



Urban spatial policy and its impact on open areas – Płock case study

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How to cite:

Feltynowski M., 2017: Urban spatial policy and its impact on open areas – Płock case study. In: Chodkowska-Miszczuk, J. and Szymańska, D. editors, *Bulletin of Geography. Socio-economic Series*, No. 36, Toruń: Nicolaus Copernicus University, pp. 87–94. DOI: <http://dx.doi.org/10.1515/bog-2017-0016>

Abstract. Spatial planning has to be carried out in accordance with the sustainable development principle. When compiling every document indicated in the Spatial Planning and Development Act, local authorities have to take into account the conditions that are valid in a gmina. They should rely on available materials which are a support for the decisions that are made. An element that constitutes support for local authorities is spatial data available in international sources, e.g. the European Environmental Agency or individual sources, e.g. vector versions of the documents in the scope of spatial planning.

The purpose of the article is to present which materials used by local governments can allow for an appropriate assessment of the need for new areas of housing development and the limitation of decisions concerning the liquidation of open areas in cities. The article presents tools and data which constitute a basis for an evidence-based spatial planning policy and have to be used by local authorities. The procedure presented in the article can be a tool supporting the spatial policy and an element of evaluation whether the decisions made by local authorities are correct.

Article details:

Received: 23 September 2015

Revised: 17 February 2016

Accepted: 02 February 2017

Key words:

study of conditions,
evidence based,
urban planning,
spatial data,
land use.

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1. Introduction

The spatial planning system in Poland during the period of transformation underwent changes connected with the adaptation to European standards. The first stage of reforms was the Act dated 7 July 1994 concerning spatial planning (Act of 7 July 1994) which introduced a new quality of spatial planning. In order to carry out activities in the scope of spatial planning, gminas acquired the following tools: the study of land use conditions and directions, land use plan and planning permits. These tools have been sustained in the current Spatial Planning Act dated 27 March 2003 (Act of 27 March 2003).

A complex document compiled for the area of an entire gmina is the study of land use conditions and directions (hereinafter: the study or study of conditions), an obligatory document that determines the spatial policy of a gmina. The study cannot directly influence the citizens, which in consequence can lead to situations in which planning permits will be contrary to the provisions of the study. However, there are judgements of the Supreme Administrative Court (SAC) which indicate the necessity to ponder over the mutual relations between the study and planning permits (II OSK 1250/08 – SAC Judgement).

With reference to land use plans, it has been explicitly stated that they constitute a local law and due to this fact, their provisions concern all space users. It has to be emphasized that land use plans, as a rule, are non-obligatory documents. An alternative to land use plans are planning permits which as administrative decisions allow for a change in land development.

The study, determining the spatial policy of a gmina, constitutes a guideline for land use plans. According to the provisions of Article 20 (Act of 27 March 2003), land use plans cannot contravene the decisions of the study. The provisions of the study due to the necessity of their consideration in plans are an element which can influence the directions of spatial development in gminas in the long-term. It is noteworthy that the publications concerning the discussed subject, often indicate that the decisions included in the studies, more than once are contrary to the trends present in the

social sphere on the gmina's territory (Kowalewski et al., 2014). Expert analyses convince that the demographic capacity of the areas set out in the documents in the scope of spatial planning exceeds the number of the state's population ten times, and the area reserves for housing development can be sufficient even for 200 years (FRDL, IGIPZ PAN, 2013).

The approach of local authorities to an unpromising destination of urban open areas for housing use meets a critical approach of the scientific environment which notices in this phenomenon the willingness to speculate in land prices (Kościński, 2012; Kudłacz, 2013). This is particularly visible with reference to the agricultural areas where the value of a hectare of arable land during the transformation period increased fivefold. The speculations connected with agricultural lands within city areas increased after 1 January 2009, when the Agricultural and Forest Land Conservation Act (Act of 2 February 1995) introduced a provision that the Articles of the Act do not apply to agricultural lands that constitute arable lands situated in cities. Even more liberal provisions were introduced in amendments concerning the Act of 2014. The provisions of the Acts do not promote the idea of sustainable development, which makes it possible for local authorities to increase the land allotted to building development, thus decreasing the potential of a city in the scope of open areas.

What can support the idea of sustainable development in spatial planning is the use of spatial data in order to estimate and monitor the urbanization processes taking into consideration the environmental sphere (Reis et al., 2003; Ciołkosz, Poławski, 2006; Drzewiecki, 2008; Koomen et al., 2008) and demographic changes. Use of spatial data can be a basis for a search for solutions based on evidence (evidence-based policy) in the scope of spatial policy. Knowledge included in the data which is available in time sequences allows its users to analyse it and draw advanced conclusions which should become a basis for the decisions made by local authorities (Marston, Watts, 2003). An answer to the indicated excessive consumption of the areas in the majority of gminas is to present citizens with conclusions from the analyses concerning space or the compilation of real demographic capacity indicators on the basis of the real use of areas in a city. This should support the rational management of the

areas. In case of the study of conditions one has to focus on a rational use of space which is a rare good and its ill-considered use negatively influences the environmental sphere.

2. Research materials and methods

The basic criterion influencing the choice of the city of Płock was the examination of the phenomena concerning changes in land development within the area of a big city in accordance with the criteria used by the CSO (the Central Statistical Office of Poland), where a centre with a population number exceeding one hundred thousand inhabitants is said to be a big city. This is confirmed by the scientific research in this scope (Regulski, 1980; Brol et al., 1990; Heffner, 2008; Runge, 2011). The choice resulted from the familiarity with the city and the chance to verify the use of urban areas.

At the end of 2014, Płock was the last of the 30 biggest cities in Poland in terms of population in the ranking published by the CSO. An additional element that has an impact on the choice of this urban centre was the fact that it is an industrial city that also has a great environmental potential, e.g. in the form of areas bordering with the Vistula River. A significant element of the city are sights which to-

gether with green areas can be considered a cultural space (Sutkowska, 2006).

Currently, Płock is inhabited by 122,224 persons (CSO data). This number systematically decreases, which indicates a trend that is coincident with trends observed in other Polish cities. The population in the period of 1998–2014 decreased by nearly 8800 persons, which constitutes a loss of 6.7% of the initial state. In that period, the area of Płock did not undergo change and it constituted invariably 88 km².

The city underwent an analysis in terms of the number of areas allotted for the purposes of housing, service and industrial development. The basis of the research were two studies of conditions and directions of Płock dated 1998 and 2013, which due to the use of Quantum GIS software were transformed into a vector version. In case of infrastructure and communication areas, they were proportionally included in the adjacent areas allotted for building development. Such procedure resulted from the fact that in the graphic part of the study of 1998 there were no fully allocated communication areas.

The Urban Atlas data of the European Environment Agency from 2010 was used in order to carry out the assessment of the real conditions of the use of areas in Płock. The basis for its compilation were satellite images from 2005–2007. This data has a uniform classification of land, among

Table 1. Connection between areas designated in the study of conditions and directions of Płock and areas in the Urban Atlas

Areas in the study of conditions and directions of Płock	Areas in the Urban Atlas used in research
The dominant housing function (multi-family housing and single-family housing) areas	Continuous Urban Fabric Discontinuous Dense Urban Fabric Discontinuous Medium Density Urban Fabric Discontinuous Low Density Urban Fabric Discontinuous Very Low Density Urban Fabric Isolated Structures
Service and industrial development areas	Industrial, commercial, public, military and private units Mineral extraction and dump sites Port areas
Open areas	Agricultural + Semi-natural areas + Wetlands Forests Green urban areas Water bodies Sports and leisure facilities Land without current use

Source: Own work based on study of conditions and directions of Płock and Meirich, 2008

which there are: urban fabric with different density; industrial, service and military development; fast transit roads and associated land; other roads and associated land; railways and associated land; port areas, airports; mineral extraction and dump sites; construction sites; land without current use; green urban areas; sports and leisure facilities; agricultural areas; forests; wetlands; water bodies.

This classification enables a correlation of individual types of area allotment with markings placed in the studies of conditions. An additional asset of the EEA data is the possibility to make conclusions in the scope of consumption of the areas of Płock declared to be urbanized, which constitutes an element whereby the legitimacy of the 2013 study's provisions is assessed together with the average real demographic capacity of the residential areas in Płock (Table 1).

The analysis carried out was supposed to compare the functions of the use of areas in the two studies of conditions for the city of Płock. Particular attention was paid to residential, service, industrial and agriculture areas. Due to this, it was possible to draw conclusions concerning the directions of the spatial policy of local authorities. A further step of the analysis constituted the comparisons of local authorities' assumptions presented in two the documents with an actual state established on the basis of the EEA resources, which enabled to estimate the degree of use of individual areas and the rationality of the decisions that are made.

3. Research results

The results of the first-stage research are connected with estimating the consumption of areas allotted to housing, service and industrial development. The starting point was a study of 1998. According to its provisions, nearly 21 km² of Płock were allotted to functions connected with the existing or planned housing development. In this resource, 4.5 km² constituted multi-family housing. Assuming this kind of spatial development direction of Płock and the indicators concerning the demographic capacity of the areas at the level of 200 persons for the areas with multi-family housing per hectare and

40 persons for the single-family housing per hectare (FRDL, IGiPZ PAN, 2013), an increase in the population number of the city up to 156 thousand of inhabitants should be expected. Taking into account the average real value of the demographic capacity of residential areas calculated on the basis of the Urban Atlas, the number of inhabitants would increase to 200 thousand with a complete development of the areas. In case of services, land use of 4.6 km² was predicted, while industrial functions took the area of 14.8 km². Nearly 48 km² of Płock were open areas, among them there were 25.3 km² of agricultural areas, where 23.3 km² were indicated as areas that may undergo adaptation for other functions (Fig. 1).

In case of the study of land use conditions and directions of 2013, the spatial policy of local authorities changed. The study assumes an increase in residential areas' surface by 25% with regard to the assumptions included in the document of 1998. With reference to multi-family housing areas, this increase amounts to 26.8%. These changes lead to an increase of residential areas to 26.2 km² (Fig. 2). Assuming as a reference point the information concerning demographic capacity, it has to be stated that the number of inhabitants in Płock will increase to over 196 thousand, which according to population trends occurring in the city is an unreal phenomenon. Taking into account the data from the Urban Atlas compilation, the population number from the year 2014 would double.

With reference to service areas, an increase by 20.4% in comparison to the study of 1998 was observed. This will result in an increase in the surface of potential service functions up to 5.5 km². In case of industrial areas, the increase amounted to 19.3%. In consequence, surface taken up by them amounts 17.7 km².

An average growth of the built-up areas in Płock increased by 22.4% with reference to the assumptions of 1998. This results in a change of the proportions of the city's development, since the number of open areas decreased to 38.7 km². The loss of these areas was 18.9%. A significant conclusion resulting from the analysis of the studies of conditions carried out in the two moments is the fact that in 2013, agricultural areas disappeared from the document defining the spatial policy.



Fig. 1. Analysis of the areas allotted for development – the study of 1998

Source: Author's own work based on the study of conditions and directions of Płock from 1998



Fig. 2. Analysis of the areas allotted for development – the study of 2013

Source: Author's own work based on the study of conditions and directions of Płock from 2013

A further element of the analysis was the comparison of the real structure of the land use in Płock and the assumptions of the documents determining spatial policy. Due to the classification applied by the EEA, service areas had to be linked to industrial areas for a proper comparison of data related to their use. Aggregation of data allowed to indicate that when the Urban Atlas data was worked out, the use of residential areas in Płock amounted to 62.3%, which proved the presence of land reserves. With reference to the study of 2013, it has to be indicated that this use amounted to 49.9%. It has to be emphasized that in 2013, the preferences of local authorities changed with respect to the location of residential areas in Płock. In the present study, they are more similar to the real use of land worked out on the basis of satellite images.

In the case of service and industrial areas, their use amounted to 80.3% with reference to the study of 1998. Taking into account the changes in spatial policy included in the Act of 2013, this level amounted to 67.2%. It has to be emphasized that this kind of land use was characterized by better adaptation. When the Urban Atlas was being worked out, there were approximately 59.3 km² of open areas in the city. This proves that the reserves expected in the spatial policy of the gmina from 2013 assume the reduction of this source by over 20 km², which will have an impact on sustainable development of the city and will be related to changes in urban environment.

It has to be emphasized that a part of Płock situated on the right bank of the Vistula River is particularly exposed to anthropogenic impact. This results from the historical conditions, as well as the development of infrastructure. It has to be indicated that the northern outskirts of Płock, according to the assumptions defined in the present study, will undergo gradual development, resulting in the reduction of open areas within the administrative borders of the city. According to the provisions of the study of 2013, green areas of the right-hand bank part of Płock will be linked with the water flows in the city.

4. Conclusions

The analysis carried out on the basis of the documents of 1998 and 2013 defining the spatial policy

in Płock, make it possible to claim that the behaviour of local authorities of Płock does not differ from the trends noted in the entire country, because each study of conditions and directions designates too many areas for housing purposes. The assumptions of the strategy for the spatial planning document include the dispersion of building areas and ineffective management of space which has a negative influence on the source of space which is considered to be a rare good (Lorens, 2003). The analysis of the 2013 study allows to assume that the population number in Płock will be increasing, which is contrary to the trends resulting from the analyses of the population number in the city.

A general conclusion is the fact that while working out the planning documents local authorities should use compilations such as the Urban Atlas, which serve to work out inventory materials particularly for the sake of the study. The use of current data concerning the manner of land use makes it possible to make appropriate decisions in the context of future development of the city. The use of spatial data in creating the spatial policy enables the authorities to build an evidence-based policy, in this case related to the rationality of transformation of open areas into areas of a high level of anthropogenic impact.

It has to be emphasized that spatial data that serves the presented analysis will become a more common source of making conclusions. This results primarily from the implementation of the decisions of the INSPIRE Directive (the Directive of 14 March 2007) and the progressive technological development. It has to be highlighted that the software used for the analysis does not generate costs for local authorities since the application is open source and it can be used for the tasks fulfilled by the authorities of a gmina.

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The proofreading of articles, positively reviewed and approved for publishing in the 'Bulletin of Geography. Socio-economic Series', was financed from the funds of the Ministry of Science and Higher Education earmarked for activities popularizing science, in line with Agreement No 509/P-DUN/2016.

