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## The importance of landscape spatial plans for the shaping of urban green areas

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### Abstract

Urban greenery is an indispensable component of urban composition and can be an effective tool for solving problems related to shaping and organising urban spaces. For the proper functioning of green areas, however, it is necessary to combine them into a functional system, which must be reflected in spatial planning documents. The most effective protection of urban green areas can be ensured by appropriate provisions in local spatial development plans. The aim of the paper is to assess the significance of local spatial development plans for Poland in shaping green areas. The number of local spatial development plans in individual voivodships in the years 2009–2017 will be analysed.

**Keywords:** Green areas, landscape spatial plans, sustainable development.

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## 1. Introduction

Spatial planning is a tool for building instruments that allow for proper spatial development of the whole country, voivodships and communes. In local planning, one of the rules in force is the superior position of the commune and its independence. When listing communes' own tasks, particular attention should be paid to pursuing and shaping spatial policy, including the adoption of planning documents that determine the manner of development, building conditions, designation and the area. It can be noticed that due to its origins in ecology of systems and the growing interest in interdisciplinary research on the management of related social and ecological systems, the role of spatial planning in the time perspective is clearly increasing (Wilkinson, 2011).

Spatial development plans are legal acts that are to serve the implementation of spatial policy in the area of the commune. They carry a number of economic, environmental, legal and social consequences. Spatial planning helps to build appropriate instruments for the proper development of the entire country, voivodships and communes. There is also a discussion about the approach to the planning process, referring to the way these plans are oriented towards the inhabitants or the city authorities. The first described as the postmodern approach, the second planning controlled by the authorities (Boelens, 2010, Recio, Mateo-Babiano, Roitman, 2017). However, while the basic objection concerning planning controlled by the authorities refers to high costs, inelasticity and inefficiency, it also better captures the concept of sustainable development, which is less stressed in the postmodern, neoliberal approach (Boelens, 2010, Balducci, Fedeli & Pasqui, 2011). The high level of state control contributes to the growing importance of political factors to a lesser extent taking into account the importance of local communities (Zeuthen, 2017). In assessing the effectiveness of plans, the institutional environment that allows to explain the effectiveness of spatial plans and their impact on environmental issues is of key importance (Kamaras & Yiannakou, 2017; Kulyk & Dubicki, 2018). The problem of the ecological protection process in the context of urban development is important here from the point of view of theory and practice. This approach allows taking into account the political economy of these plans to demonstrate their importance in the theory of urban ecology (Lin, 2019) and the concept of sustainable development. Sustainable urban development is seen as a panacea for the limitations of many negative externalities caused by urbanisation and dynamic urban development.

The aim of the paper was to assess local spatial development plans on the territory of Poland in 2009–2017 in shaping green areas by individual voivodships.

## 2. Functions of local spatial development plans

The local spatial development plan specifies the planning conditions, the location of public utility projects and the land use designation. Increasing the intensity of land use in urbanised areas requires integrated systemic actions supporting the creation of a common spatial policy for municipalities and optimal distribution of basic functions (Kurowska & Kietlinska, 2017). Local plans have different functions. We can consider the coordination of activities undertaken on the basis of plans that is investment activity in the areas covered by the plans as well as coordination due to the implementation of these activities by specific persons or units. Another function of the local spatial development plans is the information function, also called an information and planning function. It serves to preserve the openness and certainty of socio-economic life, to provide data on actions taken by participants of various processes taking place in space, and to provide information to local government bodies necessary to conduct an effective promotional and offer policy of the commune. Among the functions that the local plans fulfil there is also an inspirational function, which is realised by extracting unique values of space and creating new solutions that increase the attractiveness of potential entities and a protective and regulatory function, which is expressed by defining the framework and conditions for conducting various activities as a result of which the development takes place (Juchniewicz, 2011).

In environmentally attractive cities, there may be conflicts between environmental goals and economic development. The spatial planning system requires reconciliation of these conflicts based on the concept of sustainable development. According to it, environmental protection must be an integral component and cannot be treated in isolation from socio-economic development (Bulkeley & Betsill, 2005). In this context, the concept of sustainable city development should also be invoked (Flint & Raco, 2012; Yigitcanlar & Teriman, 2015), based on the development of a balance between the three subsystems of the city, which include: society, economy and nature. It is connected with a new way of conceiving place, space and social relations. It is a multi-dimensional approach to spatial planning. In a broader sense, it is a spatial planning concept that allows for selection of competing and complementary priorities of ecosystem services for a particular space.

### 3. Analysis of spatial development plans

The territory of Poland is divided in administrative terms into 16 provinces. The geographical distribution of Poland is diverse, voivodships differ from each other in terms of both the area they occupy and the landform. Table 1 shows how the number of local spatial development plans in Poland in 2017 was shaped.

**Table 1. Local spatial development plans in Poland in 2017**

Voivodship	Voivodship area	Area of the voivodship covered by LSDP		Number of LSDP (it.)
	(ha)	(ha)	(%)	
Dolnoslaskie	1,994,674	1,262,259	63	6,236
kujawsko-pomorskie	1,797,134	117,669	7	3,642
Lubelskie	2,512,246	1,425,176	57	1,478
Lubuskie	1,398,789	128,581	9	1,601
Lodzkie	1,821,895	595,550	33	2,253
Malopolskie	1,518,279	1,016,035	67	2,553
Mazowieckie	3,555,847	1,145,090	32	4,777
Opolskie	941,187	388,868	41	1,205
Podkarpackie	1,784,576	159,419	9	3,972
Podlaskie	2,018,702	339,315	17	1,240
Pomorskie	1,831,034	375,274	20	5,632
Slaskie	1,233,309	855,962	69	3,237
Swietokrzyskie	1,171,050	360,641	31	754
warmińsko-mazurskie	2,417,347	315,589	13	2,613
Wielkopolskie	2,982,650	607,952	20	8,110
zachodniopomorskie	2,289,248	442,368	19	2,258
In total	31,267,967	9,535,748	30	51,561

At the end of 2017, Poland had 51.6 thousand plans covering an area of 9.6 million ha, that is 30.5% of the country's area. This means an increase compared to 2004 by 13.2 pp. The pace of this growth is still unsatisfactory. There is also no reason to believe that in the coming years a significant part of the country has been regulated in this respect. Against this background, a much better situation occurs in the largest cities in which acceleration of planning works has been achieved in recent years. The number of local spatial development plans in Poland, depending on the voivodship and spatial policy conducted by local governments, is varied but in each case analysed in 2009–2017, the situation improved (Table 2).

**Table 2. The number of valid local spatial development plans in Poland in 2009–2017**

Voivodship	2009	2010	2011	2012	2013	2014	2015	2016	2017	Dynamics
dolnoslaskie	4,214	4,453	4,783	4,860	5,059	5,370	5,689	5,973	6,236	148
kujawsko-pomorskie	2,753	2,880	3,013	3,098	3,192	3,267	3,358	3,473	3,642	132
lubelskie	1,005	1,060	1,085	1,156	1,220	1,252	1,344	1,405	1,478	147
lubuskie	1,070	1,162	1,230	1,302	1,389	1,439	1,485	1,554	1,601	150
lodzkie	1,242	1,353	1,469	1,581	1,659	1,809	1,953	2,072	2,253	181
malopolskie	1,826	1,889	2,022	2,061	2,185	2,278	2,352	2,436	2,553	140
mazowieckie	3,303	3,182	3,392	3,551	3,814	4,110	4,307	4,566	4,777	145
opolskie	825	875	918	972	1,016	1,111	1,136	1,192	1,205	146
podkarpackie	3,427	3,532	3,635	3,664	3,745	3,803	3,859	3,906	3,972	116
podlaskie	920	957	1,010	1,061	1,149	1,173	1,182	1,195	1,240	135
pomorskie	4,127	4,374	4,504	4,783	4,934	5,206	5,254	5,408	5,632	136
slaskie	2,350	2,418	2,579	2,696	2,788	2,869	2,985	3,141	3,237	138
swietokrzyskie	559	607	572	600	654	676	713	720	754	135
warminsko-mazurskie	1 600	1 735	1 903	2 044	2 153	2 254	2 377	2 491	2 613	163
wielkopolskie	5,546	5,863	6,229	6,579	6,898	7,139	7,412	7,738	8 110	146
Zachodniopomorskie	1,426	1,565	1,650	1,740	1,828	1,947	2,072	2,170	2 258	158
Coefficient of variation	65.47	65.08	65.26	65.01	64.48	64.33	64.03	64.16	65.42	

The largest dynamics of local spatial development plans adopted by self-governments was recorded in the Lodzkie voivodship, in 2007 the number was 1,242, and after 9 years it increased by 1,311. It is the largest increase in Poland in the analysed years in terms of the number of local spatial development plans. The resolution adopted by the Sejmik of the Lodzkie voivodship of 21 September 2010 affects this situation to a large extent. In the light of the above-mentioned resolution, the voivodship spatial development plan is not an act of local law, however, being an expression of the spatial policy of the voivodship self-government, it plays a very important role in spatial management. The least approved and valid local spatial development plans are in the Świętokrzyskie voivodship, which covers an area of 11,710 km<sup>2</sup>. Significant disproportions can be noticed between voivodships, both in the number and area of the LSDP. While in terms of numbers, there was no reduction in disproportions (Table 2), however, in the area of space there was a gradual but systematic reduction of differences between voivodships, which is consistent with the concept of sustainable growth.

**Table 3. Area covered by local spatial development plans in Poland in 2009–2017 (in %)**

Year	dolnośląskie	kujawsko-pomorskie	lubelskie	lubuskie	Lodzkie	matopolskie	mazowieckie	opolskie	podkarpackie	podlaskie	pomorskie	śląskie	swietokrzyskie	warminsko-mazurskie	wielkopolskie	zachodniopomorskie	In total (Poland)	Coefficient of variation
2017	63	7	57	9	33	67	32	41	9	17	20	69	31	13	20	19	30	68.11
2016	62	6	57	9	32	66	32	41	9	17	20	69	31	13	20	19	30	68.24
2015	60	6	58	8	32	66	31	40	9	17	20	66	30	12	19	19	30	68.62
2014	59	5	58	8	32	66	31	40	9	17	19	66	28	12	18	18	29	69.97
2013	59	5	58	8	31	66	30	39	8	17	18	65	27	12	18	18	29	70.88
2012	57	5	58	7	29	66	29	37	8	15	17	63	25	12	17	18	28	72.62
2011	55	5	57	7	29	64	29	35	8	15	15	64	22	12	17	16	27	73.89
2010	54	4	56	6	29	62	29	36	7	14	14	62	21	12	16	16	26	74.97
2009	52	3	56	4	28	60	28	34	7	15	13	59	20	11	16	14	26	76.58
Dynamics	122	233	101	225	116	111	113	120	128	110	154	117	155	118	125	136	115	

Table 3 shows the percentage share of local spatial development plans in Poland, calculated on the basis of the area of the voivodship and the area covered by the LSPP. Also in this case, the dynamics was very diverse.

**Table 4. The structure of land use in the existing spatial development plans in 2017–2019**

Year	Housing development		Service		Technical and production, communication and technical infrastructure	Used for agricultural purposes		Greenery and water
	In total	Including multi-family housing	In total	Including public services		In total	Including farm buildings	
in % of the total area of the commune								
2009	14.6	1.2	3.9	1.0	8.5	50.4	-	22.6
2010	14.6	1.2	4.0	1.0	9.2	49.7	-	22.5
2011	14.7	1.2	4.1	1.0	9.3	49.1	-	22.8
2012	14.6	1.2	4.3	1.0	10.3	48.9	6.6	21.9
2013	14.6	1.3	4.4	1.0	9.9	49.1	6.6	22.0
2014	14.2	1.3	4.4	1.0	9.9	49.2	6.9	22.4
2015	13.8	1.1	4.4	1.0	10.1	48.3	6.6	23.2
2016	13.9	1.2	4.5	1.0	10.1	47.3	6.4	24.1
2017	14.1	1.2	4.6	1.0	10.3	46.6	6.2	24.4

Green and water areas occupy over 24% (this is an increase by several percent, as in 2009 it was 22.6%). This means that in large cities, there is a relatively good greenfield security from the point of view of quality of life. It may also indicate that the areas of these cities in Poland are relatively extensively managed. It is also worth paying attention to the increase in this indicator in recent years. In the local spatial development plans, the area of designated green areas and waters increases. At the same time, the area designated for residential development decreased significantly. Among the reasons, it is possible to distinguish the need to balance the areas designated for development. Local plans are not so much developed to organise the settlement and urban situation, but rather to cover new investment areas. It is investment processes that are the main stimulators for creating investment plans in Poland.

In order to assess the factors affecting the value of the area covered by the plans, panel regression was used, and based on the Breusch–Pagan and Hausmann tests, it was shown that the model with variable effects will be the best (Table 5).

**Table 5. Model explaining changes in the area of LSDP in 2009–2017 in Poland**

Variable	Coefficient	Standard error	t-student	p-value	Relevance
Const	3.83754	1.3653	3.783	<0.0001	***
Population density	0.216783	0.23112	4.213	<0.0001	***
Investment rate	5.83196	0.034265	4.519	<0.0001	***
Share of forests and green areas	-3.76554	5.42642e-05	-4.856	<0.0001	***
Assessment of matches and statistical tests					
Breusch–Pagan	Asymptotic test statistic: Chi-square (1) = 3,111144 with $p = 0,0777442$				
Hausmann	Null hypothesis: the GLS estimator is correct. Asymptotic test statistic $H = 32.1139$ with $p = 1.81328e-006$				

Symbol: \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Source: own study based on Eurostat data, using the Gretl 2016d program.

The conducted panel regression analysis showed that, in accordance with the assumptions and expectations, the implemented LSDP (public and private) investments and population density were positively influenced by the share of green areas. These factors constituted significant determinants of the on-going transformations in the area of development plans in Poland.

#### 4. Conclusion

Polish law in the field of spatial planning sets out a rigid framework in which city planners and officials move. At the same time, it creates various possibilities that can be used for innovative solutions with additional effort. Local spatial planning is a basic and important tool for the protection and shaping of the environment, because in the entire planning process, setting the directions of development, the principles of environmental protection should be taken into account. All planning studies must implement solutions that ensure protection and restore the environment to the right condition. The conducted analysis revealed the occurrence of significant disproportions between particular areas (voivodships) in terms of the number and area of local spatial development plans. The changes taking place, however, were characterised by signs of sustainable development, as there was a reduction in the disproportions in the area of the areas covered by the local spatial development plan. Stimulants were primarily implemented investments and, to a lesser extent, the socio-demographic situation expressed by means of population density. This allows explaining the disproportions and changes taking place in individual voivodships.

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