

Is sustainability possible in suburbs of big cities? the example of Warsaw

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Introduction

Warsaw, as a capital of Poland, has relatively good economic and social conditions comparing to the rest of the country. Furthermore, it strongly influences neighbouring areas which are rural from the administrative point of view. However, they do not like as traditionally perceived rural areas with agriculture dominating. Rural areas in the suburbs of Warsaw, but also in other territories close to big cities, have been undergoing significant transformations. They have been changing their functions from agricultural to industrial or service ones. Development of the big city is a challenge and chance but on the other hand it puts pressure for example in a form of demand for new places for investments of different nature for example housing or industry and services. All these processes contribute to very complicated situation connected for instance with a necessity of an efficient transport system or respect for protected areas of high quality and importance of natural environment.

Material and method

The question raised in the title resulted from research entitled "Social and economic determinants of development of rural areas in the suburban and external zone of Warsaw". Basing on the studies of the Polish geographers [Komornicki, Śleszyński 2009] there was indicated the functional area of suburbs of Warsaw including rural and urban-rural communes (with towns of number of inhabitants lower than 5000) (Fig. 1).



Figure 1. Researched area on the background of the Polish regions
Source: Author's with use of MapInfo Professional 10.5

Basing on such determined area, the study consisted of the following steps:
1. selection of statistics from the Local Data Bank of the Polish Central Statistical Office and basing on them formulation indicators which can describe increasing pressure of urban sprawl on neighbouring rural and urban rural communes (in Poland, this division is performed basing on administrative criteria):

- x1 growth of population density in the period 2003-2010
- x2 growth of a number of enterprises (establishment of natural persons conducting economic activity) per km² in the period 2003-2010
- x3 growth of commercial law companies per km² in the period 2003-2010
- x4 distance from the centre of Warsaw
- x5 proportion of area covered by local spatial management plans in 2010
- x6 proportion of area for which a status was changed from agricultural purposes for non-agricultural purposes

2. Values of indicators were unitarized according to the formula

$$z_{ij} = \frac{x_{ij} - \min_i \{x_{ij}\}}{\max_i \{x_{ij}\} - \min_i \{x_{ij}\}}$$

where:

z_{ij} unitarized value of i-th element of j-th variable
 x_{ij} nonunitarized value of i-th element of j-th variable
 $\min(x_{ij})$ minimum of j-th variable
 $\max(x_{ij})$ maximum of j-th variable

3. one variable which was a destimulant (x_4 - distance from Warsaw) was transformed into a stimulant according to the formula:

$$x_{ij}^s = \max_i \{x_{ij}\} - x_{ij}$$

where:

x_{ij}^s value of i-th element of j-th variable after transformation into stimulant

4. there was conducted a taxonomic comparative analysis with use of the k-means method in order to determine homogenous subgroups of communes similar from the perspective of the synthetic aggregated variable [Zeliaś 1991]; there was used IBM SPSS Statistics 20 for these calculations as well as MapInfo Professional 10.5 to display the results on a map.

5. there was perform an attempt to investigate relationships between the statistical analysis and partial results of research a questionnaire directed to local authorities and for example their opinions on influence of localization of protected areas on their development potential; the questionnaire was performed as a part of the research project "Social and economic determinants of development of rural areas in the suburban and external zone of Warsaw" N N114 145240.

Results

Statistical analysis

One of the preliminary tasks in use of the k-means method is to determine a number of groups the population is divided into. It cannot be very high because it requires much time for analysing without improvement of grouping. On the other hand, it cannot be too low because groups are too weak [Najman 2008]. Basing on the knowledge of the researched communes from the previous studies as well as results of different number of groups in various variants of the analysis, there was finally selected the division into four groups (Fig. 2).

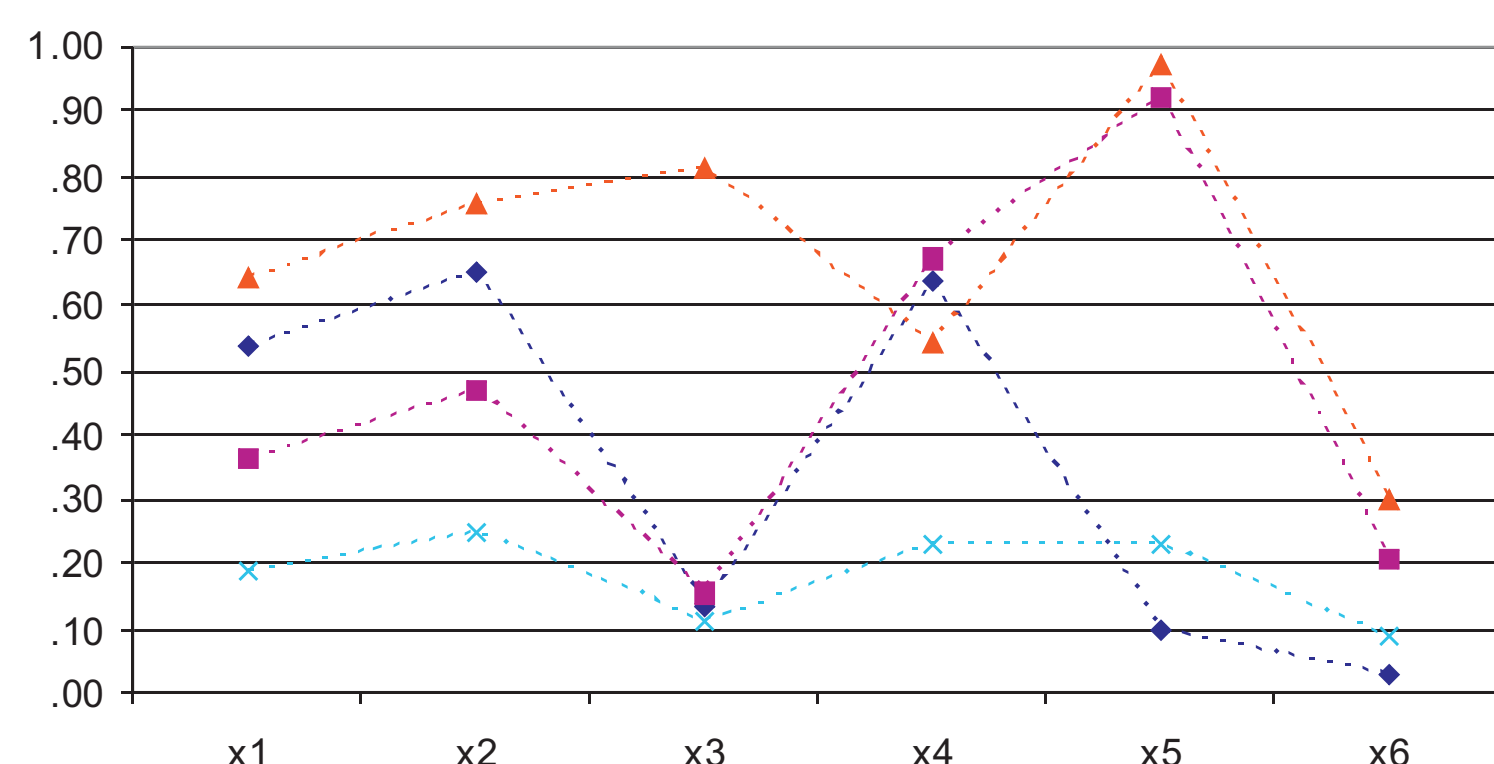


Figure 2. Average values of unitarized variables for groups distinguished by the k-means method
Source: Author's with use of IBM SPSS Statistics 20.

The analysis of the figure proves that the third group is the best one. It includes only two communes: Lesznowola and Radziejowice; however they appear to be the most outstanding ones in all analysis performed so far within the research project. The fourth group has the lowest values of variables describing: growth of population density (x_1) as well as growth of economic development expressed by growth of a number of enterprises (x_2 and x_3), and it is also characterized by the biggest distance from Warsaw (Fig. 3). However, the situation in case of spatial planning is not the worst one there.

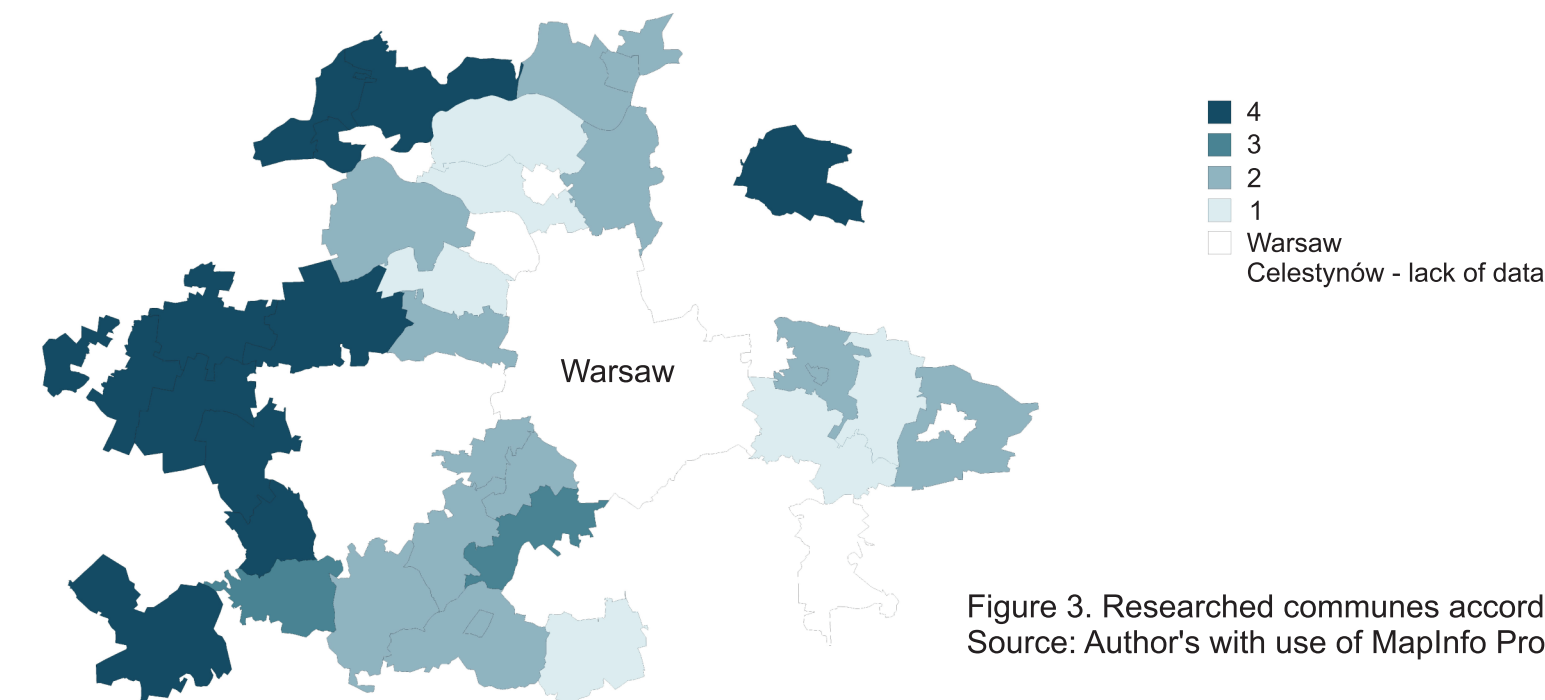


Figure 3. Researched communes according to grouping with the k-means method
Source: Author's with use of MapInfo Professional 10.5

Empirical studies

Unfortunately, the research team has not managed to get answers for the survey to commune offices for the whole investigated population of communes in the suburbs of Warsaw. The survey included one question concerning the issue how local authorities perceive localization of legal protected area in their communes. The answers, mainly because their partial character, have not displayed any comprehensive picture in that case. Taking into account the groups of communes distinguished with the k-means method, localization of legal protected area was perceived as: (1) a chance for entrepreneurship according to one commune of the 3rd (best) group; (2) a chance for two but also a barrier for two communes of the 2nd group; (3) a barrier for two or a neutral factor for two communes of the 4th group (the most remote communes); (4) both a chance and barrier for one commune of the 4th group. This list does not allow to drawing any significant clear conclusion. So in order to investigate reality of researched communes, there were included some photographs from Dębe Wielkie rural commune from the administrative point of view, placed in the 1st group with the k-means method (Pic. 1, 2, 3, 4, 5). It is situated about 32 kilometres away from the centre of Warsaw, with the express road E30 to Terespol (border crossing with Belarus).



Picture 1. Horticultural function is still present orchard
Source: Author's, 2012.



Picture 2. On the other hand horticultural function as a matter of the past
Source: Author's, 2012.



Picture 3. Part of the suburbs of Warsaw and E30
Source: Author's, 2012.



Picture 4. Industrial development
Source: Author's, 2012.



Picture 5. Housing development
Source: Author's, 2012.

Conclusions

There still exists many areas in Poland which do not have their local spatial management plans. It is caused by the existing legal regulations (they oblige to perform plans only for specially defined areas) as well as unwillingness of some local self-governments to undertake such efforts. Of course, it should be admitted that performance of such plans is a long and expensive process. On the other hand, in a situation of lack of such plans, it is much more difficult to obey rules of sustainable development on a local level. When decisions on permissions of industrial plantor housing location are rendered separately for all enquiries, it also causes a potential risk of giving a positive answer for an investment not friendly to the environment as well as people already living in particular place.

Communes located in suburbs of big cities and along with developed transport corridors are exposed to urban sprawl. In the case of the communes closest to Warsaw, it was proved by increasing pressure of population density or entrepreneurship growth as well as the highest proportion of area for which a status was changed from agricultural purposes for non-agricultural purposes. In such situation, there occurs considerable responsibility of local self-authorities for sustainable development, which in some cases can be contradictory for short-term economic interests. Taking into account the above mentioned issues, it is nearly impossible to answer the question arisen in the title of the study. Suburban areas are under such pressure of urban sprawl that their sustainable development is really a complex matter. At least, this study can contribute to pointing out how responses to this pressure are important on the local level in the context of rural areas which have been becoming not so "rural" anymore.

References

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