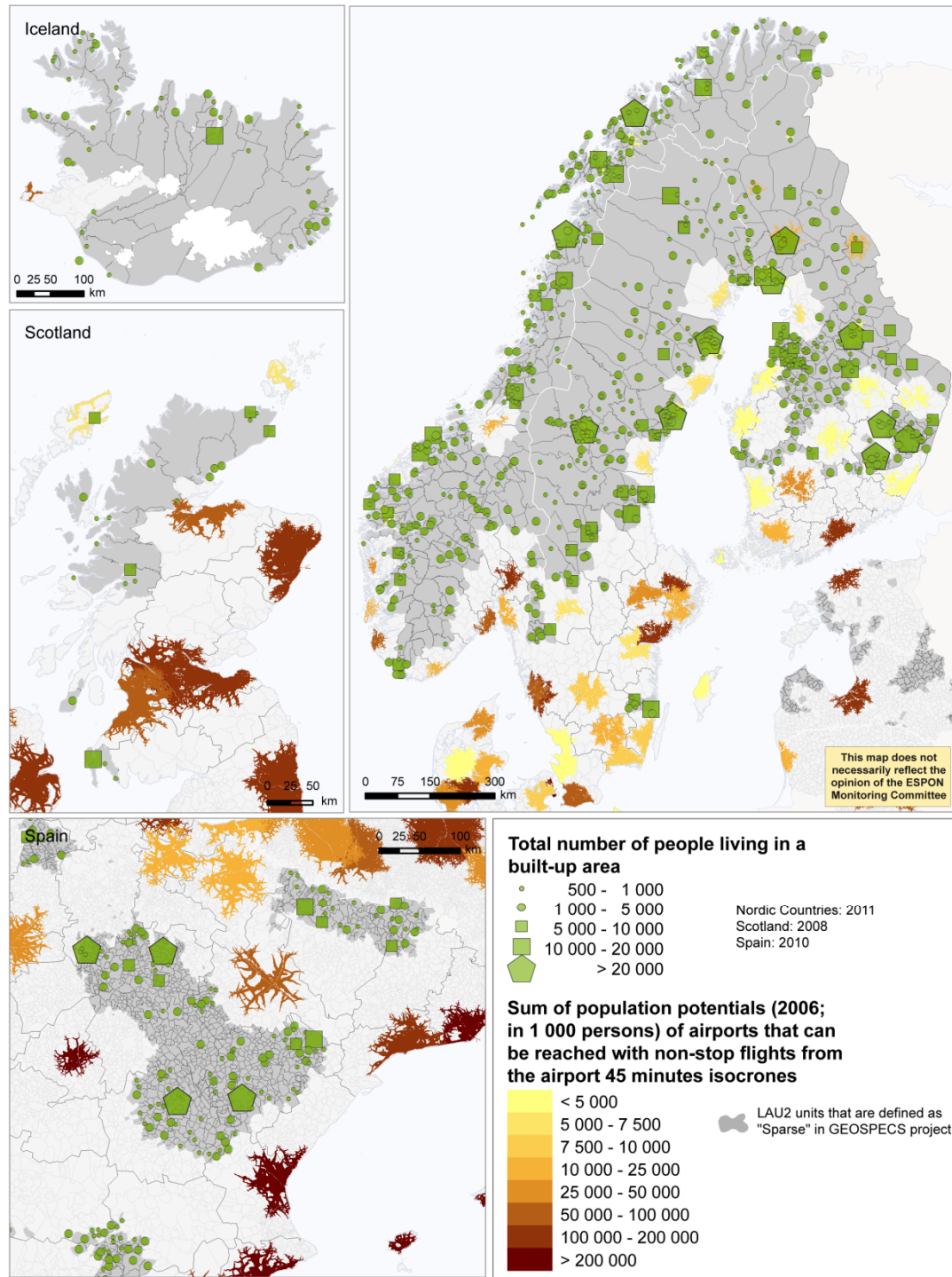
Population Change in Settlements in Northern SPAs



Map 17b: Population change in the various sized settlements and areas within 45 minutes travel time to MUAs in the Nordic sparse territories

In Finland and Sweden, only a few large settlements, often located near the coast, are growing. In Finland even the large settlements of the inland, e.g. Varkaus, Mikkeli or Kajaani, are also losing population. In Norway, most settlements are growing. However, a common trend for all Nordic countries is the decline or remote rural areas (see bottom-left corner map)

Airports & Population Change in Settlements in Main SPAs

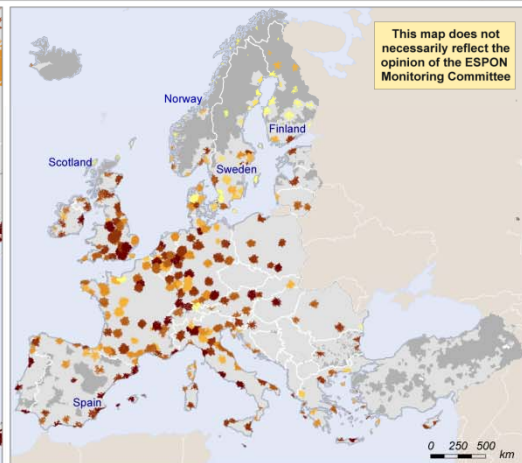
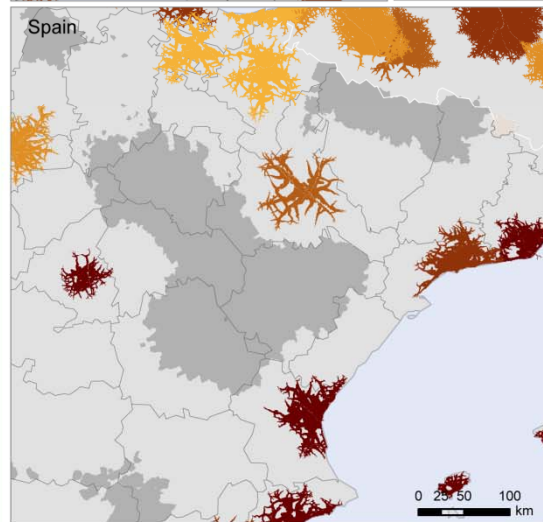
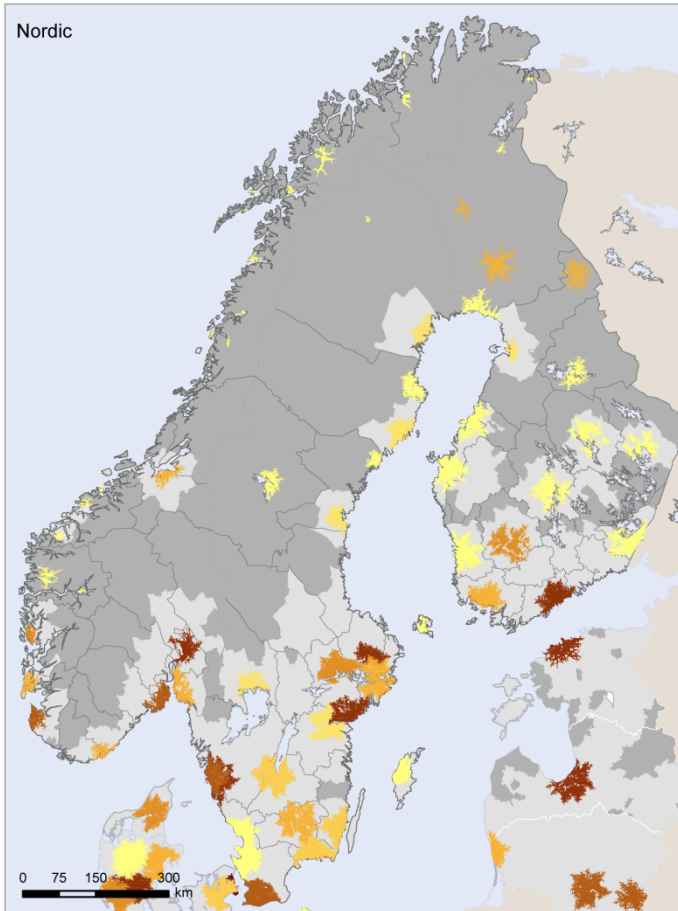
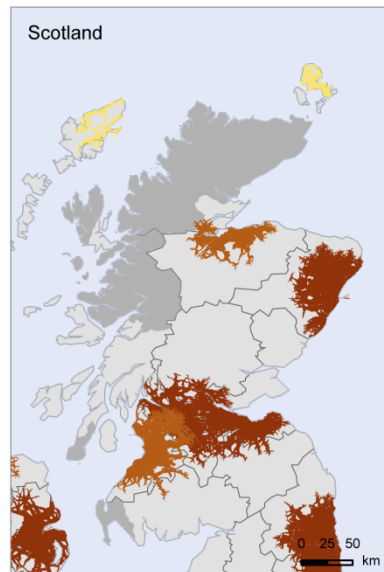
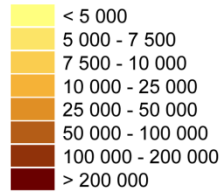


Map 18: Population change in the various sized settlements and areas within airport PUSH in the main sparse territories

Small settlements in the Nordic SPA often have close access to local airports with few connections. In Scotland and Central Spain, distance to airports are longer but the airport are often larger in terms of potential direct destinations.

Access to airports in sparsely populated areas

Sum of population potentials (2006; in 1 000) of airports that can be reached with non-stop flights from the airport 45 minutes isocrones

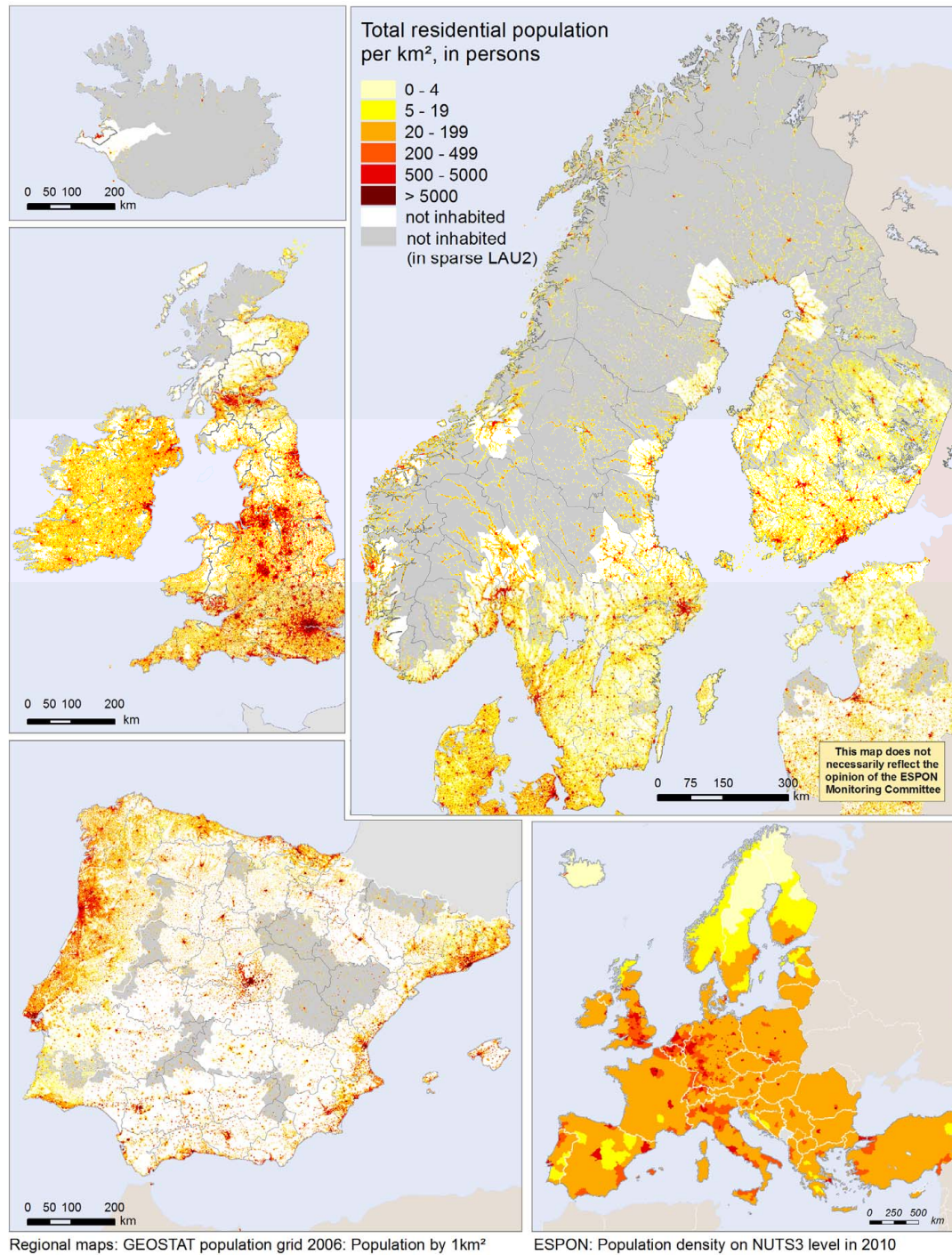


LAU2 units that are defined as "Sparse" in GEOSPECS project

Map 19: Areas within airport PUSH in the main sparse territories

Airports are essential in order to foster the external connectivity of communities in sparsely populated area, especially with respect to the capacity to attract tourists and business investments.

Sparsely Populated Areas - Settlement Pattern



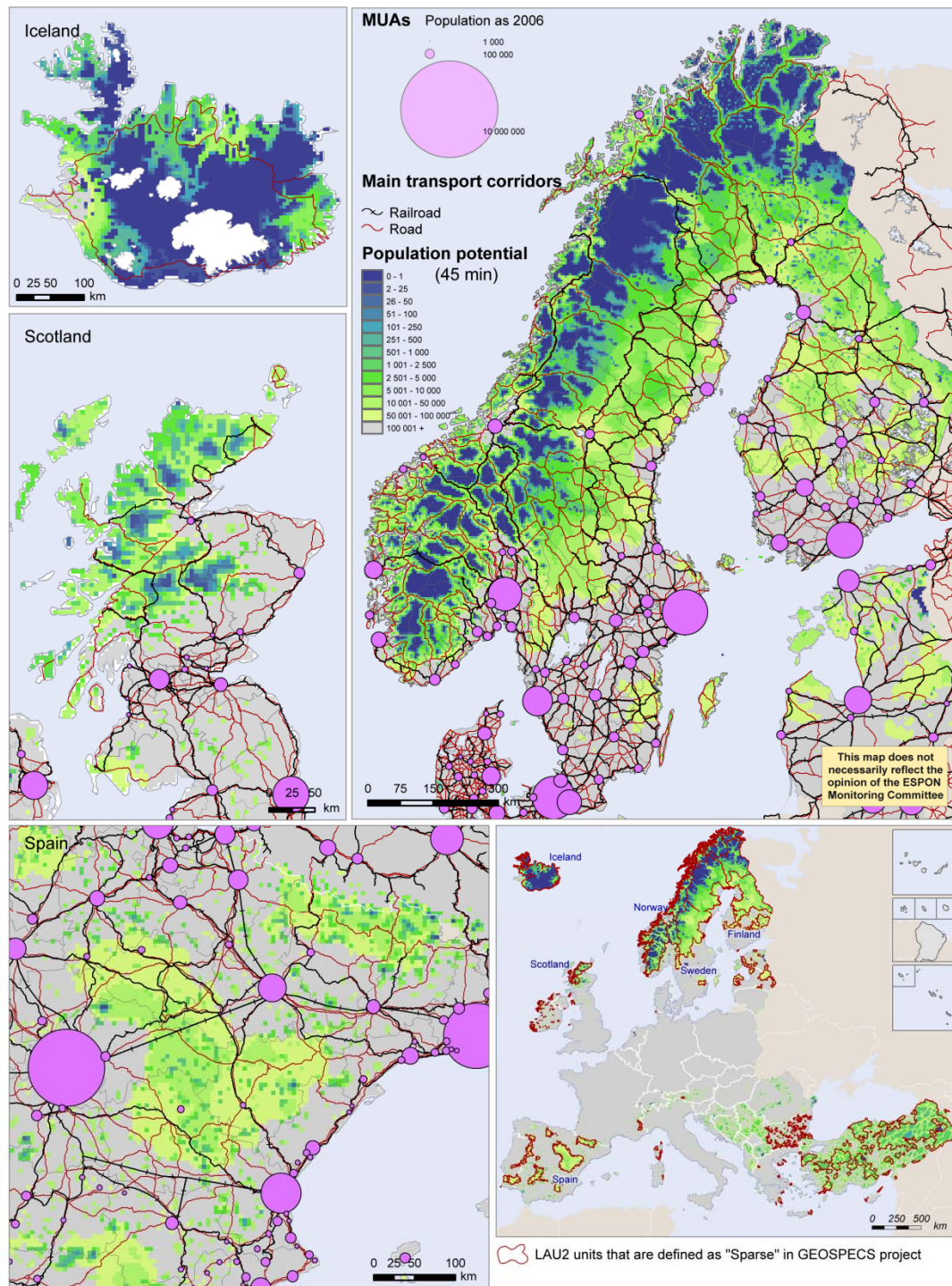
Regional maps: GEOSTAT population grid 2006: Population by 1km²

ESPON: Population density on NUTS3 level in 2010

Map 20: Total residential population per km² in the main sparse territories

Sparsely populated areas across Europe have different settlement structure. While it is rather concentrated around small villages in Spain, the Swedish and especially Finland inlands show impressive patterns of rural sprawl.

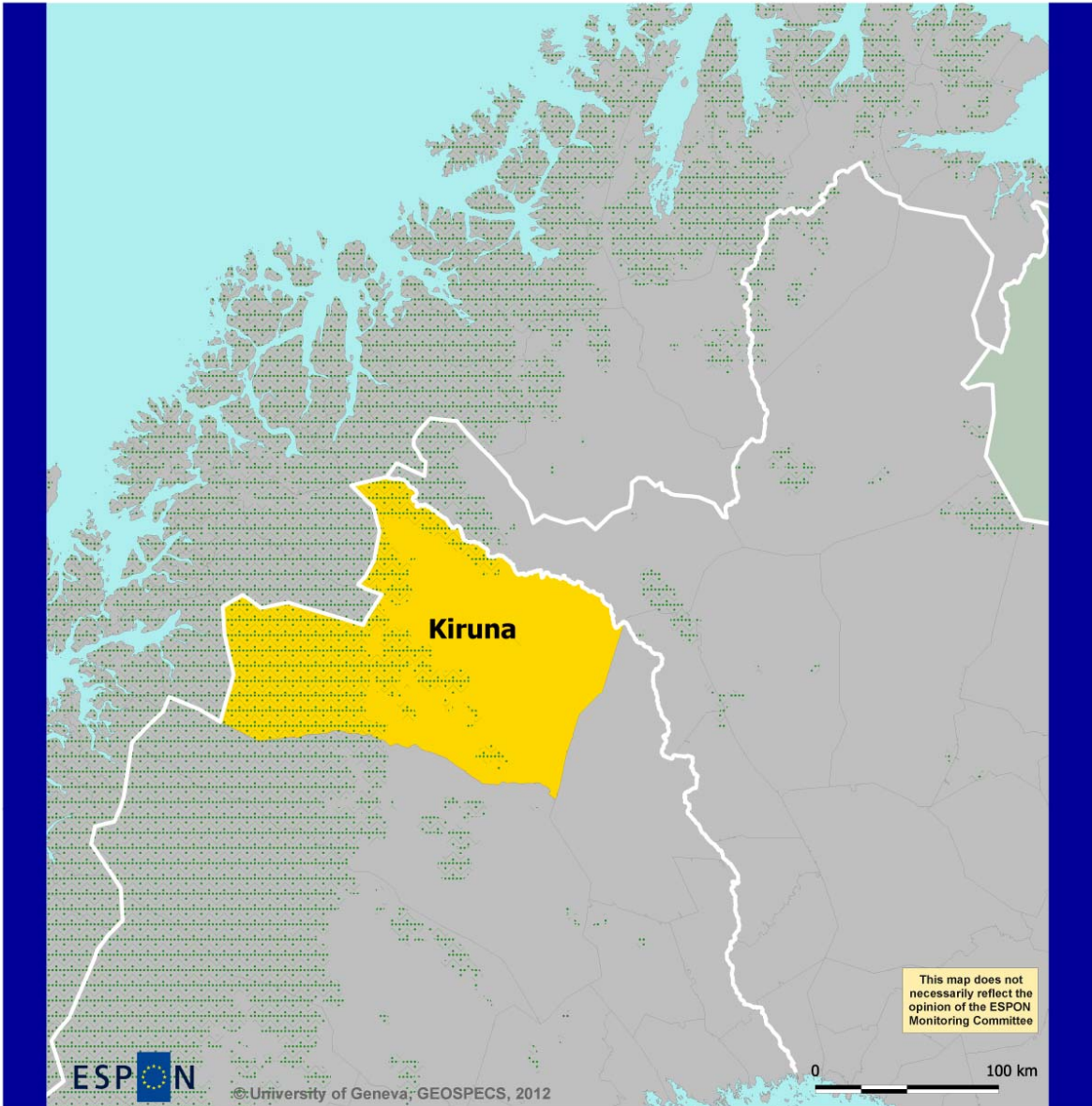
Urban cores and transport corridors in the SPA



Map 21: Territorial context of the main sparse territories

Transport corridors are important for creating a fair access to surrounding urban cores as well as for promoting more internal exchanges within the SPA.

Annex 55 Mountain areas in Kiruna municipality




 EUROPEAN UNION
 Part-financed by the European Regional Development Fund
 INVESTING IN YOUR FUTURE

Regional level: Lau 2
 Source: GEOSPECS 2011
 Boundaries: © EuroBoundaryMap v4 2008

Delimitation of mountain municipalities, the example of Kiruna in Sweden

-  Municipality of Kiruna
-  EEA mountain delineation
-  Non ESPON space

www.espon.eu

The ESPON 2013 Programme is part-financed by the European Regional Development Fund, the EU Member States and the Partner States Iceland, Liechtenstein, Norway and Switzerland. It shall support policy development in relation to the aim of territorial cohesion and a harmonious development of the European territory.

ISBN 978-2-919777-14-3