



## DEPOPULATION IN RURAL AREAS OF THE WARMIA AND MAZURY VOIVODESHIP

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### Abstract

The aim of the article was to analyse and evaluate the situation of rural municipalities and rural areas located in urban-rural municipalities in the Warmia-Mazury voivodeship in terms of the phenomenon of depopulation in 2012-2022. The study uses the method of classification of territorial units created by J. W. Webb (1963). The phenomenon of depopulation intensified in rural municipalities and in rural areas in urban-rural municipalities. The element mainly influencing depopulation during these years was population emigration. The deterioration of the population situation in the study areas was also associated with a decline in natural increase. Considering the changes that took place in the years under study and their intensity, it can be concluded that in the coming years the phenomenon of depopulation will begin to develop with even greater force and dynamism.

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**DEPOPULACJA NA OBSZARACH WIEJSKICH WOJEWÓDZTWA  
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**Abstrakt**

Celem artykułu była analiza i ocena sytuacji gmin wiejskich oraz obszarów wiejskich znajdujących się na terytorium gmin miejsko-wiejskich w województwie warmińsko-mazurskim pod względem zjawiska depopulacji w latach 2012-2022. W badaniu wykorzystano metodę klasyfikacji jednostek terytorialnych J.W. Webba (1963). Zjawisko depopulacji nasiliło się w gminach wiejskich oraz na obszarach wiejskich w gminach miejsko-wiejskich. Głównym elementem wpływającym na wyludnianie się w tych latach była emigracja ludności. Pogorszenie sytuacji ludnościowej na badanych obszarach związane było również z obniżeniem wskaźnika przyrostu naturalnego. W świetle zmian jakie nastąpiły w badanych latach oraz ich intensywności można uznać, że w najbliższych latach zjawisko depopulacji zacznie się rozwijać z jeszcze większą siłą oraz dynamiką.

**Introduction**

A current unique challenge with a wide range of impacts on the socio-economic sphere is the phenomenon of depopulation. The depopulation process is a combination of both migration flows and natural population loss caused by low birth rates (Wiśniewski *et al.*, 2020, p. 24; Papadopoulos & Baltas, 2024, p. 1). In depopulated areas, demographic changes such as an ageing population and a reduction in the proportion of young people due to selective migration are taking place. As a result, there is further depopulation of such territory (Wesołowska & Jakubowski, 2018, p. 119).

The phenomenon of depopulation is a challenge for the area in which it occurs, as it generates a number of socio-economic problems (Mickovic *et al.*, 2020, p. 1; Otovescu & Otovescu, 2019, p. 382). It is not limited to a general reduction

in population, but has complex social, economic and cultural implications, with a particularly significant impact on peripheral areas. Peripheral areas are deemed to be places away from economic centres, characterised by relatively low levels of economic development, infrastructure, entrepreneurship, innovation, and the dominance of traditional industries (Strojny & Niewiadomski, 2023, p. 104, 105; Kowalczyk & Nguyễn, 2023, p. 170, 171). In addition, it is indicated that this type of territory shows economic dependence on economic and political centres, as well as low population density and low quality of human capital (Proniewski, 2012, p. 64, 65).

Peripheral areas, due to their specific characteristics, are also termed as a problem areas (Halamska, 2018, p. 70, 71; Balińska, 2016, p. 26). An exemplary characterisation of problem areas was made within the framework of the National Strategy for Regional Development implemented until 2020, in which it was indicated that this type of territory includes, i.a. rural areas with unfavourable socio-economic development indicators and limited development opportunities, border areas, areas where the network of connections with the main voivodeship centres is poorly developed (Proniewski, 2012, p. 68).

Rural areas are defined as areas functionally linked to agriculture and other activities for which the use of natural resources is fundamental. They are used for the pursuit of agricultural production, inland fisheries, forestry (Bielecka, 2020, p. 43; Zawisza & Ptaszyńska, 2020, p. 7), as well as non-agricultural activities such as tourism and other functions to meet ever-changing human needs (Jóźwik, 2019, p. 258; Heffner, 2019, p. 948; Józefowicz *et al.*, 2020, p. 10, 11). Referring therefore to the characteristics of peripheral areas, it should be recognised that rural areas are not their equivalent.

Rural areas in Poland in 2020 covered approximately 92.9% of the country's area. However, it should be pointed out that their share in the structure of voivodeships is not equal. On the basis of the results of a report prepared by the Central Statistical Office (CSO), it can be concluded that in more than half of the voivodeships in Poland rural areas account for between 90.1% and 96% of the area of individual units. In this category the Warmińsko-Mazurskie Voivodeship stands out in comparison to Poland, as rural areas in it cover 97.4% of the territory (Morze (Ed.), 2022, p. 29).

Therefore, considering the significance of the phenomenon of depopulation, its increasing scale and the characteristic significance in areas particularly threatened by it, the aim of the article was to analyse and evaluate the situation of the Warmińsko-Mazurskie Voivodeship in 2012-2022 in terms of the risk of depopulation.

## Population Change and the Phenomenon of Depopulation – Theoretical Background

The relationship between population and the economy was analysed by economists as early as about 200 years ago with Malthus's publication of the law of population. According to this theory, population in the absence of constraints grows in geometric progression, and the amount of food produced grows in arithmetic progression (Unat, 2020, p. 133). From this relation, it is clear that the population growth force is infinite and can exceed the land's capacity to provide for it (Danowska-Prokop, 2017, p. 49-53). Consequently, Malthus argues, as a result of a constant supply of land and continuing population growth, there will be a decrease in agricultural productivity (Azam *et al.*, 2020, p. 524). This, in turn, leads to an insufficient supply of food and, as a result, a decrease in population due to co-existing social phenomena (famine, resource wars, disease). In this way, according to a point of view of Malthus, there would be a natural, although rapid, population regulation (Warżala, 2022, p. 82).

An equally important theory in the history of population change research is the classical demographic transition theory. It identifies three phases. The first is characterised by high mortality and uncontrolled birth rates (Okólski, 2003, p. 212-220). In the second, in which the demographic transition takes place, there is a decrease in infant mortality and an increase in life expectancy – the result of scientific progress occurring during this stage. This mainly involved developments in medical science, because, through the use of vaccination and hygiene principles, epidemics were reduced and diseases were learned to be diagnosed more accurately, facilitating the treatment process (Kirk, 1996, p. 362, 363; Okólski, 2003, p. 212-220). In the final phase, the population remains relatively stable, with birth rates and death rates equalizing (Utomo *et al.*, 2022, p. 289).

The theory of the second demographic transition is also an important theory with regard to population variability, considered as a kind of extension of the classical theory of the demographic transition, because the changes it covers are an extension of the classical transition (Kurkiewicz, 2008, p. 107, 108). It describes and also explains the revolution in the lifestyle and sexual behaviour of the population (Yu & Xie, 2022, p. 239). In this case, scientific developments have also played an important role because, i.a. discoveries in the field of contraception have had an impact on the development of fertility (Billari, 2022, p. 20). As a result, the incidence of multi-child family<sup>1</sup> is declining and the average number of children per family is decreasing, while voluntary childlessness is increasing. In addition, the typical age of procreation is further delayed (Janiszewska, 2022, p. 12).

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<sup>1</sup> Since the late 1960s in Poland, as in other developed countries, it has been families with three or more children (Janiszewska, 2022, p. 31).

In these theories, which are among the most important in the field of demography, it is possible to see references to the phenomenon of depopulation, but it is not included in a literal way.

The origins of research on depopulation date back to the 19<sup>th</sup> century, but the very definition of the phenomenon was not as precisely formulated as it is in the current literature. Ogle (1889, p. 205) defined depopulation as an absolute decrease in population in a given area, but did not clearly define the cause responsible for this phenomenon.

An indication of the moment when the issue of depopulation began to be studied in Poland and, at the same time, the elements generating this phenomenon were presented in a manner similar to today's is the interwar period. As Nadobnik (1937, p. 89-96) pointed out, the drivers of the phenomenon in question were 'natural causes, such as a significant weakening of the reproductive force and a possible excess of deaths over births, or social causes, i.e. the resettlement of the rural population to cities and emigration abroad'.

Currently, depopulation is defined as the phenomenon of population decline in an area compared to an earlier period. This situation occurs when the natural increase is negative and exceeds the migration balance, when the migration balance is negative and exceeds the natural increase, or when both phenomena occur simultaneously (Castillo-Rivero *et al.*, 2020, p. 1329; Johnson & Lichter, 2019, p. 1; Pinilla & Sáez, 2017, p. 2; Gómez Valenzuela & Holl, 2024, p. 430; Vuković, 2022, p. 76).

In the Polish literature, the definition of this phenomenon is similar to foreign publications. Namely, depopulation is defined as a situation of demographic and spatial character, denoting a decrease in population in a given period of time as a result of negative natural growth, negative migration balance or the occurrence of both these phenomena simultaneously (Majdzińska, 2018, p. 23; Maleszyk, 2022, p. 68; Hrynkiewicz, 2020, p. 19; Szukalski, 2019a, p. 10; Janiszewska, 2023, p. 55).

## Determinants, Impacts and Mitigation of Depopulation

The phenomenon of depopulation in Poland, especially in the last few decades, mainly affects rural areas, but also small and medium-sized cities (Szukalski, 2019b, p. 1). Of the elements generating depopulation, in the context of peripheral areas, population migration is identified as the leading one (Jończy *et al.*, 2020, p. 263). Availability of services, economic conditions and community facilities are also identified as factors influencing rural depopulation<sup>2</sup> (Alamá-Sabater *et al.*, 2019, p. 101). These elements include, for example, the existence of differences in the level of education or the quality of healthcare available in rural areas

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<sup>2</sup>Social care centres, retirement homes, primary and secondary schools, hospital availability.

compared to urban areas (Dahs *et al.*, 2021, p. 535). Another example of the predominance of cities over rural areas in the context of the depopulation phenomenon is the difference in earnings. In rural areas, the achievable income is relatively lower. Another example of the advantage of cities over rural areas is the mismatch between the qualifications of people living in rural areas and the jobs available – this applies in particular to people specialised in providing services or prepared to work in industry (Pinilla & Sáez, 2021, p. 336).

As a result of population decline in rural areas, there is a deterioration of the biological structure in terms of sex ratio as well as age (Śleszyński, 2016, p. 63). In some municipalities (e.g. in the Podlaskie Voivodeship), the gender ratio from the perspective of the depopulation phenomenon is unfavourable, as there are approximately 80 or fewer women for every 100 men aged 20-34. Thus, the conditions for starting a family and, consequently, the potential opportunity to increase the fertility rate are reduced (Śleszyński, 2023, p. 142). The reason for this is the spatial movement of the population, that is migration, which mainly involves people from the age group indicated earlier, i.e. the population in the 25-35 age range (Organiściak-Krzykowska, 2022, p. 61). In addition, the disproportion in the number of women in relation to the number of men is also due to the fact, that women are much more likely to choose secondary and tertiary education and do not want to remain on farms, which is very often associated with their migration (Szukalski, 2020, p. 2).

Women's decisions to leave are also influenced by their greater willingness to respond to deteriorating social infrastructure such as kindergartens or crèches, as well as transport infrastructure (transport connections) (Jończy, 2023, p. 59). Therefore, the mismatch between labour supply and demand in the context of depopulation is important because it causes selective migration. This demonstrates the importance of generating employment in the countryside outside the agricultural sector, which to some extent can stop population movement in both the short and long term (Stanny *et al.*, 2023, p. 223).

An equally important factor from the perspective of population decline in rural areas is the demographic situation prevailing in these areas, which can be reflected in the birth rate, that is, the ratio of live births to deaths (Mikulec, 2023, p. 15). In recent years, there has been a systematic decline in the number of births as a result of changes in the age structure of the population and the evolution of procreative behaviour (Cierpień-Wolan, 2020, p. 144). At the same time, disregarding the atypical period of the pandemic caused by SARS-CoV-2, the number of deaths was recorded with similar year-on-year values in previous years (Szukalski, 2021, p. 2). Thus, with regard to the substrates of the birth rate, it can be seen that the relationship that has been formed in this way in recent years has been unfavourable in the context of depopulation.

One of the factors generating the decline in fertility rates is the shifting age limit at which young people decide to have children (Pastuszka, 2019, p. 255). This can be seen by analysing the age of women giving birth to their first child.

In 1990, the value was about 26 years old, while about a quarter of a century later it was 30 years old (Marciniak & Stańczak, 2019, p. 50). Reasons for this are, among others, the desire for economic stability to provide for the family in the first place or for these people to achieve the desired level of education (Bieńkowska & Kitlińska-Król, 2017, p. 43).

In terms of the factors influencing people's migration decisions, some similarities can be noted with regard to the factors determining the attractiveness of a region. In the case of migration, as in the case of the investment climate, the sufficient presence of 'hard' factors (e.g. location, state of the natural environment, transport accessibility, social infrastructure shaping living conditions) and 'soft' factors (e.g. accessibility of educational and medical services, sense of identification of the local population with the city or region, efficient local administration, housing benefits) are important (Sass, 2020, p. 50; Kryk, 2019, p. 82; Sikorska-Wolak *et al.*, 2020, p. 174, 175). An insufficient level of development of these elements in an area may result not only in a lack of interest among investors, but may also be a factor stimulating in such a place the desire to emigrate among its inhabitants.

In addition to the primary effect of depopulation, which is a decrease in the population of an area, there are also accompanying consequences resulting from the exodus of inhabitants. These include the economic stagnation of the area with a deterioration of interpersonal relations, a reduction in biodiversity or a loss of the natural values of the territory (Caceres-Feria *et al.*, 2021, p. 108). Causes of depopulation also include unfavourable changes in the age and gender structure of the population (Camarero & Oliva, 2019, p. 3), which can cause difficulties for individual families or entire communities, for example by making it difficult to fulfil caring functions for the elderly (Seberini *et al.*, 2021, p. 319).

When analysing the effects of the phenomenon described, there are some similarities with its causes.. Young people, due to the lack of suitable work, seek employment outside the depopulation area. This reduces the tax base in these areas, which in turn translates into a reduction in social infrastructure (Kolosov & Crivenco, 2021, p. 264). Due to the outflow of labour, the interest of potential investors in the area is declining, so the labour market situation is not likely to improve, so there are renewed emigration aspirations among residents (Daugirdas & Pociūtė-Sereikienė, 2018, p. 16, 17).

Population decline also adversely affects the local market for goods and services, including the property market (falling prices due to low demand), inefficiencies in the public finance system at local level and the accompanying increase in infrastructure maintenance costs (Wojewódzka-Wiewiórska, 2021, p. 159; Serra *et al.*, 2023, p. 3066, 3067). Yet another problem resulting from the depopulation of an area is the increasingly dispersed and inefficient settlement, the growing mismatch between jobs and education (Śleszyński, 2018, p. 229).

As a result of depopulation, municipal revenues from personal taxes are also declining – which can make it difficult for such entities to operate



(Szweda-Lewandowska, 2020, p. 16). A long-term negative total migration balance, which is one of the elements significantly influencing the depopulation of a given area, results, i.a. in the loss of prestige of a place as, e.g. an academic centre where this phenomenon occurs, in relation to other areas. As a result, the number of students, graduates and the volume of R&D expenditures, among others, decreases. This in turn generates undesirable phenomena e.g. in medical care. As a result of the resulting population outflow, the number of doctors and medical staff is decreasing. As a result, the number of people in this group becomes insufficient in relation to the existing demand in an area experiencing a long-term negative overall migration balance (Heffner, 2023, p. 78).

A declining population also affects consumer demand (Bock & Haartsen, 2021, p. 38) and the propensity for investment by economic operators struggling to sell their goods and services. As a result, there is a shrinkage of the economic potential of such a territory, which again results in a decrease in the income of local government units (Wyszkowska & Wyszkowski, 2023, p. 30). This creates a kind of 'spiral' dynamising already existing negative trends resulting from the depopulation of a place (Kovács & Tagai, 2021, p. 420, 421; Lorente *et al.*, 2020, p. 152, 153). Finding a solution to such a situation is not an easy task (Reynaud & Miccoli, 2018, p. 1-12). It is therefore important to properly analyse the various factors that can create this phenomenon, as an accurate diagnosis is a real chance to find the most appropriate solutions to the challenge of depopulation (Hryniewicz, 2020, p. 20, 21).

The problem of the successive decrease of population in rural areas does not only concern Poland – it is also a challenge in many countries of the European Union (Eurostat, 2023), i.a.: Portugal (Fernandes, 2019; Almeida, 2020), Spain (Pose *et al.*, 2020; Cañal-Fernández & Álvarez, 2022; Rodríguez-Rodríguez & Larrubia Vargas, 2022; Pleite & Sueiras, 2024), Romania (Muntele *et al.*, 2021; Hărăguș & Földes, 2020; Otovescu & Otovescu, 2019), Lithuania (Verkulevičiūtė-Kriukienė *et al.*, 2021), Greece (Panagiotopoulos & Kaliampakos, 2024), Italy (Reynaud & Miccoli, 2023; Basile & Cavallo, 2020) or Bulgaria (Velkovski, 2022; Beluhova-Uzunova & Hristov, 2020).

Ways to prevent further depopulation are different, because the factors causing depopulation are not always related to the same problems. Examples of preventing depopulation include developing local entrepreneurship by, for example, supporting young people to set up businesses, offering them internship and apprenticeship programmes and implementing support programmes for jobseekers (Piotrowski *et al.*, 2019, p. 26-46). Other ways of stopping depopulation are the development of mobility and communication infrastructure, the development of digital infrastructure and agriculture, as well as the improvement of social services. To combat depopulation, measures are also being taken to make the most of the region's natural assets for the benefit of tourism, to provide incentives for the creation of renewable energy sources (Cambrá-Fierro & Pérez, 2022, p. 876-881; Stojanova *et al.*, 2021, p. 16, 17).



Examples of proposals for solutions to the problem of depopulation that can be found in the literature include taking measures to give an economic boost to depopulated areas. In the context of rural areas, the development of agricultural land on the basis of sustainable agriculture is one important element that could counter depopulation. Financial resources invested in this way would make it possible to stop further degradation of soils, which in turn would cease to discourage the farming population from emigrating from such areas (Jato-Espino & Mayor-Vitoria, 2023, p. 11). However, as demonstrated earlier, measures to reduce depopulation should not be limited to interventions in the agricultural sector only. To this end, it is recommended that social economy institutions play a greater role in which they support the creation of enterprises in different sectors, thus increasing the diversity of the labour market in such an area (Carchano *et al.*, 2021, p. 14). Another example of intervention in the non-agricultural sector that can reduce depopulation is subsidising companies that employ local youth. In this way, the exodus of the most valuable population from the point of view of depopulation is inhibited, so there is a chance of avoiding a decline in the attractiveness of such an area and, in addition, such people can obtain a satisfactory salary where they live (Labianca & Navarro Valverde, 2019, p. 235, 236).

In addition to creating opportunities for greater employment and building wage competitiveness, the availability of social infrastructure is also important. It is recommended to improve conditions from the field of transportation and information and communication technologies. In this way, functioning in such an area becomes more comfortable than before, which may result in the retention of some residents in such an area (Alamá-Sabater *et al.*, 2021, p. 5-10). The above examples mainly contained recommendations dedicated to rural areas in Spain. They can be applied in other countries, but as mentioned earlier – it is important to carefully analyse the conditions of depopulation in the territory where such measures would be applied, because the above solutions may not fit at all the real problems of another territory.

## Description of Research Methodology

The article assesses the scale of the depopulation threat occurring in rural areas. Due to the availability of data, the analysis covered rural municipalities and rural areas included in urban-rural municipalities. A detailed analysis and evaluation of the phenomenon of depopulation in rural areas of the Warmińsko-Mazurskie Voivodeship was preceded by a diagnosis of the problem in the interregional system in Poland. For this purpose, differences in the number of inhabitants in the rural areas of municipalities in various voivodeships in Poland in 2012 in relation to 2022 were estimated.

Taking into account the population growth and the balance of migration, the classification and evaluation of the population situation in rural areas of municipalities of Warmia and Mazury Voivodeship according to the typology of J.W. Webb (1963). This is a method commonly used to divide individual territorial units at the national and international level (Lizińska, 2022, p. 74; Gil *et al.*, 2020, p. 122; Hubl, 2019, p. 96; Prenzel, 2017, p. 41).

This typology distinguishes the division of individual territorial units into classes labelled A to H. The first four types A-D refer to units of positive character from the perspective of population change – they achieve population growth, while the remaining types E-H cover areas of negative character – there is a decrease in population. The exact description of the individual cases occurring in the adopted methodology is as follows (Webb, 1963, p. 132):

- positive types (population growth):
  - A – positive birth rate exceeds negative migration balance,
  - B – positive natural increase is higher than positive migration balance,
  - C – positive birth rate is lower than positive migration balance,
  - D – positive migration balance more than compensates for the negative birth rate;
- regressive types (population decline):
  - E – the negative birth rate is not compensated for by a positive balance of migration,
  - F – the decline in population is caused more by negative natural increase than negative migration balance,
  - G – the decline in population is caused more by negative migration migration than negative natural increase,
  - H – the negative migration balance is not compensated for by a positive birth rate.

The analyses carried out, both with regard to the values of the natural increase rate per 1,000 population, the state of the population and the migration balance rate per 1,000 population, used data from the Local Data Bank (LBD) published by the CSO (Central Statistical Office).

In the context of total migration in Poland itself, it should also be emphasised that the data provided by the CSO may result in an underestimation of the actual population living in a given area. Such disproportions may fluctuate in relation to the real value with a difference of even approximately 20-30% (Jończy *et al.*, 2021, p. 45-51). As a result, the actual situation in relation to the theoretical one regarding the depopulation situation in a given area may be considerably worse than can be presumed (Jończy, 2023, p. 56).

## Assessment of the Scale of the Threat of Depopulation in Rural Areas

According to the conducted analyses, rural areas of municipalities in Warmia and Mazury voivodeship in the analysed years were characterised by a high level of depopulation in comparison to the rest of the country. Among all voivodeships, only four were characterised by a higher share of depopulating municipalities. These were: Opolskie, Podlaskie, Świętokrzyskie and Lubelskie. All the units mentioned were characterised by a depopulation level higher by at least 5 percentage points (Fig. 1).

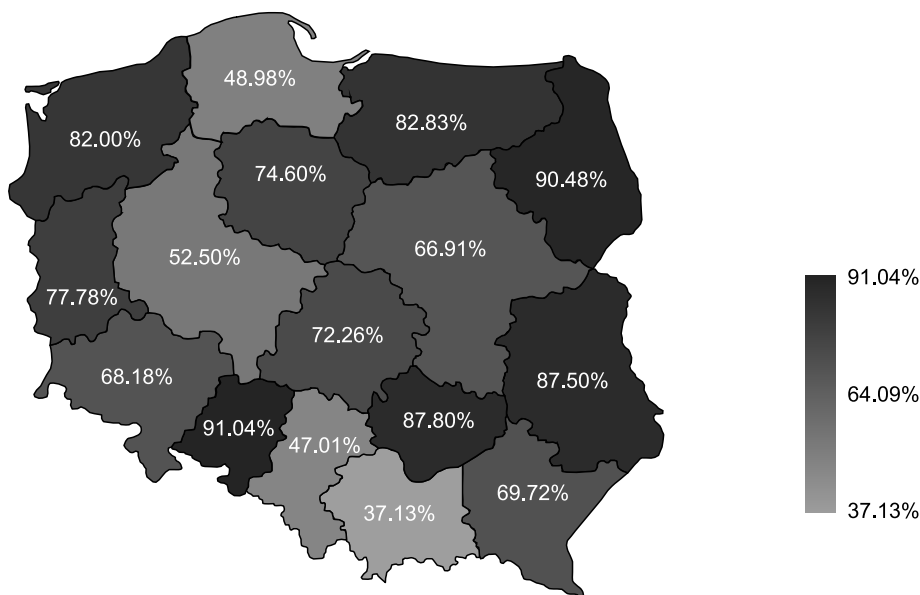


Fig. 1. Share of municipalities covering rural areas with reduced population in relation to municipalities covering rural areas in general 2012-2022

Source: own elaboration based on data published by LBD (for years 2012-2022).

The Opolskie Voivodeship was characterised by the highest share of rural areas of municipalities with depopulation in relation to the total number of municipalities. The specificity of Opolskie Voivodeship in terms of depopulation is conditioned, i.a. by its history, and the leading factor in the depopulation of this territory is migration. Due to the opportunities available to some residents of the Opolskie Voivodeship, since the 1980s they have been migrating abroad for work purposes (Jończy & Łukaniszyn-Domaszewska, 2018; Goleński & Blajda, 2021, p. 121-123). In recent years, however, internal migration has been more important from the perspective of depopulation. The population is choosing to leave the

Opolskie Voivodeship for other areas of Poland because of the relatively more attractive labour market (Kuźmicka, 2023, p. 51) and educational offer (Jończy & Rokita-Poskart, 2014, p. 9-11).

The occurrence of large interregional variation (from 37.13% – in the Małopolskie Voivodeship, to 91.04% – in the Opolskie Voivodeship) of the share of rural municipalities with a reduced population in relation to the total rural areas indicates the need for an in-depth diagnosis of the components of this phenomenon. A detailed analysis of changes in the population situation in the Warmia and Mazury voivodeship was made using Webb's typology (Tab. 1).

Table 1

Population situation in rural areas of municipalities of the Warmia and Mazury voivodeship in 2012 by Webb typology

Population situation type	Nature of the type	Number of municipalities of rural areas units	Share [%]
A	positive	7	31
B		7	
C		17	
D		0	
E	regressive	3	69
F		6	
G		16	
H		43	

Source: own elaboration based on data published by LBD (for 2012 year).

As can be seen from the summary presented in Table 1, rural areas in municipalities of Warmia and Mazury voivodeship in 2012 according to Webb's classification were mainly characterised by regressive type (E-H) of population situation (almost 70% of municipalities). From the point of view of the studied region, this is an unfavourable situation, as it indicates a decrease in population. In this case, in the context of the whole province, the factor mainly responsible for the decrease in population was the phenomenon of migration. Due to the fact that a significant part of the rural areas achieved a positive natural increase, it might seem that from the perspective of depopulation the situation of the study area is not bad. However, in reality, the opposite is true. Of all the rural municipalities and rural areas in urban-rural municipalities characterised by a positive natural increase, more than half represented type H in the method used. This means that the natural increase was not able to neutralise the population loss caused by the migration phenomenon. In addition, a negative aspect from the point of view of depopulation risk is the fact, that only 24 municipalities

included in the study were characterised by both positive natural increase and migration balance.

Analysing population changes in rural areas of municipalities in the Warmia and Mazury voivodeship in the same way a decade later, i.e. in 2022, a significant deterioration in the population situation can be observed (Tab. 2). Indeed, while in 2012 there was a positive population growth in 74 studied municipalities (in types: A, B, C, H), 10 years later the situation changed significantly (4 C – type municipalities). On the other hand, taking into account Webb's classification, it should be pointed out that only 22 units represented, from the perspective of depopulation, a positive group, namely type C – denoting a lower (although still added) natural increase in relation to the positive migration balance, and type D – denoting the compensation of the negative natural increase with a positive migration balance. The increase in the already unfavourable relationship in terms of population situation in 2022 of the number of surveyed areas with a positive character in relation to the surveyed areas with a negative character, compared to 2012, indicates an intensification of the depopulation phenomenon.

Table 2

Population situation in rural areas of municipalities of the Warmia and Mazury voivodeship in 2022 by Webb typology

Population situation type	Nature of the type	Number of municipalities of rural areas units	Share [%]
A	positive	0	22
B		0	
C		4	
D		18	
E	regressive	11	78
F		36	
G		30	
H		0	

Source: own elaboration based on data published by LBD (for 2022 year).

Further analysis of the rural areas of the studied municipalities of the Warmia and Mazury voivodeship shows that the dominant ones, constituting  $\frac{2}{3}$  of the studied areas in terms of population situation, were those classified as type F and type G – i.e. areas with a predominance of deaths over births and a predominance of emigration over immigration.

Due to the increase in the number of municipalities with a negative real birth rate in 2022 compared to 2012, it must be concluded that the phenomenon of depopulation has intensified. In order to better illustrate the process of change that took place in the analysed time period, in table 3 shows the changes in the

population situation of individual units. Comparing 2012 and 2022 in this way, it can be concluded that the negative trend in the population situation has not been completely reversed in almost any of the study areas. Moreover, the number of municipalities included in the analysis characterised by both positive natural increase and positive migration balance decreased from 24 in 2012 to 4 in 2022.

From a depopulation perspective, the situation improved significantly in only one municipality. The migration balance in this territory in 2022, compared to 2012, has reversed – it was previously negative and is currently positive, and the natural increase has been maintained at a positive level (which is due to the achieved unit type according to Webb's classification, namely the studied area has been classified as type C). An improvement in the depopulation situation has also been achieved in the 8 other study areas, as according to the typology used, the migration balance has improved in these areas (from negative values in 2012 to positive values in 2022).

Table 3

Changes in the population situation in rural areas of municipalities in the Warmia and Mazury voivodeship by Webb typology in the years 2012-2022

Specification		Types of unit in 2012								Σ of types in 2012
		A	B	C	D	E	F	G	H	
Types of unit in 2022	A	0	0	1	0	1	3	2	0	7
	B	0	0	0	4	0	2	1	0	7
	C	0	0	2	10	0	3	2	0	17
	D	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	1	1	1	0	3
	F	0	0	0	0	3	1	2	0	6
	G	0	0	0	0	1	9	6	0	16
	H	0	0	1	4	5	17	16	0	43
Σ of types in 2022		0	0	4	18	11	36	30	0	–

Source: own elaboration.

However, it is important to note that the changes that have occurred in these cases (i.e: 3 municipalities classified as type F in 2012 – qualify as type E in 2022, 1 municipality changes type from G to E and 4 municipalities change type from H to D), means that there is still a negative natural increase in their area (as shown by the characteristics of the different types according to the method used).

It should also be noted that the 8 municipalities included in the study, which were previously characterised by a positive real population growth, achieved a negative real population growth in 2022. From the point of view of depopulation,

this is important information, as it turns out that the studied areas, which in 2012 were characterised by a favourable demographic situation (they had both a positive natural increase and migration balance), 10 years later became places with a completely different population situation. The occurrence of such a situation is important not only from the point of view of the need to diagnose changes in the direction and intensity of processes generating unfavourable population situation in a given area, but also in the context of potential actions that can be taken to reduce the indicated trends. At the same time, it should be emphasised that such a dramatic change in the case of the examined areas with positive real population growth took place over a period of 10 years, which indicates relatively fast progressing negative demographic processes. Thus, possible measures in response to depopulation should be taken with an awareness of the level of their effectiveness over a specific period of time.

As emphasised by other authors, the elements that can be identified as key in the context of the depopulation of the Warmia and Mazury voivodeship are historical conditions (a large share of state-owned farms in the past with the dominant agricultural function of the voivodeship at the same time) (Hrynkiewicz, 2022, p. 47-49), or the low share in the functional structure of such functions as tourism and leisure, industrial, residential, services (Gwiażdźńska-Goraj, 2018, p. 340-342).

As a result, the existing low housing availability as well as the unattractive labour market are becoming a factor causing migration of the population (Lisowska & Łojko, 2023, p. 73). This is confirmed by the results of research, as in the years covered by the analysis, the decrease in population was significantly influenced by the negative migration balance. The problem in this voivodeship is the lack of significant changes in the context of, i.a. the diversity of the labour market, improvement of social infrastructure or competitive wage levels in relation to other parts of Poland (Szaltys, 2017, p. 104, 105; Wyrwa & Barska, 2021, p. 54-72). As a consequence a significant part of the population's migration flows is directed towards the neighbouring voivodeships, i.e. Pomeranian Voivodeship and Masovian Voivodeship (Strojny, 2013, p. 233-235; Rozkut (Ed.), 2023, p. 418, 419). These areas are relatively better developed economically in relation to Warmia and Mazury voivodeship. This, in turn, makes the opportunities related to the previously mentioned areas, such as wage levels, more favourable in these voivodeships in relation to the Warmia and Mazury voivodeship (Guzik *et al.*, 2021, p. 114-118). This, in turn, may be a factor in the willingness of residents to emigrate from rural areas of the Warmia and Mazury voivodeship.



## Summary and Conclusions

The analysis has shown that rural areas of the Warmia and Mazury voivodeship are characterised by the problem of depopulation. The importance of this problem also stems from the fact that the voivodeship has the largest share of rural areas in relation to its area.

The analysis and evaluation of the population situation in rural areas in the analysed voivodeship indicated the occurrence of an increasing trend of population loss, mainly due to a negative migration balance. The positive natural increase recorded in 2012 did not compensate for the negative migration balance, while in 2022 the negative natural increase was accompanied by a negative migration balance. Therefore, a regressive type of demographic situation prevails in the rural areas of the municipalities of the Warmia and Mazury voivodeship (type H in 2012 and type F together with type G in 2022 – dual regressive types).

In addition, Warmia and Mazury voivodeship in the analysed years belonged to the group of 5 voivodeships characterised by the largest decrease in population in rural areas. Taking into account the fact that in the same period of time the factors determining the phenomenon of depopulation clearly increased, it should be stated that the rural areas of the analysed region are to a high degree threatened by the indicated problem along with the coexisting negative consequences of a diverse nature. It is therefore necessary to precisely define the type, direction and scale of changes in demographic processes in this area and their determinants in order to adjust the policy aimed at counteracting the changes in the population situation as effectively as possible.

From the point of view of the characteristics of the phenomenon in question, its occurrence poses a major challenge for local authorities. The increasing scale of complexity and difficulty in solving emerging problems is a result of progressing depopulation. As a consequence, depopulation is becoming an important element requiring special attention in the context of the socio-economic development of the region and the limited scope and level of effectiveness of measures taken to reduce this phenomenon. Taking into account the fact that depopulation is primarily associated with the phenomenon of migration, the main attention of authorities at the local level should be directed at creating conditions that will be conducive to reducing the scale of migration and the return of residents. On the one hand, rural areas provide an opportunity to create friendly conditions for living, especially in the environmental context. However, it should be taken into account that the current expectations of rural residents in terms of conditions are increasingly similar to those in urban areas. In addition, rural areas can be a place for seasonal living, which can promote the development of existing infrastructure.

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