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Chełmsko-Zamojski Region Case Study Report

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1. INTRODUCTION TO THE REGION

Chełmsko-Zamojski region is located in the south-eastern borderland of Poland in Lubelskie voivodeship by the Ukrainian border (fig 1). The region consists of 6 rural districts (*powiats*) and two urban districts (*powiats*) – Chełm and Zamość. Analysed area occupies 9291 km^2 with 644 000 inhabitants (2010). Geographically, it is mostly a hilly region in eastern part of the Polish upland belt, with apart from south-western outskirts of San valley (Biłgorajska Flatland) (fig. 2), extraordinary agricultural conditions, e.g. soil fertility (fig. 3). The only part relatively inconvenient for agriculture is the Roztocze Hills, at southern edge of the upland. The region extends from San valley in the South-West to Bug river valley (Polish-Ukrainian borderline) in the East. Favourable environmental conditions for agriculture had an impact upon current character of the region, which is the most rural and agricultural in Poland as a whole. It is distinct for its significant share of agricultural land (69.7%, 2005) and arable land (56.1% of agricultural land, 2005), high input of labour into agriculture, (49.1% employed in agriculture and forestry, 2010, second place among 66 NUTS 3 regions in Poland), high share of small farms and marginality of other functions. The farming plant production includes wheat and other cereals, sugar beet, maize and rapeseed mostly, with local importance of vegetables, hop and tobacco. In the industry structure, small entrepreneurships dominates with a decreasing domination of food processing industry (fig. 4) and characteristic small furniture factories. The only relatively important mineral industry is located in Chełm and its surroundings (northern part of the region) (fig. 5). Total share of employment in industry in Chełmsko-Zamojski region reached 14.1% (2009).

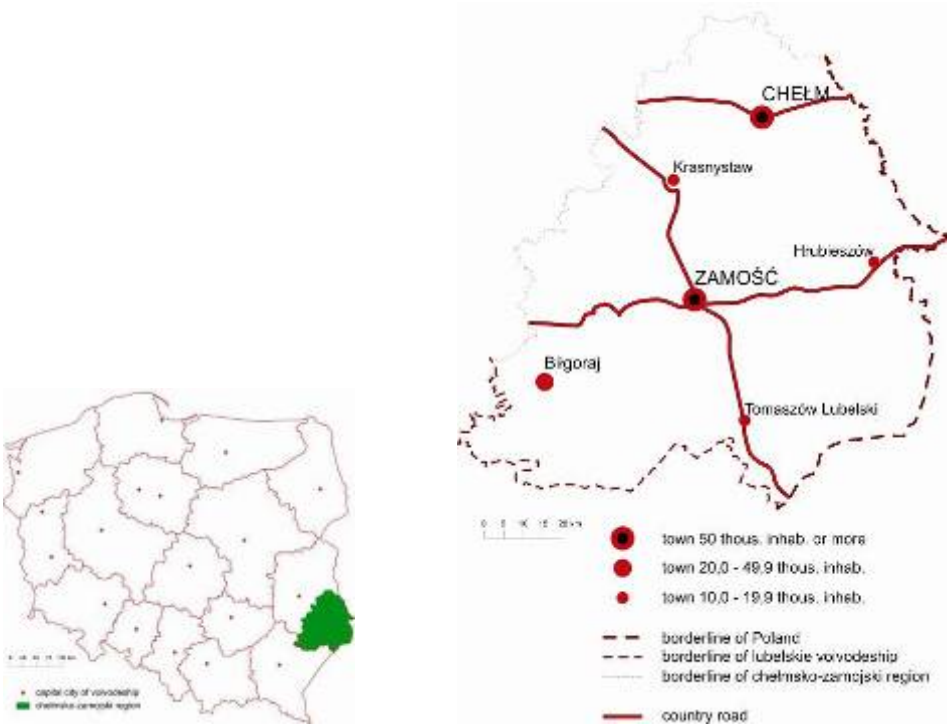


Fig. 1. Location of Chełmsko-Zamojski region

Source: own elaboration.

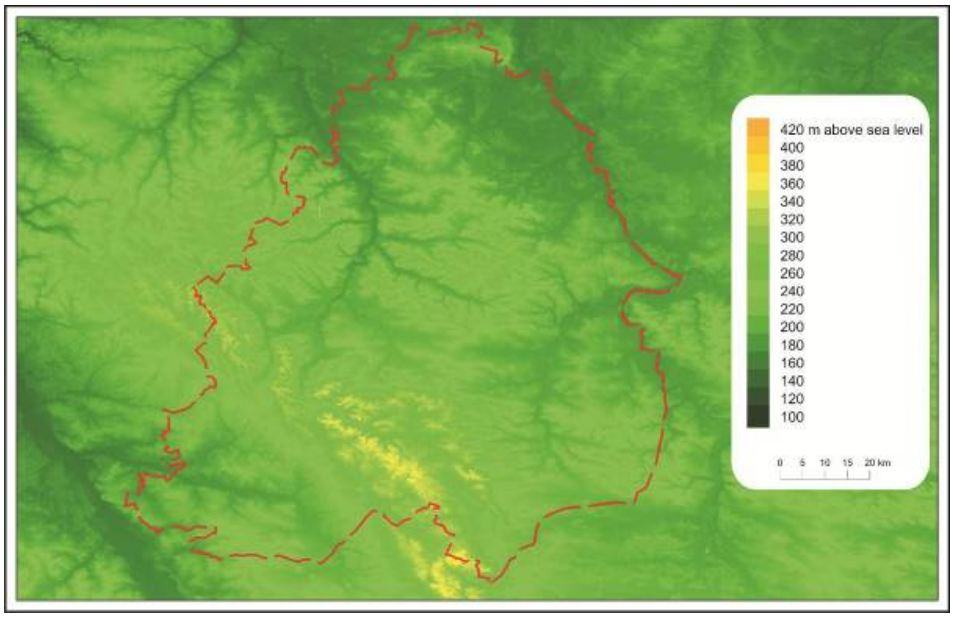


Fig. 2. Hypsometry of the region

Source: own elaboration.

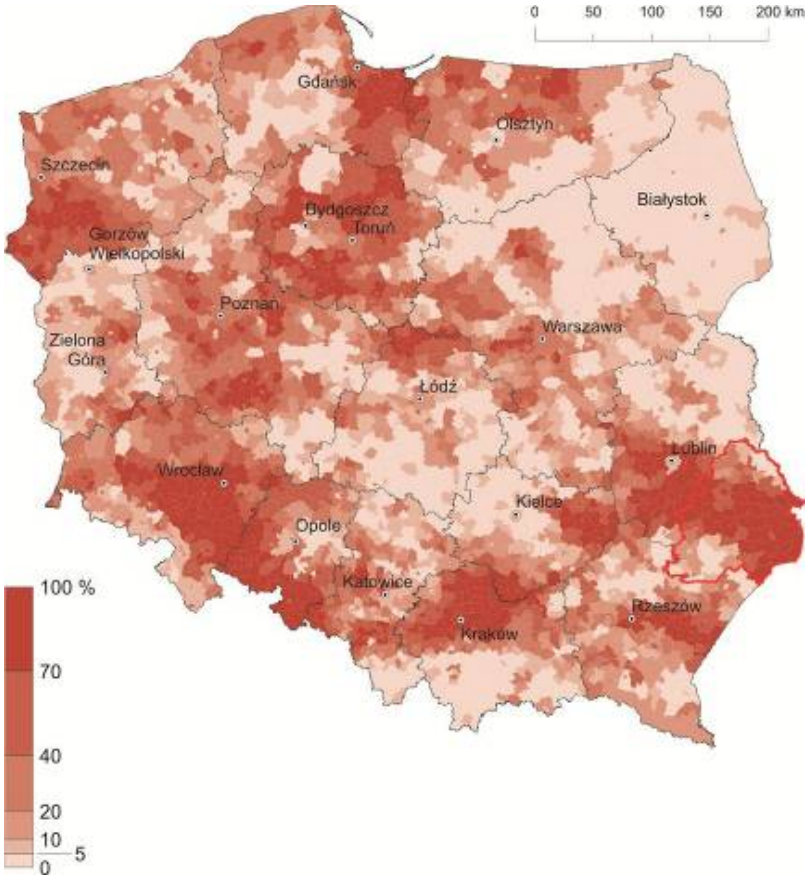


Fig. 3. Percentage of farms with the highest agricultural quality of soil index values on the Polish background

Source: own elaboration based on Polish Agricultural Census data, 2002, *Charakterystyka Rolniczej Przestrzeni…*

Fig. 4. Sugar refinery in Werbkowice (Eastern Lubelska Upland), J. Bański

Fig. 5. Cement mill in Chełm, J. Bański

Both, geographical and historical context have a significant impact on the current economic structure. For most of the time, Chełmsko-Zamojski has been a peripheral region, with a relatively low level of industrialisation occurring, within impermeable boundaries, which inhibited innovative processes. In the majority of 19th and at the beginning of 20th century, the region was the western outskirts of the Russian Empire. After II World War the region became peripheral on Polish background. In the period 1975-1999 the administrative division supported the development of medium sized towns in Poland by creating 49 smaller voivodeships substituting the earlier partition of 17 regions. Chełm and Zamość in that period used to be the capital cities of the two voivodeships, what resulted in a period of their dynamic development and food processing industry inclusive. Industrial plants cultivation developed and hence agriculture became more market oriented.

The region is distinct for a very low urbanization coefficient (38.2%, 2010). Population density was at the level of only 69.3 inhab./km^2 (2010), almost twice less than the Polish average. Two the biggest towns, Chełm and Zamość, have over 65 000 inhabitants each. Zamość is located in the central part of the region and Chełm is situated in the North-East. Apart from them, only the city of Biłgoraj (south-western part of the region) has over 20 000 inhabitants.

Permanent outflow of young people, from both rural areas and towns, is a very strong determinant of regional population ageing. The destination of migrants are external labour markets, both domestic and foreign, and centres of higher education. Demographic situation on the rural areas shows a negative tendency, due to a significant majority of males, especially in younger age groups, which is a result of rural services sector weakness and mono-functionality of rural areas.

Lack of successors of less specialized farms on the one hand and volition to be owner of cultivated agricultural land and benefit from direct EU payments on the other decided, that process of enlarging the most specialized farms by leasing the land appeared last years. Land concentration is taking place in land users structure aspect much more than in land ownership.

The region is typically agricultural, with traditional, scattered farms. New industrial and transport investments are relatively rare and insignificant in economic and territorial meaning. Former industrial areas, mainly associated with food and furniture production, were gradually transforming into services sector from the beginning of 1990s. Less favourable macroeconomic conditions for agriculture influencing inefficiency of agriculture in contributing to the Polish GDP and abandoning food industry processing in the region observed last years all committed to Chełmsko-Zamojski 63rd position out of 66 Polish NUTS 3 regions concerning the GDP per capita index, which in 2008 was at the level of 4494 € (Polish Central Statistical Office). The value of this index makes 85.9% of the GDP level for Lubelskie voivodeship and only 59.6% of the mean value for Poland. Chełmsko-Zamojski is one of the poorest regions of the EU.

Agriculture is a sector of economy changing the most dynamically last years. The region is an appropriate case to analyse the impact of economic circumstances resulting from the EU policy on agricultural land use changes for the new member states.

2. CHARACTERIZATION OF LAND USE AND LAND COVER

2.1. Definitions of land use

Land use is defined in a corresponding way to the agriculture dominating in the region's functional structure as well as in land cover. That is why in the case of Chełmsko-Zamojski region land use can be referred to a significant extent by the land cover definition and structure of the sown areas. In description of land use in the region, most commonly used categories include: agricultural land, forests and others. At least equally important in this case is the description of agricultural land structure and the types of agriculture. Agricultural land refers to grounds, which are used by a farmer in agricultural production process. In agricultural land description there are such categories distinguished as: arable land, meadows, pastures and permanent crops. Each of them has a different function. Arable land mostly supplies with cereals, vegetables, fodders and industrial plants. In permanent crops category production of fruits takes place, e.g. in orchards. Meadows and pastures supply with fodders in a more extensive way compared to arable land. Moreover, in description of functional changes of agricultural land use very useful are such terms as intensive or extensive, industrial, market oriented, self supplying, animal or plant production dominance.

2.2. Surface and structure of land use

In Chełmsko-Zamojski region agricultural land dominates (69.7% of total area, 2005) (fig. 6). In the spatial pattern, there is an improvement of natural conditions for agriculture, in particular from North and South towards the middle of the region and to the East. Therefore, the highest share of agricultural land is observed in the East of the region (79.4% in hrubieszowski *powiat*), and the lowest in the South-West (56.1% in biłgorajski *powiat*). Arable lands are dominating among them (80.5%, 2005) (fig. 7). The orchards area is rather low (1.2% of agricultural land area, 2005) and shows a significant share only in krasnostawski *powiat* (2.2%, 2005). Meadows and pastures occupy the remaining 18.6 % of agricultural land area (2005). These are concentrated along river valleys, hence the highest share is observed in Chełm surroundings, near to Bug river, where in addition agricultural quality of land is slightly lower.

Fig. 6. Typical landscape of Chełmsko-Zamojski region (view from the hill in Szczebrzeszyn to Central Roztocze Hills), M. Mazur

Forestation index is relatively low (22%, 2005). Relatively high share of forest area is observed only in biłgorajski *powiat* (38.7%, 2005), where infertile sandy soils are dominating. In this region and in Roztocze Hills only a small furniture industry has developed.

Internal water surface takes very little share, mainly due to several artificial water reservoirs with combined functions. The biggest one is situated approximately 20 km heading West from Zamość and has about 950 ha.

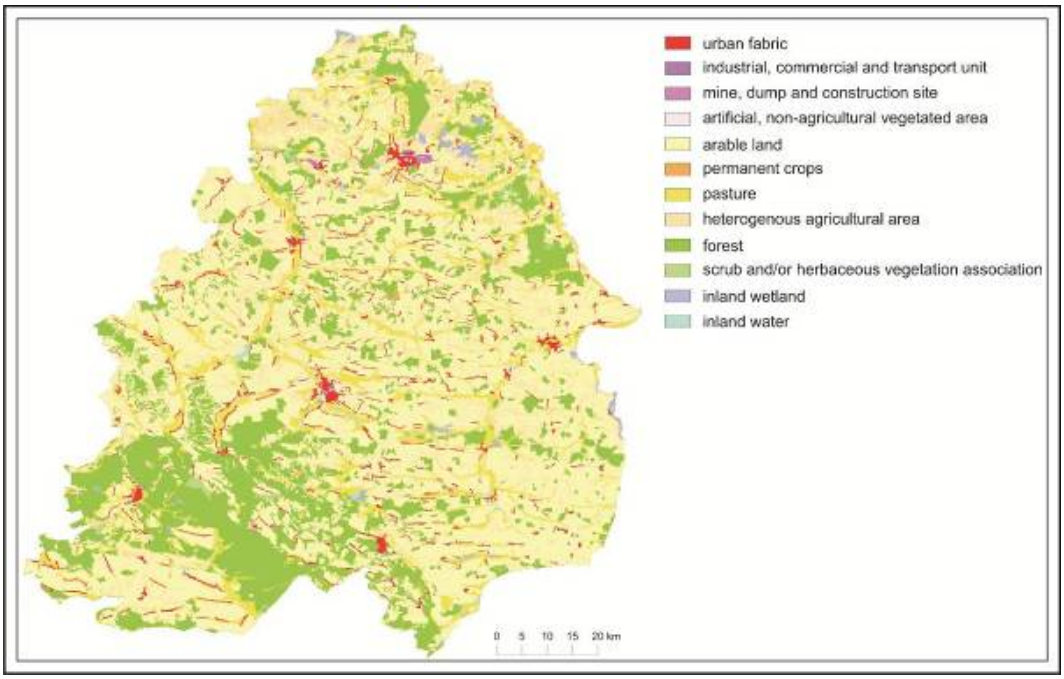


Fig. 7. Land cover, 2006

Source: Corine Land Cover Image, 2006

2.3. Land cover specificity

Environmental conditions influence the land cover spatial pattern to the greatest extent; other key factors contributing are: soils fertility, water balance and relief. Most of the area is occupied by arable land. Its spatial distribution depends very strictly on favourable natural conditions for agriculture influenced mostly by soil quality. Meadows and pastures have a significant share in slightly less favourable area in Chełm surroundings and in river valleys. Agricultural conditions are less suitable there, and these areas are excluded from crop cultivation at first. The regional urbanisation index is low and the artificial surface takes a little share of total area. Housing area is particularly prevailing. There is no extensive industrial or transport areas in the region. Forests dominate in South-West and South, where infertile soils on sands or steep slopes in Roztocze Hills make the agricultural activities difficult. The forested areas are partly protected within the Roztocze National Park. In eastern part of the region there are several unique habitats with natural steppe flora and fauna. These are protected areas within wildlife reserves.

2.4. Protected areas (from environment, military, etc. points of view)

In Chełmsko-Zamojski region 22.7% of the total area is protected by law (2010). The largest share is observed in Chełm surroundings (42.1%, 2010). Only 1% of total area of the region is occupied by two national parks. In the central part of Roztocze Hills there is Roztocze National Park preserving the unique primeval forest ecosystem of 8483 hectares, which used to be a protected area since 16th century as abundant hunting grounds, used by famous aristocratic family – Zamoyski. In the northern outskirts of Chełmsko-Zamojski region there is Poleski National Park's area (of which 9,7% is situated within the analysed region), where swamps and lakes with their flora and fauna are protected. The biggest share of total protected area of the region (56.4%, 2010) is taken by the seven landscape parks. Four of them are situated in Roztocze Hills: Szczebrzeszyński (estern part), Krasnobrodzki (central part), Puszczy Solskiej (southern edge) and Południoworoztoczański (southern-east). Apart from those, in Chełmsko-Zamojski region there are: Chełmski (northern-east edge), Skierbieszowski (central part) and Strzelecki (eastern edge). Landscape parks have the most significant impact on the land use, because their network creates a form of preserving agricultural and environmental dual land-use function on the predominant surface. This form of active environmental protection based on supporting good agricultural practice contributes in avoiding harmful human activities in the most environmentally valuable parts of the region.

Protected areas in general, in spite of their high share, do not have a significant influence on land use changes due to domination of traditional agriculture in the region. Although the protected areas show some impact on land use in the current structure, being the barrier for intensification of agricultural production, which started taking place outside of them. Nevertheless, it should be admitted that there is no notable pressure on the investments harmful to natural ecosystems.

2.5. Technical management of the land use (infrastructure, drainage systems, etc.)

Technical infrastructure does not take a large part of the land use. There are three national roads within the region, but lack of expressways (limited-access highway) and motorways. There are two railway axis with passenger-trains and one broad-gauge railway for international freight transport. Apart from the connection from Chełm heading West direction, the railway traffic is not very common nor frequent.

Drainage system was formed in the North-East, along the Bug valley, but it does not function currently. Generally, technical infrastructure does not have a significant influence on the land use as the agricultural function dominance in the region does not require a particularly developed technical management.

2.6. Major trends in historical context

The major trends of land use changing depend on economic and to a lesser extent, demographic processes, which are strictly related. Their impact reflects especially in agricultural economic situation and land structure changes. For centuries, this region used to be covered mostly by arable land. Generally, in the last decades forest invasion on meadows and pastures is observed and therefore resulting in reduction of their area (fig. 8). This process is strongly linked with concentration and intensification of cattle breeding in 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. Most farmers of the region sustained animal production on a small scale up to beginning of 1990s for self-supplying.

Transforming meadows for willow cultivation is the process occurring in the last years (fig. 9). This positive tendency contributes to a greater use of renewable energy in Chełmsko-Zamojski region.

Fig. 8. Forest overgrowing on pasture in Radecznica (Western Roztocze Hills), M. Mazur

Fig. 9. Energy willow cultivation on former meadow in Sułów (southern Lubelska Upland, Por valley), M. Mazur

Impact of economic situation within the region is also observed in case of shifting of the sowing area. Chełmsko-Zamojski was famous for cultivation of such industrial plants like sugar beetroots (fig. 11), flax, tobacco (fig. 10) and hop (fig. 12). The cultivation of listed plants including the potatoes, due to various economic circumstances, shifted to cereals nowadays. Cultivation of mentioned plants that once were characteristic for the region became rare as these are upheld at a small scale only. On the other hand, best prospering, food industry in particular fat processing factory in Bodaczów (15 km to West from Zamość), caused introduction of rape cultivation in the region. The economic difficulties that have arisen last years however, contributed to a decrease of rape cultivation in the region.

Fig. 10. Little scattered areas of sugar beetroot cultivation, former very common plant in the region (Gaj Czernięciński, Western Roztocze Hills), M. Mazur

Fig. 11. One of the last examples of traditional tobacco drying in the region (Gaj Czernięciński, Western Roztocze Hills), M. Mazur

Fig. 12. Hop plantation in Lubelska Upland, J. Bański

While the intensity of plant cultivation in the region declined, the breeding industry and the agricultural production related is currently developing. Although the number of cattle and pigs was decreasing, production was concentrating in less number of specialised, larger farms. This results in abandoning of mowing the meadows, and introducing of fodder maize cultivation.

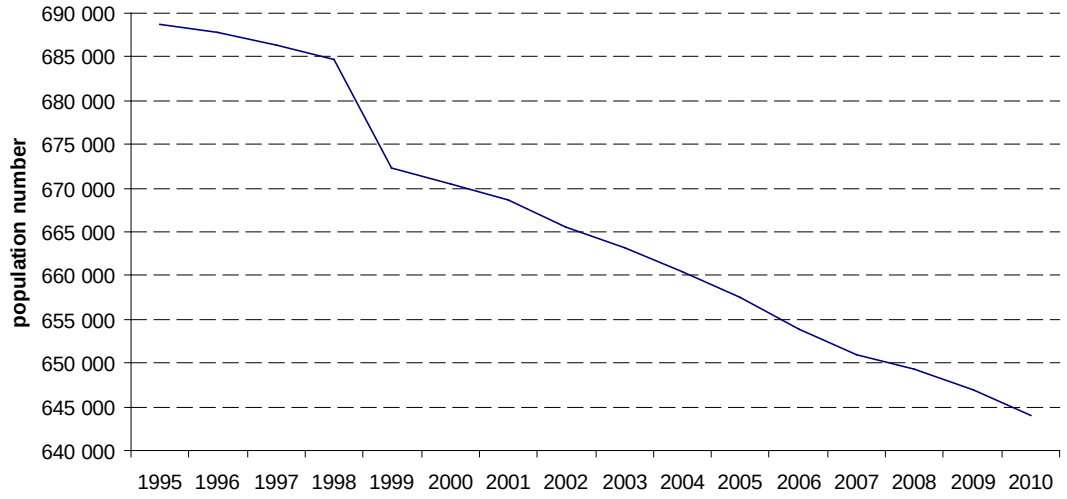
Forested area slightly increased, because cattle breading is in collapse and meadows are no longer mowed on the one hand, and the furniture industry is not developed enough to exploit the forests and significantly reduce their area on the other. The economic condition of agriculture does not put pressure to reduce forested area on the weaker soils.

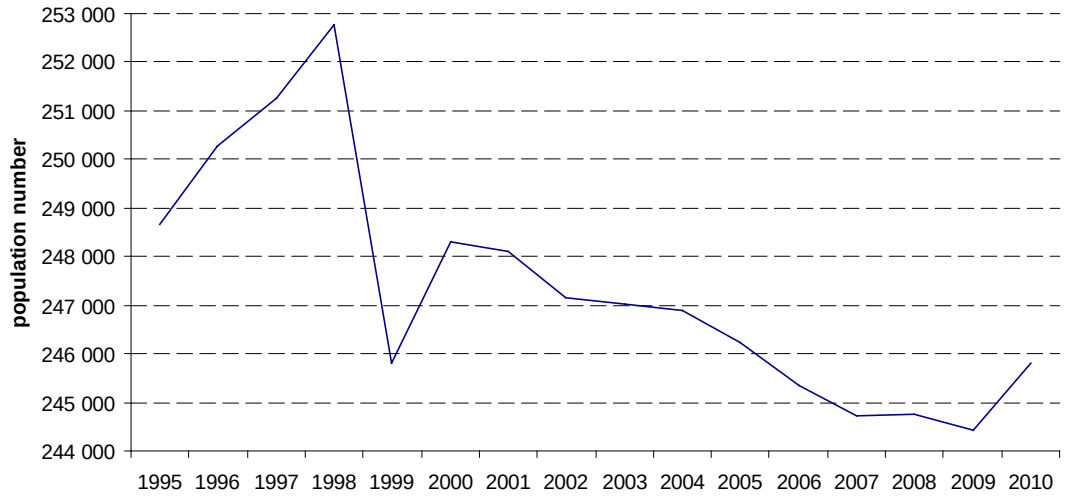
In the last years an increase of land use for touristic purposes is observed. There are new investments in the region, such as: the ski lift, artificial water reservoir and a stud farm. This process is observed especially in Roztocze Hills region (southern part), where the entire territory of national park is located. In the 1990s, the largest artificial water reservoir in the Chełmsko-Zamojski was built on Wieprz river, in western part of the region. This influenced significantly the raising of recreational function in the surroundings since then. Another sub-region of leisure activities and agritourism function development since the 1990s is Central Roztocze Hills, within the landscape parks nearby the Roztoczański National Park border.

3. NARRATIVE OF CHANGE IN RELATION TO LAND USE

3.1. Socio-economic (demography, employment, … etc.)

Chełmsko-Zamojski region registers a permanent young people outflow in particular from rural areas, and to a lesser extent from towns as well. Migration from urbanised zones is mainly due to difficulties on local labour markets caused, among the others, by collapse of numerous workshops of food processing industry in the region dating from the 1990s. Additional impact on population number decrease has also negative natural movement (fig. 13).





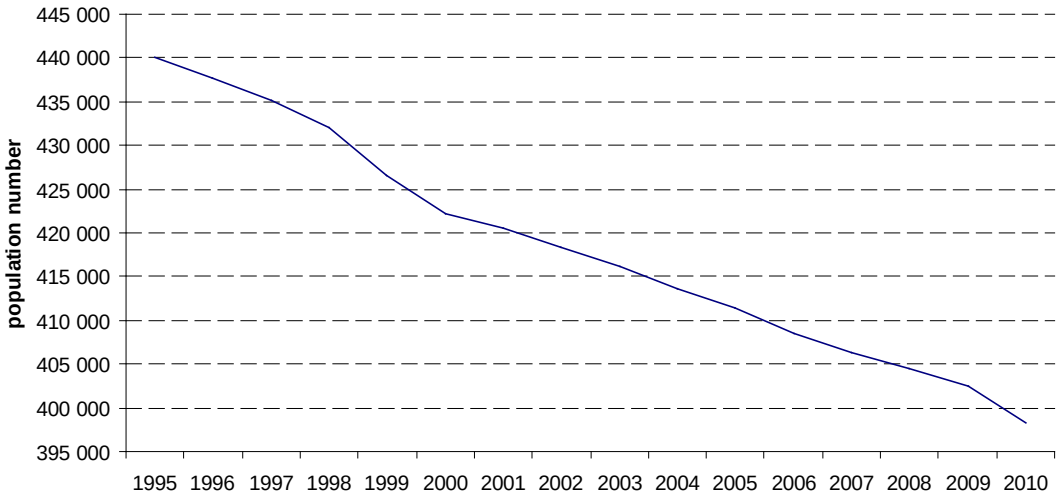


Fig. 13. Change of population number in the region: total (top), in towns (centre) and in rural areas (bottom)

Source: Source: Bank of Local Data, Central Statistical Office

Another negative tendency observed in regional demography is unbalanced feminisation index, especially in marital age groups. As can be expected, far lower values of feminisation index are noticed when analysing the feminization index for population aged 20 to 29 years old in comparison to total index rate (tab. 1, fig. 14), and marital age is the most influential on natural movement rate. Index for this age group is also a more applicable indicator of a real demographic situation because it is more influenced by migrations intensity and structure and reflects the impact of economic situation more fully. In Chełmsko-Zamojski, the value of feminisation index in marital age is significantly lower than in Poland as a whole, and even comparing to Lubelskie voivodeship, although it is generally raising. There are significant differences between the values between urban and rural areas, but a trend of gradual equalising is observed as the disparities are diminished. However, an increase of index value on rural areas can be explained not only by the effect of positive economic transformation, but in majority as a result of raising percentage of population in a post-productive age, where the excess in number of females is significant. Although a general raising of feminisation index value is noticeable in the region, it still remains at a lower level than it was for Poland in 1995.

Groups of population in marital age in different communes are more diverse regarding the feminisation index values. The communes of lowest values are in the eastern outskirts of the region, and generally in peripheral, rural areas like Jarczów commune in Southern-East (75.7) and in Horodło commune in the East (76.3).

Tab. 1. Feminisation index in marital age group

		1995	2010	Dynamics (1995=100)
Poland	**Total**	96.0	96.6	100.6
	Urban areas	100.3	98.7	98.4
	Rural areas	89.7	93.6	104.4
Lubelskie, Podkarpackie, Podlaskie and Świętokrzyskie voivodeship		93.2	94.6	101.5
Lubelskie voivodeship	**Total**	93.1	94.4	101.4
	Urban areas	103.2	97.9	94.9
	Rural areas	84.6	91.3	107.9
Chełmsko-Zamojski		90.1	91.7	101.8

Source: Bank of Local Data. Central Statistical Office

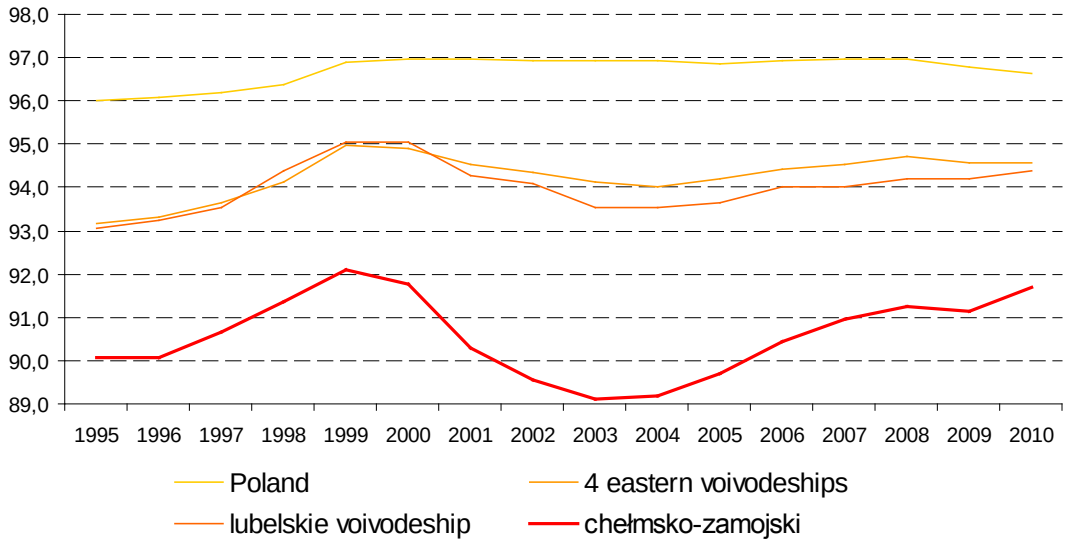


Fig. 14. Feminisation index in marital age group change

Source: Bank of Local Data. Central Statistical Office

Unbalanced feminisation index in most of Chełmsko-Zamojski area has a negative impact on general demographic situation within the region, what can be observed for instance in a low natural movement *per saldo* and the ageing of society. An increase in feminisation index values is observed, what can be linked with a gradual tertiarisation of rural economy.

However, the age structure of regional population as a consequence of permanent young people outflow is unfavourable and this negative tendency is deepening. This phenomenon is also strictly related with disadvantageous sex structure. It can be seen on the sample of rapid share of population under

14, as a change and gradual raise of population in post-productive age increase (tab. 2. tab. 3. fig. 15).

Tab. 2. Percentage of population under 14

		1995	2010	Dynamics (1995=100)
Poland	**Total**	22.5	15.1	67.1
	Urban areas	21.0	13.9	65.9
	Rural areas	24.8	17.0	68.4
Lubelskie, Podkarpackie, Podlaskie and Świętokrzyskie voivodeship		23.8	15.2	63.9
Lubelskie voivodeship	**Total**	23.3	15.3	65.6
	Urban areas	22.8	14.1	61.9
	Rural areas	23.8	16.4	68.7
Chełmsko-Zamojski		23.9	15.0	63.0

Source: Bank of Local Data. Central Statistical Office

Tab. 3. Percentage of population in post-productive age (females over 59, males over 64)

		1995	2010	Dynamics (1995=100)
Poland	**Total**	13.8	16.9	122.5
	Urban areas	12.8	17.7	138.4
	Rural areas	15.4	15.6	101.4
Lubelskie, Podkarpackie, Podlaskie and Świętokrzyskie voivodeship		14.7	17.3	117.1
Lubelskie voivodeship	**Total**	15.4	17.7	114.7
	Urban areas	10.9	16.7	152.6
	Rural areas	19.2	18.6	96.5
Chełmsko-Zamojski		16.4	18.1	110.3

Source: Bank of Local Data. Central Statistical Office

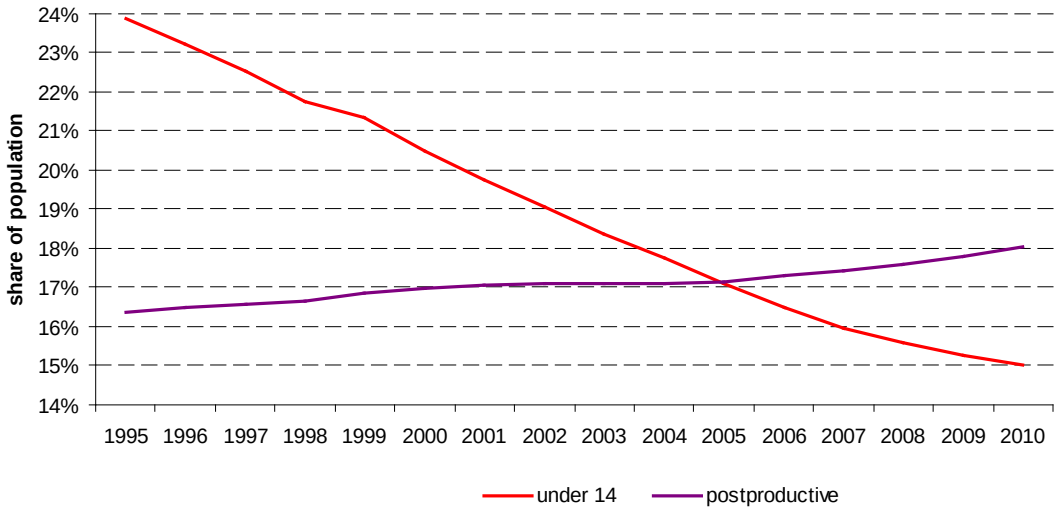


Fig. 15. Percentage of under 14 and post-productive (females over 59, males over 64) population change

Source: Bank of Local Data. Central Statistical Office

Demographic process of population ageing is the major reason, that lack of successors of the small farms leads to the leasing of land to the larger competitors, which are more economically effective. This also has an impact on agrarian structure. As a result, the number of small farms is decreasing rapidly, which is a common process in the Polish agricultural regions. In the years 2005 to 2009 number of farms under 1 ha in Lubelskie voivodeship declined from 75.1 to 54.5 thousand (27.4% decrease). During this period share of the farms above 2 ha increased from 59.1 to 65.4%. It highly contributes to the abandoning of breeding in small farms and intensification of animal production, but at the same time reinforces the changing of cultivation structure for a more extensive one.

Due to the limitations on the labour market, a permanent outflow has been occurring since the 1990s. Mainly the active and the enterprising young people migrate outside of the region to big cities as well as abroad. This process accelerated in the recent years due to new opportunities of earning money abroad or studying. It brings a harmful impact on the economic activation of the region. Rural population, relatively less educated had limited possibilities of finding the job other than agriculture sector.

As a consequence, the level of entrepreneurship in Chełmsko-Zamojski region is very low (69.3 enterprises per 1000 inhabitants) and it increases relatively slowly (by 78.1% between 1995 and 2010). Registered unemployment in the region is rather moderate (14.6% in 2011). A phenomenon occurring in the rural areas of south-eastern Poland called - hidden unemployment in agriculture is worth attention; there is too much labour force used in small farms and this is not registered as unemployed.

Main industrial activity concerns the cement mill in Chełm, some remaining food processing industry and small furniture factories in Zamość and in Roztocze Hills region. The one in Zwierzyniec is prospering the best.

Changing of land use in rural areas into multifunctional is a rather slow process. It appears mainly in introducing tourism in traditional rural areas with unfavourable environmental conditions for agricultural activities (fig. 16). Heritage of landscape of the region determines significant tourist potential. Old Town in Zamość (fig. 17) was placed on the World Cultural Heritage List in 1992. The cultural heritage includes also old spatial patterns of villages and traditional countryside architecture. Diversified relief, small patches of cultivated fields, a significant share of forests and attractive mosaic landscape are contributing in creation of this potential as well. However, it still remains a marginal form of land use. The most rapidly developing kind of services in towns is trade in stores and supermarkets. The main reasons for failure of large enterprises in second and third economic sector are: the peripheral location of the region, its weak human potential and lack of industrial tradition.

Fig. 16. Advertisement for accommodation opportunity in “Oasis of Peace” (left) and modern hotel in rural area (right) (Kawęczynek, a village in Western Roztocze Hills), M. Mazur

Fig. 17. Town hall in the old town of Zamość, J. Bański

Demographic adversity of Chełmsko-Zamojski is reflected also in the diminished expansion of housing area. This is a common trend observed in the region at a relatively significant scale. Expansion of housing area can be seen to a meaningful extent only in Chełm and Zamość suburbs along the main routes with sufficient infrastructure and in the areas of most attractive landscape, especially in Roztocze Hills.

3.2. Environment (Landscape. soils. climate change… etc.)

Despite good soil quality, most favourable areas for agriculture are on the loess background, which at the same time is a vulnerable soil-bedding for water erosion, especially in case of steep slopes of Roztocze Hills area (fig. 18) with high density of gorges in western part. Relief conditions and scattered farms contribute in making agriculture of this area more self-supplying oriented.

Fig. 18. Example of water erosion in Sąsiadka village (Western Roztocze)

Protected areas show no pressure from the new investments and agriculture.

Changes of nature life in the region are in general positive, especially in the last two decades. This is caused by the decreasing of market oriented agriculture, the use of fertilisers and reinforced sewage networks investments with sewage treatment plants building as well. For instance, a sewage treatment plant in Zamość built in the 1990s is currently exploited to a minimum extent because of the collapse of industry in the town.

Number of species. especially the migratory birds is increasing as a result of building the biggest artificial water reservoir occupying 950 ha in Nielisz (southern Lubelska Upland). Population of some rare species in the region is increasing as well. Water quality in region's rivers is still improving.

The only negative environmental process is the lowering of ground waters level and springs efficiency.

There are two main threats concerning the environmental state of the region. The first one being the intensification of animal production in the future under the economic pressure of large farms. The second one is related to the potential energy produced from renewable sources, like wind power plants (main threat to natural landscape) and the possibility for future slate gas exploiting in the region.

3.3. Government and policy

There is no complaining for the administrative and legal system related to spatial planning. There are only a few examples of controversial spatial decisions, which are mostly related to lack of spatial organisation planning for the municipality and the necessity of individual decision making regarding building conditions given by municipal officials.

Lack of realistic perspectives for the development of other branches caused special concern among regional and local authorities on tourism development

in the region, and especially agritourism. Zones for the development of tourism in the spatial development plan of Lubelskie voivodeship were confirmed, agritourism financial and training programs with preferential credits were started and these encouraged many agritourism farms. The estimations of real potential were however exaggerated, mainly due to low level of facilitating, lack of tourist tradition and poor promotion. Stimulation in the tourist branch in some particular parts of the region was observed mostly in Roztocze Hills.

Direct payments had an influence on breaking the process of land selling and made land leasing more common. This makes restructurisation of the agriculture in the region slower and preserves traditional landscape as well as farms structure.

In the spatial development plans the areas attractive in terms of nature are usually protected against construction sites. The authorities of the municipalities try to resolve the dilemma between nature protection and profitable investments, which are addressed to the zones intended for housing or commercial enterprises harmful to natural environment (Wesołowska 2006).

3.4. Localization (accessibility. core-periphery. urban-rural continuum)

Localization of the region is one of the most important factors of its economic structure. From one side it used to be a peripheral region for over two centuries, among the others, in the industrialisation period in 19th century it was a borderland of the Russian Empire. From the other side, there are very favourable conditions for the development of agriculture in the region.

Currently the region remains fully peripheral in the European and country scale as it is located relatively far from Lublin, the core of Lubelskie voivodeship. On the other hand, there are three Polish-Ukrainian border crossing points and three main routes are passing across the region. They are attained mainly by vehicular traffic and are forming the main axis of development in the region. The local cores of development are Chełm and Zamość. However, their influence on the surrounding rural areas is rather weak and of a narrow range.

Considering the economic activation of the region issue, its localisation is a strong barrier for further development. This is reflected by an insignificant foreign investment dynamics, tourism development etc.

3.5. Conclusions in the context of land use

In this peripheral region traditional agriculture dominates. The only exceptions are the areas in the south-west of Roztocze Hills, where sandy soils remain forested and small linear sites in the towns' suburbs, where suburbanization is proceeding relatively slowly (fig. 19). The area is mostly stable in terms of land use and the spatial pattern of land use structure has been permanent during the last two decades as well. The most significant area of instability is located along Roztocze Hills and in the northern part of the region with

relatively less favourable conditions for agriculture. In the last years food industry workshops collapse is observed as well as crisis on local labour markets and young people outflow. In agriculture the process of extensification of plant cultivation is particularly significant, especially the shifting of sawing area from industrial plants into cereals as well as the intensification of animals production. Young people outflow contributed to the lack of small farm successors, leasing the land to large, more competitive farms and increasing the average farm size. Environmental changes, apart from ground water level decrease are generally positive.

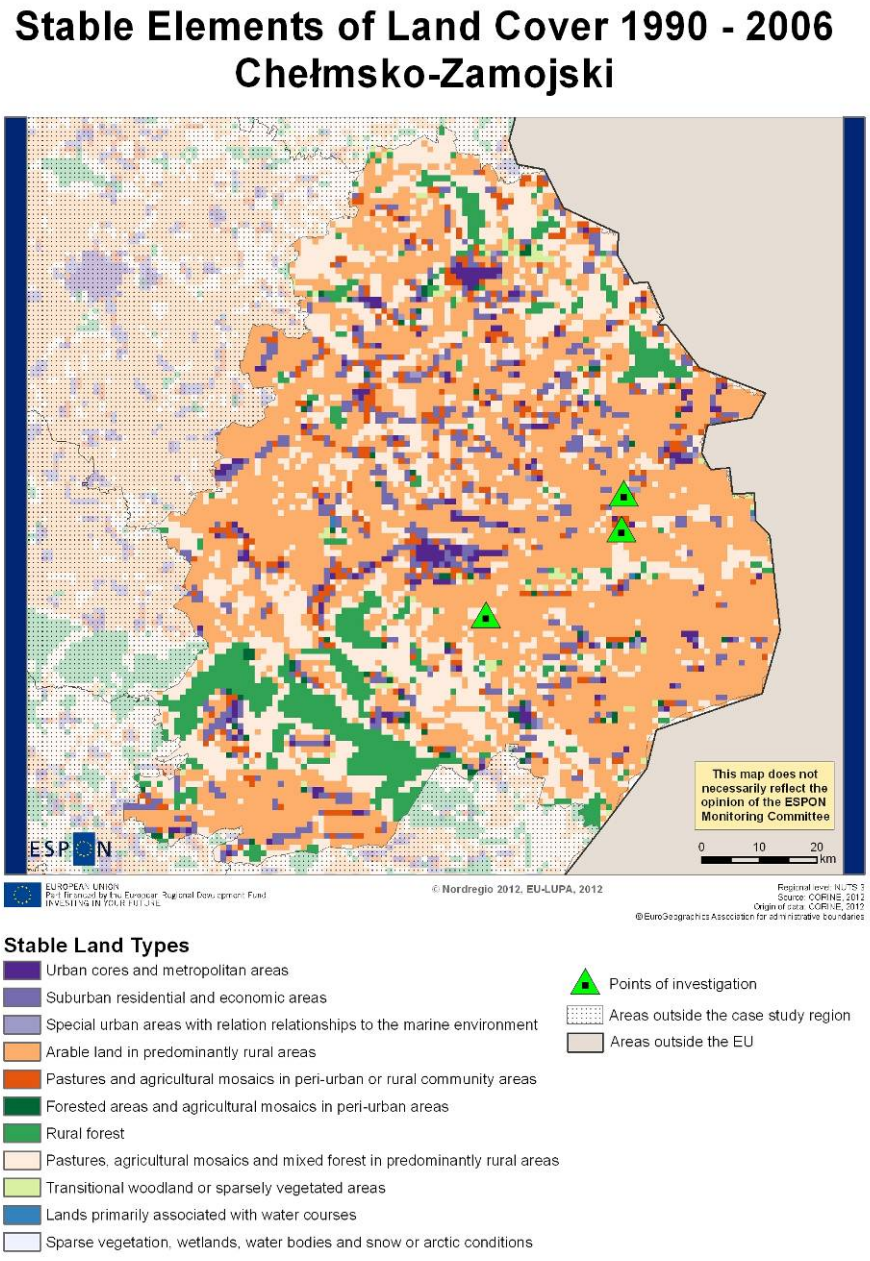


Fig. 19. Stable elements of land use between 1990 and 2006

Source: Corine Land Cover

Changes of land cover in the region are relatively slow, what is the effect of low investment pressure of both, housing areas and industrial zones. The most interesting changes are taking place among the agricultural land use categories and between agricultural land and forests (fig. 20. fig. 21). The major factor of these land cover flows results from macroeconomic circumstances concerning agriculture and demographic crisis. Among the land cover changes related to agricultural land use, the most significant are the conversions of arable land and pastures and natural process of untilled unfavourable land conversions into forests in the south-west and north. In the central part of the region, in the Wieprz valley especially, there are also some cases of conversions of arable land to permanent crops (fig. 22).

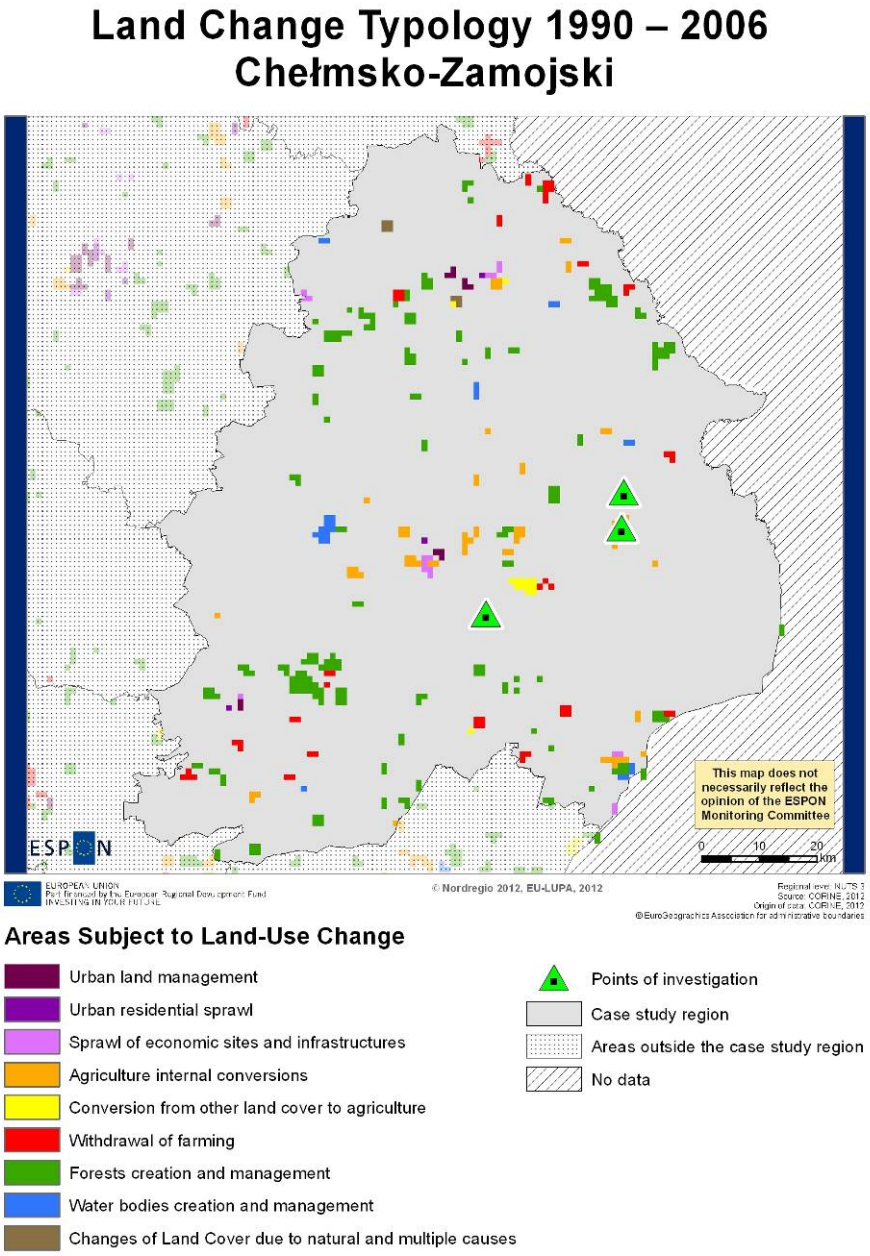


Fig. 20. Land use change types between 1990 and 2006

Source: Corine Land Cover

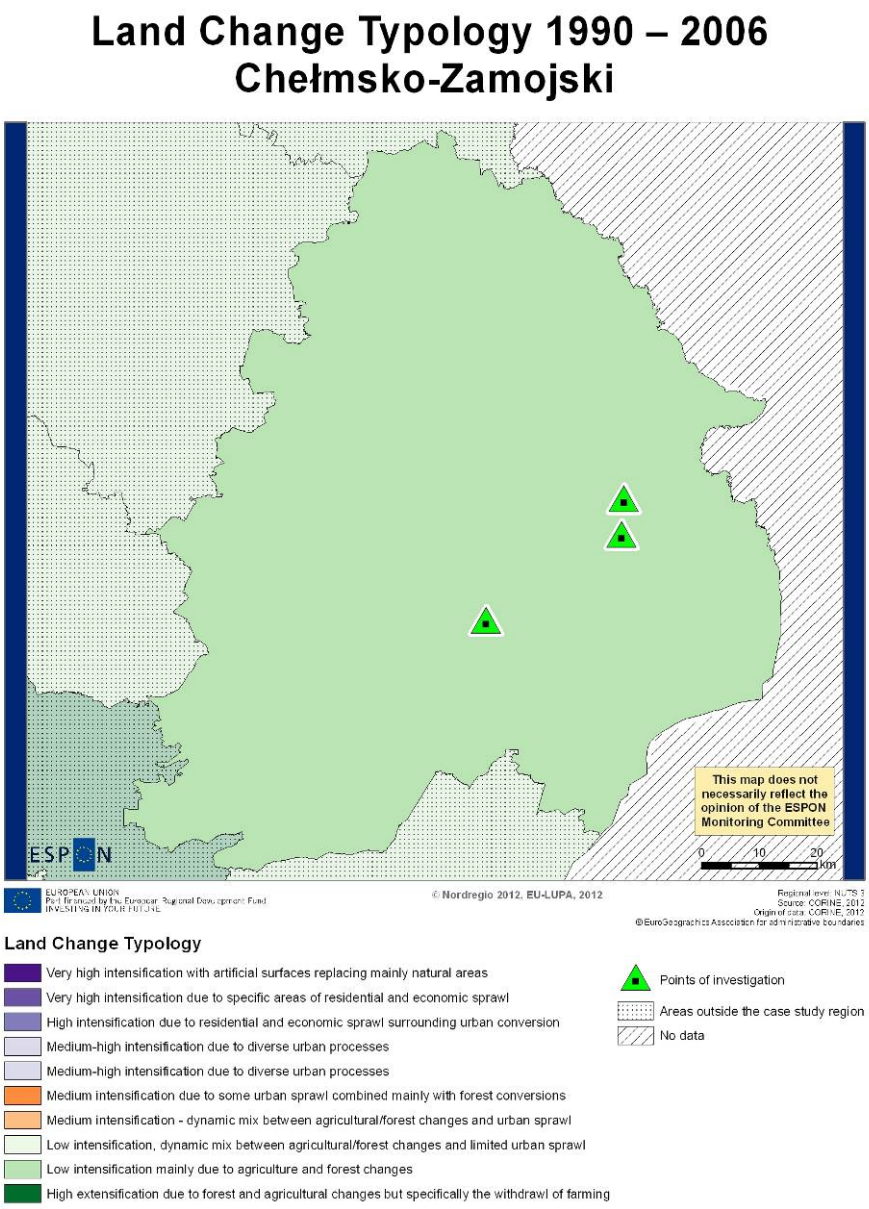


Fig. 21. Land use change type of the region

Source: Corine Land Cover

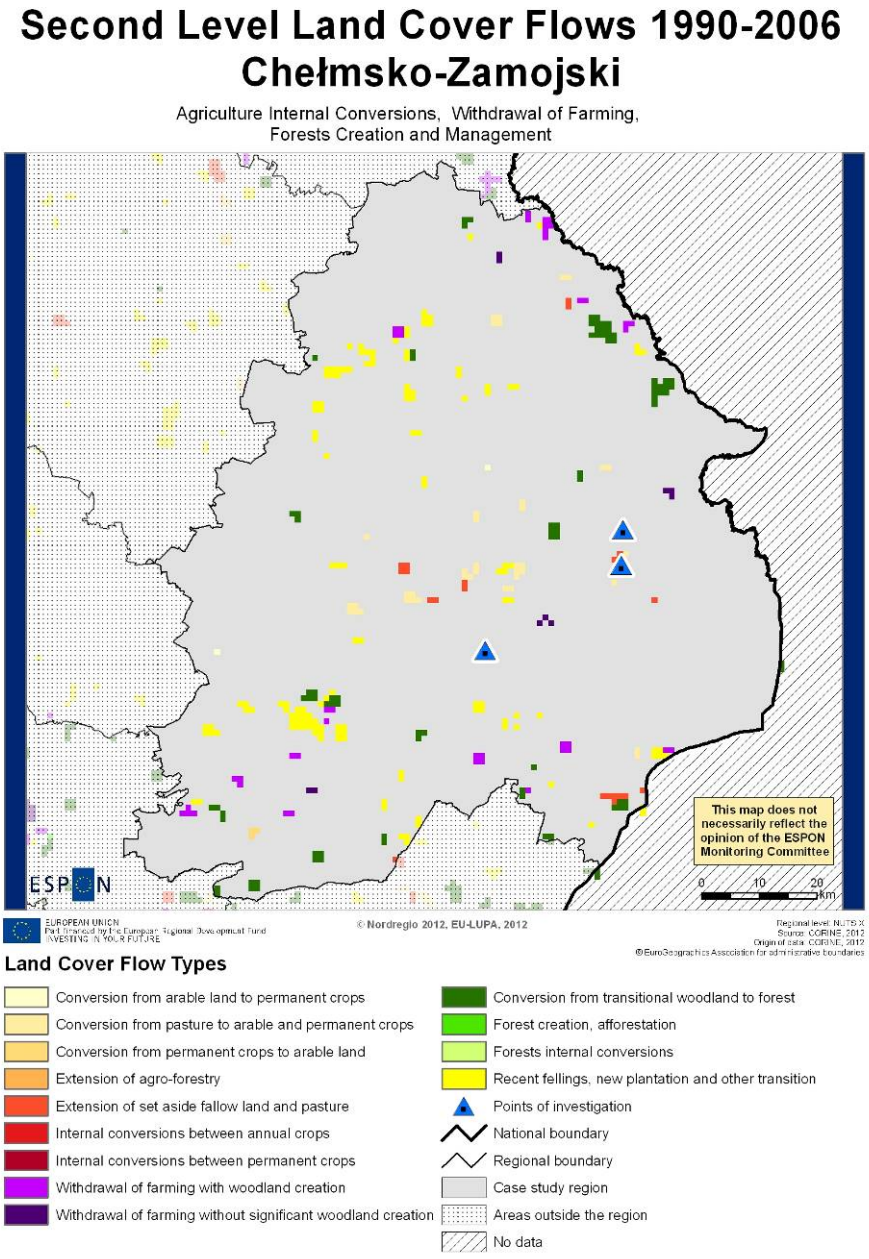


Fig. 22. Land cover flow types between 1990 and 2006, 2nd level

Source: Corine Land Cover

4. ANALYSIS OF LAND USE CHANGES

4.1. Dynamics and directions of land use and land cover changes

Dynamics of land use changes was rather slow. Domination of the agricultural land since the 1990s was gradually decreasing (fig. 23) due to afforestation of the weaker soils and steep slopes process (fig. 24). This trend changed after Poland's EU accession in 2004 due to direct payments for agricultural land of good practice. In Chełmsko-Zamojski region it is still more profitable to have such agricultural land. because the pressure of agricultural function change results from land prices increase and with the exception of Chełm and Zamość suburbs and along the main roads it remains low. Nevertheless, the EU accession turned back the trend in afforestation *per saldo* within the region for two years only.

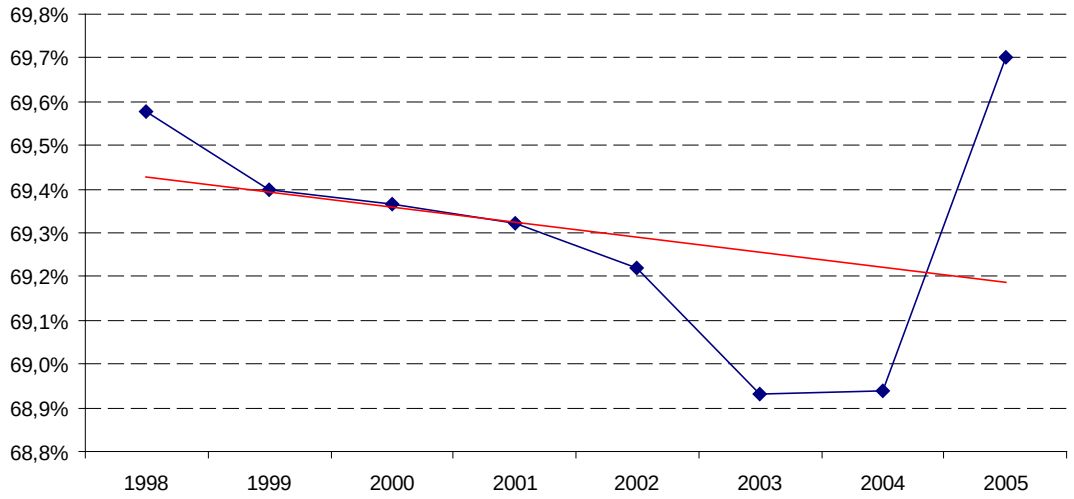


Fig. 23. Agricultural land area share change

Source: Bank of Local Data. Central Statistical Office

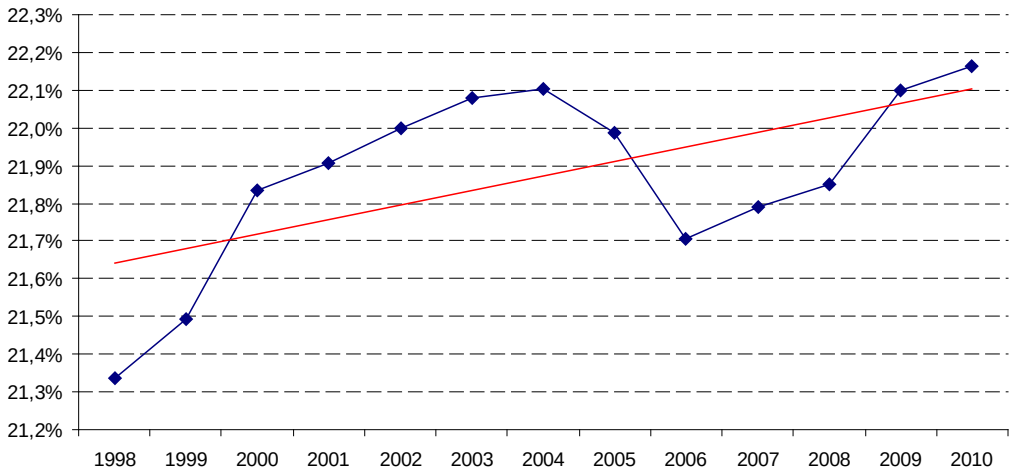


Fig. 24. Forests area share change

Source: Bank of Local Data. Central Statistical Office

Area of arable land is gradually increasing due to a greater demand for land by large farm owners and extensification of agricultural plant production (fig. 25). However, changes of the agricultural land use structure generally depend on the decreasing of meadows and pastures share (fig. 26. fig. 27). Reduction of their area is noticed most clearly and it is related to the animal production intensification, greater specialisation and concentration of cattle stock. This general trend concerning agricultural land structure change turned dramatically after the year 2004, similarly as the total agricultural land area trend. Such impact of general economic conditions is not clearly observed only regarding the permanent crops area changes (fig. 28). However, orchards have a rather insignificant role in agriculture of the region.

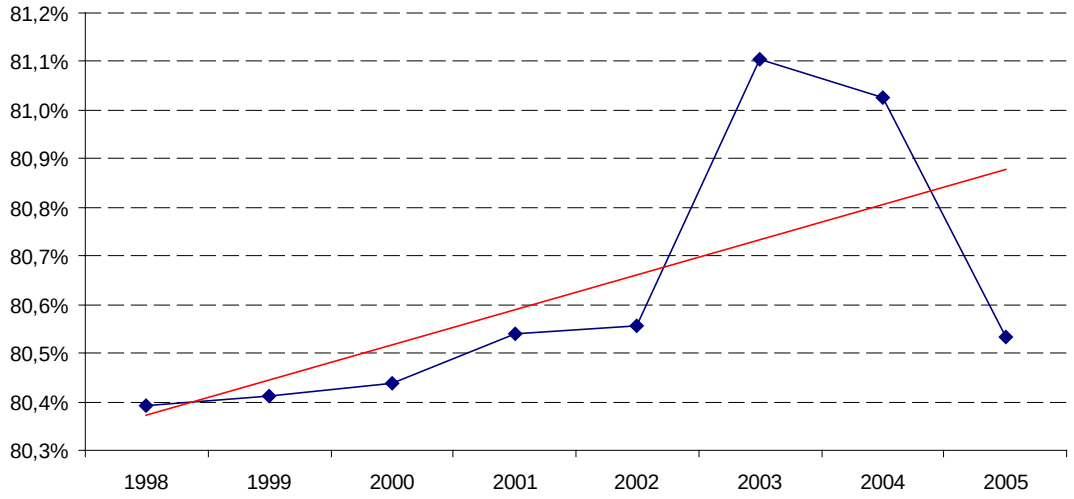


Fig. 25. Share of arable land in agricultural land area change

Source: Bank of Local Data. Central Statistical Office

Fig. 26. Share of meadows in agricultural land area change

Source: Bank of Local Data. Central Statistical Office

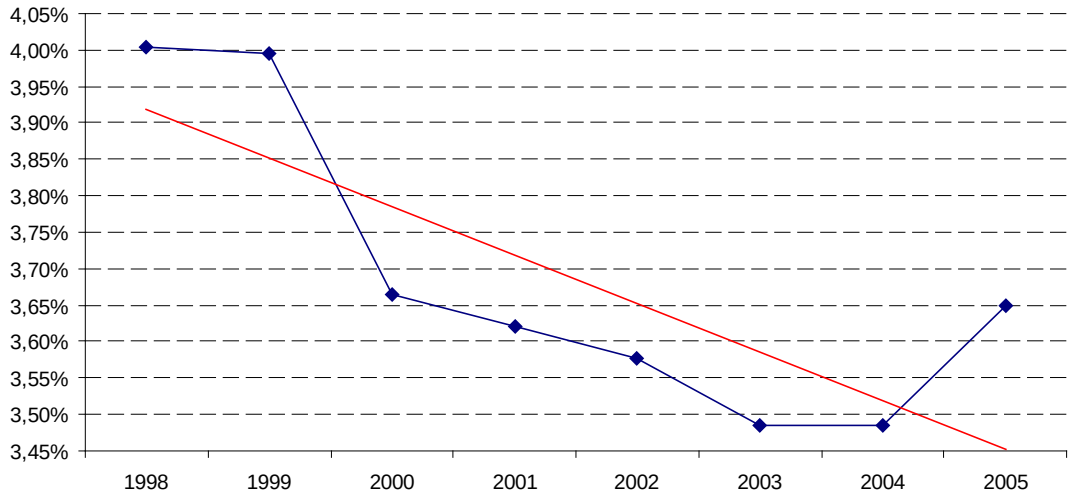


Fig. 27. Share of pastures in agricultural land area change

Source: Bank of Local Data. Central Statistical Office

Fig. 28. Permanent crops area change

Source: Bank of Local Data. Central Statistical Office

4.2. Trends. actors and drivers of the changes (micro and macro scale)

The main actors of land use changes in rural areas are farmers contributing to afforestation and new activities related to recreation. Changes are observed both, inside the agricultural land, even in plant production on arable land itself and between agricultural land and forests or multifunctional land use. A new actor of agricultural land use changes are the investors interested in implementing the wind power stations on rural areas.

The major actors causing land use changes in towns are entrepreneurs who are investing on former industrial areas by building stores and supermarkets or developers transforming them into new estates. There are still some post-industrial sites that require organisation and adaptation for new land use functions.

The major actors of land use changes in the suburbs are their new inhabitants. New investments in the suburbs of Chełm and Zamość are taking place along major routes as a principle but in more peripheral sites there are cases of individual forcing to obtain permission for house building in some distance from the infrastructure but of a more natural neighbourhood.

4.3. Contemporary and potential conflicts

The only important contemporary spatial conflict concerns social protests related to the investing in new mobile telephony base stations. There are also potential threats of future spatial conflicts. These may originate from possessing the energy from new sources such as wind power plants or slate gas exploiting nearby settlements or environmentally valuable areas. There is also a threat for the environment protection in the light of further intensification of animal production.

In a very local scale there were cases of forcing house building in a distance from infrastructure and among natural environment on the areas without any spatial planning. There is such risk to be observed in Roztocze Hills especially.

Significant potential conflicts concerning functional spatial structure of the regional development come from the discovery of rich slate gas resources. This energetic potential needs to be used for regional economy activation but maintaining the awareness of local landscape preserving at least in case of the most valuable areas. It will probably become a common dilemma between the two ways of thinking about regional development: dynamic investments with concentration on the exploiting of the most economically profitable regional resources in short terms or multifunctional and sustainable development with preserving the regional character based on broad spectrum of regional strengths. The second way, although more time demanding, guarantees a longer perspective. The choice among these two, will have a great impact on the future land cover and land use changes direction.

4.4. Scenarios

The next 10-15 years will bring a further decrease in the rural population and most probably in the total population of Chełmsko-Zamojski region. The only areas of population increase are most likely to be observed in the vicinity of few biggest towns and along major roads. The average level of education of rural inhabitants will gradually improve. This conclusion is based on the current educational population structure in which a strong correlation between age and educational level is noticeable.

The economic significance of agriculture for rural households income will be reduced. Thus, the regional character of land use and landscape of rural areas will be gradually changing. However, the decline of farming significance will be associated with diversification of farms. Commercial farms will be developing and will become more specialised as the investments are made. This can partly compensate the regional trend of agriculture significance declining in majority of individual farms. As a consequence, the number of small farms conducting production and applying traditional methods will be decreasing. These will shift entirely the purpose of agricultural production from market-oriented as a source of income to self-supplying production.

Taking into consideration the land use changes of the low economic development scenario, called marginalisation of rural depleting regions scenario, a further afforestation in the South-West of the region and meadows in the other parts can be expected. This scenario brings economic stagnation and the adoption of such state policy as preferring efficiency rather than equality. In the marginalisation scenario, the changes of land use will be proceeding very slowly with various processes of marginalisation the economy in areas located far from acknowledged cores of development. Wild life will become richer and of improved condition therefore with the proper marketing of the region, the touristic function can be co-existing with traditional agriculture to a broader extent.

In the moderate development scenarios, the extinguishing of afforestation process can be expected with a gradual introduction of settlement and services along main roads in the rural areas especially nearby major towns. The first of moderate scenario called the polarisation scenario relies on dynamic economic development with adoption of national policy preferring efficiency than equality and cohesion. According to this scenario, the space will be polarised through diverse processes in the surroundings of towns of regional rank and on the rest of the region. The second of moderate scenario called the depression scenario brings economic stagnation but with the policy of development level equalising. In theory the policy is aiming at equalising inter-regional disparities. Current economic crisis however, will not allow generating real rural development.

In the fast economic growth scenario called the unification scenario described process concerning land use will be accelerated. In this scenario generally favourable economic circumstances will contribute to apply effectively the cohesion policy at European, national and interregional scale. Although the agriculture development. intensification of animals production and increasing of environmental pressure can be expected, competition between regions is inevitable and is determined by the limitations of peripheral rural areas development. Despite the forced promotion of lagging of them by stronger performer it will allow to create at the most averagely-developed region. However, such scenario probably will not be sufficient to develop a competitive region of Chełmsko-Zamojski in longer terms and with the lost of traditional advantages sustainable development can be impossible. In this scenario traditional agriculture will be gradually disappearing. There is also a variant of this scenario with introduction of energy production based on the wind energy and/or slate gas exploiting. Both, land use and economic structure will change then definitely.

5. MULTIFUNCTIONALITY OF LAND USE

5.1. Functional differentiations

Agricultural function dominance is clear. The second function in the land use sense is the forestry. Agricultural function is co-existing with tourist function to a broader extent as new investments in the region are made (accommodation infrastructure, ski lifts, studs and artificial water reservoir).

Agricultural function dominates in the central part Chełmsko-Zamojski region. It consists of slightly larger and more market-oriented farms in the North and East and very scattered, mostly self-supplying farms in the South and West. Forestry has a predominant role in the south-western edge of the region. Tourist function is associated with agriculture and has a significant role mainly in Roztocze Hills and in the vicinity of water reservoirs. However, the region is rather peripheral and traditionally is not a tourist one. Therefore, it does not register many visitors and the tourist function does not change the land use at a significant scale (fig. 29).

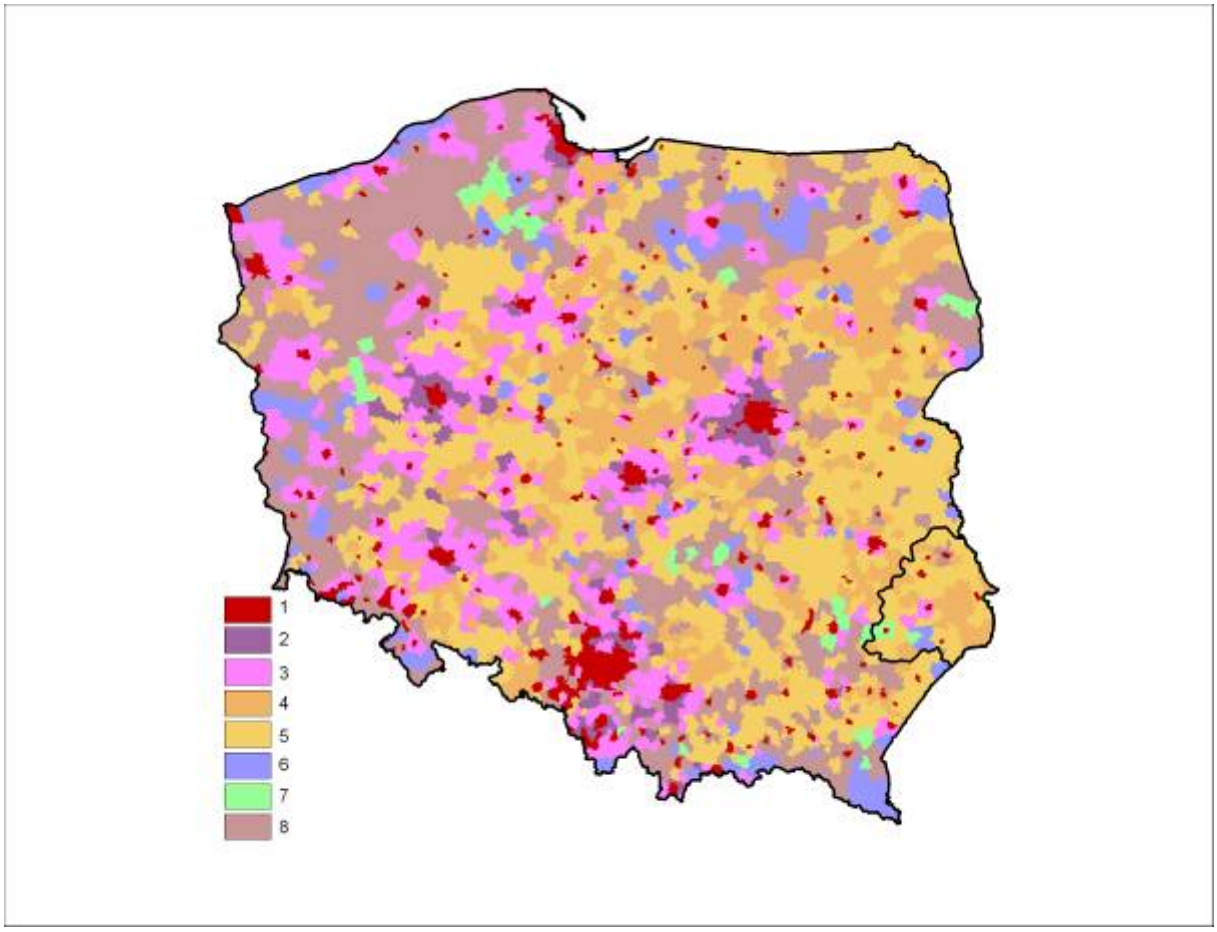


Fig. 29. Functional typology of Chełmsko-Zamojski on Polish background. 1 – urban municipality. 2 – urbanized area. 3 – multifunctional transitional area. 4 – highly agricultural area. 5 – area of agricultural function advantage. 6 – area of tourist and recreational function. 7 – area of forestry function. 8 – area of mixed functions

Source: Bański J.. 2010

5.2. Current multiple uses of land

Agricultural function co-existing with tourist function is often found currently although with little tourism significance in the region. This is an effective way of multifunctional development implementing in the region especially for rural areas, despite the lack of significant impact on the local economy so far. The areas of greater potential for tourism are located in Roztocze Hills, the South-Western forested outskirts of the region and in the river valleys with relatively deficient natural conditions favour traditional way of farming with little use of mechanisation. The tourist function development relies on attractive and natural landscape and some recreational infrastructure for skiing, biking, swimming, fishing and horseback riding.

Another field of potential multifunctionality is to be seen in the framework of agriculture and energy production linkage. Green energy production became a new trend as an effective development direction of European agriculture and it seems to be one of future opportunities for Chełmsko-Zamojski economic activation. Using agricultural land for energetic plants cultivation or for wind power stations is in the initial state.

5.3. Potentiality of multiple uses of land

There is an opportunity of introducing the energy production in the region at a larger scale. Wind power plants can co-exist with agricultural activities what gives a chance for development of peripheral rural areas. According to the national plan from 2005 to 2014 the production of energy from renewable resources in Lubelskie voivodeship should increase from 3.12 to 11.63 TWh and its share in Poland from 2.2 to 7.5% (*Wojewódzki Program Rozwoju*…. 2006).

However, it is difficult to decide where the new investments should be forbidden due to unique landscape protection because it will deprive some poor communes of important short-term and relatively easy to achieve source of income. In that areas it is probably more reasonable to introduce less landscape interfering energetic plants cultivation, for instance the energetic willow.

Exploitation of the slate gas deposits requires transformation of entire region's character and creates a significant environmental pressure. It could not co-exist within the current land use structure. Exploitation of the slate gas deposits would create a spatial conflict at regional scale. Nevertheless, opportunity of using these deposits as an endogenous potential for regional development seems to be attractive as the regional policy direction.

Co-existence of agriculture and rural tourism is an effective way of land use in this case but as contemporary experiences show, rural tourism in the peripheral region without unique natural conditions and longer traditions as a tourist region with young enterprising society cannot exist as a main direction of development. Although this multifunctional way of land use can have a role as an additional source of income for some individual farms offering not only bad and breakfast but some proposal for spending leisure time linked with traditional farming as this already takes place in some villages.

6. POLICY CONTEXT OF LAND MANAGEMANT

6.1. Land use in the regional/local documents

There are:

- *Strategy of Lubelskie Voivodeship Development for 2006-2020*.
- *Strategy of Powiat Development of each of 8 powiats in the region.*
- *Plan of the Spatial Organisation of Lubelskie Voivodeship* (in preparation).
- *Plans of Spatial Organisation* of many communes.

The Strategy is a general document of voivodeship development priorities.

Plan of the Spatial Organisation of Lubelskie Voivodeship includes three volumes:

- *Internal and external conditioning*.
- *Directions of spatial policy*.
- *Map of the directions of spatial policy (scale 1:200 000).*

The Plan is predicting agriculture, tourism and recreation development excluding the ecological area of the highest natural values in Roztocze Hills.

The structure of documents is hierarchic. The local plans of spatial organisation are related to the plans of a higher level. They facilitate localising new investments consistently with general spatial pattern of the region. However, sometimes local societies complain for the lack of municipal or local plan of spatial organisation, especially in the suburbs where attractive terrains for harmful economic activities are situated in the vicinity of settlements or in the areas of the highest environmental values which are attractive for residential function consisting of single dispersed houses sometimes pressuring the network infrastructure development.

There are also some strategic documents on the level of voivodeship which are linked with the land use issues like:

- Program of Sustainable Development of Agriculture and Rural Areas of Lubelskie Voivodeship.
- Voivodeship Program of Transport and Communication Infrastructure Development for Lubelskie Voivodeship.
- Program of Environmental Protection of Lubelskie Voivodeship for 2008-2011 with perspective until 2015.
- Voivodeship Program of Alternative Energy Resources Development for Lubelskie Voivodeship.

The most important strategic document concerning the land use changes in the regional point of view is *Program of Sustainable Development of Agriculture and Rural Areas of Lubelskie Voivodeship* which contains diagnosis and some predictions regarding the changes of land use itself but also predictions of farm size structure improvement of their spatial

organisation, plant production structure, animal production structure, ecological agriculture development, alternative agricultural plant production development, fallow and waste lands management. perspectives of sustainable development of agriculture and rural areas, development of agro-industry, development of trade and services on rural areas and producer groups.

7. CONCLUSION

In this peripheral, mono-functional agricultural region, the land use changes are of relatively low dynamics. Natural conditions are mostly very favourable for agriculture but at the same time, the region belongs to the poorest in the EU. Chełmsko-Zamojski registers a demographic structure imbalance and difficulties in local economy as a consequence.

During the last two decades, the changes reflected macroeconomic condition of agriculture as a principle and this was the major actor of land cover transformation. The gradual land use changes within agricultural land are observed. Generally, its area is slowly decreasing mainly due to the abandoning of meadows mowing and neglected drainage systems in the river valleys or forestation of steep slopes. The most common change in land cover is the increase of cereals cultivation and the abandoning of sugar beetroots, tobacco, flax, hemp and potatoes cultivation. This trend reflects a general extensification of plant cultivation. Introduction of rape cultivation results from the development of one of the best prospering workshop of food industry branch – fat processing factory. Initiation of maize cultivation for fodder purposes within the region is caused by cattle breeding intensification. Average farm size is increasing dynamically, mainly due to a more significant dynamics of land leasing.

There were no other important external impulses which could become land use change initiators like for instance transport, industry or tourism bringing broad investment. The only capital expenditure of that kind included new artificial water reservoir with an area of approximately 1 000 ha. However, a gradual implementing of land use multifunctionality on rural areas is observed. The residential areas in the vicinity to Chełm and Zamość along the main roads are enlarging. On the other hand, the area of Roztocze Hills and the water reservoirs surroundings are gaining in importance in the field of tourist and recreation function with some desired infrastructure developing. Agriculture becomes more frequently associated with green energy production, mainly because of wind power plants or energetic plants cultivation. Only 1% of the total area of Chełmsko-Zamojski region is protected in the form of national park. Environmental and landscape protection function is linked nowadays with agriculture to a greater extent and as a result, the wildlife is significantly richer than for instance 20 years ago, when more intensive farming and industrial activity dominated.

Initiating the transformation of the region towards further multifunctionality is an adequate time to implement more restricted spatial planning and organise optimal, spatially varied functions co-existence with preserving the most valuable natural sites. Unfortunately, some examples of unfavourable decisions concerning location of certain investments in the region appeared.

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Appendix 1

Verification of land use changes typology in practice

Land use changes identified by Corine Land Cover pictures analysis were verified in practice by field study of three cases in Chełmsko-Zamojski region. Verification was carried out by the sample of three squares 1 x 1 km^2, where the changes were the most intensive in the region, but were processing in different directions:

- Square 1. is situated in the eastern part of Chełmsko-Zamojski region, approximately 40 km East from Zamość, between villages Malice and Kotorów, upon Huczwa river. The surrounding has generally very favourable environmental conditions for agriculture. However, the square is situated in the flat river valley and it tends be relatively moist in the spring time. The square distinguishes agricultural internal conversion.
- Square 2. is situated on the outskirts of Werbkowice, big village by the main road from Zamość towards East, heading to one of three important Polish-Ukrainian border crossing points in Zosin. Werbkowice is well known for one of two still active sugar-rafineries in the region. The surrounding has the best quality of environmental conditions for agriculture in European scale. The square distinguishes urban residential sprawl.
- Square 3. is situated ab. 1 km to the West of the main road from Zamość towards South, to one of three important Polish-Ukrainian border crossing points in Hrebenne and further to Lviv. The square distinguishes forest creation and management.

The location of the investigation points are presented in figure 30.

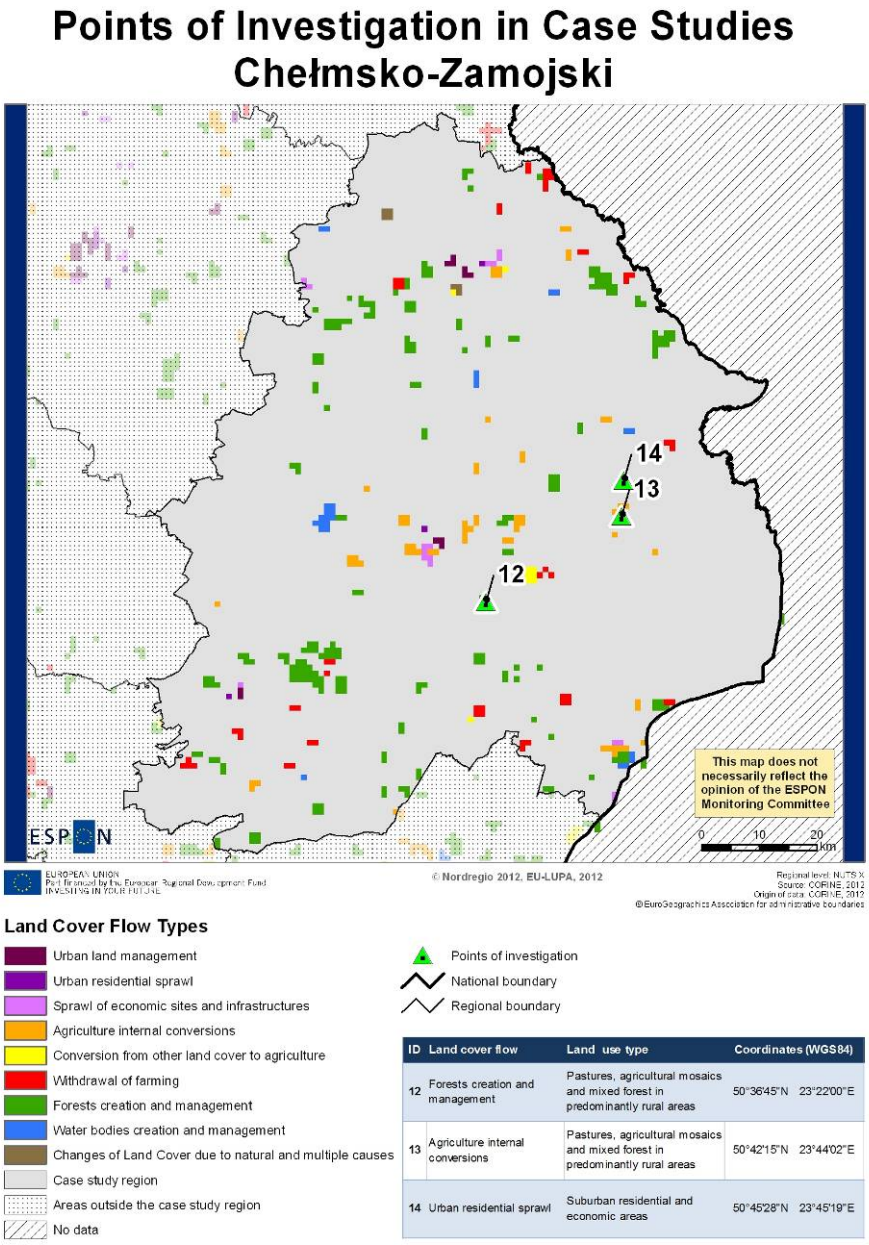

Fig. 30. Investigation points at the land cover flow types background
Source: Corine Land Cover

Square 1.

The land in spring time is partly flooded meadows with some woodland and shrubs. The area is situated in the flat valley of meandering Huczwa river. In the 1990s there was good a quality arable land here, with cultivation of barley and maize predominantly. It was possible with the drainage system working properly. After negative change of macroeconomic circumstances of Polish

agriculture, extensification of this area took place with neglected drainage system (phot. 1 and 2) and reappearance of natural grasslands as a consequence (phot. 3). The grasslands were used by individual farmers as cattle grazing area, but due to concentration and intensification of cattle breeding in Poland during 2000s it is almost cast-off now. After the rise of ground water level, the expansion of wildlife is observable.

Phot. 1. Neglected drainage system

Phot. 2. Drainage ditch seen in the landscape

Phot. 3. Natural grassland upon Huczwa river

Square 2.

The area is an outskirt of big village with developing housing function. It is situated approximately 0.5 km to the main road from Zamość to border

crossing point in Zosin, hence the general accessibility is relatively good, what makes it attractive. However, the development of road infrastructure within the settlement is slower compared to housing investments (phot. 4). The oldest houses in the area are 30 years old, but the majority of the houses was built during the 2000s on the former arable land of very high soil quality (phot. 5) with predominance of sugar beetroots cultivation. Before 1990 sugar beetroots could be easily sold out to big sugar-refinery in the village.

Phot. 4. New houses and cars, but old road infrastructure

Phot. 5. New house with very fertile soils in background

Square 3.

The area is a state forest nearby important national road of international importance. The forest is situated along the valley in W-E direction. Forestry is still active in the area due to profitable wood trading. Wood is a raw material desired by local furniture factories and used for building construction. However, on the valley slopes at the edge of the forest there is a natural forest succession that in the last years merged to the abundant unfavourable arable land (phot. 6). This is a result of a deteriorating macroeconomic situation of Polish agriculture.

Phot. 6. Transition between arable land on the hill and forest in the valley

Conclusions:

In the case of Chełmsko-Zamojski region field studies confirmed the typology of land cover flow, even in spite of large scale of examination. Field investigation verified the appropriateness of the method used in explanation of generally indicated directions concerning the changes in the region and can applied for their more detailed description. Based on the sample of the three points in Chełmsko-Zamojski region, it can be stated that the assessment of the typology results is positive.

However, one significant conclusion considering the typology and its general assumption needs to be emphasized. All investigations are regarding only land cover changes in spatial dimension. In some cases, in square 1. for instance, it can be mistaken without more detailed studies, because the land cover flow can be extensification of land use itself (converting arable land into natural grassland), but at the same time it is much more difficult to observe that this is a result of cattle breeding intensification.

Appendix 2

Field study – interviews questionnaires

Adam Ogorzałek 21
September 2011
Owner of a modern farm in Czernięcin (Turobin municipality)

I. Socio-economic factors of land use change

1. *Could you describe the main demographic processes in the region: migrations, birth rate etc.? What is their impact on land use?*

Ageing of rural society and lack of farming interests among young people because of the economic circumstances have a great impact on the significant average farm size increase in the last years in the region.

2. *What are the main processes and trends of settlement? What is the impact of new settlements on land use and spatial organization? Is there a lot of new built-up areas? What are the forms: contiguous development, linear patterns, scattered development?*

There is a rather weak process observed. As principle, the new built-up areas are observed in the vicinity of towns, not in the nearest surrounding of farms that are located in a typical rural area.

3. *What are the main processes, directions of changes in the field of agriculture (extensification or intensification, changes of fields spatial structure and crops structure)?*

A significant average farm size increase is observed in the region last years. Land is shifting from small to larger farms. Great share in this shifting is in the form of leasing because of direct payments. There are examples of land leasing from owners living in Western Pomerania. There is process of buying the land by bigger farms, but they own many plots of land e.g. 30 Ares each of them. Farmers have abandoned flax and hemp cultivation in the region. Sugar beetroot cultivation is also going to be ceased. Cereals cultivation is currently definitely dominating in this area. There is a process of maize cultivation area increase as well, mainly as fodder for cattle, but for corn as well.

4. *Are there such processes like: changing agricultural function of areas into other functions? Building-up areas of fertile soils? Increasing/decreasing the share of untilled land? Please describe briefly the processes concerning changes of agricultural land use.*

An introduction of tourist function in Krasnobród and Zwierzyniec communes. It firstly appeared on the areas of weaker natural condition.

5. *What are the main processes in the field of industry and technical infrastructure (new plants, industry centers, roads, railways etc.)? How would you assess its influence on land use?*

There are no important new industrial and infrastructural investments. The main transport investment is outside the region. It's a modernization of the main road from Lublin in direction to Chełm and Zamość. The only investment of this type was building the road connection between Szczebrzeszyn and Frampol and transforming this corridor into a state road.

6. *What are the main processes in the field of tourism and services? Is there any development of tourism infrastructure (new hotels, holiday centers, swimming pools, tourist roads)? How intensive is the development in the spatial context (spatial extent of new areas used for tourism purposes etc.)?*

Infrastructure for tourism development is generally weak. It relies mainly on farmers' houses in certain villages.

7. *How would you describe and summarize the general conditions of economy in your region and its impact on land use? Please refer also to employment issues.*

The land use depends mainly on economic circumstances for agriculture. Relatively high unemployment and a weakness of local economy have a negative impact on the land use.

II. Environmental issues

1. *Could you describe the main changes of natural areas in the last five decades (changes of forested areas, biodiversity, water conditions)? Has the spatial extent and condition of areas of high nature value changed for the last five decades?*

There is an afforestation process observed, especially on the weak soils of Biłgoraj surroundings.

2. *Please assess the main contemporary and future threats for natural areas (especially protected areas) in the region. How are they related to land use changes?*

The major threat is the discovery of a slate gas deposit and opportunity for the development of industry. Agricultural function is not competitive.

3. *Were there any natural disasters in the region in the last two decades which influenced the land use and land cover (floods, fires)?*

There were no important natural disasters.

III. Multi-functionality

1. *Please name socio-economic and environmental functions of land use in the region.*

There is an agricultural predominance in land use and in economy of the region. In the last decade it has been strongly linked with environmental protection.

2. *Multifunctional land use - which of the functions in your region co-exist?*

There is no multifunctionality of land use in the region. Especially in western Roztocze agriculture is the only function, although there is a very high environmental and landscape attractiveness of the region.

3. *Which of the functions are the most important in the context of land use?*

No opinion

4. *Is the number of functions of land use increasing or decreasing?*

No opinion

5. *To which extent is the land in your region used in multifunctional way?*

No opinion

6. *What kind of functions co-existence is:*

a) the most effective?

b) the most desirable?

c) the most common?

d) the most difficult?

No opinion

7. *Which of the functions of land use are the most important for the future regional development?*

Investments creating employment increase both, in rural areas and in towns. This is the only way to preserve traditional agriculture and landscape values.

IV. Spatial conflicts

1. *Are there any conflicts related to land use? (As space is limited different actors compete to obtain the possibly largest area or their needs. For example: inhabitants strive to build houses, a businessman wants to put a plant or warehouse, there is a need to build somewhere sewage plant, administration of protected area tries to enlarge the area and so on).*

There are no important spatial conflicts in the region. The reason is lack of pressure aiming at intensifying the land use.

2. *What are the "competing" actors and functions (environmental, agricultural, industrial, settlement etc.)?*

No opinion

3. *Which of the actors are the most dynamic and successful in obtaining new land?*

Owners of large farms, who have enough economic power to buy a land regardless of dynamic increase of its price last years.

4. *What are the most likely conflicts related to land use in future and what could be its impact on land use?*

No opinion

V. Government and policy

1. *Please assess the state and regional law concerning spatial management and planning in your region. Are legal rules effective in sustainable and rational management of land?*

Law concerning spatial management allows creating the spatial organization in a positive way.

2. *Is the local and regional administration effective in land management and in preventing and solving conflicts related to land use? (Please describe and assess the issue and give some examples. Summarize the role of local and regional administration in management of land use).*

The only negative aspect is a long time of decision making caused by bureaucracy. It is also a barrier for potential investors.

3. *Is there any monitoring of land cover changes in the region? (Please describe briefly).*

The only way of monitoring the land use changes is the one applied to direct payments. It's an effective way, what can be proven by actual basic agricultural activities, which are conducted each year even by the non-commercial farmers.

VI. Localization (depending on the region)

1. *How land use changes are resulting from the vicinity of state border (how the state border influences land use in your region)?*

There is no influence of the border vicinity. Before joining the Schengen treaty many people from eastern part of the region had their important share of income from the cross-border trade.

2. *How land use changes are resulting from vicinity of sea coast (how the coastal location influence land use in your region)?*

Not concerning.

VII. Land use in general

1. *Please describe and summarize the major processes and trends of land use changes in the region over the last 50 years.*

Shifting the cultivated plant structure from industrial plants to cereals and average farm size increase.

2. *In a typology elaborated on the basis of statistic data, your region represent the type X, characterized by "agricultural". Is it a proper type for your region? Please explain.*

Agricultural type is the most adequate. It's in fact adequate in both aspects concerning land use and economic situation.

Kazimierz Cybulski 20 September. 2011
Department of Geodesy, Cartography, Cadastre and Properties
Powiat County in Zamość

I. Socio-economic factors of land use change

1. *Could you describe the main demographic processes in the region: migrations, birth rate etc.? What is their impact on land use?*

The impact of permanent young people outflow and a low birth rate is reflected in the increase of the number of large farms in the region and a more common of leasing the land from smaller farms.

2. *What are the main processes and trends of settlement? What is the impact of new settlements on land use and spatial organization? Is there a lot of new built-up areas? What are the forms: contiguous development, linear patterns, scattered development?*

Changes are seen in Chełm and Zamość closest surrounding. They used to be more dynamic in the 1990s., when they were capital cities of the voivodeships. Then there were created over 300 plots with technical infrastructure for housing in Jarosławiec (Sitno municipality) after the liquidation of a large state farm. They were intended for doctors employed in the newly built hospital in Zamość. Multi-family houses in bigger towns surroundings are built even on wet terrains (e.g. Karolówka – western Zamość or Łapiguz – south-east of Zamość).

3. *What are the main processes, directions of changes in the field of agriculture (extensification or intensification, changes of fields spatial structure and crops structure)?*

Enlarging the average farm size and land concentration in ownership sense. There are several farms that are definitely the largest and lease the land in many municipalities. Abandoning the agricultural use on areas with inconvenient environmental conditions, especially in the case of not mowed meadows, where forest succession is observed. They are sometimes converted into energy willow cultivation areas, like in Sułów municipality. Extensification of plants cultivation is also observed, what is linked with economic circumstances of agricultural development. Area of cereals cultivation is increasing, sugar beetroots cultivation area is decreasing as a result sugar refineries collapse. Animal breeding is decreasing, especially in small farms. There are several farms with animal breeding in every village.

4. *Are there such processes like: changing agricultural function of areas into other functions? Building-up areas of fertile soils? Increasing/decreasing the share of untilled land? Please describe briefly the processes concerning changes of agricultural land use.*

Weak process related to building of new settlements is observed mainly along the transport corridors in the vicinity of Chełm and Zamość. This process is stimulated generally by young emigrants employed out of the region. There are intentions to use the land for wind power plants in the future. Untilled land

is observed on former meadows, and not-seen on terrains with good soil quality.

5. *What are the main processes in the field of industry and technical infrastructure (new plants, industry centers, roads, railways etc.)? How would you assess its influence on land use?*

New technical investments are mainly the enlargement of the sewage network in the surroundings of Zamość. It is currently taking place in Żdanów (south from Zamość). In towns, the largest areas are converting their function from industry to trade.

6. *What are the main processes in the field of tourism and services? Is there any development of tourism infrastructure (new hotels, holiday centers, swimming pools, tourist roads)? How intensive is the development in the spatial context (spatial extent of new areas used for tourism purposes etc.)?*

Mostly new wedding houses are built as a part of new tourist investments – not traditional to rural areas. New gastronomy and accommodation investments are mainly located by the main routes. Newly built artificial water reservoir on Wieprz river in Nielisz (940 ha) is attracting second houses development.

7. *How would you describe and summarize the general conditions of economy in your region and its impact on land use? Please refer also to employment issues.*

The region is generally weak in the economic sense and for many years it has been seeking for new investments. The only industry that is still functioning are small furniture factories, in Biłgoraj, Tomaszów Lubelski or in Zwierzyniec.

II. Environmental issues

1. *Could you describe the main changes of natural areas in the last five decades (changes of forested areas, biodiversity, water conditions)? Has the spatial extent and condition of areas of high nature value changed for the last five decades?*

There is no pressure upon the environmentally valuable areas. There are basically no harmful human activities in the national parks surroundings thanks to adequate protection.

2. *Please assess the main contemporary and future threats for natural areas (especially protected areas) in the region. How are they related to land use changes?*

There is a good organization of environment protection network in the region. An example is the reserve of gopher in Miączyn, on 30 hectares of former national farm by the state road. A newly built large water reservoir attracted new species of birds to the region. Ground water level is currently higher in the region than it used to be.

3. *Were there any natural disasters in the region in the last two decades which influenced the land use and land cover (floods, fires)?*

There were no natural disasters in the region. There were only some troubles in the Wieprz valley near to Krasnystaw after longer rainy periods, but without an impact on the land use change.

III. Multi-functionality

1. *Please name socio-economic and environmental functions of land use in the region.*

Outside of towns the functions of agriculture and forestry are strongly dominating. In towns the industrial function has almost disappeared during the last two decades and trade areas are increasing dynamically.

2. *Multifunctional land use - which of the functions in your region co-exist?*

Agricultural and forestry functions are co-existing with agritourism in the Zwierzyniec, Krasnobród, Skierbieszów, Radecznica and Szczebrzeszyn communes. They are benefiting from the EU financial support.

3. *Which of the functions are the most important in the context of land use?*

Agriculture and forestry in the south of the region. Environmental function is co-existing with them on a relatively big area.

4. *Is the number of functions of land use increasing or decreasing?*

The role of agritourism is gradually increasing but is it still marginal and is likely to remain that way. Along the main roads in Chełm and Zamość as well as neighboring settlements in rural areas the urban services are widening.

5. *To which extent is the land in your region used in multifunctional way?*

There is a low level of multifunctionality. New functions in traditional agricultural areas are just becoming popular. Especially in Roztocze Hills agritourism and leisure activities functions are relatively important, as well as in the vicinity of Nielisz water reservoir and in Skierbieszowski Landscape Park. The most common co-existing functions in rural areas are agriculture and environmental protection.

6. *What kind of functions co-existence is:*

a) the most effective?

In current conditions the most effective is co-existing of traditional agriculture and environmental protection.

b) the most desirable?

The most desirable is protection of landscape not only from environmental point of view, but also preserving the cultural landscape by creating opportunities for young people who stay in rural areas.

c) the most common?

The most common is the co-existing of agriculture and active environmental protection thanks to direct payments.

d) the most difficult?

Co-existing of dominating function with agritourism is effective and desirable, because of common rural origin of many inhabitants of towns. Agritourism became more popular in the rural areas last years.

7. *Which of the functions of land use are the most important for the future regional development?*

Lack of important investments in the region is causing the anticipation of a non-dynamic land use change. New industrial investments, if not harmful to natural environment are required, because they can stop young people from migrating. Small industry doesn't change the land use itself, but it can help indirectly within economic processes in the regional change.

IV. Spatial conflicts

1. *Are there any conflicts related to land use? (As space is limited different actors compete to obtain the possibly largest area or their needs. For example: inhabitants strive to build houses, a businessman wants to put a plant or warehouse, there is a need to build somewhere sewage plant, administration of protected area tries to enlarge the area and so on).*

Currently, there are no important spatial conflicts. There were only small local conflicts concerned with new investments, such as buying land for road infrastructure development.

2. *What are the "competing" actors and functions (environmental, agricultural, industrial, settlement etc.)?*

The most frequent are local conflicts between neighbors. These are caused by new buildings or other investments in the neighbors' plots, which often disturb the landscape and tranquility.

3. *Which of the actors are the most dynamic and successful in obtaining new land?*

Large farms buying land. Thanks to direct payments they have economic power to enlarge their properties and concentrate land in own hands.

4. *What are the most likely conflicts related to land use in future and what could be its impact on land use?*

There is no plan of big investments in the region, so there are no threats of significant spatial conflicts.

V. Government and policy

1. *Please assess the state and regional law concerning spatial management and planning in your region. Are legal rules effective in sustainable and rational management of land?*

The state law (special act) guides the most common investments in the region such as road infrastructure development. I think it is effective.

2. *Is the local and regional administration effective in land management and in preventing and solving conflicts related to land use? (Please describe and assess the issue and give some examples. Summarize the role of local and regional administration in management of land use).*

No opinion.

3. *Is there any monitoring of land cover changes in the region? (Please describe briefly).*

Grounds registry contains the list of lands excluded from agricultural production and finishing. That is basically the only kind of monitoring.

VI. Localization (depending on the region)

1. *How land use changes are resulting from vicinity of state border (how the state border influences land use in your region)?*

In the neighborhood of a state border there is less settlement and less scattered farms. Localization of the region near the borderline is reflected in a relatively low level of economic development. It has also a positive impact in the case of furniture industry, because its products are effectively sold in Ukraine.

2. *How land use changes are resulting from vicinity of sea coast (how the coastal location influence land use in your region)?*

Not concerning.

VII. Land use in general

1. *Please describe and summarize the major processes and trends of land use changes in the region over the last 50 years.*

The major changes of land use were forest succession on the not mowed meadows and arable land distinguishing unfavourable environmental conditions for agriculture use. Human impact is observed mainly in the towns surrounding.

2. *In a typology elaborated on the basis of statistic data, your region represents the type X, characterized by "agricultural". Is it a proper type for your region? Please explain.*

Agricultural is an adequate type of land use in the region. The development of other functions is rather weak due to lack of economic power of local investors.

Ryszard Borowski 17 October 2011
Director of Instructional-Expositional Centre in Sitno (Branch of Centre of Agricultural Consultancy)

I. Socio-economic factors of land use change

1. *Could you describe the main demographic processes in the region: migrations, birth rate etc.? What is their impact on land use?*

The key process influencing changes of regional economy and land use is emigration especially among young people, which is not represented in official statistics. It has a seasonal character sometimes, but people are staying abroad for a longer time very often as well. This is a reason of ageing of population in the region. Some outline of the scale of this process is reflected in a relatively low number of given votes in the region. After emigration of young people, farms having no successors sell or lease plots to larger farms. Another effect of a demographic process in land use is appearing of untilled and not mowed meadows belonging to small farms with abandoned animal production. An Example of it can be observed in Bodaczow surroundings, where in the Wieprz valley many meadows are untilled. Ageing of society has an impact on a low birth rate and in many villages of almost every commune primary schools are being closed. This process is deepening with a negative feedback and gives bad future perspectives.

2. *What are the main processes and trends of settlement? What is the impact of new settlements on land use and spatial organization? Is there a lot of new built-up areas? What are the forms: contiguous development, linear patterns, scattered development?*

The new plans of spatial organization accept the transformation of good soil quality plots for non-agricultural purposes in Zamość surroundings. This reflects an increasing pressure for the development of residential function. The converted plots in suburbs, like in Płoskie or Jatutów, or in Roztocze Hills by often bought by people from big cities, like Lublin or Warsaw, there is a kind of speculation concerning housing function future strengthening. This process is especially observed along the main roads, so new settlements won't be dispersed and investments in infrastructural networks will be relatively easier.

3. *What are the main processes, directions of changes in the field of agriculture (extensification or intensification, changes of fields spatial structure and crops structure)?*

Animal production is more concentrated nowadays in larger farms, what results in a more intensive type of production. On the other hand, specialization of animal production and fodders use led to extensification of land use, like untilled meadows. In sandy soil areas even arable land is being untilled. Extensification of land use by small farms has strengthened due to direct payments. More powerful farms are buying the neighboring plots and are enlarging them. The biggest process of merging plots and farms took place in Skierbieszów commune. Crop structure is changing for more mono-

cultural crops and legume as well as rapeseed introducing thanks to the UE payments. Crop structure is changing year after year, what is caused by macroeconomic situation changes. For instance, in spite of general trends last year we observed higher popularity of sugar beetroots due to the maximum peak of sugar prices and a lower area of rapeseed cultivation due to economic disturbances of a fat factory in Bodaczów.

4. *Are there such processes like: changing agricultural function of areas into other functions? Building-up areas of fertile soils? Increasing/decreasing the share of untilled land? Please describe briefly the processes concerning changes of agricultural land use.*

In the region there is a trend of recreational function development as well as housing and mechanical services introduction to rural areas. This has not changed the land use a lot so far. However, it causes building up of even the best quality soils along the main roads, like in Wielącza village, about 10 km west from Zamość, nearby the state road.

5. *What are the main processes in the field of industry and technical infrastructure (new plants, industry centers, roads, railways etc.)? How would you assess its influence on land use?*

Industry and technical infrastructure do not bring a significant impact on land use changes. Only collapsing of industry can influence some changes, like in the case of sugar refinery in Klemesów, its closing down resulted in a decrease of sugar beetroots cultivation area. A similar case can be observed because of economic disturbances in a fat factory in Bodaczów last time. Among new investments in towns and suburbs the most dynamic increase in spatial dimension can be observed in the case of big shops. Even transport corridors area doesn't increase last years, although the existing corridors are still being modernized.

6. *What are the main processes in the field of tourism and services? Is there any development of tourism infrastructure (new hotels, holiday centers, swimming pools, tourist roads)? How intensive is the development in the spatial context (spatial extent of new areas used for tourism purposes etc.)?*

Development of tourism takes place in the areas of weak agriculture, in the vicinity of Zwierzyniec and Krasnobród in Roztocze Hills. Accommodation facilities are improving, but tourism hasn't got significant influence on land use changes yet.

7. *How would you describe and summarize the general conditions of economy in your region and its impact on land use? Please refer also to employment issues.*

The collapse of food processing industry had a great impact on the crop structure. Many factories are closed, but the remaining ones reduced buying agricultural goods. This has influenced the increase of unemployment as well as young people outflow from agricultural farms as a consequence. That's why the economic role of agriculture in the region is decreasing in spite of its continuous predominance in land use. Agriculture has a more self-supplying function nowadays and very often it is not the main income source any more, even in spite of the EU payments.

II. Environmental issues

1. *Could you describe the main changes of natural areas in the last five decades (changes of forested areas, biodiversity, water conditions)? Has the spatial extent and condition of areas of high nature value changed for the last five decades?*

The area of Natura 2000 has been enlarged in the last years. The total forested area in the region has increased as well, especially in Roztocze Hills. Nowadays Natura 2000 Program determines stopping of the afforestation process, but there are some changes in regulations concerning Natura 2000 functions planned. Ground water raised due to abandoning of drainage management in the meadows. A greater number of beavers has an important influence as well. Apart of them, there is an increase of boars, foxes and deers observed. This phenomena reflects not only the enrichment of a wildlife, but also a specific ecosystem balance disturbance. Environmentally valuable areas are enlarging in majority on fallow lands. E.g. in Szewnia – village in Roztocze Hills, there is observed a growth of over 20 ha of fallow land per year.

2. *Please assess the main contemporary and future threats for natural areas (especially protected areas) in the region. How are they related to land use changes?*

The most common threat for natural areas is observed on meadows, as they are abandoned, which leads to trees succession and lakelet overgrowing. These changes can cause lack of birds nests. Another environmental threat is the energy production. For instance, on some fields in rural areas, there is a search for slate gas and wind power plants are built, having a negative influence on birds habitat and rural landscape. Even some municipal spatial plans were altered due to demands of energetic investors. This purpose is changing the crop structure as well, like the introduction of energy willow cultivation. Transition masts (cell phone towers) of mobile phones signal are causing another common threat for a nature life. E.g. in Gorzków village, in the northern-west edge of the region, birds have totally escaped after building such mast.

3. *Were there any natural disasters in the region in the last two decades which influenced the land use and land cover (floods, fires)?*

There have been no significant natural hazards in the last decades. The most important were small-scale floods in the river valleys, e.g. in Skierbieszów or on Biłgorajska Flatland. The flooding destroyed cellars in a few houses. However, floods are very positive for beavers population. Apart of that hail has destroyed some greenhouses, what can be one of the reasons that fruit and vegetable production is not well developed in the region.

III. Multi-functionality

1. *Please name socio-economic and environmental functions of land use in the region.*

The most important functions of land use are agriculture and agritourism. Some areas are used as mines of sand or stones as well.

2. *Multifunctional land use - which of the functions in your region co-exist?*

The development of multifunctionality is most advanced in the northern borderland of Western Roztocze Hills, where the Local Action Group “Upon Wieprz and Por” works on 440 km^2 of four municipalities with one town and 70 villages. There are different functions coexisting with agriculture: renewable energy production, environment protection, agritourism, recreation and other services.

3. *Which of the functions are the most important in the context of land use?*

The most important is still agriculture, in spite of food processing industry collapsing.

4. *Is the number of functions of land use increasing or decreasing?*

Multifunctionality is increasing, but with a less diversified agriculture, which is still the most important function.

5. *To which extent is the land in your region used in multifunctional way?*

No opinion.

6. *What kind of functions co-existence is:*

a) the most effective?

Additional functions in typically agricultural areas are economically effective generally.

b) the most desirable?

Using the untilled former meadows is the most desirable from environmental point of view.

c) the most common?

Agriculture, agritourism and environment protection.

d) the most difficult?

Traditional functions are not to co-exist with energy production, which is an important chance for a regional economy transformation.

7. *Which of the functions of land use are the most important for the future regional development?*

To make multifunctionality more common in the region, food processing industry is needed. In agriculture it would be very helpful to introduce vegetable production for local market.

IV. Spatial conflicts

1. *Are there any conflicts related to land use? (As space is limited different actors compete to obtain the possibly largest area or their needs. For example: inhabitants strive to build houses, a businessman wants to put a plant or warehouse, there is a need to build somewhere sewage plant, administration of protected area tries to enlarge the area and so on).*

The best known spatial conflict was related to bio-gas plant location in the vicinity of Zamość. There was also a spatial conflict when locating the wind-power plant in Sitno near Zamość and the Skierbieszowski Landscape Park. There are some spatial plan changes needed already made and measurements are currently lasting. There were also spatial conflicts due to dumping ground location near the residential areas of Dębowiec village last time.

2. *What are the "competing" actors and functions (environmental, agricultural, industrial, settlement etc.)?*

Competing actors of land use changes are mostly investors intending to introduce renewable energy production into areas of other functions. The only non-competing kind of such energy is the one obtained from solar cells.

3. *Which of the actors are the most dynamic and successful in obtaining new land?*

Generally the most successful in obtaining new land is the function of environment protection, because it's mostly a non-competing function. However it would be probably far less successful against more economically powerful actors, like huge companies producing energy.

4. *What are the most likely conflicts related to land use in future and what could be its impact on land use?*

The discovery of rich slate gas deposits is causing fears, but it does not have an important impact on real spatial conflicts so far. However its future impact is unknown. Another important threat of future spatial conflicts is related to permission for relatively cheap local land bought by foreigners, what can result in destructive, intensive, mono-cultural agricultural activities.

V. Government and policy

1. *Please assess the state and regional law concerning spatial management and planning in your region. Are legal rules effective in sustainable and rational management of land?*

The law doesn't favor biodiversity protection and support. The restrictions aren't sufficient for current threats. The system isn't adequate for real effective spatial planning as well, because the main axis of conflict between environmental protection and local administration supporting economic development, e.g. industrial and infrastructural investments, still exists. Many

communes decide individually having no plan of spatial organization, but the only study of conditioning and directions of unit spatial organization. It isn't a common current problem only because of lack of economically powerful actors in the region.

2. *Is the local and regional administration effective in land management and in preventing and solving conflicts related to land use? (Please describe and assess the issue and give some examples. Summarize the role of local and regional administration in management of land use).*

Local and regional administration is relatively effective in the framework of given responsibilities and in given external conditioning of state law. There are examples of individual solutions of potential conflicts, like e.g. exchange of some roads between commune and county to make managing of them easier.

3. *Is there any monitoring of land cover changes in the region? (Please describe briefly).*

There is one person in each commune to monitor and analyse the official statistical data concerning land use, given by Central Statistical Office.

VI. Localization (depending on the region)

1. *How land use changes are resulting from vicinity of state border (how the state border influence land use in your region)?*

Before accessing the Schengen zone in 2008, a close distance to national border had a positive influence on the local economy and indirectly, on young people outflow. Good accessibility of foreign market of individual customers was a positive impulse for vegetable production near Zosin and Tomaszów Lubelski, in the surroundings of road border crossing points.

2. *How land use changes are resulting from vicinity of sea coast (how the coastal location influence land use in your region)?*

Not concerning.

VII. Land use in general

1. *Please describe and summarize the major processes and trends of land use changes in the region over the last 50 years.*

The major trend concerned agrarian structure changes and a decrease of animal farms production. Strong concentration of cattle breeding is observed as well, what is an effect of rural society ageing and competition in agriculture.

2. *In a typology elaborated on the basis of statistic data, your region represent the type X, characterized by "agricultural". Is it a proper type for your region? Please explain.*

The region is typically agricultural. Changes in this type are slow. Permanent outflow of young people from rural areas caused preservation of traditional regional economic structure.

dr Ryszard Molas 19
September 2011
geographer, geomorphologist
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I. Socio-economic factors of land use change

1. *Could you describe the main demographic processes in the region: migrations, birth rate etc.? What is their impact on land use?*

Migration of local population and ageing of society contributed to abandoning of farms in the region of very good natural conditions for agriculture.

2. *What are the main processes and trends of settlement? What is the impact of new settlements on land use and spatial organization? Is there a lot of new built-up areas? What are the forms: contiguous development, linear patterns, scattered development?*

Settlement development can be observed in a significant scale only in suburbs and along the main routes, rather in linear form. It started developing since 1990.

3. *What are the main processes, directions of changes in the field of agriculture (extensification or intensification, changes of fields spatial structure and crops structure)?*

The major factor is the profitability of the agricultural activity. Bipolar changing of agriculture, general extensification of plant cultivation and intensification of animal breeding. Increasing of the cereals cultivation and decreasing of the industrial plants cultivation, like tobacco, sugar beetroots or potatoes. Rape cultivation appeared because of the prosperity of fat factory. Considering the animal production, especially milk production development is observed.

4. *Are there such processes like: changing agricultural function of areas into other functions? Building-up areas of fertile soils? Increasing/decreasing the share of untilled land? Please describe briefly the processes concerning changes of agricultural land use.*

Housing is developing in the suburbs, on untilled land on former meadows and near to the forests, forest area has increased in the last 20 years.

5. *What are the main processes in the field of industry and technical infrastructure (new plants, industry centers, roads, railways etc.)? How would you assess its influence on land use?*

There are no important industrial and infrastructural investments. Furniture factories do not bring a negative impact on the forested area, but only on the wood resources in the forests.

6. *What are the main processes in the field of tourism and services? Is there any development of tourism infrastructure (new hotels, holiday centers, swimming pools, tourist roads)? How intensive is the development in the spatial context (spatial extent of new areas used for tourism purposes etc.)?*

Tourist function of rural areas in the region is just starting its development. It has a rather weak significance in both dimensions, land use share and economic importance.

7. *How would you describe and summarize the general conditions of economy in your region and its impact on land use? Please refer also to employment issues.*

Weak condition of economy has a significant impact especially on emergence of untilled land on former meadows and forests area increase on terrains of less favorable environmental conditions.

II. Environmental issues

1. *Could you describe the main changes of natural areas in the last five decades (changes of forested areas, biodiversity, water conditions)? Has the spatial extent and condition of areas of high nature value changed for the last five decades?*

Forests area and biodiversity increase. Quality of water improved. Level of ground water and springs efficiency lowering. Generally the last two decades have been a very advantageous period for the natural environment of the region.

2. *Please assess the main contemporary and future threats for natural areas (especially protected areas) in the region. How are they related to land use changes?*

Intensification of agriculture is the main realistic threat for environmental conditions. There is no pressure of transport or industrial investments.

3. *Were there any natural disasters in the region in the last two decades which influenced the land use and land cover (floods, fires)?*

There were no important natural disasters.

III. Multi-functionality

1. *Please name socio-economic and environmental functions of land use in the region.*

A strong domination of the agricultural function is still present. It is concentrating as a source of income to a smaller number of farmers but the number of self-supplying farms and depending on social expenses increased due to the ageing of rural society.

2. *Multifunctional land use - which of the functions in your region co-exist?*

There is an initial co-existence of agricultural and tourist function, for instance in the case of ski lifts building.

3. *Which of the functions are the most important in the context of land use?*

Definitely agricultural function is predominant. Tourist function is rather weak in land use sense.

4. *Is the number of functions of land use increasing or decreasing?*

It is slowly increasing thanks to introduction of tourism and other services in rural areas. More attractive areas within the region, as for instance the Roztocze Hills are more advanced in the development of a touristic function.

5. *To which extent is the land in your region used in multifunctional way?*

Not asked.

6. *What kind of functions co-existence is:*

a) the most effective?

Agricultural function with protection of traditional landscape and environmental function. The region has a potential to become a future “second house” area.

b) the most desirable?

Stronger protection of traditional agriculture and environment co-existence in the current shape guaranteed by law. In order to achieve this target, it is necessary to create workplaces in rural areas and provide suitable conditions for young people to reduce the scale of migration.

c) the most common?

The most common in a spatial dimension is the co-existence of traditional agriculture and environmental protection.

d) the most difficult?

Co-existence of agriculture and a various forms of tourism is the most effective, desirable, and common as well.

7. *Which of the functions of land use are the most important for the future regional development?*

It is important to increase the number of the forms of tourism the region can offer. It will help to create a local, diversified labor market for young people who will be interested in preserving the traditional landscape. This will help to promote this region as a future second houses area, which can be the only realistic way for future development of such peripheral region without urban tradition or many tourist attractions.

IV. Spatial conflicts

1. *Are there any conflicts related to land use? (As space is limited different actors compete to obtain the possibly largest area or their needs. For example: inhabitants strive to build houses, a businessman wants to put a plant or warehouse, there is a need to build somewhere sewage plant, administration of protected area tries to enlarge the area and so on).*

There are no important spatial conflicts, because there are no economically strong actors aiming at changing the land use.

2. *What are the "competing" actors and functions (environmental, agricultural, industrial, settlement etc.)?*

Mainly competing actors are administration of protected areas and inhabitants building new houses.

3. *Which of the actors are the most dynamic and successful in obtaining new land?*

Inhabitants interested in creating new housing areas are the most important actor so far due to the economic aspect. Price of land for housing is much higher than for agricultural activities, so it's an important economic potential in rural areas. They're successfully converting the land of weaker and medium agricultural quality for residential area if at least any road to a given plot exists.

4. *What are the most likely conflicts related to land use in future and what could be its impact on land use?*

Perhaps investing in wind energy power stations will be the future source of local conflicts. Complaints from inhabitants of settlements surrounding wind power plants appeared last years.

V. Government and policy

1. *Please assess the state and regional law concerning spatial management and planning in your region. Are legal rules effective in sustainable and rational management of land?*

In general the state and regional law functions quite well in spatial management and planning. I think it is good enough.

2. *Is the local and regional administration effective in land management and in preventing and solving conflicts related to land use? (Please describe and assess the issue and give some examples. Summarize the role of local and regional administration in management of land use).*

There are extremely distinct examples of administration impact on land use changes. Human factor decides about it, because very often a given municipality hasn't got the plan of spatial organization and decision of possible permission for land use change is left to local authorities.

3. *Is there any monitoring of land cover changes in the region? (Please describe briefly).*

There has been a need of introducing land use changes monitoring for several years now. If such system is created, the Chełmsko - Zamojski region will be probably one of the last in Poland, where it will be introduced due to the low dynamics of changes.

VI. Localization (depending on the region)

1. *How land use changes are resulting from vicinity of state border (how the state border influence land use in your region)?*

There is a negative impact on economic development opportunities. The vicinity of a border put an impact on land use and farms size structure in the past, what has not changed in a significant scale so far.

2. *How land use changes are resulting from vicinity of sea coast (how the coastal location influence land use in your region)?*

Not concerning.

VII. Land use in general

1. *Please describe and summarize the major processes and trends of land use changes in the region over the last 50 years.*

Housing development in the suburbs, untilled land on former meadows and near to the forests, forest area increasing during the last 20 years.

2. *In a typology elaborated on the basis of statistic data, your region represent the type X, characterized by "agricultural". Is it a proper type for your region? Please explain.*

Agricultural is the only correct type for this region. Although other functions in rural areas exist and their importance has increased last years, they are still marginal.

Stanisław Gmitruk 17 October 2011
Director of 600 ha commercial code company farm in Bezek (Chełm County)

I. Socio-economic factors of land use change

1. *Could you describe the main demographic processes in the region: migrations, birth rate etc.? What is their impact on land use?*

The most featured demographic process in the region is permanent outflow of young people and ageing of rural society. In agriculture inheritation of farm is still the most common way of the ownership change, but it's accomplished by lack of farms successors. Young people from agricultural families, who are finishing schools in towns or in cities outside of the region, generally aren't interested in coming back to agriculture.

2. *What are the main processes and trends of settlement? What is the impact of new settlements on land use and spatial organization? Is there a lot of new built-up areas? What are the forms: contiguous development, linear patterns, scattered development?*

In the surroundings of this farm changes are insignificant. It has more important role in land use changes close to municipal centres and along main roads.

3. *What are the main processes, directions of changes in the field of agriculture (extensification or intensification, changes of fields spatial structure and crops structure)?*

Area of sugar beetroots cultivation fell down by 60% last years, what indicates extensification of plant production connected with abandoning industrial plants cultivation. On the other hand smaller farms, which are in poor financial condition, sell the land to bigger and more specialized. This process helps to introduce modern, specialized methods and tools of agricultural production and conducting to intensification of it.

4. *Are there such processes like: changing agricultural function of areas into other functions? Building-up areas of fertile soils? Increasing/decreasing the share of untilled land? Please describe briefly the processes concerning changes of agricultural land use.*

Direct EU payments caused, that predominance agriculture in land use is preserved. It's barrier of introducing other functions in rural areas. Municipal plan of spatial organization, if exists, doesn't take into consideration natural conditioning for agriculture, but rather existing infrastructural networks to change function of given plot from agricultural. General level of untilled agricultural land hasn't changed last years. It consists in majority from swamps, wetlands and bushes on the border of forests and meadows.

5. *What are the main processes in the field of industry and technical infrastructure (new plants, industry centers, roads, railways etc.)? How would you assess its influence on land use?*

The industrial branch in the region collapsed. E.g. in Chełm in cement plant there were 3 500 employee in the past. Only 300 employees are working

there currently. The biggest Employer in the town is hospital, where 700 employees are working. The biggest workplace in food processing industry in the town is dairy employing about 300 people.

6. *What are the main processes in the field of tourism and services? Is there any development of tourism infrastructure (new hotels, holiday centers, swimming pools, tourist roads)? How intensive is the development in the spatial context (spatial extent of new areas used for tourism purposes etc.)?*

There are new water reservoirs having less than 100 ha, e.g. in Siedliszcze, seat of local authority. The similar investments were created last years in surrounding communes. Their function isn't only as flood protection, but they compose basis for the tourism, leisure activities, residential function and other services related to them introducing in rural areas. Generally scale of tourist and recreational facilities as land use function in the region is very little.

7. *How would you describe and summarize the general conditions of economy in your region and its impact on land use? Please refer also to employment issues.*

The most important impact on general condition of regional economy have troubles of agriculture and unemployment caused by them. Transformation of size structure of farms, which was forced by economic circumstances, influenced limitation of real employment in agriculture. Agriculture as source of income still exists only in the case of several farms over 10 ha, in each commune. They can aim intensifying of agricultural production. Farms below 4 ha in majority have old technical facilities and conducting activity in majority for self-supplying.

II. Environmental issues

1. *Could you describe the main changes of natural areas in the last five decades (changes of forested areas, biodiversity, water conditions)? Has the spatial extent and condition of areas of high nature value changed for the last five decades?*

There is no significant changes in forests area in surroundings. However number of wild animals increased thanks to less intensive plant production. Enlarging of close Poleski National Park protection zone can be important reason as well. In the farm surrounding especially increase of wild boars and roe deers is observed. Also deers and elks are emerging last time. Although there is observed disturbance of some environmental balance as well, what can be claimed on the basis of hares, partridges and pheasants disappearing. The possible reason can be lowering level of ground water. Drainage on meadows isn't necessary any longer.

2. *Please assess the main contemporary and future threats for natural areas (especially protected areas) in the region. How are they related to land use changes?*

There is no important threats for the future environmental conditions of the region.

3. *Were there any natural disasters in the region in the last two decades which influenced the land use and land cover (floods, fires)?*

There were no natural disasters influencing land use changes.

III. Multi-functionality

1. *Please name socio-economic and environmental functions of land use in the region.*

The region is rather monofunctional with predominance of agriculture.

2. *Multifunctional land use - which of the functions in your region co-exist?*

Multi-functionality of land use can increase in the region after starting slate gas exploitation. It can change general character of the region, which would become multifunctional. About 15 km from the farm, in Syczyn, first shaft was built up.

3. *Which of the functions are the most important in the context of land use?*

Definitely agriculture has the greatest importance in land use structure and in economic significance as well.

4. *Is the number of functions of land use increasing or decreasing?*

The number of function is decreasing, because other branches of regional economy collapsed during the last two decades.

5. *To which extent is the land in your region used in multifunctional way?*

In surroundings there is no multifunctional land use. Agriculture is definitely predominant.

6. *What kind of functions co-existence is:*

a) the most effective?

The most effective is abandoning of agriculture on the areas of higher natural resources values, like in the case of sand mines.

b) the most desirable?

The most desirable are functions which will diversify regional labour market for young people, especially services in rural areas and industry in towns.

c) the most common?

The most common is monofunctional land use for agricultural purposes.

d) the most difficult?

Introducing any kind of industry in the region without any tradition. E.g. in small village there were protests against sand main creating in neighbourhood, because it leads to roads devastated by tracks.

7. *Which of the functions of land use are the most important for the future regional development?*

It is hard to claim straightforward. It isn't so simple to plan wisely complex sustainable development of such region.

IV. Spatial conflicts

1. *Are there any conflicts related to land use? (As space is limited different actors compete to obtain the possibly largest area or their needs. For example: inhabitants strive to build houses, a businessman wants to put a plant or warehouse, there is a need to build somewhere sewage plant, administration of protected area tries to enlarge the area and so on).*

In the nearest surroundings there were no important spatial conflicts so far, because there were no important land use changes.

2. *What are the "competing" actors and functions (environmental, agricultural, industrial, settlement etc.)?*

Agriculture haven't got any comparable competition in the region. Environmental protection is rather not competing, but complementary function.

3. *Which of the actors are the most dynamic and successful in obtaining new land?*

There were no important pressure for changing land ownership last time. In the field of agriculture more often user of land is changing than owner of it.

4. *What are the most likely conflicts related to land use in future and what could be its impact on land use?*

It's a hard question, because it depends on future regional development scenario. And future development direction strongly depends on number of factors.

V. Government and policy

1. *Please assess the state and regional law concerning spatial management and planning in your region. Are legal rules effective in sustainable and rational management of land?*

As far as from point of view this big farm can be told, that law haven't got significant influence on activities in agriculture.

2. *Is the local and regional administration effective in land management and in preventing and solving conflicts related to land*

use? (Please describe and assess the issue and give some examples. Summarize the role of local and regional administration in management of land use).

There is no weighty troubles in the relationships between farmer and administration units. They haven't got important influence on the shape of land use.

3. *Is there any monitoring of land cover changes in the region? (Please describe briefly).*

There is no any monitoring of current land use state.

VI. Localization (depending on the region)

1. *How land use changes are resulting from vicinity of state border (how the state border influence land use in your region)?*

Neighbourhood of border line rather haven't got impact on land use structure in the region. On the other side land use and farm structure is totally different from decades.

2. *How land use changes are resulting from vicinity of sea coast (how the coastal location influence land use in your region)?*

Not concerning.

VII. Land use in general

1. *Please describe and summarize the major processes and trends of land use changes in the region over a last 50 years.*

General direction of land use changes is from diversified crop structure with rotation of it to monocultural agriculture destroying natural advantageous conditioning. There is negative influence on yields observed due to it.

2. *In a typology elaborated on the basis of statistic data, your region represent the type X, characterized by "agricultural". Is it a proper type for your region? Please explain.*

It's typically agricultural region without significant changes of this state. A simple proof of it is actual landscape around this farm.

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