

EU-LUPA

European Land Use Pattern

Applied Research 2013/1/8

Executive Summary

(Draft Final) Report

Version 06/June/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 & **TECNALIA** Research & Innovation, 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

Tecnalia (Spain)

Efrén Feliu

Gemma Garcia

Carlos Tapia

Autonomous University of Barcelona (Spain)

Jaume Fons

ALTERRA (The Netherlands)

Marta Pérez-Soba

Sander Múcher

Matthijs Danes

Michael Eupen

Bas Pedroli

Gerard Hazeu

Nordregio (Sweden)

Rasmus Ole Rasmussen

Ryan Weber

IGSO (Poland)

Prof. Jerzy Banski

Konrad Czapiewski

Mariola Ferenc

Marcin Mazur

Table of contents

1	EU-LUPA project in brief: the challenge of Land Use Characterization in Europe	5
2	Relevant findings	7
2.1	Which are the prevailing characteristics of land use in Europe?.....	7
2.2	Where are the hotspots of land use change?	7
2.3	Characterization of land use change in Europe: regional typologies	10
2.4	Land use Functions approach	12
2.5	Are the trends sustainable?	13
2.6	What do the case studies reveal?	14
3	Lessons learnt for policy development	16
4	Further steps	18

1 EU-LUPA project in brief: the challenge of Land Use Characterization in Europe

Current European land use patterns are the visual expression of centuries of human intervention on its environment. Nowadays, the diversity of geographic features, social, economic and environmental characteristics, use planning traditions and competences, technical and legal frameworks, governance structures and systems, among and within regions and countries in the European context, is more than evident.

The geographical context and the availability of resources, along side the push of demographic evolution and the economic development have played an important role in driving land use changes and shaping Europe's landscapes. Moreover, the legacy of past decisions constitutes a crucial element to understand this changing process, where leadership, policies and planning systems have had also a major influence. Those differences in land use decision processes due to different pattern of legal, constitutional and administrative framework represent an aspect, which macro-regionally shape Europe.

Although European policy does not have a specific spatial planning responsibility or competence for planning *per se*, it sets the framing conditions of planning through different strategies and instruments.

For decades, land use and land use change in Europe have been mainly addressed from a thematic perspective (e.g. environment, agriculture, urban areas). Therefore there is a need to integrate all these different sector views in order to provide a better understanding on key territorial questions. This is even more relevant on the current time of general economic crisis. At the same time, it is also crucial to realize that land use characteristics are becoming increasingly multi-functional, crossing not only sectors but also administrative boundaries, and thereby becoming more demanding in relation to background information and institutional and administrative structures.

The EU-LUPA project has a pan- European approach to land use. Land use changes and dynamics in Europe are approached as a policy driven process in the context of the European Spatial Development, although the evaluation of policy impacts is definitely out of its scope.

With this premise in mind, the EU- LUPA project *provides a consistent methodology and framework for integration of scales and themes to analyse comparable information about European regions based on data from different sources and different levels, combining and aggregating physical dimension (land cover), with social-economic and environmental (land use) and administrative data into meaningful typologies, in order to understand and obtain a clear view on land use changes, identify main challenges and potentials for regions and define policy options accordingly.*

The project strives to achieve a better understanding of the following key policy questions:

- What are the main characteristics of ongoing changes in land use and land use patterns **over the last 16 years (1990-2000-2006)**¹? *Determining typologies reflecting amount (area wise) of change, as well as the intensity (degree of change on land for individual parcels or for land change in general for a given area) of change.*
- To what extent and how are changes in land use patterns interacting with ongoing socio-economic developments? *Land Use Functions approach*
- What are the causes of the changes inland use patterns and the dynamics behind, as reflected by the typologies? *Assessment of Drivers*
- Are the trends sustainable, and to what extent will the ongoing changes compromise future developments? *Showing the land use performance and efficiency of the different sustainability dimensions (economic, environmental and social) and to what extent certain “patterns of Land Use” have been effective in achieving policy goals and the amount of land taken to do so.*

Case studies allow us to dig in more detail in the processes that, being not visible at regional scale, could definitely explain the major trends, and are used within EU-LUPA to: assess “multifunctionality”; identify factors and drivers (natural and socio-economic) of land use changes and land use dynamics in details in different types of areas; provide answers about mechanisms and trends (processes) of land use changes; identify challenges in those areas and defining policy recommendations to cope with those challenges on the basis of stakeholders opinion.

Based on scientific evidences and key findings, the EU-LUPA project outlines some general responses and messages for policy development towards a more sustainable land use management, and hence more resource efficient territorial development. This is in line with the EU development principles and objectives (mainly under the EU Cohesion Policy, EU2020 Strategy and the Territorial Agenda),

- on one hand to monitor land use intensity to support responsible land management and to resolve conflicting land use demands affecting the economic, social and environmental performance of a region
- and on the other hand to identify the potentials for improving regional competitiveness and territorial cohesion towards sustainability

EU-LUPA project provides:

- **Awareness-raising:** messages on how the land use typology and economic, social and environmental performance relate (e.g. “fast urbanizing areas face social and environmental problems”)

¹ The selection of this time period is determined by the use of CORINE Land Cover 1990, 1996 and 2000 as basis for the assessment of the changes.

- Indication of **potential and challenges** in relation land use patterns: What should European, national, regional and local authorities do in order to face challenges and use potentials of land use patterns and dynamics?
- Formulation of **policy messages** anchored in the EU Cohesion Policy and the Territorial Agenda policy objectives.

2 Relevant findings

The assessment of the main characteristics of ongoing changes in land use, over the last 16 years (1990-2000-2006) based on CORINE Land Cover, provides a current view on how European land use look like, what are the current land use patterns.

Besides, an assessment of the Land Use Functions at regional level by means of a comprehensive analysis of the multiple functions attached to land use, considering the three main dimensions of sustainability, i.e. economic, environmental and societal, gives information on to what extent and how are changes in land use patterns interacting with ongoing socio-economic developments.

2.1 Which are the prevailing characteristics of land use in Europe?

The assessment of land use in Europe based on the distribution to CLC data provided at both a 1km² grid and a regionalized NUTS2/3 levels reveals that there are certain dominant patterns or prevailing characteristics of land use that could be summarized as follows:

- European territory is dominated by rural landscape strongly linked to agricultural activity
- Prevalent urban areas are only found in the high density area of Belgium, The Netherlands, in some regions of Germany and in Paris and London. It means that in other areas in which a high degree of urbanisation (e.g. coast) would be expected, the regional context still has a strong rural component
- There is a North-South noticeable gradient: not only a clear north-south gradient in climate showing a clear gradient in vegetation patterns and the fact that specific land cover classes such as sclerophyllous vegetation, vineyards, rice fields, and olive groves, are mainly occurring in southern Europe, but there is also a clear gradient in land use intensity, which is the highest in North-West Europe. In Scandinavia land use intensities are again much lower, reflecting the high percentage in cover of forest, water and other semi-natural areas.

2.2 Where are the hotspots of land use change?

Within EU-LUPA project regions have been typified based on the levels of physical change (by area) and intensity of change that takes place in a region and provides “Hotspots of Land Use Change”.

In relation to the intensity of land use change it is understood as the degree of human intervention on the land caused by socio-economic activities by means of the consideration of GDP and population density. It is included in the analysis based on an inferred intensity hierarchy that is inherent in the CLC classification.

Hotspots enable us to identify places in Europe where marked changes have been taking place during the last 16 years, where are the main changes in typical land use patterns? And therefore, what could the main driving forces behind these land use and land use pattern changes be?

It is important to understand the overall change accumulated over a period of 16 years:

- Change is not necessarily negative, but there is a need to understand why and the quality
- Change is related to certain dynamics in the region, strongly related to type of change
- In contrast to the clear North-South divide in terms of prevailing characteristics of land use, there is a clear East-West divide in terms of the intensification of land use. Regions with high intensification and a relatively high amount of change are identified mainly in some regions of the Mediterranean coast, Belgium, The Netherlands, Spain, Portugal and Ireland but particularities in each country.
- All regions in Portugal are identified as hotspots – albeit to differing degrees – in all of the time series'. Consultation with the maps showing total land change by area (Appendix 6.1) shows that this is mainly due to the fact that all regions show very high levels of overall change. This is due to the high levels of ongoing changes related to forest management. Conversely, the intensity maps in Appendix 6.2 show more stable patterns with the exception of two regions. Lisbon and Alentejo. In the former, intensification is predominantly related to residential sprawl between 1990 and 2000; a process that has slowed considerably since then (EEA, 2011). In Alentejo, relatively high land change is characterized as an extensification process. This is due to the fact that land abandonment due to the withdrawal of farming activities (EEA, 2011).
- The immediate effects of the inclusion of East-Central European countries - previously part of the "East Block" mostly characterized by state and cooperative ownerships - are immediately reflected through a drastic decline in intensity over substantial areas in the period from 1990 to 2000. The reforms in ownership from the former state and cooperative ownerships forms has had some immediate consequences in relation to intensity due to that the new private farms did not have the necessary means to ensure a high intensity in land use. The situation in Poland being different in this respect because of a dominance of private land use activities, and as a consequence effects as described above only relating to the relatively smaller areas owned by cooperatives and a few state holdings as well.
- The situation in Poland was, however also affected through the lack of funding for investments in many of the small farms functioning more as subsistence bases for a still older population, and several of the regions where this has been the dominating characteristic have continued being regions of decreasing intensity through the 2000-2006 period as well. One important element in this connection has been the small size of a substantial part of the already private farms. The advantage in other parts of East-central Europe has been that in the aftermath of the first round of extensification the new private farms were able to establish themselves not as subsistence activities but as

professional and capital intensive farms on previous state or cooperative owned large scale farms. And similar situations have appeared in relation to other types of land use.

- Ireland being a “hotspot” for IT development during the 1990’s had some spin-off in relation to increased intensification of activities related to land use. Partly because the attraction of labour force away from direct land use to industrial activities required adjustment in land related activities requiring technology to replace the missing workforce. With a partly collapse of the IT-adventure after 2000 the process described above came to a halt, and the shift is apparent when comparing the 1990-2000 and the 2000-2006 situations.
- While missing data for Sweden, Finland and Norway for the period 1990-2000 does not allow a comparison between the two periods, an important issue of the effects of increasing activities related to resource extraction, especially in relation to oil and gas development, is very apparent for the 2000-2006 period shown for Norway. While fisheries used to be a mainstay for coastal communities in Norway the picture today is a high degree of dependency on the sea, but to a high degree in relation to energy resource extraction, in the South related to the oil related industries which took off several decades ago, while NW Norway is highly influenced by expansions in both oil and gas development during the last decade. This leads to the inclusion of large areas for on-shore production facilities, but requires at the same time related economic activities – processing, investigation, planning, education etc., which shows through inclusion of still larger areas for housing.
- While many border regions used to be characterised by differences in land use due to the influence of differences in national land use policies, the CAP has contributed to a withering of many of these differences and are instead in a process where differences in land use patterns tend to be much more reflecting combinations of natural potentials, settlement patterns and infrastructural characteristics, less dependent on national policies. As a small scale example the previously very marked border between Denmark and Germany could be mentioned. With the incentive of EU membership of Denmark a marked intensification in cattle and milk production in the border region of Southern Jutland developed, while the land use south of the border continued to be characterized by extensive land use. Today the differences in land use characteristics have been considerable reduced. As a large scale example the above mentioned East-West divide in land use characteristics due to previous differences in economic systems could be emphasized. A general characteristic in this connection is the process of de-population and retracting/extensification of agricultural activities from mountaneous and sparsely populated areas, and replacing it with tourism – often in combination with agriculture and other traditional land use.
- European tourism is an activity requiring still larger areas, and the development of the Spanish coastline illustrates that it is not only a question of short term changes, but seems to have been a consistent development process throughout the whole period from 1990 to 2006.

2.3 Characterization of land use change in Europe: regional typologies

In relation to land use change, this is the cornerstone of the EU LUPA land use characterization and it answers the question, what characterizes land use changes in Europe, based on the regional clustering of all Corine Land Cover Flows and changes in land use intensity. The results are typologies of Land Use Change provided at a regionalized NUTS2/3 level.

While the hotspots enables us to identify places in Europe where marked changes have been taking place during the last 16 years, the development of a typology which is able to capture these changes and provide a connection between types and processes of change, an important planning instrument will be at hand.

- **Very high intensification with artificial surfaces mainly replacing natural areas.** Regions in this cluster are very unique. In each time series, both the area and the total number of land change are very small. However, the changes that are taking place relate exclusively to urban land management and residential, economic and infrastructure development. The very high level of intensification indicates the formation of these land uses results from the consumption of very low intensity land covers; most likely natural landscapes. Presence of this Land Use Change Type is limited to the Canary Islands (touristic infrastructure) and northern Norway (urban infrastructure supporting natural resource-based development).
- **Very high intensification due to specific areas of residential and economic sprawl.** Regions in this type are experiencing land use changes that are dominated by urbanization process. The term “specific” is used because, like the previous type, the level of change by area is low (for example, the average amount of land change for the 1990-2006 period was only 1.1%). The reason for such a low level of changes is that these regions are exclusive to the existing large urban centres in Europe; in particular, NUTS3 city-states. Urban form in these regions is already well-established and changes tend to further to the amount of urbanized area.
- **High intensification due to residential and economic sprawl.** This group encompasses three sub-categories with small variations: each type reflects the high level of economic and residential sprawl, but each type is somewhat distinct based on the land use change processes that accompany the sprawl. For this particular type urban sprawl is coupled with relatively high levels of internal urban change. Regions in this typology are predominantly located in western European countries where many regions in each country appear to be undergoing the same urbanization processes. Many of the regions are either located along the coast or in close proximity to large urban centres. For example, inland regions surrounding Madrid, Geneva, Zurich, Paris and Brussels are a part of this type, along with coastal regions in Spain, France, Italy and Croatia.
- **Medium-high intensification due to diverse urban processes.** This type characterizes over 100 regions that are undergoing very typical types of land change – moderate levels of urbanization processes are coupled with diverse forest and

agricultural changes. Like each of the high and very high intensification types above there is a very strong western dimension to this type.

- **Medium intensification due to some urban sprawl combined mainly with forest conversions.** Regions in this type are undergoing relatively stable land processes with comparatively low levels of regional change (by area) in the sequence 1990-2000-2006. While there is still a Western orientation to the regions in this type, the appearance of regions in Eastern Europe (for instance Poland in the 1990-2000 time series) is evident. This trend extends to regions in Romania and Serbia in the 2000-2006 time period.
- **Medium intensification - dynamic mix between agricultural and forest changes with urban sprawl.** The land use change characteristics in this type are similar to the previous type except the rural land processes increase in their role of defining regional changes. The same east west pattern is evident as in the previous type, but additional regions in selected Eastern European member states are notable, especially in the 2000-2006 time period (e.g. Romania, Serbia and especially Turkey).
- **Low intensification - dynamic mix between agricultural and forest changes with limited urban sprawl.** Regions in this group are characterized by land changes that have resulted in a neutral level of intensification (between 0.00 and 0.40). Rural land changes dominate in these regions with an increased level of change related sprawl of economic sites and infrastructures.
- **Extensification due to agriculture and forest changes.** Regions in this group are unique in that they show regions where cumulative land changes in each of the time series' have resulted in an extensification of socio-economic activities taking place on the landscape. For a majority of the regions a dominant trend has been the replacement of agricultural activities in favour of pastures or forest land covers. As such, land use changes seem to reveal a socio-economic trend of rural stagnation; as rural land-based activities are being replaced by growth that is concentrated in urban areas. Regions in this type are exclusive to Eastern European and new member states, with notable distributions in Poland and the Czech Republic; particularly in the 1990-2000 time series.

2.4 Land use Functions approach

What are the **relations between land use patterns** (and more specifically urban land use patterns) **and drivers of development** such as geographical, demographic and cultural influences, climate change, transport, employment, GDP and other economic structures? How and to what extent **are land use patterns efficient** in relation to these aspects? And what are the **relations between urban areas and open space** (non-build areas)?

Based on the need to approach the multiple perspectives of land use, the EU LUPA project has introduced the notion of Land Use Functions (LUFs) and has completed a comprehensive analysis of changing performance in relation to six individual land use functions:

LUF1: Provision of work; LUF2: Provision of leisure and recreation; LUF3: Provision of primary products; LUF4: Provision of housing and infrastructure; LUF5: Provision of abiotic resources; LUF6: Provision of biotic resources

Synthesis of these functions also allows for the summaries of land use functions relating to the provision of economic, environmental and social functions.

LUFs express the goods and services that the use of the land provides to human society, which are of economical, ecological and socio-cultural value and are likely to be affected by policy changes.

- Extreme changes do not occur and the overall pattern shows stability in the six years studied (2000-2006). Overall Scandinavia shows the highest stability, being central and southern Europe more unstable with mixed patterns.
- The two mainly economic LUFs (LUF1 Provision of work and LUF2 Leisure and recreation) show a high stable performance in the *Blue Banana* corridor, as it could be expected, although some negative changes in LUF 1 are observed in the fringes, e.g. in the Netherlands and East Germany, Eastern France and Barcelona. Positive changes are scattered except in Scandinavia and the Baltic countries. Other countries showing positive development are eastern Turkey, western Spain and central Europe.
- LUF2 Leisure and recreation shows a more general trend to increase the performance than to decrease. In general, coastal areas and the Canarias islands improve. Romania and Bulgaria increase from low to medium, showing developments in the tourist sector in the years previous to their entrance in the EU (2007).
- In contrast with the economic LUFs, LUF3 Provision of food, timber and biofuels shows negative developments in several regions, especially in the Mediterranean countries, which could be associated to land abandonment and decrease in area harvested (mainly conversion of rural areas into urban). In contrast, there are positive changes in Scotland and central Europe. It is interesting to see the different geographical patterns in Sweden, with a high and stable performance in the North (associated to forestry), and a negative performance in the south (linked to agricultural production).
- LUF4 Housing and infrastructure shows a high stable performance in the Blue Banana², similarly to the economic LUFs, indicating significant urban and infrastructure

² Discontinuous corridor of urbanisation in Western Europe. It stretches approximately from North West England in the north to Milan in the south.

developments in the European Megalopolis. Coastal areas in the Mediterranean show as well a high stable performance and even an increase in some regions. Increases are also observed in southern Spain, southern Italy and eastern Germany, as well in main cities in central Europe (Budapest, Bratislava and surroundings). Decrease is found in few rural areas of Romania, Poland, South Sweden and Lleida (Spain).

- LUF5 abiotic resources shows scattered changes as it describes broad environmental issues linked to air, water and soil quality. Therefore variations are difficult to explain without assessing the changes in the indicators affecting the LUF.
- LUF6 biotic resources show significant improvement in central Spain and north-western France. There are more negative developments than in the other environmental LUF. For example, in some regions of the Dutch 'randstad' (industrial and metropolitan conurbation occupying west-central Netherlands) where significant infrastructure and urban development has taken place. This trend appears as well in Southern Alps including the densely populated Po valley.
- More intensive changes tend to occur in shorter lapse of time, while reversing their potential negative impact would take much more time -if not irreversible. This is well exemplified on the LUF ecological functions that needs longer period of time (> 6 years in our project) to see changes (changes at general ecosystem level, not single factors). On the other side economic components are much more flexible and change over very short period of time. The risk is when rapid changes in socioeconomic components are based on intensive use of large areas. In those cases an exhaustive analysis would be required to avoid a serious compromise for the future.

2.5 Are the trends sustainable?

How to measure if the ongoing trends of land use change in the European regions are sustainable or whether they are compromising future development has been one of the key challenges of the EU-LUPA project research.

Several exercises have been undertaken to find out to what extent certain "patterns of Land Use" have been effective in achieving policy goals towards sustainable development in the European regions and the amount of land taken to do so.

A broad evaluation of the potential relationship between certain socioeconomic indicators particularly those set in the EU2020 Strategy and Cohesion Policy and the land take at NUTS2 level, based on CLC data, have provided some interesting results.

Land take by the expansion of residential areas and construction sites is the main cause of the increase in the coverage of urban land at the European level. Agricultural zones and, to a lesser extent, forests and semi-natural and natural areas, are disappearing in favour of the development of artificial surfaces. (EEA, Land Take GDI 5 March 2012)

At the European level, housing, services and recreation made up a third of the overall increase in urban and other artificial area between 2000 and 2006. (LEAC Database (based on Corine Land Cover 2000-2006 changes, version 13, 02/2010), ETC/LUSI)

A test has been done with the Nitrate Directive in order to show the potentiality when a clear threshold is available. The Nitrates Directive requires MS to monitor surface waters

and groundwater for nitrate pollution against a maximum limit of 50 mg nitrate/l (Directive 91/676/EEC on pollution caused by nitrates from agricultural sources).

Regions in eastern and central Spain, Bretagne in France, south of the Netherlands, Belgium, some regions in the western part of Germany, Finland and some regions in Poland do not comply with the nitrate directive and therefore their environmental land use performance regarding the agricultural land use is negative. Moreover, it is possible to differentiate the case of Poland where it is strongly linked to changes in agricultural areas, while in the rest of the countries the process is more complex and probably related to decrease in agricultural area or even displacement of agriculture to less productive areas by urban sprawl like in the case of the Mediterranean coast (EEA, 2006).

There is very difficult to understand the performance of European territories in relation to land use is that most of the policy targets do not have a direct translation on land use. Even that polices that have a more direct relationship with the land (e.g. Biodiversity, CAP) there are no specific targets on percentage of land that should fulfil certain requirements.

2.6 What do the case studies reveal?

The case study regions of the EU-LUPA project are: Øresund (Denamark), Basque Eurocity (Spain/ France), Chełmsko-Zamojski & Jeleniogórski (Poland). All analysed regions are strongly diverse in the land use structure and land use changes respectively. According to the land use change typologies within the examined regions it is possible to separate some specific territories representing different clusters. The case studies investigated four of them: Low intensification mainly due to agriculture and forest changes, Extensification of rural activities, Dynamic rural and peri-urban changes, High extensification in rural and sparsely populated region and Stable rural and peri-urban activities.

The main processes identified in these regions are described in further detail.

Urban residential sprawl represents intensification of multiple land uses (conversion of agricultural land into built-up areas). The main factors of those changes are: localisation close to road or railway infrastructure, good connection to core towns, access to social infrastructure. This process is characteristic of **dynamic rural and peri-urban changes**. In these regions the development of non-land based economic activities occurs. The highest pressure on peri-urban areas is observed around big cities, which will certainly become a challenge for regional green structure plans like the Fingerplan in Denmark or sectorial planning in Basque Country. Urban sprawl is less chaotic in countries with standardised spatial planning, and therefore the land use is very patchy (there are a lot of single houses scattered over a large territory, between the forest and agricultural areas). In the Polish cases there are also difficulties with lack of development in technical and social infrastructure in the suburban area.

Sprawl of economic sites and infrastructures Dynamics and directions of land use as well as the land cover changes are high or very high and are connected with the localisation and pressure derived from the new investors. Dynamic rural and peri-urban changes are

represented in each of the case study regions, but underlying differences are noted. For instance, in Lomma (Sweden) the nature reserve is located on one side of the road and new services are situated on the other. There was a significant pressure on this nature reserve which resulted in building a protection fence. In Øresund Region, mostly on the coast, conflicts between building of second houses, leisure activities area and wind power plants are appearing. Also in Polish cases the highest level of development of infrastructure is to be seen in the most attractive places (e.g. development of tourism infrastructure in mountain areas). Very common type of infrastructure is the leisure-designated areas, such as golf clubs and horseback riding paths, especially in the vicinity of cities, but in an attractive landscape.

Agriculture internal conversions characterise extensification or stabilisation and differentiated dynamics of land use changes (from high to low) depending on the region. Some of the territories represent high natural environment values and consequently they are protected by law. The investigated areas represent wide range of trends (- extensification of rural activities, - high extensification in rural and sparsely populated regions and - stable rural and peri-urban activities), what is confirmed by relatively diverse directions and dynamics of land use changes. Agriculture areas were gradually transformed into more peripheral ones, where the building pressure and land price are lower (e.g. in Denmark, farmers moved to Jutland and the new EU member-states). The internal conversions are mostly observable in the neighbourhood of big cities: there are more ecological farms, which produce healthy food and sell it on a local market. One of the most considerable changes in land use is related to the migration from peripheral areas to the coastal and urban ones. People living in rural areas resign from cultivation of land, moving to towns and changing the way of production to a more environment-friendly. In the Basque Country rural tourism is more popular (to foreign visitors) in comparison to the most typical coastal tourism. Internal conversions in Chełmsko-Zamojski region derive from the economic transformation. Changes in the structure of land use are related to the profitability of production: high extensification of region's agriculture results in the increase of cereals cultivation and the abandoning of sugar beetroots, tobacco, flax, hemp and potatoes cultivation.

Forests creation and management represents stabilisation and low dynamics of the land use changes. The major reason for the stabilisation is poor quality of land in relation to other economic activities and land protection. The investigated areas represent - extensification of rural activities and - stable rural and peri-urban activities). On the example of Basque Country the shifting function of forest is observable. There are a lot of areas, classified as forests, which in reality turn out to be tree plantations. There are no visible changes in the landscape or in CLC data, but only as the environmental issue. In Chełmsko-Zamojski case in the last decades, forest invasion on meadows and pastures is observed and therefore resulting in the reduction of their areas. This process of renaturalisation is strongly linked with concentration and intensification of cattle breeding within the region, abandoning meadows and pastures as a fodder source. Small farms do not uphold animal production due to macroeconomic changes in agriculture and their meadows and pastures areas are often under renaturalisation. The processes taking place in forest areas (extensification and stability) have no major impact on land use change, such as intensification. The changes

often appear as a point, invisible to the Corine Land Cover, but having a very strong influence on the functional and economic structures.

3 Lessons learnt for policy development

A review of the most relevant EU policies, strategies and institutional reports has been undertaken in order to set the policy framework regarding Land Use in Europe. This review helps us in the contextualization of the land use change and land use dynamics as a policy driven processes trying to give light on to what extent are existing land use patterns throughout Europe in line with the general spatial development principles as formulated in most territorial policy documents.

- European policy, although having no spatial planning responsibility, sets the framing guidance for planning.
- There are several policies that have a strong impact on the territory (e.g. Habitats Directive, Water Framework Directive, CAP, Energy policies...).
- It has been said that territorial cohesion supports the coordination of sector policies and can be regarded as a spatial representation of sustainability (EEA, 2010)
- European economies depend on natural resources, including raw materials and space. Land is a limited resource. Different sector interests are often competing for the same territorial resource.
- Policy responses are needed to help resolve conflicting land use demands and to guide land use intensity to support sustainable land management
- The way land is used has impacts on climate, biodiversity and ecosystem services. It can also cause degradation and pollution on water, soil and air.
- Monitoring and mediating the negative environmental consequences of land use while sustaining the production of essential resources is a major priority of policy-makers around the world.
- Coordination of different sector policies and various policy levels is therefore crucial: good governance.
- Land-use planning and management are powerful and essential to better reconcile land use with environmental concerns and resolve potential conflicts between sectoral interests and potential uses.
- Due to the cross-cutting nature of land use, integrated programmes are needed to guarantee the EU objective for territorial cohesion.
- Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) are the important tools for evaluating programmes and projects that have impacts on land resources.
- In the need for strengthen territorial cohesion particular emphasis should be placed on the role of cities, local development and the macro-regional strategies.

- Tailored measures and policy instruments for specific locations or land-use types are needed.
- A shift in the land management concept from linear to land use cycling has been gaining priority across the EU Member States, especially in the context of the EU 2020 Strategy.
- Growth is possible without major new land take: This is possible by reusing/optimising existing urbanised land. The coming high-level conference on 'Soil remediation and soil sealing' (DG ENV, Brussels 10-11 May) highlights the crosscutting component of this intensive use of the land. This could not be tackled by a single policy, but rather a crosscutting element that needs better integration across policies.

The policy recommendations guidance will be delivered in the Final Report. In September 2012 a stakeholder's workshop will be held in Warsaw (Poland) hosted by the project partner Institute of Geography and Spatial Organization (IGSO) Polish Academy of Science. The outcomes of the workshop will constitute the final input for the configuration of the policy recommendations document.

4 Further steps

An important of the last decades of land use development in Europe has been – as noted in the report above – a withering away of many of the differences in land use characteristics determined by national borders and replaced by land use characteristics still more determined by land use potentials in combination with the general economic development.

The land use systems in Europe used to be characterised by varying, historically developed governing and planning systems in relation to both landscape and spatial planning, resulting in national differences in land use decision processes due to different patterns of legal, constitutional and administrative frameworks, showing obvious impacts on the concept of landscape and practices in relation to landscape management and planning.

Common policies, however, especially in relation to territorial cohesion, are in the process of limiting or even eliminating these differences! And in this context it is clear that the landscape and its potentials has become a key territorial value where analyses and assessments as well as integrating into the governing and planning systems is becoming still more important. This, however, is not a simple task, because knowledge about differences in land use decision processes due to different patterns of legal, constitutional and administrative frameworks are obviously impacting the practices of landscape management and planning.

A crucial issue in this connection is the fact that – as emphasized in the report above – there are marked differences in connection with land use development relating to two major questions: On one hand the question of development relating to mono-functionalities versus multi-functionalities, and on the other hand the question of development relating to intensification versus extensification in land use. And when working with both questions it becomes apparent that there are limitations to accessible tools that allow the necessary analyses in order to understand both background and consequences of the processes. The landscapes of the future will have to serve, simultaneously and in integrated ways, a number of different functions (Haber 1973). These include for instance:

- ecological (as an area for living organisms and natural environments),
- economic (as an area for production and reproduction),
- socio-cultural (as an area for cultural actions and identification),
- historical (as an area for settlement, memory and identity),
- and aesthetic (as an area for shaping and experiencing).

The expression “multifunctional landscapes” refers to areas serving different functions and combining a variety of qualities, i.e. that different material, mental, and social processes in nature and society take place simultaneously in any given landscape and interact accordingly. Multifunctionality in landscape, therefore, means the co-existence of ecological, economic, cultural, historical, and aesthetic functions.

Thus, landscape multifunctionality is not necessarily synonymous with multiple land uses. Different land uses can be a criterion for multifunctionality in landscapes, but even a single land use can involve numerous functions. Different land uses can result in different functions, but not all functions can be expressed as land uses. The problem in this connection, however, is that the concept “land use” often – as emphasized in the report - is only related to the physical characteristics of the land cover identified through for instance the Corine land cover characteristics and the economic activities related to its use.

An important tool for the analyses of changes in land use during the last decades has been the registration of land cover characteristics through the Corine system, and throughout the report this characterization has been a key input to the analyses, base for both the determination of land use and land use change typologies. Due to the ongoing changes in land use characteristics in Europe, however, important limitations in relation to identifying for instance mono versus multi functionalities are apparent. In many cases the previous secondary activities have become dominant, for instance when aesthetic or recreational functions are defining what kind of land cover would be acceptable. Such considerations have become key questions in the ongoing discussions of how the future CAP should be structured.

There is obviously a need of developing tools which enables the inclusion of differences in relation to both intensity and diversity of the use of landscapes in order to become an asset in regional development towards sustainability. Such tools – both quantitative (intensity) and qualitative (functionality) - are needed in order to for instance enable the analysis of questions relating to balances between landscape protection and social welfare combined with different types of economic development.

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