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EFFECT OF UNCONTROLLED URBANISATION ON RURAL AREAS AROUND CITIES

Abstract: This study attempts to determine the effect of suburbanisation on rural areas around cities, with the Municipal Functional Area (MFA) used as an example, in regard to: demography, housing, land development, planning documents and local tax rates. The analyses were based on data from the Central Statistical Office, from the Official Journal of the Voivodship of Warmia and Mazury and from Geoportals. The findings of this study indicate that urbanisation of suburban areas is a diverse process and it is not linked with one specific factor. Urbanisation is largely determined by the natural value and infrastructural potential.

Key words: suburbanisation, spatial planning, suburban zone, rural area

INTRODUCTION

Rural areas in Poland are changing constantly. Modifications affect economic, social, spatial and landscape structures and they are associated with transformations in agriculture itself and with rapid suburbanisation.

The development of cities is part of their history. Expanding cities affect suburban areas. Local authorities must take into account that the process of suburbanisation is another – unavoidable – phase of a city's development. Suburban communes must cooperate with the municipal centre to follow the right spatial policy and define directions of spatial development (Feltynowski 2010). Negative effects of suburbanisation include: social conflicts, scattered housing sites, which upsets the spatial order, leads to deterioration of agricultural land and creates infrastructure-related issues (Pankuau et al. 2005).

Śleszyński (2015) points out a strong association of suburbanisation and liberal law, which allows for issuing land development decisions and for allocating too much land for residential buildings in local plans.

Urbanisation of suburban areas is a long-term process, which is why the issue does not get proper attention. Over time, issues appear which are related to overloading of insufficient infrastructural networks, transport routes and social infrastructure. Intensified urbanisation also entails privatisation of space and social divide. Developing common spatial policy by neighbouring communes and adopting good local plans, which do not regard construction of residential buildings as the only method of land development, will limit the negative effects of city expansion.

The results presented below are an analysis of statistical data, documents and maps. The aim of the analyses was to present an effect of spontaneous urbanisation on rural areas. The data used in the analysis concerned demography, quality of spatial planning, land development and rates of local taxes and charges and were taken from the Central Statistical Office, the Official Journal of the Voivodship of Warmia and Mazury and from Geoportals.

MATERIAL AND METHODS

The Municipal Functional Area of Olsztyn was taken as the study area. An analysis of the effect of uncontrolled urbanisation on rural areas in the vicinity of cities was conducted on data from the Central Office of Statistics for the years 2010-2016 (depending on what data were available) concerning: demography, housing, land development and planning documents. In

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addition, information supplied by local authorities on rates of local taxes and charges was used, as well as web geoportals of local governments.

The data were used to determine changes of the population and of the number of flats. Information on planning documents and information from geoportals was used to analyse the quality and scope of planning documents, which directly results in spontaneous urbanisation. It was verified in successive stages whether local governments of suburban communes do not promote uncontrolled suburbanisation by lowering their taxes and charges. The last part contains the summary of the results and conclusions.

All the analyses were conducted with Microsoft Office, Google Earth Pro and QGIS version 2.18.11.

STUDY RESULTS - THE MUNICIPAL FUNCTIONAL AREA IN OLSZTYN

The Municipal Functional Area in Olsztyn (Fig. 1) includes five rural communes: Purda, Stawiguda, Gietrzwałd, Jonkowo and Dywity, one municipal-rural commune: Barczewo and one municipal commune, which is the core of the area - Olsztyn. MFA Olsztyn occupies the total area of 1451.51 km², which accounts for 6% of the area of the Voivodship of Warmia and Mazury. The administrative borders of the communes did not change during the period covered by the analyses.

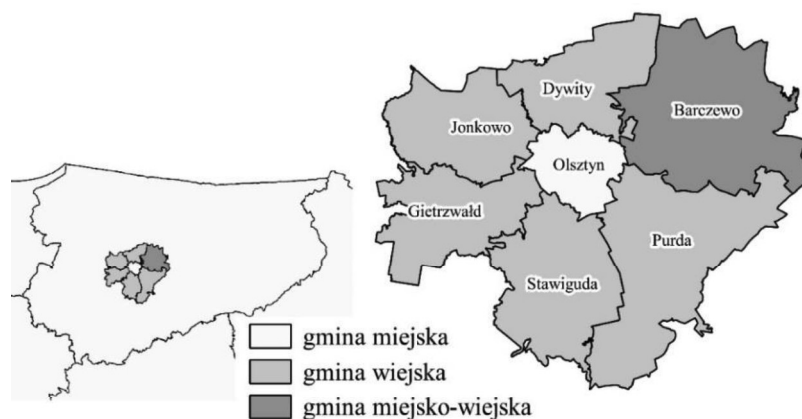


Fig. 1 The Municipal Functional Area in Olsztyn

Source: prepared by the author

The commune of Barczewo is the largest - it occupies 22% of the whole area; it is followed by Purda (21.9%) and Stawiguda (15.4%); Olsztyn (6.1%) is the smallest of the communes. A large portion of MFA Olsztyn is occupied by lakes and forests.

Over 50% of the MFA is protected under the Nature Conservation Act. The communes of Stawiguda and Purda have the largest nature conservation areas. Moreover, a large portion of the whole area is occupied by lakes and forests. Such natural and environmental conditions may limit the development of certain branches of the economy (Strategy for the Municipal Functional Area of Olsztyn 2016). Trends and methods of land use are shown in the following table.

The greatest portion of the area is occupied by forests and tree-covered land - 63,951 ha, which accounts for 44% of MFA Olsztyn - followed by farmland - 58,031 ha (40%), whereas built-up and urbanised land occupies 10,150 ha (7%), lakes and rivers occupy 6% of the area and the other land, which includes wasteland - 3%. During the period between 2012 and 2014, 1,478 ha of other land was developed; the largest portion (80%) was transformed into farmland and 13% was urbanised.



Table 1. Methods of land use in 2014 (ha) (with a change compared to 2012)

Specification	Land under waters		Forests and tree-covered land		Farmland		Built-up and urbanised area		Other land		Total
	2014	change	2014	change	2014	change	2014	change	2014	change	2014
Barczewo	1618	9	11497	44	16073	358	1684	32	1129	-443	32001
Dywity	342	0	4629	-2	9615	263	1006	20	524	-281	16116
Gietrzwałd	722	4	8961	-4	6314	99	828	21	408	-120	17233
Jonkowo	188	0	6690	19	8511	157	867	12	613	-188	16869
Purda	1865	-14	17348	34	10410	204	1113	19	1076	-243	31812
Stawiguda	3172	0	12722	10	5202	134	884	27	307	-171	22287
Olsztyn	850	4	2104	-6	1906	-32	3768	66	205	-32	8833
MFA	8757	3	63951	95	58031	1183	10150	197	4262	-1478	145151

Source: Prepared by the author based on: BDL GUS.

The structure and method of land use shows that not a large portion of the land is urbanised (obviously, ca. 1/3 of all the built-up area is within the city of Olsztyn).

According to statistical data, the MFA was inhabited by 232,855 people in 2016, which is more by 2893 than in 2010 (Table 2).

Table 2. Population of MFA in 2010-2016

Specification	Actual place of residence		Population density (people/km ²)		Percentage of population		Change of population (number of people)
	2010	2016	2010	2016	2010	2016	2016-2010
Barczewo	17063	17662	53	55	7.42	7.58	599
Dywity	10399	11374	65	71	4.52	4.88	975
Gietrzwałd	5980	6536	35	38	2.6	2.81	556
Jonkowo	6653	7229	39	43	2.89	3.10	576
Purda	8118	8612	26	27	3.53	3.70	494
Stawiguda	6361	8449	29	38	2.77	3.63	2088
Olsztyn	175388	172993	1986	1958	76.27	74.29	-2395
MFA	229962	232855	63	62			2893

Source: Prepared by the author based on: BDL GUS.

The communes with the smallest population include: Gietrzwałd and Jonkowo, whereas Olsztyn has the largest population – 172,993 (74.29% of the population of the entire functional area), followed by Barczewo. 2,395 people moved out of Olsztyn during the period between 2010 and 2016. During that time, the largest population increase was recorded in the commune of Stawiguda (Table 2), situated south of Olsztyn and in the commune of Dywity, situated to the north.

The demographic structure of MFA Olsztyn reveals an increase in the number of people at the post-working age in each commune of the area (Table 3). The largest portion of such people lived in Olsztyn in 2016. The overall percentage of people at the pre-working age in the years 2010-2016 remained at the same level – 17.7%, but the portion of this group in the whole population increased only in the communes of Olsztyn and Stawiguda. The percentage of people at the working age decreased in each commune in the period 2010-2016 (Table 3). The population of the MFA Olsztyn is growing despite such a disadvantageous demographic structure (Table 2). This may be a sign of certain attractiveness of the area.

Table 3. Economic age groups as % of the total population in the years 2010-2016

Specification	Pre-working age		Working age		Post-working age	
	2010	2016	2010	2016	2010	2016
Barczewo	21.0%	19.2%	66.5%	64.5%	12.5%	16.3%
Dywity	22.0%	20.2%	67.8%	65.1%	10.2%	14.7%
Gietrzwałd	21.5%	20.1%	66.9%	65.2%	11.6%	14.6%
Jonkowo	23.4%	20.6%	66.0%	65.9%	10.5%	13.6%
Purda	20.5%	18.8%	68.9%	66.9%	10.6%	14.2%
Stawiguda	20.3%	21.7%	69.4%	65.6%	10.3%	12.8%
Olsztyn	16.6%	17.0%	67.2%	61.9%	16.3%	21.2%
MFA	17.7%	17.7%	67.2%	62.7%	15.1%	19.5%

Source: Prepared by the author based on: BDL GUS

The constant increase in the population size requires investment in housing. The housing resources in the MFA increased by 3,153 between 2010 and 2016 (Table 4).

Table 4. Housing resources 2010-2016

Specification	Housing resources				
	2010		2016		2016-2010
Barczewo	2 608	13%	3 064	13%	456
Dywity	2 319	12%	2 826	12%	507
Gietrzwałd	1 211	6%	1 563	7%	352
Jonkowo	1 527	8%	1 867	8%	340
Purda	1 519	8%	1 920	8%	401
Stawiguda	1 475	7%	1 977	9%	502
Olsztyn	9 322	47%	9 917	43%	595
MFA	19 981	100%	23 134	100%	3 153

Source: Prepared by the author based on: BDL GUS.

The largest numbers of apartments were built in the communes of Olsztyn, Dywity and Stawiguda. The number of houses built during the past decade in the suburban communes increased, especially near the administrative borders with the city. The number of apartments built in Olsztyn was the largest, while the population size decreased, which may indicate an improvement in housing conditions. The smallest housing resources can be found in: Jonkowo and Gietrzwałd.

Housing investments require one of the two planning documents: a local plan or a land development decision. The largest areas covered by local plans in 2015 were found in the communes of Barczewo and Olsztyn, and the smallest were in the communes of Purda and Jonkowo (Table 5). The largest increases in the area covered by the plans in the years 2010 to 2015 were observed in Olsztyn and in the commune of Dywity.

Due to their features and their legal authority, local plans fully regulate the method of development of larger areas. However, if communes do not have local plans in place for their entire area, then land development decisions are issued, which are valid only for one plot. Such documents - prepared on individual basis - may upset the spatial order in an area. The largest number of decisions in MFA Olsztyn during the period of 2010-2015 was issued in Olsztyn and in the commune of Purda (Table 5). Moreover, the number of decisions for residential buildings was also the largest in the commune of Purda. This commune also has the smallest portion of the area covered by valid local plans.



Table 5. Planning status 2010-2015

Specification	Portion of area covered by local plans		Decisions on land development issued	Decisions on residential building construction issued
	2010 (%)	2015 (%)	2010-2015	2010-2015
Barczewo	60.2	60.7	898	523
Dywity	14.0	18.5	931	501
Gietrzwałd	8.1	9.4	597	334
Jonkowo	1.6	2.3	839	416
Purda	1.9	2.2	1488	949
Stawiguda	8.6	9.4	645	239
Olsztyn	44.1	55.8	1669	398

Source: Prepared by the author based on: BDL GUS.

Part of the communes are shown in geoportal layers concerning spatial planning - the scope of local plans and their contents. An analysis of the zoning status and available aerial photographs allow for identification of areas of development of suburban housing and the directions in which the city is spreading. The greatest pressure of building construction on rural areas bordering on the city is seen near the southern border between Olsztyn and the commune of Stawiguda (Fig. 2), near the northern border with the commune of Dywity (Fig. 3) and near the border with the commune of Jonkowo (Fig. 4).

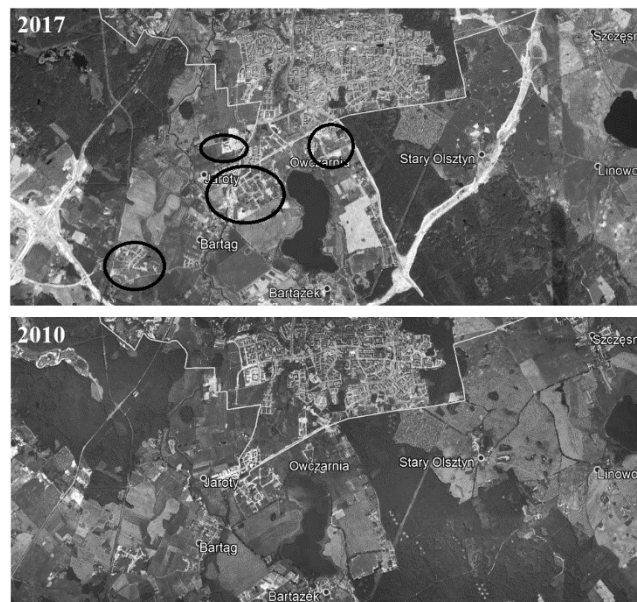


Fig. 2 Expansion of built-up areas in 2010-2017 (southern part)

Source: Prepared by the author based on Google Earth aerial photographs.

The new buildings (marked with black ellipses) comprise mainly residential buildings: single-family and multi-family ones with service establishments. The commune of Stawiguda started construction of a new school close to the residential quarters, which is an unexpected effect of excessive urbanisation. There are more people living in the new residential quarters close to the border with the city than in the village of Stawiguda, which is the administrative centre of the commune. A number of multi-family blocks of flats were constructed in the southern suburbs, which is not seen in the other areas of the city. There are valid local plans in place for the whole area close to the border between the city and the commune of Stawiguda, which makes it easier to maintain the right spatial and functional order. However, certain errors have been made in this regard - the distance between areas with single-family and multi-family buildings is not sufficiently large. In effect, five-storey and taller buildings are situated close to low single-family houses.

The vicinity of the northern border of the city is another area of intensive urbanisation. Construction of a large group of multi-family blocks of flats was started there, but its extent is smaller than near the southern border (Fig. 3).

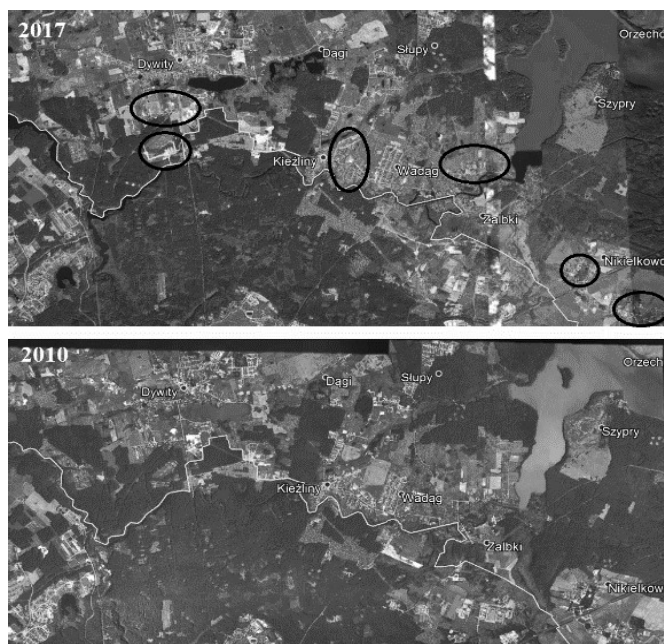


Fig. 3 Expansion of built-up areas in 2010-2017 (northern part)

Source: Prepared by the author based on Google Earth aerial photographs.

A majority of the suburban area in the commune of Dywity is occupied by land with single-family houses. Zones of intensive urbanisation stretch from the northern to the eastern side. In consequence, the border between the villages of Kieźliny, Wadaż and Żabki has disappeared. This area is not wholly covered by local plans. Therefore, new houses are built in this area under individual land development decisions.

The western suburbs, situated mainly in the commune of Jonkowo, are the last area with a noticeably intensive increase in the number of houses (Fig. 4).



Fig. 4 Expansion of built-up areas in 2010-2017 (western part)

Source: Prepared by the author based on Google Earth aerial photographs.

Buildings in this area are mainly single-family ones and they are scattered. A small part of the area is covered by the local plan and buildings are constructed mainly under individual land development decisions. These three areas of new house construction in the suburban zone around Olsztyn are the three directions of the city development. This takes place mainly in the southern zone. The other areas around the city do not favour building construction because of the forests and wetlands present there.

Expansion of the suburbs may entail differences in costs incurred by the population in various communes. An analysis was conducted for the rates of real estate tax in the communes in the years 2011-2017. The analysis showed that the lowest tax rates were established in the city of Olsztyn, but it is in Olsztyn that the largest decrease in the population size was observed (Table 2).

The real estate tax rates were higher in the commune of Stawiguda, which recorded the largest number of people moving in. This shows that people do not move from cities to the suburbs because of the differences in local taxes and charges. They probably do not take this factor into consideration when deciding to move.

CONCLUSIONS

An effect of uncontrolled urbanisation on suburban rural areas was analysed on the Municipal Functional Area of Olsztyn. Being the capital and the best developed city in the Voivodship of Warmia and Mazury, Olsztyn is also a unique city, with a large forest complex and many lakes within its borders. Despite such natural and landscape value, the city still has many areas which can be used for its expansion. Progressive southward suburbanisation has been observed in recent years.

An analysis of the statistical data and comparing planning documents and the methods of land development in suburban areas indicates the following conclusions:

- The findings of this study indicate that urbanisation of suburban areas is a diverse process and it is not linked with one specific factor. Urbanisation is largely determined by the natural value and infrastructural potential - mainly the transport links with the city centre.
- The rural areas around the city lost their importance long ago; agricultural landscape turns into urban landscape, with a road sign being the only clear boundary between the city and its outskirts.
- Increasing population size forces local governments to make infrastructural investments (roads, water supply and sewerage, social infrastructure) with the aim of improving the quality of life of suburb residents. The number of residents of suburban areas is often larger than that of the main village in a commune.



- The majority of the suburban population work in the city, which makes it necessary to construct new roads and parking spaces in city centres.
- Apart from an obvious change of the method of land development and the loss of agricultural value of the area as a result of residential building construction, effects of suburbanisation include social changes. The local population no longer live off the land, but they look for jobs outside agriculture. This often requires acquiring new qualifications and time-consuming commuting.
- There are many areas within the borders of Olsztyn which can be used for new investments, including house building. However, residents and developers prefer to invest out of the city, despite the fact that real estate taxes are much lower and real estate prices are only slightly higher in Olsztyn.
- People may choose the suburbs as the place of residence because they want to escape from the hustle and bustle of city and because of the natural environment and its biodiversity. The southern suburban zone of Olsztyn, which is developing the most rapidly, lies close to areas of nature conservation.
- It is an advantage of Olsztyn suburbs that the majority of them have valid local plans. This makes the process of suburbanisation controlled in terms of the size and colour of buildings.
- Cities spreading into neighbouring communes is a negative phenomenon with a number of consequences. The major consequence appears to be the need to provide infrastructure of a sufficient quality - mainly roads for travelling to the city; another is commuting, which takes a long time.
- Due to liberal laws, too much land is allocated for house building.

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