

## CHANGES IN THE LANDSCAPE OF RURAL AREAS LOCATED CLOSE TO CITY – CASE STUDY OF OLSZTYN

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### ABSTRACT

Transformations in suburban areas are consequences of a developing city. The main reason for the changes of rural areas located close to city is the increasing population rate and spatial changes. The purpose of study is to show the demographic and spatial changes that are influencing the landscape of rural areas located close to city Olsztyn. The subject of the analysis were the changes occurring in suburban municipalities: Stawiguda and Dywity. This study focuses on selected population processes and the analysis of the instruments of spatial planning that are affecting the spread of the buildings and the changes in the rural landscape.

**Key words:** rural areas, developing city, changes in the rural landscape, suburban space

### INTRODUCTION

The intensive development of cities in the early twentieth century has forced changes in areas directly adjacent to the city limits, mainly rural areas. Intensive transformation processes in these areas have had an impact on society, the economy and the landscape. Research in this field referred to the processes occurring in the rural space (The geography... 1998), social space (Cloke and Milbourne 1992, Cloke et al 1994, Halfacree 1995, 1997 Basiago 1999) rural social entrepreneurship (Lang and Fink 2018), land protection (Barr et al. 2011), sustainable development of the village (Horlings and Kanemasu 2015, Boron et al. 2016, Profit 2018), economics of the countryside

and the natural environment (Cloke and Milbourne 1992, Cloke et al. 1994, Philipis 1998) landscape protection (Gil-Mastalerczyk 2016).

The main influence on the activities in this field is primarily population migration(s). According to the data (GUS 2018) in Poland since 2000 there has been a greater movement out of the cities compared to new arrivals. In 2017, 212.6 (thousand) people flocked to cities, while 238.4 thousand left. It was the opposite trend in rural areas, where 187.8 (thousand) were attracted, while 161.9 (thousand) left.

According to demographers, the largest outflow of people is to rural municipalities adjoining the city's administrative boundaries (Raźniak 2007, Okólski and Fihel 2012, Józwiak 2013 Śleszyński 2014b).

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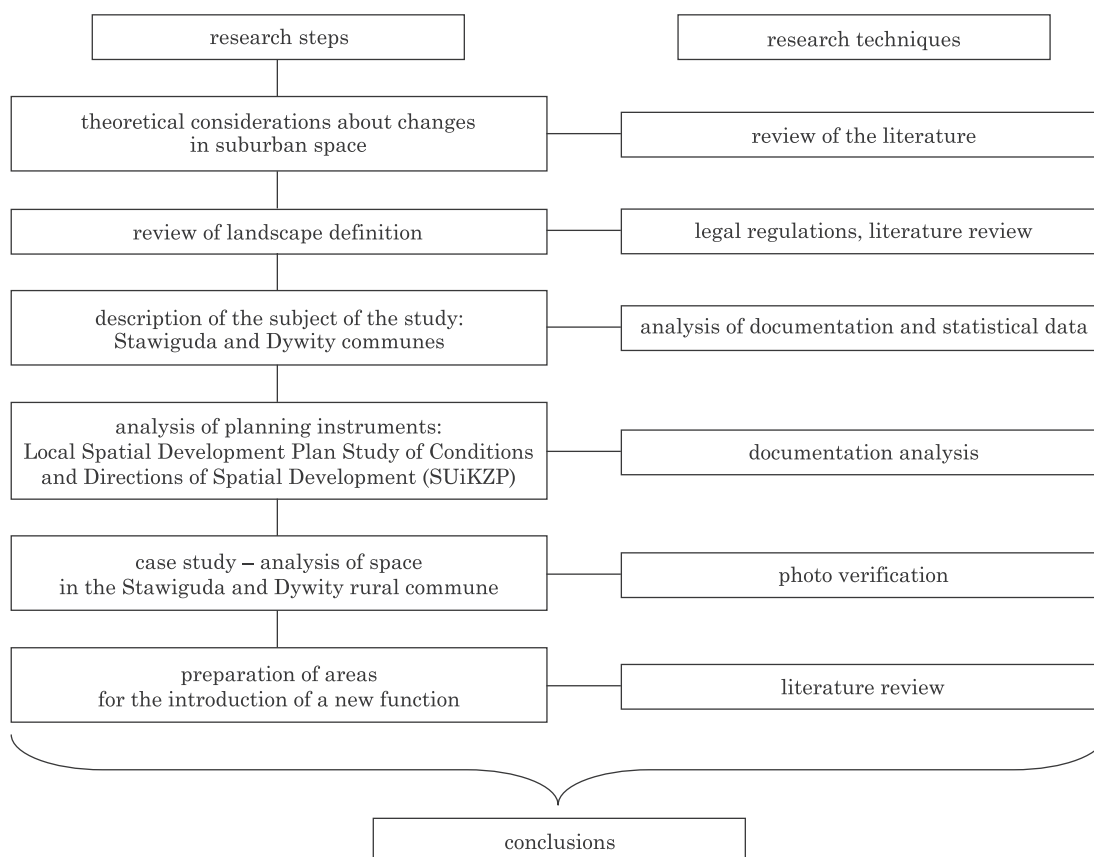
This affects the way the formation of these areas, including the environment (Pirnat 2000, Burns et al. 2005, Kotani and Sugita 2005, Chapman and Reich 2007).

The aim of the study is to show demographic and spatial changes that affect the rural landscape in the impact zone of the city of Olsztyn in the municipalities – Dywity and Stawiguda. The work focuses on selected population processes and the analysis of planning instruments affecting the spread of buildings and changes in the rural landscape. The research was carried out on the basis of GUS data, local land development plans, Study of Conditions and Directions of Spatial Development and decisions on building conditions. The time range of the tests covers the years 2013–2018. The work was prepared on the basis of field studies, analysis of source materials (statistical data) and literature of the subject.

## RESEARCH STAGES AND RESEARCH TECHNIQUES

The following steps and research techniques were used to achieve the assumed research goal (Figure 1).

This research was started with theoretical considerations in the context of changes in suburban space developed on the basis of literature. The next part presents the definition of landscape based on legal acts and literature. The subjects of the study are two suburban municipalities: Stawiguda and Dywity, located in the vicinity of the city of Olsztyn, which were diagnosed in terms of population growth and documentation analysis: local spatial development plan, study of conditions and directions of spatial development and decisions on building conditions and land development. The last part is a case study analysis of the selected space and its visualization.



**Fig. 1.** Research stage and techniques  
Source: own study

## **THEORETICAL CONSIDERATIONS ABOUT CHANGES IN SUBURBAN SPACE**

The environment in which agricultural production has been conducted so far gives way to residential construction (Zysk 2014). Newly built buildings spill in a patchy, often uncontrolled way in rural areas that lose their original function (Nelson 1999, Koomen 2007). This phenomenon is called suburbanisation (Forman 2008, Śleszyński 2014a). Currently, suburbanisation manifests itself in the outflow of urban population from central districts and large estates to the external zones of major urban centers (KPZK 2030).

The process of suburbanisation and decline in arable land for suburban housing is noticeable worldwide (Basten 2017, Meiyappan et al. 2014). Since the 1990s, the phenomenon of population living in metropolitan areas moving from the center, i.e. the city, to suburban areas has been observed in Poland. In Poland, suburbanisation this process began much later than in other countries of the world such as: England, Germany, Canada, the United States and many others (Basten 2017, Basten and Gerhard 2018, Małek 2011, Kilper 2018). Geist et al. 2006 examined that urban and rural population density are potential factors affecting land use change (Land use... 2006). “Villages are becoming a kind of ‘bedrooms’, with extensive urban infrastructure and similar buildings. These processes can be called quasi-urbanisation semi-urbanisation of the village” (Becla and Czaja 2015). Suburban municipalities have been showing great development over the years. Rural areas that are within the zone of larger cities lose their agricultural function and rural buildings disperse. The current rural space is changing. “With the expansion of cities, the distinction between urban and rural areas has actually blurred. The boundaries between the city and the village are disappearing creating new rural and urban conditions”. (Tokajuk 2017).

A phenomenon that immediately follows suburbanisation is deurbanisation. Initially, it is relative

deurbanisation, during which the number of people in the periphery increases, but slower compared to the decrease in the number of people in the center, and then there is absolute deurbanisation, during which depopulation also takes place in the suburbs and the entire metropolitan area (Jałowicki and Szczepański 2002). Majer (2010) indicates that deurbanisation is “the process of decreasing the population of cities in metropolitan areas and agglomerations, accompanied by the development of small towns away from them”. The above processes are influenced by a changing population. According to the forecast (GUS 2011) there will be a slight increase in population in rural areas until 2030 (by 1.8% more). It will be noted after this period it will fall and in 2050 the population of rural areas will constitute 98.9% of the current population. In cities, the population is expected to gradually decrease, which is to be 18.6% lower in 2050 (GUS 2011). Such forecasts indicate significant changes in space, and above all changes in the landscape, through the introduction into the open agricultural space of dispersed single-family and multi-family housing, disrupting the original character of rural areas (Śleszyński 2011).

The indicated phenomena also take place in the areas adjacent to the city of Olsztyn, including the rural communes of Dywity and Stawiguda. Changes in spatial development of rural communes may pose a threat to the broadly understood spatial order and cause irreversible transformation of the landscape (Krajewski and Raszka 2011, Zysk 2014).

Maintaining the landscape of suburban areas is primarily a strive to maintain appropriate proportions between natural resources (Solon 2002, Degórski et al. 2007), economic (Basiago 1999), social (Sobala and Myga-Friday 2016) as well as individual needs of the investor (McDonald and Bailly 2017). The activities undertaken by municipalities and, above all, the planning instruments they use have an important impact on the above processes, which will shape the landscape.

## LANDSCAPE DEFINITION

Landscape is an ambiguous concept. Geographer Degórski (2009) places the landscape in a system of natural environment in which a number of phe-

**Table 1.** Definitions of landscape in selected Polish legislation

Polish legislation	Definitions
The Act of 27 April 2001 Environmental Protection Law, Journal of Laws, 2019 item 42, 412, 452	There is no unambiguous definition of the landscape. Nevertheless, it can be defined by reconstructing the definition of the environment, which is understood as all natural elements, including those transformed as a result of human activity, in particular land surface, mineral, water, air, landscape, climate and other elements of biodiversity, as well as mutual interactions between these elements
The Act of 27 March 2003 on Spatial Planning and Development, Journal of Laws, 2019, item 60, 235, 730, 1009	Landscape is a space perceived by people, containing natural elements or products of civilization, shaped as a result of natural factors or human activity. Priority landscape – this is a landscape that is especially valuable for the society because of its natural, cultural, historical, architectural, urban, rural or aesthetic-visual values, and as such requires observance of rules and conditions of its formation
The Act of 23 July 2003 on the protection of monuments and care of monuments, Journal of Laws, 2018, item 2067, 2245 and 2019 item 730	Cultural landscape – space perceived by people, containing natural elements and products of civilization, historically shaped as a result of natural factors and human activity
Act of 16 April 2004, National Heritage Conservation, Journal of Laws, 2014, item 1614, 2244, 2340	Reference to the definition of landscape included in the laws: on planning and spatial development, and on the protection of monuments and the care of monuments. An important provision has been included in Article 5, point 23, referring to landscape values. According to the adopted definition, landscape value is the natural, cultural, historical, aesthetic and scenic values of the area and the associated relief, creations and elements of nature and civilizational elements, shaped by the forces of nature or human activity

Source: own study

nomena and processes take place. Spatial planner – Dubel (2000) indicates that landscape is a system that consists of anthropogenic, biotic, abiotic components, at the same time it can be identified with the geosystem. According to architect Bogdanowski (1976), the landscape is the environment, and the physiognomy of the natural and artificial environment.

The European Landscape Convention defines a landscape as – an area perceived by people whose character is the result of the action and interaction of natural and/or human factors. The following indications are mentioned: landscape policy, landscape quality objective, landscape protection, landscape management, landscape planning. The concept of landscape according to the European Landscape Convention is also reflected in Polish legal regulations (Table 1).

An overview of the presented definitions indicates that there is no unambiguous definition of landscape in Polish legislation. A common denominator may be the location with which components such as nature, environment, aesthetics and housing are closely related. The local authorities have influence on the last indicated landscape component, which, through spatial policy instruments, shapes space. These instruments are: local spatial development plan, study of conditions and directions of development as well as decisions on building and land development conditions.

## CHARACTERISTICS OF THE STUDY OBJECT

### Municipality Dywity

The subject of the research are spatial and demographic changes in rural municipalities neighbouring the city of Olsztyn: Dywity and Stawiguda (Figure 2).

Municipality Dywity is a rural commune with an area of 161 km<sup>2</sup>. The commune consists of 19 villages: Brąswałd, Bukwałd, Barkweda, Dąbrówka Wielka, Frączek, Gady, Gradki, Kieżliny, Nowe Włóki, Ługwałd, Redykajny, Rozgity, Różnowo, Sętań, Sprzędzowo, Słupy, Tuławki, Zalbki, Dywity.



**Fig. 2.** Map communes Dywity and Stawiguda  
Source: own study based on Geoportal powiatu... 2019

In the municipality, forest and water areas constitute 23% of the area. According to statistical data, in 2018 (as of December 24, 2018), the municipality had 11,697 inhabitants (Figure 3). In 2013, the population density index was 68 people/1 km<sup>2</sup>, then in 2018, it was 73 people/1 km<sup>2</sup> (BDL). Over the space of five years, the number of inhabitants of the suburban municipality has increased by 686 people.

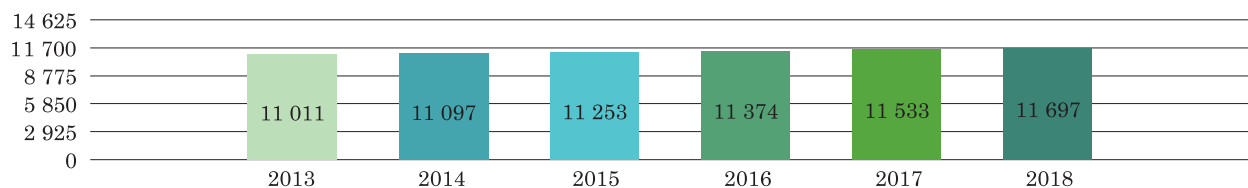
It is a rural commune with an area of 223 km<sup>2</sup>, which is divided into 13 villages: Bartąg, Bartązek, Dorotwo, Gałąwka, Gryźliny, Jaroty, Majdy-Kręsk, Miodówko-Zezuj, Pluski-Rybaki, Ruś, Stawiguda, Tomaszkowo, Wymój. According to statistical data, in 2018 (as at 31 December 2018), it had 9,748 inhab-

itants (Figure 4). In 2013, the population density index was 33 people/1 km<sup>2</sup>, then in 2018, 44 people/1 km<sup>2</sup> (BDL). Over the space of five years, the number of inhabitants of the suburban commune increased by 2,350 people.

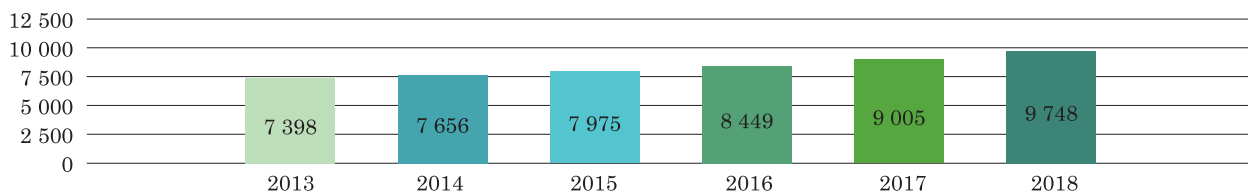
## ANALYSIS OF PLANNING INSTRUMENTS

### Local Spatial Development Plan

The Act of 27 March 2003 on Spatial Planning and Development, Journal of Laws, 2019, item 60, 235, 730, 1009 on spatial planning and development is an act of local law, so the entries in the area covered by the local spatial development plan have universally binding force. In the areas of Dywity and Stawiguda municipalities, the number of existing local plans is gradually increasing (Table 2). Coverage of municipalities with local spatial development plans at the end of 2018 was respectively 9.8% in the Stawiguda commune and 19% in the Dywity commune (BDL). The majority of local plans are valid in the Dywity commune (within the Dywity district) and in the Stawiguda commune (Tomaszkowo and Bartąg areas). In 2013 in the Stawiguda commune 72 plans were in force, and in 2018 – 98 plans (26 more). In 2013 In the Dywity commune 44 plans were in effect and by 2018 67 plans were in place (23 more).



**Fig. 3.** Changes in the population numbers the commune of Dywity in the years 2013–2018  
Source: own study based on the data from Local Data Bank Municipality Stawiguda



**Fig. 4.** Changes in the population numbers the commune of Stawiguda in the years 2013–2017  
Source: own study based on the data from Local Data Bank



**Table 2.** The number of valid zoning plans local spatial development plans

Gmina	Number local spatial development plans in the analysed municipalities					
	year					
	2013	2014	2015	2016	2017	2018
Stawiguda	72	77	79	88	96	98
Dywity	44	51	57	60	63	67

Source: own study based on the data from Local Data Bank

Along with the increase in the number of local plans, the area of land is increasing for non-agricultural and non-forest purposes (Table 3). In 2018 in the municipality of Stawiguda, non-agricultural purposes were allocated by 164 hectares more than in 2013, while in the municipality of Dywity

277 hectares more were allocated than in 2013. Changes in the use of forest land remain at a similar level in both communes.

### Study of Conditions and Directions of Spatial Development (SCDSD)

The study of conditions and directions of spatial development of the commune is defined by the Act of 27 March 2003 on spatial planning and development. This is the basic document that defines the spatial policy of the commune, including local spatial development rules. This document should take into account the needs and conditions of the study area (Foryś and Nowak 2014).

**Table 3.** The area of agricultural land for which plans for non-agricultural purposes and non-forest purposes were changed in the plans

Commune	Area of agricultural land changed for non-agricultural purposes [ha]						Area of forest land, changed for non-forest purposes [ha]					
	year						year					
	2013	2014	2015	2016	2017	2018	2013	2014	2015	2016	2017	2018
Stawiguda	1 637	1 641	1 714	1 750	1 788	1801	10	12	12	12	12	12
Dywity	861	1 110	1 112	1 123	1 126	1138	9	9	9	9	9	9

Source: own study based on the data from Local Data Bank

**Table 4.** The number of decisions on development conditions in the analysed municipalities

Commune	Type of decision	Year					
		2013	2014	2015	2016	2017	2018
Stawiguda	decisions on total building conditions	<b>86</b>	<b>63</b>	<b>55</b>	<b>79</b>	<b>87</b>	<b>90</b>
	decisions on the location of a public purpose investment	18	29	52	41	15	31
	decisions regarding multi-family housing	2	1	0	0	0	0
	decisions regarding single-family housing	33	40	36	46	60	70
	decisions regarding service development	6	6	4	14	15	11
	decisions regarding other buildings	45	16	15	19	12	9
Dywity	decisions on total building conditions	<b>79</b>	<b>122</b>	<b>85</b>	<b>124</b>	<b>80</b>	<b>88</b>
	decisions on the location of a public purpose investment	17	32	14	46	36	36
	decisions regarding multi-family housing	1	1	4	0	0	0
	decisions regarding single-family housing	56	79	41	73	54	63
	decisions regarding service development	5	7	10	14	6	6
	decisions regarding other buildings	17	35	30	37	20	19

Source: own study based on the data from Local Data Bank

SCDSD of the Dywity commune was adopted in 2006. Six zones were designated in the study. For selected cities, the directions of spatial development and areas that can be designated for development – Spręcowo, Ługwałd, Kieźliny, Dywity, Różnowo, Myki, and Zalbki.

SCDSD of the Stawiguda commune was adopted in 2013. Four zones were designated in the document: southern, central, northern and Stawiguda. Directions related to the development and use of the land were designated, and areas designated for development were identified. In the northern zone, which is affected by the city of Olsztyn, concentration of housing has been adopted. In the cities where the city has the greatest influence (Bartąg, Jaroty), the possibility of multi-family housing, utilities and the construction of communication systems have been indicated.

### **Decisions on the conditions of building and site development**

In July 2003, after the entry into force of the Act on Spatial Planning and Development, a new instrument for creating spatial policy in local government units became a decision on land development and development conditions. It was to break the investment restrictions related to the small number of zoning plans drawn up. Its introduction, following the application of the “good neighborliness” principle, was to enable the construction of buildings on agricultural land (Sobotka and Młynarczyk 2010). Over the years 2013–2018, the self-government bodies of the Dywity commune issued more Decisions the conditions of building and site development than the authorities of the Stawiguda commune (Table 4).

In Dywity, the bulk of decisions were issued in 2016, while in the Stawiguda commune in 2018. In the case of a decision on the location of a public-purpose investment in the Dywity commune, the most decisions were issued in 2016, and in the Stawiguda commune in 2015. It should be emphasised that in 2013–2015, a total of six decisions on building conditions for multi-family housing were issued in the Dywity commune. In the municipality of Stawiguda

in the years 2013–2014 a total of three decisions on building conditions regarding multi-family housing were issued.

Śleszyński (2015) indicates that the majority of decisions on building and land development conditions applies to single-family housing. The same tendency is in the analysed communes. In the years 2015–2018 the majority of decisions on building conditions in the Dywity commune were issued for single-family housing located near the border of the city (in Dywity, Kieźliny and Różnowo). In Stawiguda, the development of single-family housing is the strongest in the central and south-western part of the commune, where the most decisions on land development and development conditions were also issued (Zysk and Wawrowska 2018).

### **CHANGES IN THE LANDSCAPE OF RURAL AREAS**

Cities located near cities undergo constant transformations, and the phenomenon that accompanies this is the intensive development of housing construction. The processes associated with intensive development entail changes in the landscape and spatial layout of the traditional village. Similar transformations occur in the vicinity of the city of Olsztyn in the analysed communes. In the communes of Dywity and Stawiguda, one can notice the construction of modern multi-family housing in areas previously used for agriculture (Figure 5). Transformations in the land use structure have a negative impact on the development of agriculture and the landscape of fields and arable land (Figure 6), causing irreversible spatial changes.

Figure 7 shows an area that according to satellite images is a rural area. A local spatial development plan (Resolution No. XL/399/2018) was approved in 2018, which allows multi-family housing. The landscape, which until now was an agricultural area with rural buildings, becomes an area with single-family and multi-family housing.

The above photograph illustrates the lack of compositional harmony between the new archi-



**Fig. 5.** Changes in land use on the example of Dywity commune (modern Kormoran housing estate)  
*Source:* own study



**Fig. 6.** Changes in land use on the example of Stawiguda commune (disturbance of the rural landscape)  
*Source:* own study





Fig. 7. New development in the rural area – view from the Google map, local plan for the indicated area, view of the new developments – Bartag village (municipality of Stawiguda)

Source: own study own study on basis of the Spatial Information System of the Stawiguda Commune (System Informacji... 2019), Google (2019)

texture and the old buildings. The existing buildings in no way adjust to the already existing buildings in terms of storeys of buildings and materials. Multi-family buildings dominate over traditional buildings and do not create a coherent landscape. Loss of landscape and spatial layout makes the villages become suburban settlements with single-family and multi-family buildings. The traditional Warmian buildings were dominated by red brick houses, on a rectangular plan, with a gabled roof covered with tiles in shades of red. Currently, despite the times of restrictive provisions in local spatial development plans, one can observe a variety of forms and colours of buildings and roof coverings (Żróbek-Różańska and Zysk 2015). In the analysed rural areas,

modern multi-family housing is incorporated into arable land (even in forest areas), where spatial order and traditional landscape are disturbed.

An example of a newly built multi-family building in the Dywity commune is shown in Figure 8. Osiedle Sterowców is located on the border of the Dywity commune and the city of Olsztyn. Land for development constitutes 15 hectares and is surrounded by the Municipal Forest. According to the local spatial development plan, resolution No. XXXIX /263/14, this area is intended for multi-family housing, housing and service, greenery and forest areas. According to the assumptions, a total of 40 buildings are to be built in the area, housing approximately 4,000 people with accompanying services.

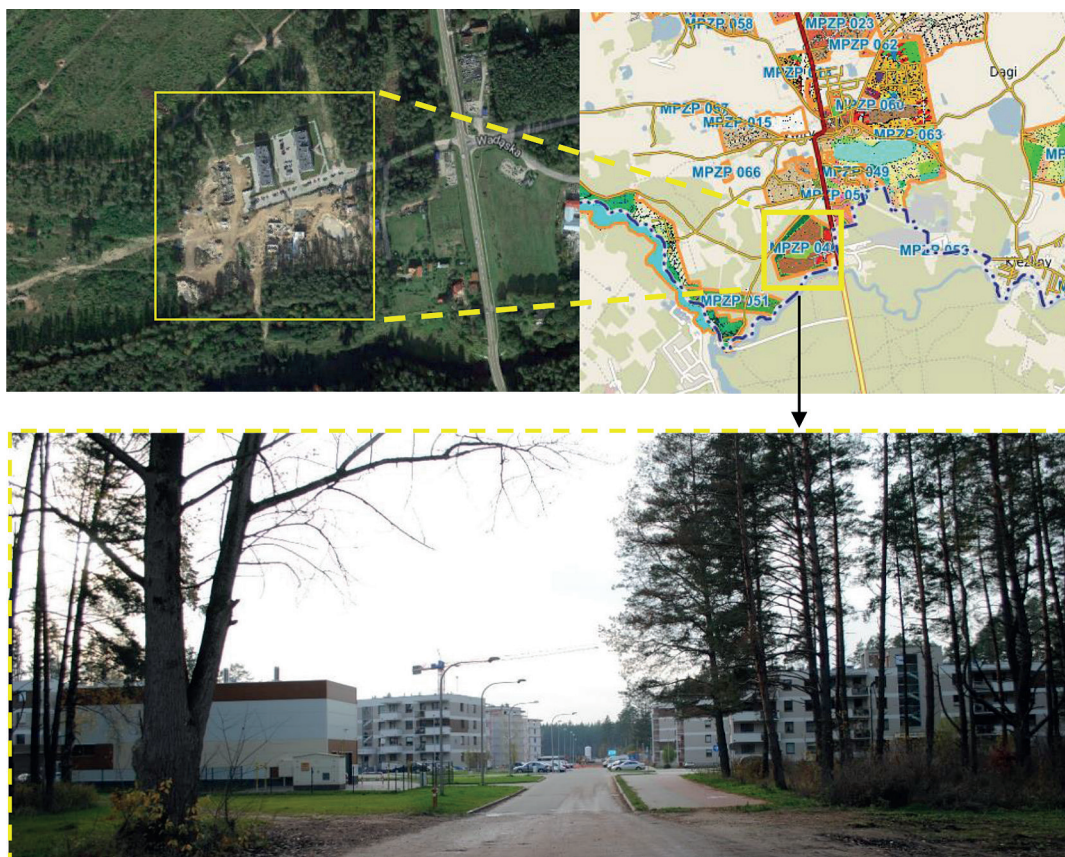


Fig. 8. New development in the rural area – view from the Google map, local plan for the indicated area, view of the new developments – Dywity village (municipality of Dywity)

Source: own study on basis of Dywity Commune Office. Spatial Information System (Urząd Gminy Dywity... 2019) and Google (2019)

As part of the implementation of the work objective, several selected features were presented (based on a literature review) to show how the analysed areas are prepared for adopting a new residential function.

Table 5 shows the preparation of the analysed areas for the introduction of a new function. This simple analysis shows that the buildings are not, first of all, synchronised with the spatial conditions, the surroundings and the neighborhood, and above all they are not prepared for the introduction of a new function.

The indicated conditions were not met, as there are no pedestrian pathways, pavements or lighting. In addition, neighboring buildings are several residential buildings built in the surrounding of agricultural or forestry real estate.

Table 5. Preparation of areas for the introduction of a new function

Preparation of areas for the introduction of a new function	Stawiguda	Dywity
Adjacent space	agricultural property	agricultural and forestry real estate
Technical infrastructure	is located	is located
Driveway	is not found	is located
Buildings in the neighborhood	single-family housing, multi-family housing	multi-family housing
Lighting	is not found	partly missing
Pavements/pedestrian paths	is not found	is not found

Source: own study



It is worth pointing out the social aspect that has an impact on the fact that suburban space is undergoing transformation, and above all, neighboring agricultural and forest areas.

Demand created by buyers of apartments in the vicinity of cities pushes investors (developers) to invest in land on which housing is possible, often after conversion from agricultural and forestry ground. As long as the demand is there, developers will take action to implement housing.

Unfortunately, this implies irreversible changes in the landscape and rural space. First of all, sustainable development is shaken, agriculture will never be implemented there again, nature and cultural heritage are lost. It is worth emphasizing that the transformations are irreversible and their effects will be felt over the next decades.

According to CSO forecasts, the reverse process will take place in a few years and the number of rural residents, including suburban areas, will decrease. Already today, action should be taken towards the proper use of planning instruments, preserve space and minimise the negative effects of space transformations.

## CONCLUSIONS

The transformation of the suburban area is mainly caused by the increase in the number of inhabitants of these areas. In connection with the influx of people, suburban municipalities intensively use the planning instruments available to them to transform the land previously used for agriculture. Analysis of municipal planning instruments indicates that in each of the analysed communes there is a tendency to change agricultural and forest land for non-agricultural and non-forest purposes. In areas previously used for agriculture in the villages of Bartąg, Jaroty (commune of Stawiguda) and Dywity (commune of Dywity), new complexes of multi-family buildings were created. As a result of the process of city sprawl and the emergence of suburban development, the city's administrative boundaries are disappearing. At the same time, the traditional way of managing

the rural space disappears, because the newly constructed building does not refer to the traditional rural construction, which disturbs the traditional picture of the village.

The effects of spatial changes and processes are irreversible. A landscape transformed in this way will never regain its original form, character or aesthetic value. Rational spatial management is above all thinking not only about today, but also about the future of these areas. As results from analyses and visualisations, residential buildings are erected in typically agricultural areas not prepared to take on a residential function. Statistical data and forecasts by the Central Statistical Office also clearly indicate that in the future there will be no such large demand for residential space in rural areas, including suburban areas. Hence, the authorities should look in the perspective of future generations and the space that we will leave them. This awareness should encourage proper spatial policy and the use of planning instruments to protect space and make every effort to ensure that the landscape is preserved for future society.

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