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Rural Demographic Problem Areas in Poland

Abstract. Demographic problem areas are perceived as one of the most important types of problem areas and require special research interest. Problem areas conditioned by population factor most often refer to rural areas. Presented article aims to identify and delimit rural demographic problem areas in Poland. The study covered rural areas distinguished on the basis of the classification of the European Commission DEGURBA. The analysis enabled to identify depopulation areas, areas with disrupted population reproduction (ie areas of permanent natural decline), areas of permanent outflow of population, areas with impaired population structure by age and areas with disrupted population structure by sex in the group of people of marriage age (20-34 years). To indicate clusters of communes characterised by the presence of the unfavourable demographic phenomena and processes (rural demographic problem areas) the measure of local spatial autocorrelation (Anselin Local Moran's I) was applied. The application value resulting from the research may be the improvement of the effectiveness of public intervention carried out as part of the development policy.

Key words: rural areas, demographic problems, Poland

JEL Classification: J10, R10

Introduction

The concept of problem areas is an important research matter, which has received a lot of interest. The significance of this issue has been observed at different territorial level and included in the development policy among the European Union countries, individual states and regional and local self-governments. The concept of problem areas is varied and the criteria for their identification and delimitation are differentiated. One of their most important types of problems areas are demographic problem areas. A demographic potential is considered as one of the most important factors in broadly understood socio-economic development. Demographic changes have a great impact on development and growth. Urbanization, the ageing of population and migration are the key factors of regional discrepancies. The recognition of demographic processes is the basis for any assessment of the economic situation and is also one of the most important reasons for making decisions related to regional policy.

The aim of the paper is to identify and delimit rural demographic problem areas in Poland. This article focuses on demographic threats and the problem areas resulting from them. The examination of the population structure, dynamics and the direction of changes in its size allowed to capture changes in the demographic sphere taking place in spatial

¹ PhD, Faculty of Earth Sciences and Spatial Management, Maria Curie Skłodowska University, Al. Kraśnicka 2cd, 20-718 Lublin, e-mail: andrzej.jakubowski@poczta.umcs.lublin.pl; <https://orcid.org/0000-0003-2368-7426>.

² PhD, Faculty of Earth Sciences and Spatial Management, Maria Curie Skłodowska University, Al. Kraśnicka 2cd, 20-718 Lublin, e-mail: urszula.bronisz@poczta.umcs.lublin.pl; <https://orcid.org/0000-0002-4755-6060>.

terms. Based on the analysis of the distinguished criteria the areas characterized by the concentration of negative demographic trends, resulting in the shaping of rural problem areas in Poland. The application value resulting from determining the rural demographic problem areas may be the improvement of the effectiveness of public intervention carried out as part of the development policy.

The structure of the article is as follows: The first section outlines a literature review concerning the notions of demographic problems areas. The next part provides the research framework of the paper. The following section focuses on the results obtained from the conducted analysis. Finally, the last section contains the conclusions.

The literature review

There are a number of studies concerning the different types of problem areas. The approach to problem areas and the way they are delimited differs depending on the field of knowledge and the adopted criteria. The very notion of the problem area, also referred to as the area of scarcity, less developed, peripheral, lagging behind, depressive or difficult, is variously defined in the literature. According to Churski (2011), these are areas characterized by low level of economic development, showing weak development dynamics and characterized by negative social effects of the transformation process. Zagożdżon (1988), the problem area refers to a part of the geographical space characterized by the occurrence of negative phenomena from the social, economic and technical spheres, which evoke specific internal anomalies in the spatial structure. In this context, the author distinguished areas of population outflow from rural areas, areas of reduced agricultural efficiency, areas of ecological threat, areas of structural disproportions, peripheral and border areas, areas of reduced health and poverty. Ciok (1994) indicates that the problem area is characterized by low efficiency of socio-economic and spatial structures, poor development dynamics and a series of negative phenomena from the geographical, economic and social and cultural spheres. In the geographical sphere it reveals as peripherality, lack of natural resources, poor position in the transport network and difficult accessibility to other regions. In the socio-economic area, negative phenomena refer to such issues as: raw material production, the predominance of traditional sectors (agriculture), uncomplicated production system, labor force exports, import of final goods, lack of entrepreneurial attitudes, low income of households and the public sector, depopulation, low population qualifications, poor infrastructure, low GDP per capita, marginalization and social exclusion. The cultural aspect is related to the use of symbols created outside the region and the necessity to bear the consequences of other social models (Skubiak 2013).

The concept of problem areas gained a lot of attention of political dissidents and was included in the National Strategy for Regional Development, which defines the most important objectives of the regional development policy in Poland. According to the document, the problem area is understood as the territory characterized by the largest concentration of negative development phenomena with a range and national or supra-regional significance (NSRD 2010). The strategy identifies the following types of problem areas: areas with the lowest level of socio-economic development, rural areas with the worst indicators of the socio-economic situation and the lowest level of access to goods and services that determine development opportunities, cities and other areas losing their

current socio-economic functions, border areas, especially at the EU's external borders, and areas with the lowest spatial availability to voivodship centers.

Demographic problem areas are perceived as one of the most important types of problem areas and require special research interest. Problem areas conditioned by population factor most often refer to unfavorable gender structure, disturbed age structure, inactivity or excessive and long-term outflow of the population (Bański 2002). Zagożdżon considers that (1988) the basic criterion for delimitation of population problem areas should be negative migration balance, which allows for the identification of areas experiencing a constant outflow of population. The process of depopulation as a significant demographic problem was also indicated in studies carried out by Eberhard (1989), Strzelecki (1995) or Jelonek (1988). In his research, Jelonek distinguished areas with disturbed population reproduction or with a deformed structure of sex and age.

Rural areas are widely recognized as areas with a declining population and a strongly progressing aging process. Although in recent years there has been a growing interest of urban residents in settling in rural areas, this was noticed mainly in the vicinity of large urban agglomerations. The vast majority of rural areas are still depopulated quickly (Brodziński et al. 2013). Thus, there is a great need to recognize the scale and spatial distribution of demographic changes in rural areas, and identify rural demographic problem areas.

Data and Methodology

This article examines the situation of rural areas in terms of selected negative demographic processes allowing delimitation of demographic problem areas. The study covered rural areas distinguished on the basis of the classification of the European Commission DEGURBA. This classification is based on the assessment of the urbanization degree of local administrative units (LAU2) and allows the assignment of communes to one of three categories: (1) urban areas, (2) urban and suburban areas, and (3) rural areas (Eurostat 2017). The study covered communes classified in category 3 (i.e. rural areas), including 1957 of 2478 local administrative units in Poland (79.0% of the total). The source of empirical data used in the analysis was information collected by public statistics of Poland.

The study was aimed at identifying: (1) depopulation areas, (2) areas with disrupted population reproduction (i.e. areas of permanent natural decline), (3) areas of permanent outflow of population, (4) areas with impaired population structure by age and (5) areas with disrupted population structure by sex in the group of people of marriage age (20-34 years) according to the methodology developed by Jakubowski and Bronisz (2017). These indicators have been examined in terms of variation and cross-correlation.

In the process of determining depopulation areas, the scale and intensity of the phenomenon was an important factor proving its relatively permanent nature. According to the proposal of Strzelecki (2005) who analyzed the problem of "demographic deformation", areas of depopulation may include areas with a more than 5% drop in the population in the 10-year period. A similar assumption was made by Eberhardt (1989) regarding a ten-year period. Wesółowska and Jakubowski (2018) analyzed demographic changes in a twenty-year period, distinguishing regressive units (with population decline in the range from -5 to -20%) and deeply regressive (those with a population decline above 20%). In this study the units in which the population decline in period 1995-2017 exceeded the threshold of 10% were considered as depopulation areas. This value indicates a relatively permanent character and

high intensity of the aforementioned process. For the same reason, the threshold value for the average natural increase/decrease rate and the net migration per 1000 population was set at -3‰ level. In order to indicate the areas of the highest concentration of people aged 65 and more, a limit value of 18% was set (see Bański 2002, Flaga and Wesołowska 2018), while the units in which the number of women per 100 men was lower than 90 were considered as the areas of the disturbed population structure by sex (Flaga, Wesołowska 2018).

The analysis of the above-mentioned processes enabled the identification of rural problem areas in Poland, covering communes in which at least 3 of the analyzed phenomena occurred at a level exceeding the threshold values. In order to indicate clusters of communes characterized by the presence of the unfavorable demographic phenomena and processes (rural demographic problem areas) the measure of local spatial autocorrelation (Anselin Local Moran's I) was applied, calculated according to the following formula (Suchecki 2010):

$$I_{i(w)} = \frac{(x_i - \bar{x}) \sum_{j=1}^n w_{ij} (x_j - \bar{x})}{\sum_{i=1}^n (x_i - \bar{x})^2} \quad (1)$$

where x_i is an attribute for feature i , \bar{x} is the mean of the corresponding attribute, w_{ij} symbolizes the spatial weight between feature i and j , and n equates to the total number of features. The ArcGIS program was used to perform calculations.

Results

The most noticeable manifestation of adverse population changes, and at the same time their most frequently used measure is the loss of population. The scale of the problem of depopulation of rural areas in Poland is evidenced by the fact that in 1995-2017 among the analysed 1957 communes, the loss of population was observed in 1,495 units, i.e. 74.9% of the total. A significant and permanent drop in the population exceeding 10% (according to the criterion adopted in this analysis) was recorded in 528 communes (27.0%). Some of them also experienced a very deep demographic regression, exceeding 20% in the analysed period (67 units). The largest population regression was noticed in the Koszarawa commune, in which the population decreased by almost a half.

Depopulation rural areas were concentrated in the area of the eastern and central part of Poland. In the Lubelskie voivodship, the rural communes in which the population decreased at 10% and more were half, and the Podlaskie voivodship – more than half (58.7%) of all administrative units of this type. The biggest clusters of the communes affected by the depopulation processes were concentrated in the area of eastern and southern part of Podlaskie voivodship, eastern, southern and western part of Lubelskie voivodship (most of all Western Polesie, Lublin Upland with Rostocze and Volhynian-Podolian Upland), at the junction of the borders between Świętokrzyskie, Lubelskie and Mazowieckie voivodships (Vistula River Gorge of Lesser Poland), on the borderland of the Świętokrzyskie voivodship with Małopolskie, Śląskie and Łódzkie voivodships as well as in the northern part of the Łódzkie, Mazowieckie and Warmińsko-Mazurskie voivodships. A significant loss of population was also observed in southern and eastern part of Opolskie voivodship and in numerous communes of the Dolnośląskie voivodship, especially in its southern, mountainous part. Generally, the highest degree of depopulation was observed in typical agricultural rural communes, located far from larger cities (inner peripheries) and in the border areas (Fig. 1).

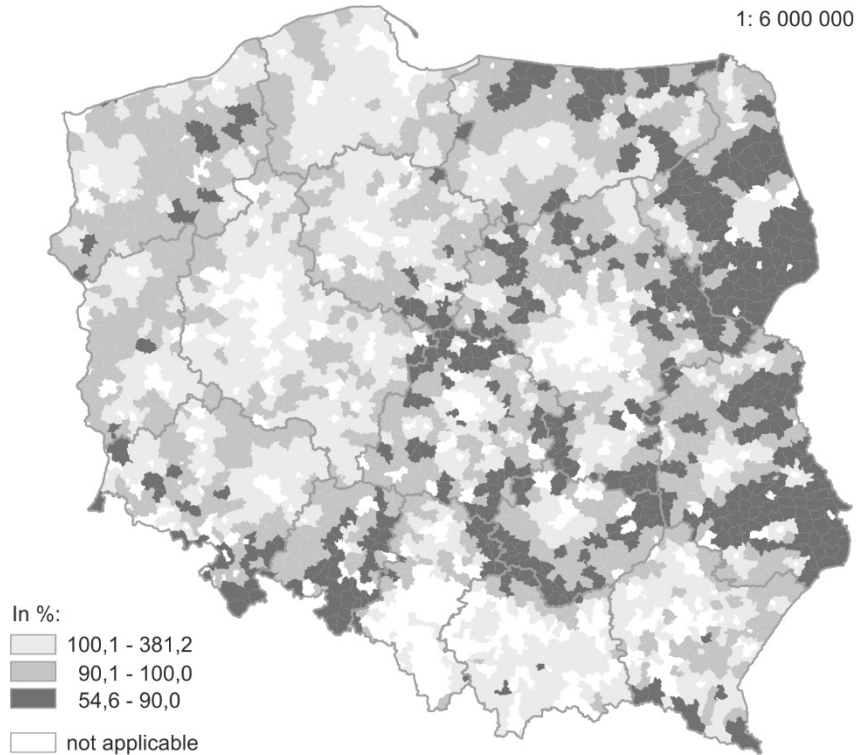


Fig. 1. Change in the number of population in communes in the years 1995-2017

Source: Own elaboration on the basis of Statistics Poland (2018).

The real loss of the population is conditioned by a natural decrease, a negative net migration, or both factors that occur simultaneously. The first of the above components of population growth or decline, i.e. natural increase/decrease, remains closely related to the structure of the population by sex and age in a certain area. It is also dependent on the nature of the migration processes taking place on it, because the migration outflow of women of reproductive age affects to a large extent the limitation of the number of births, and thus the natural increase (Jakubowski, Bronisz 2017). In the period 2008-2017, negative average annual values of the natural increase rate were observed in 1211 communes (77.5% of the total), while in the case of 270 units (13,8%) they were at the level equal to or lower than -3 persons per 1000 population (Fig. 2). Communes in which the lowest values of the analysed coefficient were recorded were located in the Podlaskie voivodship, eastern and south-eastern part of Lubelskie voivodship and on the borderland of the Świętokrzyskie voivodship with Małopolskie, Śląskie, Łódzkie, Mazowieckie and Lubelskie voivodships as well as in the northern part of the Łódzkie voivodships. The analysed phenomenon also occurs with high intensity in selected communes of the Dolnośląskie, Opolskie and Mazowieckie voivodships. Attention should be drawn to the large similarity of the spatial distribution of the analysed feature's value to the distribution of the population changes in 1995-2017, which indicates a significant impact of the natural decline on the processes of depopulation (Fig. 1).

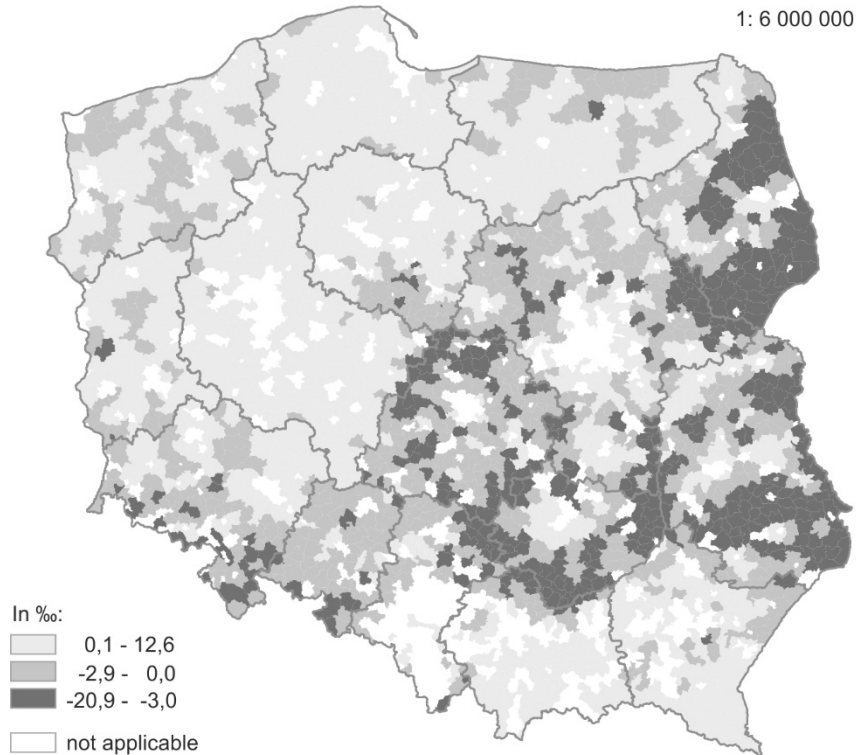


Fig. 2. Average annual natural increase per 1000 population in communes in 2008-2017

Source: Own elaboration on the basis of Statistics Poland (2018).

Migration flows of the population is another factor that has a significant impact on the processes of socio-economic development. They are not only a key factor for shaping the demographic potential of a given area, but also affect the shape and nature of socio-economic processes taking place on it. Migrations have a significant impact on the population structure by sex and age: the inflow areas are generally characterized by a younger age structure of the population than areas with a balanced migration balance. The outflow of the population, mainly concerning the young and the most mobile, influences the deformation of the age structure, primarily through the depletion of the population in the procreative age, thus leading to a reduction in the fertility rate. In general, emigrant areas are characterized by a high level of advancement of demographic aging. On the other hand the inflow of new residents contributes not only to the increase in the number of people, mainly in younger age groups, but also affects the development of the market, the labour market or the housing market (Jakubowski, Bronisz 2017). According to Celińska et al. (2010) the broader socio-economic context of the effects of emigration is also important, including a decrease in human capital resources, shrinking the market or a decrease in the investment attractiveness and competitiveness of a given territorial unit.

The measure of the net internal migration for permanent residence per 1000 population is a ratio allowing to capture negative processes in the area of population flows. This

indicator not only illustrates the displacement of people, determining the strengthening or weakening of the demographic potential of a given area, but also reflects the socio-economic situation in a given spatial unit, which is one of the most important factors affecting migration decisions (Jakubowski, Bronisz 2017). In the period 2008-2017, the negative net migration coefficient per 1000 population was observed in 1654 rural communes, which constitutes 84.5% of their total number. In the present study, the threshold value of the analysed indicator used to determine the demographic problem areas was determined at -3‰ and lower. Such low values of the migration balance coefficient were recorded in the case of 619 entities, i.e. almost one third of all communes of the voivodeship (Fig. 3). Their largest clusters are located in the north-eastern (Warmińsko-Mazurskie, Podlaskie and Mazowieckie voivodships), north-western (Zachodniopomorskie and Lubuskie voivodships part of Poland) and eastern (Lubelskie voivodship) parts of Poland. Communes characterised by permanent and significant migration outflow of the population are located mostly on peripheral areas, including so-called inner peripheries.

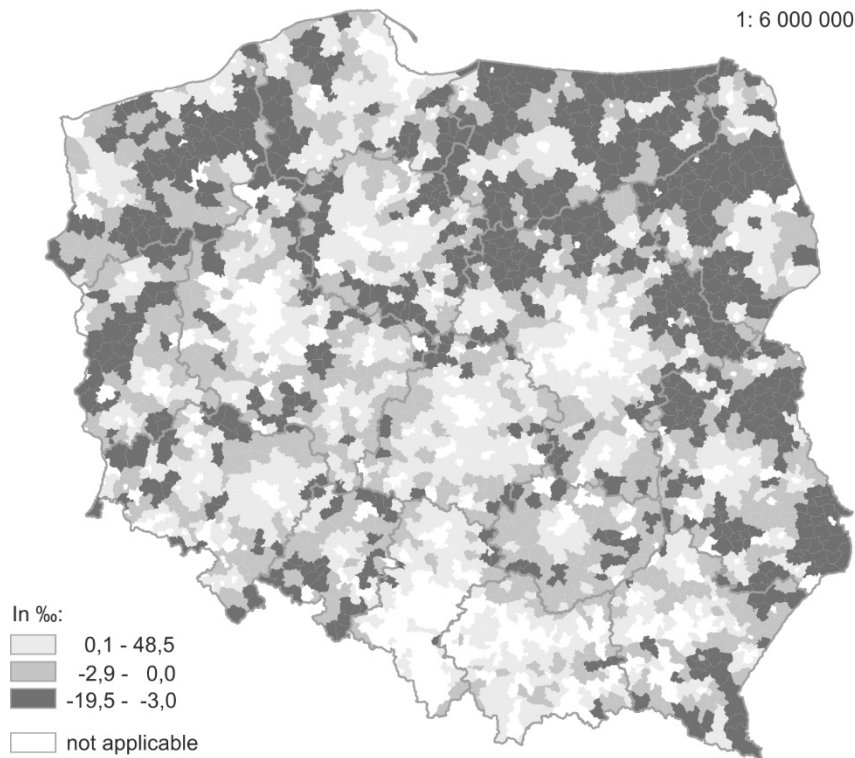


Fig. 3. Average annual net migration per 1000 population in communes in 2008-2017

Source: Own elaboration on the basis of Statistics Poland (2018).

Another criterion for recognising a given area as a problematic one (in terms of demography) is the disturbed structure of the population by age. This applies mainly to the units with a high level of advancement in demographic aging. The aging of the population is mainly demonstrated by the increasing share of older people in the general population

(Jakubowski, Bronisz 2017). The commonly used measures of the advancement of the aging process are based on the relations between the main (functional or biological) age groups including the so-called demographic aging rate, i.e. the share of people aged 65 and more in the total population (Abramowska-Kmon 2011).

In 2017, there were 371 communes (19.0%), in which the share of people aged 65 and more exceeded the threshold value of 18% (fig. 4). These units were located mainly in the central (Świętokrzyskie and Łódzkie voivodships) and eastern (Podlaskie and Lubelskie voivodships) parts of the country. In some communes in Podlasie, the aging of the population is a particularly important problem, reflecting the difficult demographic situation of these areas. For example, in Dubicze Cerkiewne, Orla and Czyże communes, the post-working age population (65 years and more) constitutes more than one third of the population.

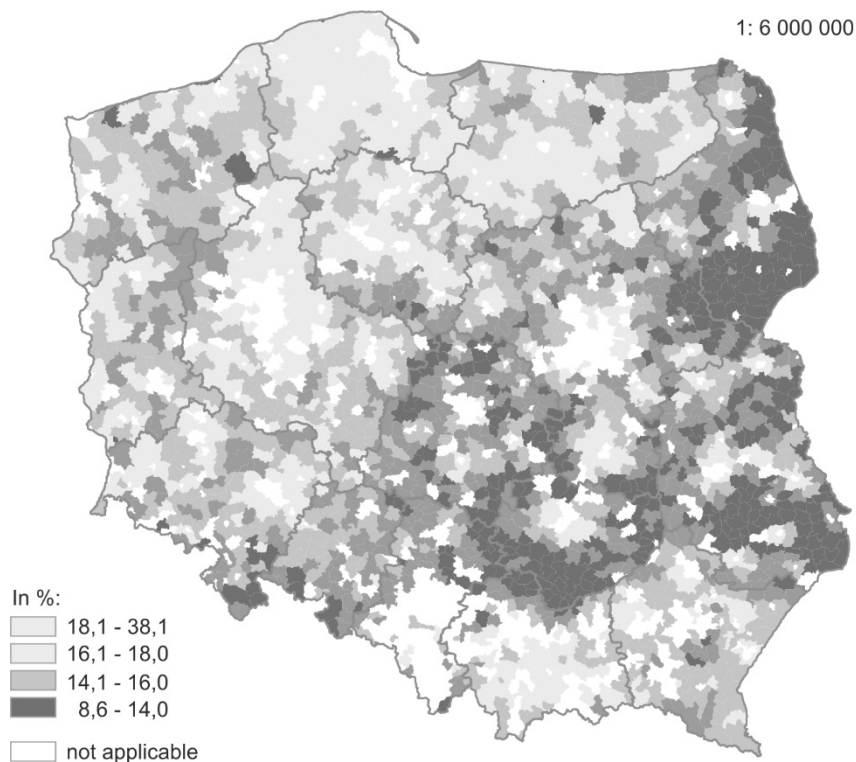


Fig. 4. Share of people aged 65 and more in the total population in communes in 2017

Source: Own elaboration on the basis of Statistics Poland (2018).

The last of the examined characteristics was disturbed gender structure, which determines the formation and course of many negative phenomena and processes on the population level. In this respect, it is crucial to determine the value of the feminisation index for people in age groups characterized by the highest fertility rate, i.e. for the group of people in the matrimonial age (20-34 years) (Bański 2002; Celińska-Janowicz,

Miszczyk, Płoszaj, Smętkowski 2010; Jakubowski, Bronisz 2017). This indicator informs about the reproductive possibilities of a given population in a certain area. The analysis of its value indicates that the deficit of females in the analysed age group at the level lower than 90% occurred in 784 rural communes (40.1%), while the deficit below 80% - in 31 (1.6 %) (Fig. 5). Analysis of the spatial distribution of the phenomenon indicates a greater intensity of communes with disrupted gender structure in the north-eastern and eastern parts of the country. Although rural areas in Poland are characterised by a marked deficit of females in their matrimonial age, it should be noted that the scale of this phenomenon is not large enough to speak of permanent demographic deformation in the form of defeminisation (Strzelecki 1995; Jakubowski, Bronisz 2017).

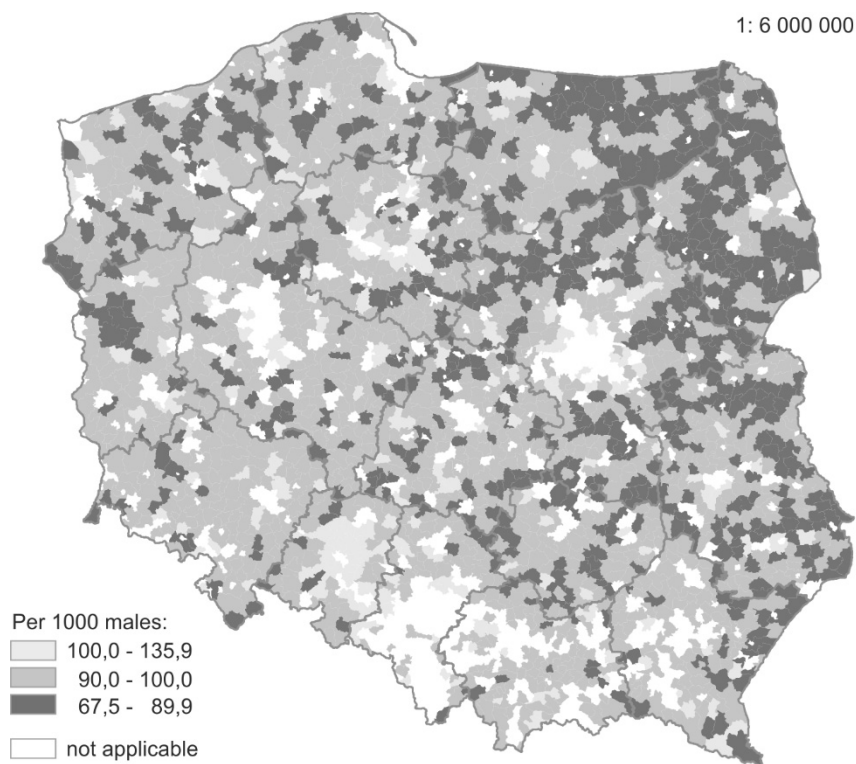


Fig. 5. The number of women per 100 men in the 20-34 age group in communes in 2017

Source: Own elaboration on the basis of Statistics Poland (2018).

In order to make a synthetic assessment and delimitation of rural demographic problem areas a methodology developed by Jakubowski and Bronisz 2017 was applied. A given administrative unit was considered a demographic problem area if at least 3 of the analysed indicators exceeded critical values. This criterion was met by 348 rural communes (17,8%), of which in the case of 45 communes all five negative phenomena and demographic processes were observed, in case of 119 units – four characteristics and in the case of 184 units – three of five analysed identifiers (Fig. 6).

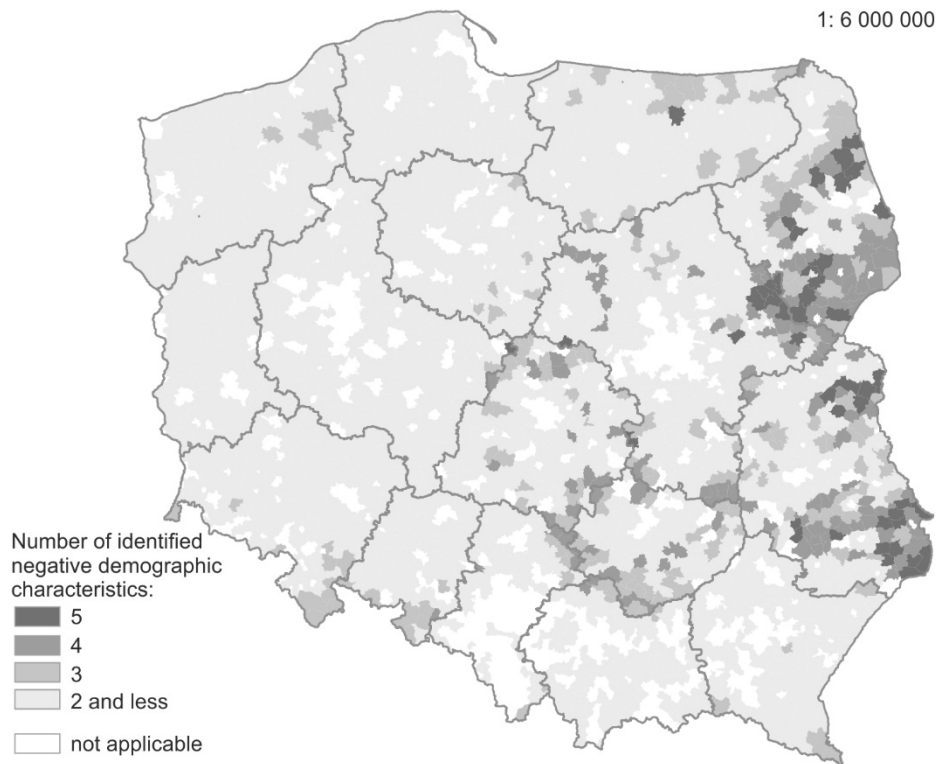


Fig. 6. Rural demographic problem areas in Poland

Source: Own elaboration on the basis of Statistics Poland (2018).

The application of the measure of local spatial autocorrelation (Anselin Local Moran's I) allowed the indication of clusters of similar values in neighbouring locations. In this study only the statistically significant (at the 95% confidence level) clusters of high values (HH) were taken into account, including units characterised by the presence of the unfavourable demographic phenomena and processes, bordering units with similar negative features. Based on the analysis, we can distinguish seven main rural demographic problem areas in Poland (Fig. 7):

1. Biebrza – located in the Podlaskie voivodship along the Biebrza River to the north and west of Białystok;
2. Podlasie – the largest one, located in the southern part of the Podlaskie voivodship and the eastern part of the Mazowieckie voivodship;
3. Polesie – covering the area of Western Polesie in the Lubelskie voivodship;
4. Hrubieszów-Janów Lubelski – covering the south-eastern area of the Lubelskie voivodship, extending from Hrubieszów in the east to Janów Lubelski in the west;
5. Vistula – located in the Vistula River Gorge of Lesser Poland in Świętokrzyskie voivodship;

6. Pilica-Nida – covering the belt of communes located on the border of the Świętokrzyskie voivodship with the following voivodships: Małopolskie, Śląskie, Łódzkie and Mazowieckie;
7. Kutno – located in the northern part of the Łódź voivodship between the cities of Łowicz, Kutno and Koło.

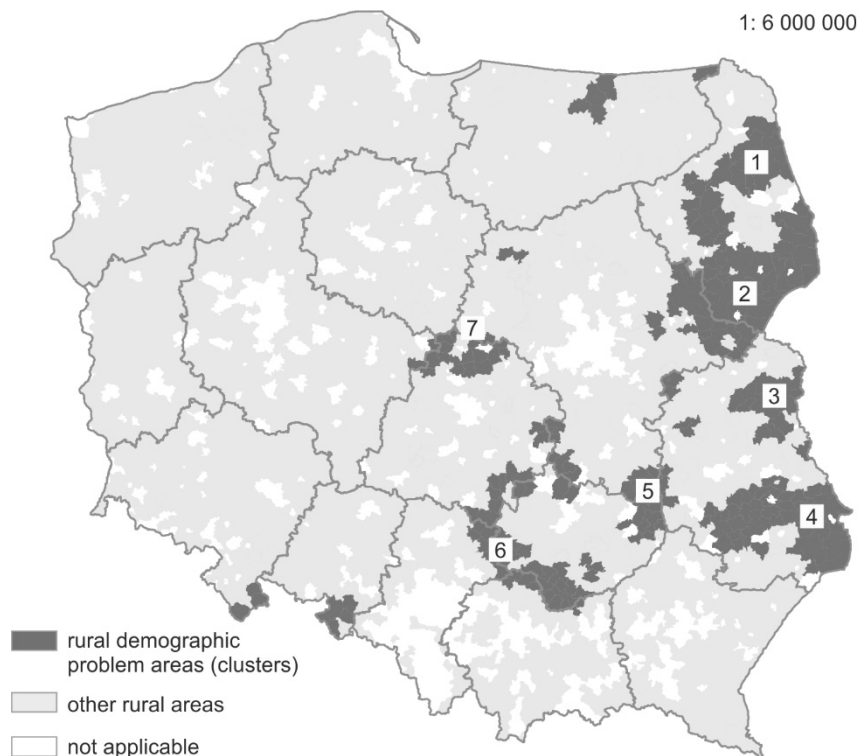


Fig. 7. Clusters of rural demographic problem areas in Poland

Source: Own elaboration on the basis of Statistics Poland (2018).

The achieved results largely coincide with the results of Eberhard's research (1989), which proves the permanent character of the negative demographic trends observed in rural areas in Poland. These results also concur with current research conducted by Jakubowski (2015, 2017), Wesołowska (2017), Flaga (2002, 2010), Flaga and Wesołowska (2018), Celińska-Janowicz, Miszczuk (2010), Płoszaj (2010) and Smętkowski (2008, 2010). In their research, they focused on demographic problem areas, including depopulation areas mainly due to natural deprivation, areas with a regressive age structure and areas of migration loss with low or very low population density.

Conclusions

Problem areas are understood as areas that are characterized by a specific set of conditions and social, economic or environmental features that determine the existence of structural barriers to development. In this context, one of the key factors determining the development of a given area is its demographic potential. Negative changes in population in both quantitative and qualitative terms are an important element destimulating the socio-economic processes. Demographic processes affect both the number and average size of settlement units. There is a clear correlation between the population density and the direction of population changes. The processes of population decline lead to its concentration in the area of more developed entities. The permanent population outflow also leads to changes in the development intensity (Wesołowska, Jakubowski 2018). Unfavorable demographic processes affect the reduction of the potential labor force and deterioration of the structure of local labor markets. Thus, the deficit of human capital may become a barrier for the inflow of investments and reduce the development potential of the region.

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For citation:

Jakubowski A., Bronisz U. (2019). Rural Demographic Problem Areas in Poland. *Problems of World Agriculture*, 19(2), 41–53; DOI: 10.22630/PRS.2019.19.2.22