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Changes in land use structure in suburban zones in Poland after the 90.

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Abstract. Suburbanisation is currently an essential characteristic of urban development in big European cities and their peripheral zones, both in the so called "Old Europe" and in most big cities in post-Communist countries. Suburbanisation is reflected mainly in changes within land use, intensification of development outside the city borders (especially along exit roads), and increased commuting.

Land use structure is the outcome of decisions of bodies responsible for spatial management. It also depends on external factors (economic, technological, and social) and internal ones (e.g. current land development, attractiveness of land location within the city).

The aim of the paper is to present changes in land use structure in Poland after the 90. with special focus on changes within suburban zone of Poznań city.

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INTRODUCTION

After 1990, we witnessed a number of social and economic changes – including the marketization of land management and the change of property relations – which accelerated the process of the functional and spatial transformation not only of cities, but also of suburban areas.

The process of the functional and spatial transformation of suburban zones is reflected in the change of land use, i.e. the distribution of functions in a given area. The structure of land use is the outcome of the decisions made by subjects responsible for land management and changes under the influence of exogenous and endogenous factors.

Changes in land management that took in place in Poland after 1989 are the product of overlapping processes of the political transformation and globalisation. They occurred not only in cities, but also in

other areas, although the scale and intensity of changes were varied. The scale and intensity of these changes is determined by local factors, such as the geographical location, transport accessibility, human resources, the level of investment so far, the structure of local economy, the condition of the environment, and others (Tanaś and Trojanek 2012).

1. THE PREMISES OF THE PROCESS OF THE LAND USE STRUCTURE

The scope and pace of changes in the structure of land use vary both with regard to the cross section of particular communes (rural commune – municipal commune) and within the framework of specific types (Wierzchowski 2011).

In rural communes, where the rural use of land is dominant in the structure, this process is slower than in municipal communes, especially in big cities and conurbations. Moreover, it usually comes down to excluding land from rural or forestry use. Transformations of the structure of land use within the administrative borders of a city take place in a different way. We usually witness the process of internal reorganisation within the framework of the existing structure of municipal lands (Gaczek 1992, 2000) or a succession (which usually consists in replacing arable lands by more intensive forms of use) (Korenik and Słodczyk 2005). The need for land use transformation may result from the following types of activities aimed at accomplishing the established development objectives of a specific area:

- social, including the creation of conditions for improving the living standard of a given community,
- ecological, including the activities aimed at slowing down the processes of the degradation of the environment,
- economic, such as those which provide the opportunity for the growth in the operational efficiency of all subjects (including communes) by choosing the most beneficial forms of land use.

They concern particular communes (location zones) to a different degree. Potential investors assess the location attractiveness of these communes as less or more conducive to their investment plans.

The structure of land use is determined by:

- the features of space which influence the potential development directions of a given area,
- the way the processes of development in space have gone so far,
- the need for undertaking action aimed at eliminating the effects of wrong location decisions,
- decisions concerning the management of the land included in the local spatial management plan,
- the restructuring action undertaken in a given area,
- the need for obeying market rules in land management,
- the need for rational land management, which comes down to the implementation of the principle: the right activity at the right place (the coherence principle).

In recent years, we have witnessed the phenomenon of the activation of suburban areas. The functional changes occurring in suburban zones include the conversion of rural land and its reclassification as the land suitable for residential, service and industrial purposes, related to the manufacturing industry. The multitude of economic functions makes suburban areas become the place of severe conflicts concerning land use (Bański 1998). A typical example of such a conflict is the situation in which the same area provides favourable conditions for the development of various business functions. If the demand of different subjects for specific features of space is bigger than supply, a conflict situation will occur.

Nowadays, the toughest conflicts in suburban zones arise between agriculture and the construction industry. Until recently, two contradictory processes have been developing here. A ready market was an incentive for intensifying agriculture and increasing the area of arable land. On the other hand, the territorial and

population growth of cities led to the gradual reduction of this land. The competition of agricultural land located far from big municipal centres and strong construction pressure make agriculture lose its significance in suburban areas.

Table 1 presents changes in the structure of agricultural land use in the first ring of communes directly neighbouring the biggest Polish cities.

Table 1

Changes in the size of agricultural land in the suburban zones of the biggest Polish cities in the years 1995-2010

Territorial unit	Agricultural land - total		Arable land		Orchards		Meadowland		Grazing land	
	change		change		change		change		change	
	2000/ 1995	2005/ 2000	2000/ 1995	2005/ 2000	2000/ 1995	2005/ 2000	2000/ 1995	2005/ 2000	2000/ 1995	2005/ 2000
Warsaw	-3.44%	-2.99%	-3.07%	-1.64%	-5.17%	-8.52%	-4.46%	-9.72%	-4.63%	-4.61%
Łódź	-0.85%	0.22%	-3.34%	1.73%	16.01%	-5.04%	1.73%	-1.59%	28.48%	-13.96%
Wrocław	-0.60%	0.59%	3.99%	0.20%	2.24%	-15.11%	-13.93%	-7.18%	-42.02%	29.98%
Poznań	-2.79%	-1.43%	-2.57%	-1.76%	0.00%	-20.05%	-6.32%	2.43%	-4.00%	17.75%
Kraków	-5.71%	-8.30%	-8.43%	-4.74%	-18.05%	-34.43%	13.54%	-9.36%	-12.63%	-42.05%
Tricity	-1.05%	-0.07%	0.30%	4.13%	0.29%	-16.08%	-3.51%	-17.76%	-8.80%	-12.18%
Szczecin	-4.90%	-2.50%	-4.41%	-3.52%	-27.45%	-28.37%	-5.49%	1.72%	-3.63%	-4.97%
Białystok	-0.47%	-1.06%	-0.94%	-1.25%	29.39%	7.99%	18.50%	-8.12%	-22.06%	11.36%

Source: based on the Bank of Local Data of the Main Statistical Office.

Around all of the above cities (except for Łódź and Wrocław in 2000-2005) the size of agricultural land decreased in 1995-2005. The phenomenon reached the biggest scale between 1995 and 2000. The communes surrounding Kraków witnessed the most significant reduction in the area of agricultural land. In the years 1995-2000, its size diminished by about 5.7%, while between 2005 and 2005 it fell by 8.3%. There was also a significant decrease of agricultural land in the area surrounding Szczecin and Warsaw. Orchards, meadowland and grazing land accounted for the biggest drop in the size of agricultural land.

In the following section of the paper, we will look into changes in the use of land using the example of the selected conurbation.

2. THE EXTENSION OF POZNAŃ AGGLOMERATION

Urban agglomeration is basically a morphological unit and it consists of compact set of settlement units (big city with suburban zone), created as a result of concentration of development and functions in the city and its border zone. Its creation is a result of stopping territorial development of the city (expansion of its administration area), accompanied by the process of sprawling compact building, production and service infrastructure development outside its administrational areas (suburbanisation) (Kaczmarek 2008).

From the point of view of practical activity, it is necessary to delineate such borders of agglomeration which would not change in a longer term. Besides, due to legal and system reasons agglomerations should consist of territorial units equipped with legal power as to the appropriate area (Parysek 2007).

On the basis of the analysis of earlier works, and various social and economic circumstances, as Poznań agglomeration we regard the area of the Poznań city and Poznań county (Figure 1).

Figure 1. The area of Poznań agglomeration as accepted in the article
Source: http://pl.wikipedia.org/wiki/Powiat_pozna%C5%84ski.

According to functioning 3-level administration division, basic elements of Poznań agglomeration are:

- Poznań city (city with county rights),
- Poznań county – local self-government unit of transcommunal level,
- 17 communes – local units, including 2 urban communes (Luboń and Puszczykowo), 7 rural communes (Czerwonak, Dopiewo, Kleszczewo, Komorniki, Rokietnica, Suchy Las and Tarnowo Podgórne) and 8 urban-rural communes (Buk, Kostrzyn, Kórnik, Mosina, Murowana Goślina, Pobiedziska, Stęszew and Swarzędz).

3. CHANGES IN THE STRUCTURE OF LAND USE IN POZNAŃ AND ITS SUBURBS

The process of changes in the structure of land use in the Poznański district in the years 1995-2010 took place in the area of almost the same size (the area shown in the list as of 1 January, 2010, is smaller than in the previous year of the analysis - 2005 – by 18 ha) and initially featured the increase in the intensity of land management.

The analyses were based on the overall lists of land as of 1 January of 1995, 2000, 2005 and 2010, prepared by the *District Centre* of *Geodetic* and *Cartographic* Documentation at the District Governor's Office in Poznań.

The structure of land use in the analysed years is shown in Figure 2.

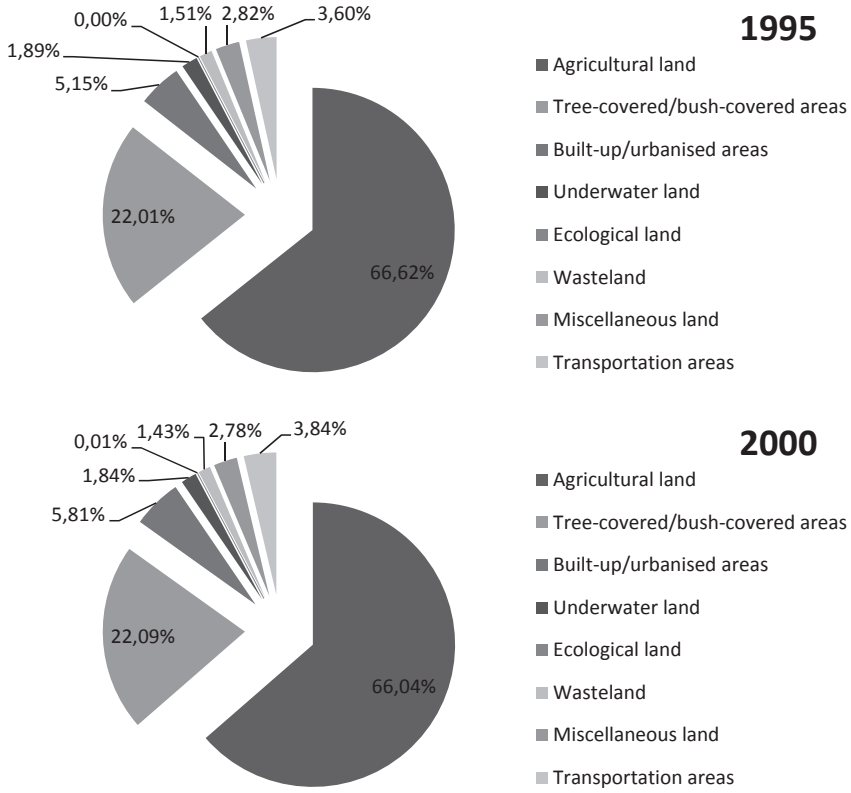

Figure 2. The structure of land use in the Poznański district in 1995 and 2000.
Source: author's own work based on the data from the *District Centre of Geodetic and Cartographic Documentation* in Poznań as of 1 January, 1995, and 1 January, 2000.

The size of land in the communes of the Poznański district in the years 1995-2000 was 189 635 ha. In the period under study, the most significant changes in the structure of land use in the Poznański district occurred in:

– built-up/urbanised areas. In 1995, these areas accounted for 5.15% of the total area of the district. Between 1995 and 2000, the size of the built-up and urbanised areas increased by almost 13%, and their share in the total area grew to 5.89%;
– agricultural land was the most significantly reduced – by 1111 ha. Taking into consideration its share in the total area, however, it was a drop by only 0.9%;

– changes in the size of forest land and tree-covered areas were not bigger than half a percentage point, but the difference between 2000 and 1995 was just 158 ha. The pursuit for the rational use of one's land is also reflected in the successive reduction of areas classified as miscellaneous land and wasteland;

The scale of changes in the use of agricultural land in the communes of the Poznański district was spatially varied:

– the biggest reduction in the size of this land took place in the cities of the Poznań conurbation: Swarzędz, Stęszew and Puszczykowo (by 11.5, 10 and 8% respectively);
– there were different trends as regards particular types of agricultural land. The increase of the size of built-up areas was the most significant. The maximum growth took place in the communes directly neighbouring Poznań (Tarnowo Podgórne, Suchy Las, Dopiewo and Rokietnica) as well as the cities of Kórnik, Luboń and Swarzędz, and the rural part of the Pobiedziska commune. We also witnessed the reduction in the size of green areas and orchards;
– roads occupied the biggest part of built-up and urbanised area – 61.7% and 59.3% respectively. Their size in the period under study grew by 8.5% (from 6,026 to 6,538 ha);
– the biggest growth of size (by 82.35%) in relation to the base year took place in the case of non-built-up urbanised areas and other built-up areas (by about 22%). The size of industrial, recreational and built-up areas was reduced by 22%, 10.5% and 7% respectively.

Figure 3 illustrates the structure of land use in 2005 and 2010.

In the years 2005-2010, the most significant changes in the structure of land use in the Poznański district occurred in:

– built-up/urbanised areas. Between 2005 and 2010, the size of the built-up and urbanised areas increased by over 8%, and their share in the total area grew to 8.17%;
– agricultural land was the most significantly reduced – by 1557 ha. Taking into consideration its share in the total area, it meant a drop by about 0.9%;
– woodland grew by about 1.5% and took up 23% of the district's territory (43,619 ha). The share of the area of ecological land, wasteland and miscellaneous land in the total area of the Poznański district only slightly changed.

In the period under study, the most considerable changes in the structure of agricultural land in the communes of the Poznański district took place in built-up agricultural land and green areas – meadowland, grazing land and orchards. All the above subgroups witnessed the reduction in their area in 2010 as compared to 2005 (by 16.7%, 12.3%, 20%, and 16% respectively). It is worth noting that the area of arable land slightly increased – by 0.71%, which means the growth in size by 736 ha.

Moreover, it was industrial land and other built-up areas that grew in size in the most significant way (by about 45% both). It was the result of the location of manufacturing plants in the communes directly neighbouring Poznań: in Tarnowo Podgórne, Komorniki, Kostrzyn, in the rural areas of Buk and Kórnik, as well as of the increase in the size of other built-up areas in Komorniki, Tarnowo Podgórne, Swarzędz, Suchy Las and Luboń.

There was also a big increase in size (the biggest of all subgroups – by 1,356 ha) in residential areas – the growth by about 37% from 2005 to 2010. It resulted from the difference between the prices of land for housing development in Poznań and the prices of such land in the surrounding communes.

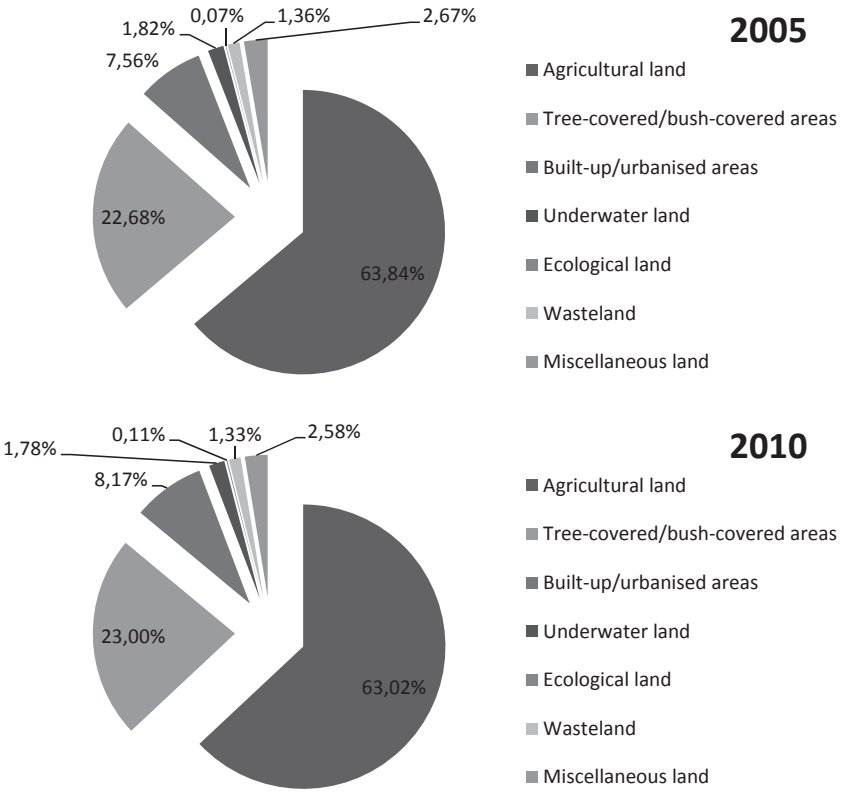

Figure 3. The structure of land use in the Poznański district in 2005 and 2010.
Source: author's own work based on the data from the *District Centre of Geodetic and Cartographic* Documentation in Poznań as of 1 January, 2005 and 1 January, 2010.

Figure 4 illustrates the reduction in arable land in the communes of the Poznański district in 1995-2010 in hectares.

The scale of changes in the use of agricultural land in the communes of the Poznański district was spatially varied. In the period under study, regardless of the changes in the classification of arable land mentioned earlier, the biggest reduction in the area of agricultural land in absolute numbers took place in the communes of Swarzędz (399 ha of agricultural land less), Swarzędz (332 ha), Tarnowo Podgórne (328 ha), and Komorniki (324 ha). Among the communes with the lowest decrease are Luboń (108 ha of agricultural land less), Kostrzyn (115 ha), Kleszczewo (148 ha), and Puszczykowo (175 ha).

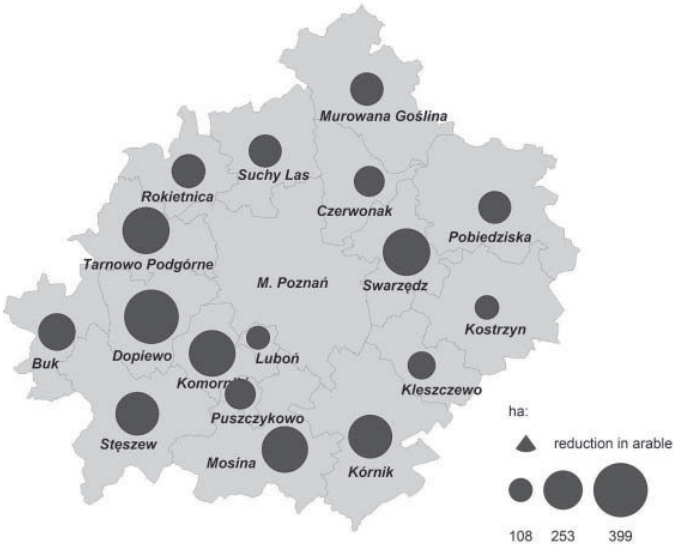

Figure 4. The reduction in arable land in the communes of the Poznański district in 1995-2010 (ha).
Source: author's own work based on the data from the *District Centre of Geodetic and Cartographic* Documentation in Poznań.

Figure 5 shows the reduction in the size of agricultural land in the communes of the Poznański district in 1995-2010.

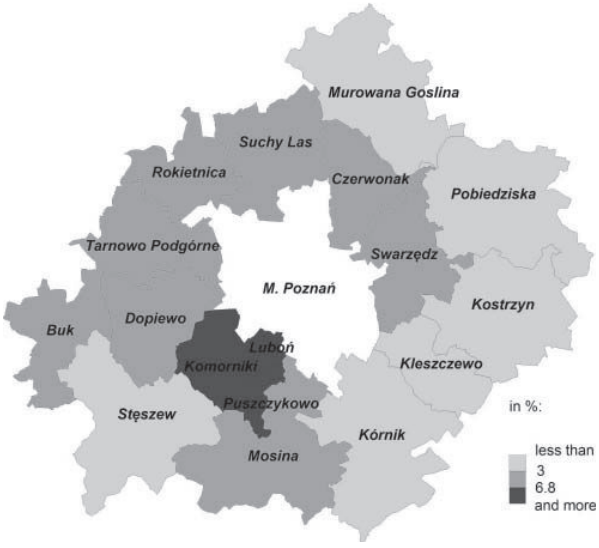

Figure 5. The reduction in the size of agricultural land in the communes of the Poznański district in 1995-2010 (%).
Source: author's own work based on the data from the *District Centre of Geodetic and Cartographic* Documentation in Poznań.

If we analyse changes in the size of agricultural area in directed numbers, the classification of communes looks a bit different. The biggest reduction in the size of agricultural land in relation to the total territory of a given commune took place in the communes of Puszczykowo, where its area decreased by 46.05%, Luboń – by 16.01%, Komorniki - by 6.85%,and Suchy Las – by 6%. The following communes witnessed the smallest decrease - Kostrzyn (by less than 1%), Pobiedziska (by 1.66%), Kleszczewo (by 2.2%), and Stęszew (by 2.38%).

The above analysis, on account of the existing law regulations, does not provide the full picture of the phenomenon under discussion, but it may be used for the observation of the dynamic phenomenon of "urban sprawl."

CONCLUSION

The development and structural and functional transformation of cities are the outcome of the impact of internal factors (systemic changes concerning the functioning of economy and state) and external ones (globalisation, the openness of economies, integration, and competitiveness).

The discussed transformations differ in size and characteristics between particular cities, depending on their conditions resulting from the previous development directions. One of the indications of spatial and structural changes that occur not only in Poland is the way land management has changed.

The pace and scope of changes in the structure of the use and ownership of land with reference to particular areas (communes) will depend on exogenous factors (indicated before) and endogenous ones, including the preparation and implementation of the local strategy of property management, in which the nature of the discussed issues is expressed.

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