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**STRUCTURAL TRANSFORMATION
OF EDUCATION LEVEL IN RURAL POLAND
– A SPATIAL APPROACH***

Abstract: The aim of this article is to analyse changes in the structure of education level of the rural population which took place between 2002 and 2011, as well as to assess trends in these changes in relation to the population of Polish cities. Attention has also been paid to diversification in the rate of change in the rural population's educational attainment in particular regions of Poland: Eastern, Central and Western Poland. The analysis was conducted at the level of *powiaty* (*powiaty* – plural of *powiat*: the secondary unit of territorial and administrative division in Poland). The research revealed that the structure of the population according to education level in rural areas of Poland between 2002 and 2011 underwent favourable changes. The proportion of people with at least secondary education grew while proportion of the least educated people decreased. Well-developed non-agricultural functions favour the fast growth of number of graduates from at least secondary school level. On the other hand, agriculture fixes an unfavourable structure of educational attainment.

Key words: Education, non-agricultural and agricultural functions, rural areas.

Introduction

The general aim of the cohesion policy conducted by the EU is to equalise regional disparities. According to Jędrzejczyk [2008] in Poland a disparity exists mostly between rural space and highly urbanised regions, between regions of the old industries and regions with favourable economic and social structure as well as between regions of Western and Eastern Poland. The mentioned disparities are supposed to be consistently levelled by the activities aimed at raising the territorial, economic and social cohesion of the country.

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Elements and instruments of the European cohesion policy have been consistently introduced in Poland since 2004. The effects of these activities are spatially diverse. Alongside regions which have achieved economic success, there are also such regions that are characterised by low competitiveness, where level of cohesion is at least unsatisfactory [Swianiewicz 2007; Szlachta 2007; Markowski, Turała 2012]. Large cities are usually mentioned among the areas with a highly competitive economy, whereas rural areas, especially those located peripherally in relation to urban centres and routes, are classified as areas of poverty.

The level of development of rural areas depends on many factors [Heffner, Rosner 2005; Bański 2008]. Their significance has changed over time and space. In the 19th century, it was land, physical and financial capital that played a crucial role in economic development. Human and social capital were considered the most important factors at the turn of the 20th and 21st centuries. The multifunctional development of rural areas and introduction of a knowledge-based economy cause an increase in demand for well-educated staff, also in the rural areas, whereas the sustainable development of these areas requires conscious and educated inhabitants.

Previous studies unequivocally indicate that inhabitants of the Polish countryside used to be worse educated than people living in the cities [Janc, Czapiewski 2005; Frenkel 2012]. Systemic transformation, the development of schools and private institutions of higher education created special conditions for improving and attaining formal education, for both the urban and rural population. Enrolment rates at the level of secondary and high schools have risen significantly¹.

A question arises as to whether differences in level of educational attainment between the urban and rural populations in Poland, as well as between rural populations from Eastern and Western Poland, decreased. The question is justified both in the context of the cohesion policy and in light of the knowledge-intensive economy development. In both cases economic success depends to a large extent on the structure of population by educational attainment level.

In light of the above remarks the aim of this article is to analyse changes which took place in the educational structure of the rural population between 2002 and 2011 and to assess trends of these changes in relation to the population of Polish cities. Attention has also been paid to diversity in the pace of change of educational attainment of the rural population in particular regions of the country: Eastern, Central and Western Poland.

The analysis was conducted at the level of *powiaty* (plural of: *powiat* – the secondary unit of administrative and territorial division in Poland). Some methodological problems occurred during the research relating to comparability of particular levels of

¹ Gross enrollment rate at the level of high schools increased from 12.9% in the school year 1990/1991 to 53.8% in the school year 2010/2011, whereas net enrollment rate rose respectively from 9.8% to 40.8%.

education. In 2002 statistical data from GUS (the Central Statistical Office of Poland) distinguished primary, vocational, secondary, post-secondary and higher education. In 2011 a lower-secondary education was introduced, while the population with higher education also included three-year long study graduates (with a bachelor's degree). Some simplifications have been made in this paper, namely adopting the principle that people who had primary education in the census of 2002 as well as people who graduated from primary schools and junior secondary schools ("*gimnazjum*") according to the census of 2011 were included in the category "primary education". It was considered that there was a similar number of years of learning (before the reform, primary education consisted of eight years of education in a primary school while currently it includes the first six years of learning in a primary school and another three years in junior secondary school) and number of educational stages required to take up studies at institutions of higher education (in both cases a student has to graduate from a secondary school and pass the final exam called "*matura*"). Such a simplification will not influence the accurate assessment of the phenomenon in regional comparisons as a presumptive error would consider all the spatial units. The total number of people with secondary, post-secondary and higher education has been analysed in the paper in order to eliminate differences resulting from the introduction of the bachelor's degree. This is justified by the fact that there is a strong correlation between the number of higher education facility graduates and secondary school graduates. The spatial distribution of the indexes describing location of population with higher and secondary education is very similar.

1. Studies into educational attainment of the population – literature research

Studies into the educational attainment of populations have mostly been conducted by economists, sociologists and geographers. The economists put most emphasis on the role of education in economic growth/development, sociologists determined major relationships between level of educational attainment and a person's status in society whereas geographers analysed spatial diversity in educational attainment of inhabitants of cities and the country.

The issue of the population's qualifications has already occurred in economic studies of the 17th, 18th and 19th centuries. However, only in the second half of the 20th century was educational attainment introduced to economics permanently as a factor of production in development models. These models based on the concepts of human capital show a strong relationship between educational attainment and technical progress [Nelson, Phelps 1966; Lucas 1988] and between knowledge on the one hand and productivity and pace of technology diffusion on the other hand [Arrow 1962; Romer 1990]. The above mentioned authors underlined a two-fold influence of knowledge on the economy. Firstly, knowledge determines the effectiveness of the production

process. Secondly, knowledge delimits human capital productivity in the research sector enabling faster and faster technical advancement [Cichy 2008]. Education became a crucial factor for economic growth in the second half of the 20th century [Jimenez *et al.* 2012].

Empirical studies provide much proof of relations between education and economic growth. They mostly considered calculations of the rate of return of input in education and raising qualifications [Becker 1964; Psacharopoulos, Patrinos 2004; Denny, O'Sullivan 2007; Jimenez *et al.* 2012], determination of education's role in economic growth of the region [Kendrick 1961; Denison 1971; De la Fuente, Ciccone 2003; Kirchoff *et al.* 2007; Jimenez *et al.* 2012] and calculation of positive externalities of the input in education [Acemoglu 1996; de Barros *et al.* 2000; McMahon 2001; Wilson, Briscoe 2004].

This research showed that rate of return of the input in studies is almost the same as in the case of investment in capital market, real estate or a bank deposit [Becker 1964]. It has also been found that education increases individual income over the level of costs [Psacharopoulos, Patrinos 2004], decreases dispersion of wages [Jimenez *et al.* 2012] and may account for a substitution of other factors in generating profit [Denny, O'Sullivan 2007]. It is symptomatic that similar results were received in countries of various levels of economic development: in the USA [Buchynsky 1994], in the countries of southern Africa [Mwabu, Schultz 1996], in selected European states [Harmon *et al.* 2003; Denny, O'Sullivan 2007; Jimenez *et al.* 2012] and in states reforming themselves [Fleisher *et al.* 2004; Munich *et al.* 2004; Newell, Socha 2005; Flabbi *et al.* 2007].

Some of the researchers made an attempt to estimate the influence of educational attainment on economic growth. Kendrick [1961] calculated that approximately 50% of the production growth between 1889 and 1957 was the result of increased effectiveness and application of capital input thanks to improvement of the working population's education, while Denison [1971] indicated that workforce productivity in the United States grew by 19.6% between 1929 and 1957 due to the rise in qualifications. The studies of Mankiw, Romer and Weil [1992] also confirmed the important influence of education on a nation's wealth. The authors calculated that an increase in human capital measure of 10% transformed into a growth of GDP *per capita* of 6.7 - 7.6%. Meanwhile, Barro [1998] found that every additional year of learning at the above-primary level leads to an increase in the future economic growth rate by 0.7 pp. In turn, De la Fuente and Ciccone's [2003] research revealed that every additional year of education in an average European state may raise productivity by as much as 6%. A positive correlation between enrolment ratio (at the above-primary level) and GDP *per capita* was also confirmed by Fleischer [*et al.* 2008] and Cooray [2009].

It is not so much the length of the education process as its quality that is emphasised by the authors of the more recent studies. Hanushek and Woessmann [2008] found that real skills are more correlated with the amount of individual income and

economic growth than length of the school education process. Additionally, according to Jimenez [*et al.* 2012], ability to communicate and to work in a team, and skills characteristic for a given profession are important for economic growth alongside basic knowledge, as the majority of professions require a blend of skills of different kinds at a specific level.

The result of the studies into the positive externalities of input into education is that the value added of investment in the improvement of qualifications concerns not only the people engaged in this investment, but also spills over to the whole society [McMahon 2001; Wilson, Briscoe 2004]. Better educated citizens are characterised by higher productivity than their less educated colleagues and the companies employing highly qualified staff use their physical capital extraordinarily as well as investing more in research and science [Acemoglu 1996]. McMahon [2001] estimated that approximately 75% of these advantages may have a market character. Additionally, although it is difficult to include them in the growth models, their influence on economic development is unquestionable. This concerns health, life expectancy, infant mortality, delinquency reduction as well as society's attitude towards the natural environment, social life democratisation, execution of civil rights *etc.* According to de Barros [*et al.* 2000], education has a very strong direct influence on population growth, improvement of parental care and enhancement of people's participation in public life. Education also affects growth of economic productivity and poverty reduction, and facilitates social mobility. Sociologists underline the relation between education and ability to manage conflicts, adapt to new circumstances (economic, social and cultural), tolerance level, chance for self-fulfilment, social roles performed in a society and ability to function in a group *etc.* [Anderson, Taylor 2009].

Research into education has also been conducted in Poland. These studies observe a positive correlation between education and: production effects on farms [Gałczyńska, Kulikowski 1986; Kulikowski 2001; Wawrzyniak 2001], level of rural area development (Janc, Czapiewski 2005; Kamińska 2013), the economic situation of farms [Gołębiewska, Klepacki 2004], level and standard of living [Stawicka, Wołoszyn 2007], possibilities of innovation absorption in farms [Gałczyńska 1998] and acquisition of EU funds [Bański, Stola 2002; Ciok, Rabczyk 2006].

2. Changes in educational structure of the rural and urban population in Poland

Positive changes in educational structure of the inhabitants of Poland took place between 2002 and 2011. What we observe is a significant increase in the percentage of people with higher education by 7.8 pp. (Tab. 1). This growth was related partly to the new educational conditions at the higher education level, which was the result of the abolition of limits on the number of people admitted to higher education facilities, the launch of private institutions of higher education and, partly, to changes in the

organisation of the education system and the introduction of bachelor's studies offering higher education status in three years.

The rise of the percentage of the population with secondary and post-secondary education was another positive change. This increase was not as spectacular as the case of higher education, amounting to 1.2 pp. The proportion of Poles with lower-secondary and primary education, as well as people with no education, declined significantly (by 5.9 pp. and 2.3 pp. respectively).

These positive changes were observed both in the cities and in the countryside, although two regularities should be underlined. Firstly, growth rate of the proportion of people with higher education was lower in the cities than in the country (comp. Tab. 1). Secondly, the high growth rate of the proportion of higher education facility graduates in the rural areas did not lead to a decrease in the distance between cities and the countryside – on the contrary, a divergence trend is visible, which means that the difference between the proportion of people with the analysed level of education in the cities and the countryside grew (amounting to 9.4% in 2002 and 12.4% in 2011).

Table 1
Changes in educational structure of the urban and rural population in 2002 and 2011

Educational attainment level	Year	Poland	Cities	Countryside	Difference between the cities and the countryside (4-5)
		share of inhabitants			
1	2	3	4	5	6
higher	2002	10.1	13.6	4.2	9.4
	2011	17.9	22.7	10.3	12.4
secondary and post-secondary	2002	32.1	38.4	21.7	16.7
	2011	33.3	37.5	26.7	10.8
basic vocational	2002	23.7	21	28.2	-7.2
	2011	22.9	19.8	27.6	-7.9
primary and lower-secondary*	2002	30.4	246	40	-15.4
	2011	24.5	19	33.1	-14.1
no education	2002	3.7	2.4	5.9	-3.5
	2011	1.4	0.9	2.2	-1.3
total	x	100	100	100	x

Source: Own listing on the basis of Local Data Bank, National Census 2002 and 2011.

* In 2002 this group includes only primary education.

Tendencies of changes in the cities and in the countryside are different in the case of secondary and post-secondary education from those described above. The percentage of people with this level of educational attainment in the cities decreased by 0.9 pp., whereas in the countryside it grew by 5 pp. These different trends might have

resulted from the fact that inhabitants of the cities who had secondary school diplomas and rural inhabitants who graduated from primary and vocational schools continued their formal education at institutions of higher education. The difference in terms of percentage of people with secondary and post-secondary education between the cities and the countryside decreased as a result of the described phenomenon. It amounted to 16.7% in 2002 and to only 10.8% in 2011.

The percentage of people with vocational education in the general number of adults in both the cities and the countryside remained at a similar level between 2002 and 2011. The proportion of people who graduated from vocational schools is more significant in the structure of educational attainment level of the rural population than of the inhabitants of cities. As Kacprzak [2010] indicates, the intensive striving to acquire a specific vocational education among the rural youth is related to a great extent to the mindset formed during the past centuries and to the intensive development of vocational education in the 1970s and 80s. A short period of education and good accessibility of vocational schools do not burden a family with education costs and a young person becomes self-dependent quickly. Nevertheless, as the cited author indicates this approach is changing slowly and young people are choosing general education more and more often.

The percentage of Poles who graduated from junior secondary and primary schools decreased both in the cities and in rural areas. This decline amounted to 5.6 pp. in the urban centres and 6.9 pp. in the rural areas. Although this group of people still accounts for almost one third of the rural population, the described changes should be perceived as positive. They are the result of two main factors. First of all, there were natural deaths of elderly people, a group among which the proportion of people with primary education was the highest. Secondly, the awareness of the importance of education in rural population grew, which meant that they started raising their qualifications in secondary schools [Baran 2011].

The decline of the percentage of people with no education – in the cities by 1.5 pp. and in the rural areas by 3.7 pp. – is worth noting. The distance between the Polish cities and the country in this regard decreased significantly. This was related to the natural deaths of the oldest, often least educated, population.

3. Growth rate of the number of people with secondary and higher education in rural areas between 2002 and 2011

The number of Poles with at least secondary education grew by over one fifth between 2002 and 2011. This is a spectacular increase, especially in view of the fact that in the analysed period the population remained of almost the same size (growing by 0.8%). The upward trend of the number of people who graduated from at least a secondary school concerned both the inhabitants of the cities and the countryside, with the index of change for the urban areas amounting to 113.2%, and for rural areas

148.3%. This means that the rural population took advantage of the new conditions creating opportunities for training and education to a greater extent than the urban population. In spite of the fact that this growth rate resulted in a decrease of the difference in level of educational attainment between the rural population and urban population, still almost 72% of Poles who had a diploma from a secondary school or higher education facility used to live in the cities. The location quotient also proves the convergence trend²: it declined from 1.25 to 1.18 in the cities, but grew from 0.59 to 0.71 in the countryside. However, there is still overrepresentation of people with at least secondary education in relation to the number of inhabitants in the cities and a deficit of this group in the countryside.

The index of change of people with at least a secondary school diploma oscillated in the rural areas between 108.2% and 205.5%, with the average at the level of 148.3%. The growth rate of this group of people corresponds to the growth rate of the number of inhabitants. The correlation coefficient amounts to 0.745 and the coefficient of determination to 0.555. This indicates that changes in the size of the population explain 55.5% of dispersion (variance) in respect to the growth rate of the number of people with secondary or higher education.

The spatial distribution of the analysed index may be explained in light of the core-periphery model (Fig. 1). The index is high in *powiaty* located in the vicinity of the large cities and it reaches a maximum in the areas located around the big urban centres of Western Poland (Poznań, Gdańsk, Toruń, Bydgoszcz). As distance from the agglomerations increases, the analysed index decreases, reaching minimal values in the peripheries of particular voivodeships. It can also be stated that in the areas which are characterised by a high percentage of people with at least secondary education in 2002, growth rate of this group of people is high and *vice versa* – in *powiaty* of an unfavourable structure of educational attainment level, the analysed indexes of change are low.

Moreover, differences between Eastern, Central and Western Poland are apparent. Rural areas in Eastern Poland look unfavourable in such a comparison. They are characterised by a lower growth rate of the best educated population. The index of change amounted to 139%.

The most favourable changes in growth rate of the number of people with higher education facilities and secondary school diplomas took place in Western Poland. The index of change amounted to 153.7%. The biggest increase of the population who graduated from at least secondary school occurred in *powiaty* which are located directly at the border of the Zachodniopomorskie Voivodeship, in the neighbourhood of

² Location quotient is calculated as the relation between percentage of people with at least secondary education living in the cities (the countryside) and percentage of the inhabitants of the cities (the countryside). A value over 1 proves an overrepresentation of the people with a given level of educational attainment in relation to the demographic potential; a value below 1 signifies a deficit of this group. When the quotient amounts to 1 there is a balance of both these features.

Poznań in the Wielkopolskie Voivodeship and in the Lubin Powiat in the Dolnośląskie Voivodeship, where the KGHM Polska Miedź company operates, as well as Zakłady Górnicze Lubin and the “Cedynia” copper-works in Orsk. Thanks to these companies the average wage in the Lubin Powiat is the highest in Poland [Cieślak-Wróblewska 2011], which in turn favours immigrations of well-qualified staff.

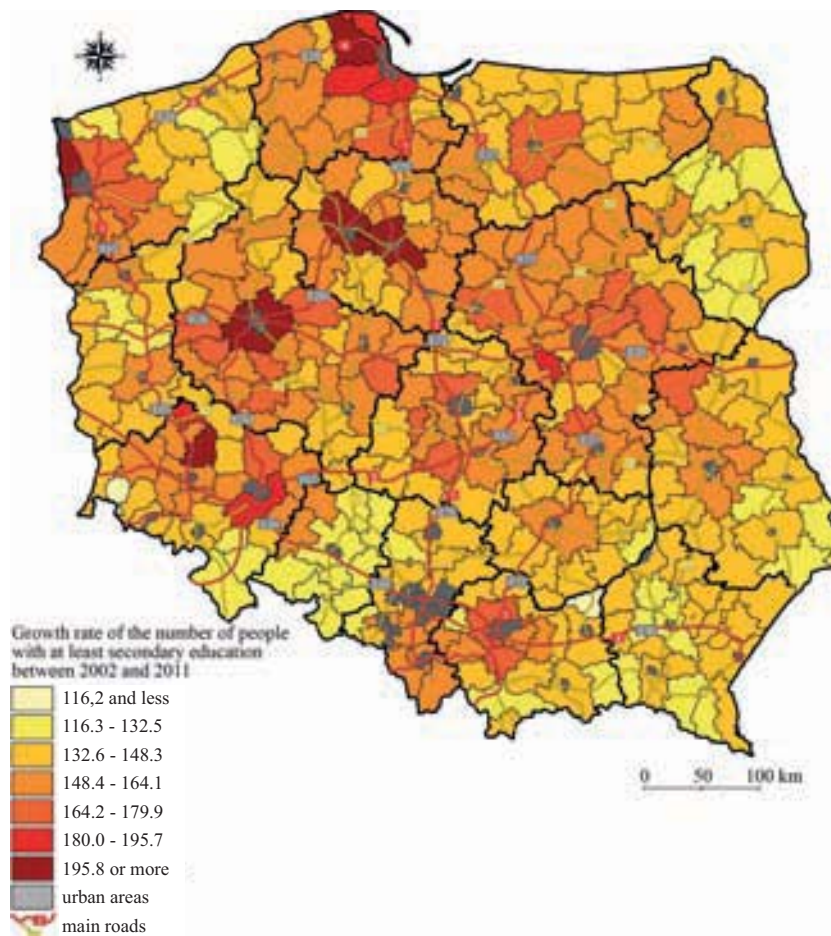


Figure 1. Spatial diversity in index of change of the number of people with at least secondary education in the rural areas of Poland between 2002 and 2011

Source: Author's own elaboration (Figs. 1-7).

However, in Central Poland the index of change of the number of people who graduated from at least secondary school amounted to 150.8%.

4. Changes in distribution of the population with secondary and higher education in the rural areas of Poland

The diverse growth rate (described above) influenced changes in the distribution of people with at least secondary education. The percentage of people with this level of education in the total adult population grew in all the *powiaty* and in 2011 it oscillated between 17% and 54.2%.

General regularities in the distribution of the analysed index in 2002 and 2011 did not change: in those places where the index had been high at the beginning of the 21st century, it remained high ten years later (Figs. 2, 3). Thus, what we observe is self-duplication of the structures. The influence of the regional and national urban centres on educational attainment level of the population is apparent in the spatial layout. The bigger the city, the bigger the zone of favourable percentage of the best educated inhabitants and the higher the analysed percentage.

No big regional disproportions are found when comparing Eastern to Central and Western Poland in terms of percentage of people who graduated from secondary school or a higher education facility, although they are observable and include three elements. First of all, in 2011 Eastern Poland was distinguished as having the lowest percentage of the best educated inhabitants, amounting to 36.0% when the average for the Polish rural areas reached 37%, for Western Poland 36.8% and Central Poland 37.7%. Secondly, the growth of the analysed percentage between 2002 and 2011 in Eastern Poland was the lowest – from 25.7% to 36.0%, that is by 10.3 pp, while in the western part of the state by 11.4 pp and in central part by 11.5%. Thirdly, the distance between Eastern Poland and the remaining regions of the state increased in the analysed period. In 2002 the difference between the percentage share of the best educated group of people in Poland (rural areas) and in Eastern Poland amounted to 0.2 pp., while in 2011 to as much as 1.0 pp. In the case of Western Poland, in 2002 this difference amounted to 0.5 pp. and in 2011 to 0.2 pp. However, Central Poland was characterised by the most favourable situation: the distance grew in favour of the central part of the state from 0.3 pp. to 0.7 pp.

This means that, despite a significant growth in the number of inhabitants of the countryside with at least secondary education, over-regional disparities (Eastern Poland – Central Poland – Western Poland) are not decreasing.

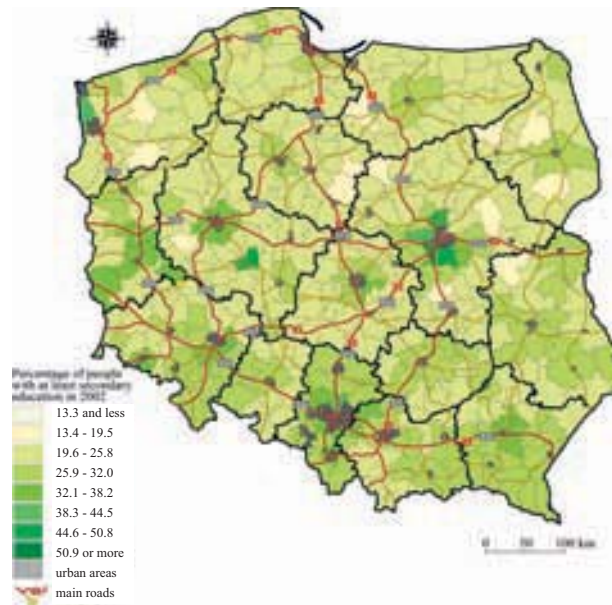


Figure 2. Spatial diversity in percentage of people with at least secondary education in rural areas of Poland in 2002

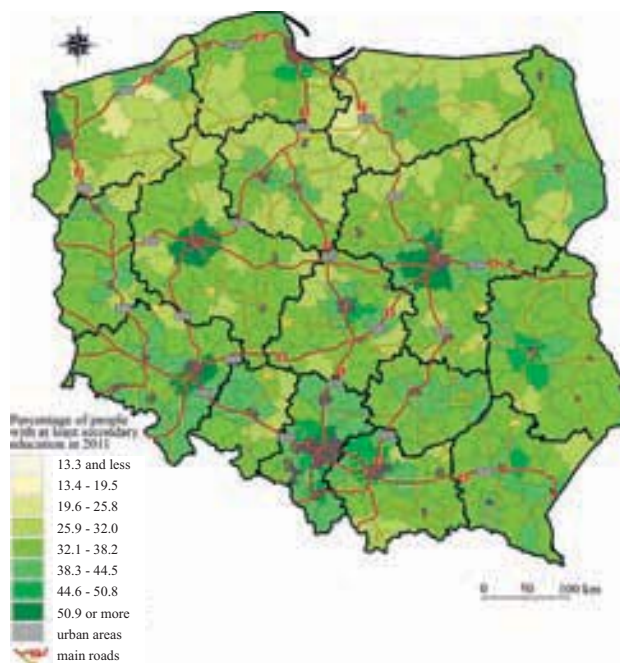


Figure 3. Spatial diversity in percentage of people with at least secondary education in rural areas of Poland in 2011

5. Growth rate of the number of people with basic vocational education in rural areas between 2002 and 2011

The number of people with basic vocational education dropped from 7,539.8 thousand to 7,260.8 thousand, that is by 3.7 pp. between 2002 and 2011. A downward trend was also observed in the Polish cities where the index of change amounted to 92%. However, in rural areas the number of people with this level of education grew by 1.6 pp. This diverse growth rate resulted in a decline in the percentage of people with vocational school diplomas living in the cities (in relation to their total number) from 55.3% to 52.9%, whereas the share of people inhabiting the countryside grew from 44.7% to 47.1%. In relation to the number of inhabitants in the analysed period, an overrepresentation of people who graduated from vocational schools in the countryside and their deficit in the cities can be observed. The quotient of location for a city amounts to 0.87 (0.90 in 2002) while for the country it is 1.20 (1.17 in 2002). This is consistent with Kacprzak's (2010) thesis that rural youth more often choose schools that teach the skills needed to perform a specific profession than their colleagues from cities.

The pace of change of the number of people with vocational education in the rural areas was diverse with an index of change oscillating between 80.3% and 119.0%. The deficit of this group of people was observed in 91 *powiaty* concentrated mostly in the agricultural areas of Eastern and Central Poland as well as in the industrial areas of the following voivodeships: Śląskie, Opolskie and Dolnośląskie (Fig. 4). In the case of the Opolskie Voivodeship this deficit is related to the emigration of specialists abroad, mainly to Germany [Solga 2002; Rauziński 2010; Heffner, Rauziński 2013], whereas the decline in the number of people from this group in the case of Silesia (both Lower and Upper) should be related to the bankruptcy of many industrial mills and the emigration of physical workers to their homelands (meaning to the Warmińsko-Mazurskie Voivodeship).

The number of people who graduated from basic vocational school did not change in the area of 37 *powiaty* (the index of change oscillated between 99.0% and 101%). These spatial units have a distinctive location – they are concentrated in the peripheries of voivodeships.

However, the number of people who have vocational school diplomas grew in the area of 186 rural *powiaty* (59.2% of their total number). These are mainly areas of northern and western Poland, which used to be included in the Prussian sector during the period of partitions. The skills to perform a particular profession and entrepreneurial spirit have always been better developed in these areas than in other regions (sectors) of the country [comp. Chołaj 1976; Wieloński 1991; Chmiel 1997; Kamińska 1996, 1997, 2010].

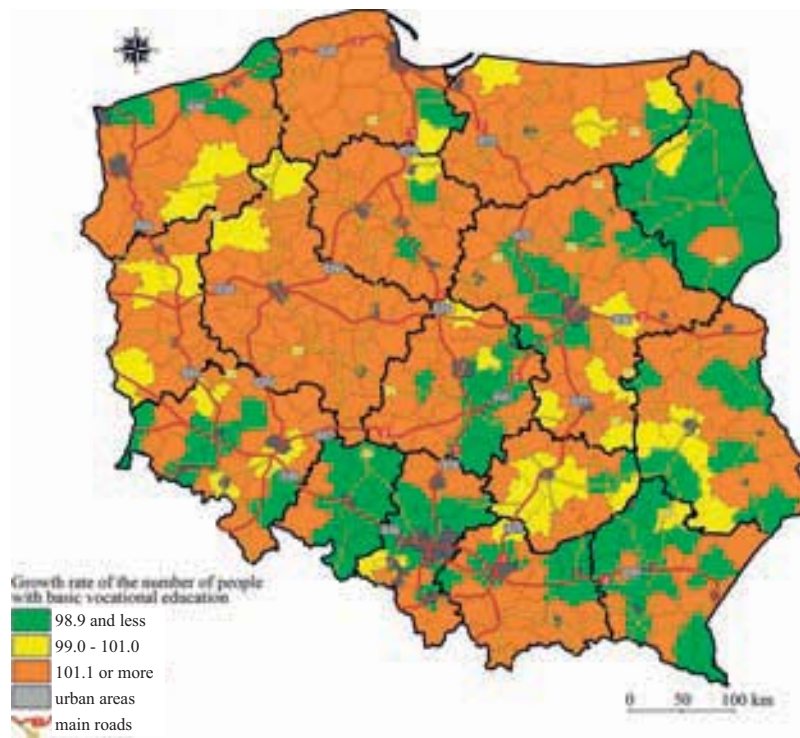


Figure 4. Growth rate of the number of people with basic vocational education in rural areas of Poland between 2002 and 2011

6. Changes in the distribution of people with basic vocational education in rural areas of Poland between 2002 and 2011

The above presented pace of changes in the number of people with basic vocational education did not significantly influence the distribution of this group of people. The proportion of people who graduated from vocational schools out of total number of adults in the country amounted to 27.6% in 2011, decreasing by 0.6 pp in relation to 2002. The analysed percentage oscillated in particular *powiaty* between 13.3% and 38.8%.

The spatial layout of this index corresponds to the sectors of partitioned Poland (Fig. 5). The percentage of people with a specific profession in the area of the Russian sector is often lower than the average for Polish rural areas, while areas of the Austrian sector are characterised by mean values of the analysed index. However, a higher than average percentage of people with a vocational education was observed in the range of the Prussian sector. The Zachodniopomorskie and Warmiańsko-Mazurskie Voivodeships are the exceptions. The low percentage of people who graduated from

vocational schools is related to the processes of colonisation (after the Second World War) of these areas by the people from eastern areas, thus representative of a specific (eastern, lacking entrepreneurial spirit) mindset.

Only every fourth inhabitant of Western Poland has a vocational school diploma; 28.3% of the population has this level of educational attainment in the central part of the state, whereas in Western Poland it is 29.8%. This is an unfavourable situation as it is not the people with secondary or higher education but with primary and lower-secondary education that dominate in the remaining part of the adult population in the eastern part of the state. If there are no possibilities for attaining a higher level of education (lack of willingness, impulse *etc.*), at least a specific set of skills for performing a particular profession could help in finding a job and additional sources of income. In the 21st century there exists a reality of a decreasing number of jobs for people with the lowest qualifications, whereas jobs for people whose educational attainment is the highest and the most extensive are growing in number [Thurow 1999].

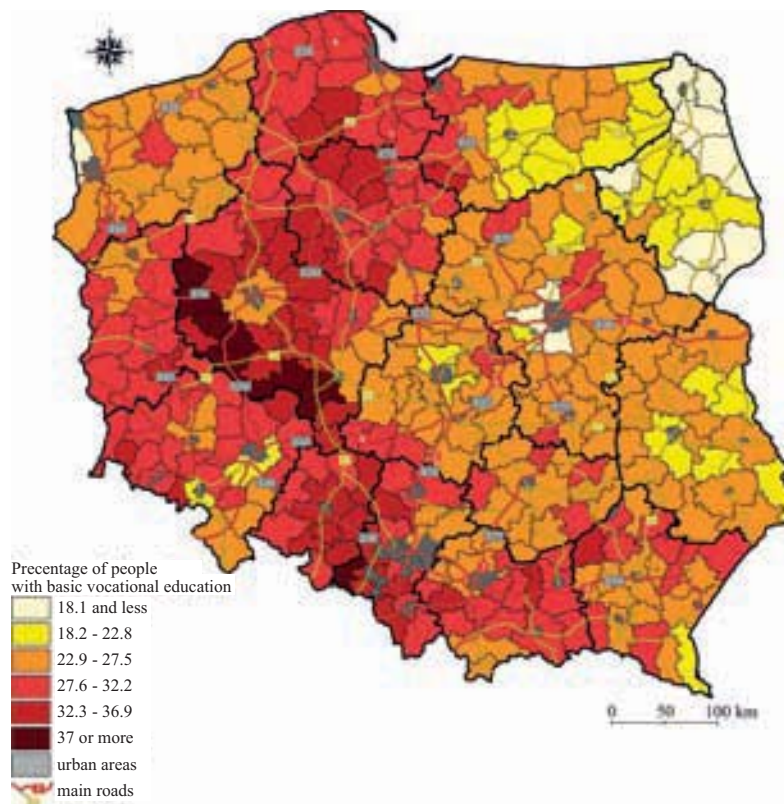


Figure 5. Spatial diversity in percentage of people with basic vocational education in rural areas of Poland in 2011

7. Growth rate of the number of people with the lowest level of educational attainment³ in rural areas between 2002 and 2011

The number of people with the lowest level of educational attainment declined by almost one quarter between 2002 and 2011. This decrease was significantly higher in the cities (by 27.5 pp) than in rural areas (20.4 pp). Over half of the people with the lowest formal qualifications were living in the Polish countryside during the whole analysed period (in 2002 it was 50.5% and in 2011, 52.9%). The quotient of location is higher than 1 in the case of the lowest level of educational attainment in rural areas and it grew during the analysed period from 1.29 to 1.35. Thus, there is a significant overrepresentation of this group of people in relation to the whole population in the rural areas. This is not a favourable situation, as study results [Krosny 2001] show that it is qualifications and level of educational attainment of the population that account for the basic factor which determines the modernisation of agriculture, improves its productiveness as well as facilitates civilisation and cultural development.

The index of change of the number of people with the lowest formal qualifications at the level of *powiaty* (rural areas) oscillated from 60.8% to 98.5%, which means that the group of people with the analysed level of educational attainment decreased in all spatial units (Fig. 6).

The pace of change in the number of this group of people corresponds to the growth rate of the population. The correlation coefficient amounts to 0.651 with the coefficient of determination reaching 0.424. This indicates that the growth rate of the population explains 42% of the dispersion (variance) in the growth rate of the number of people with primary (lower-secondary) and lower education.

The analysis of the pace of decrease in the population with lower-secondary and lower education in Eastern Poland in comparison to Central and Western Poland does not reveal any major regional disproportions. Admittedly, the highest deficit of this group of people living in rural areas occurred in the areas of Eastern Poland, where the index of change amounted to 78.6%, but in the remaining parts of the state it reached 80%.

³ This group includes people with primary and incomplete primary education, and without school education in 2002 as well as the population with lower-secondary, primary, incomplete primary education and without school education in 2011.

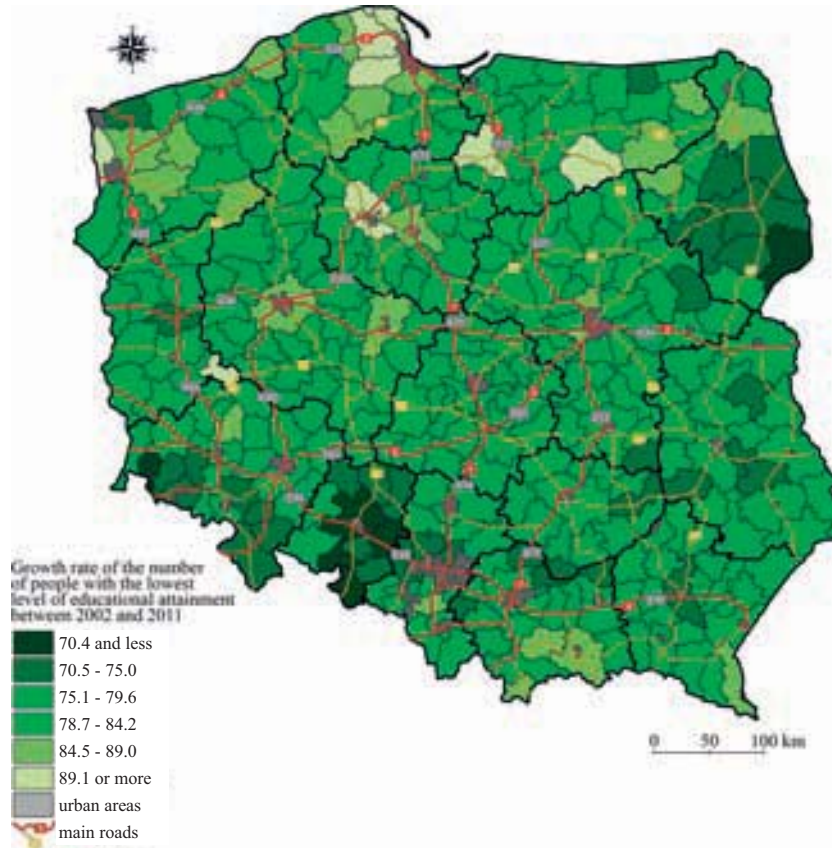


Figure 6. Spatial diversity in growth rate of the number of people with the lowest level of educational attainment in rural areas of Poland between 2002-2011

8. Changes in the distribution of people with the lowest level of educational attainment

The diverse growth rates of the number of people with the lowest level of educational attainment influences changes in their distribution. The proportion of people with this level of educational attainment out of the total number of adults in the country in 2001 amounted to 35.3% and decreased in relation to 2002 by 10.6 pp. In individual *powiaty* it oscillated from 21% to 55.6%.

The spatial distribution of the analysed index shows that its highest values occur in the areas of north-eastern and north-western Poland, where the state farms operating in the 20th century used to create jobs for unqualified workforce (Fig. 7). Lack (or small number) of alternative (non-agricultural) sources of income affected the preservation of an unfavourable educational structure for the population inhabiting these

areas. As it turns out, the persistence of these deformations is so strong that even the new economic environment, new opportunities for attaining education and training are not an important impulse for raising qualifications. This is surely related to financial capabilities but also to the mindset of inhabitants of these areas. It is also very important that it is mainly the population of immobile (elderly) working age that has the lowest level of educational attainment, which may account for a good side of the situation we are facing. However, it has to be underlined that uneducated parents have a huge influence on the course of their children's education [Herbst 2004; Śleszyński 2004], which may continue to strengthen this unfavourable educational structure.

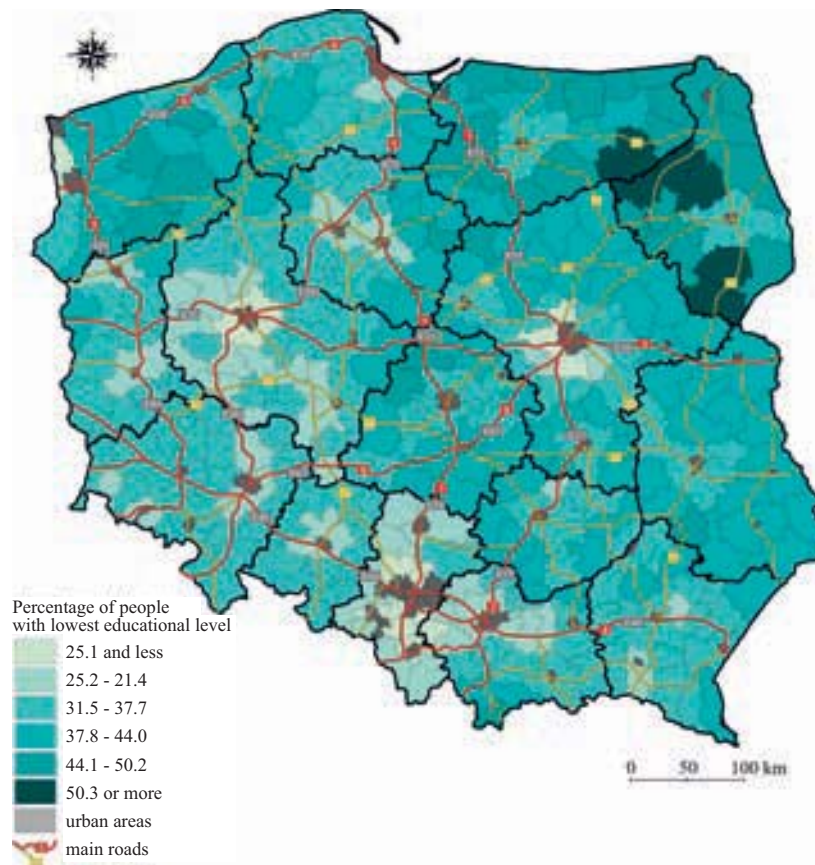


Figure 7. Spatial diversity in percentage of people with the lowest education level in rural areas in 2011

A comparison of Eastern Poland with Central and Western Poland in terms of percentage of inhabitants with the lowest education allows the statement that there are apparent regional disproportions to the detriment of Eastern Poland, which was characterised by the highest percentage of the least educated inhabitants. This amounted to

49.4% in 2002 and 39% in 2011. The analysed percentage was higher than the average for Polish rural areas, both in 2002 and 2011 (respectively 45.9% and 35.5%). The proportion of this group of people out of the total number of inhabitants was more favourable in Western and Central Poland than in the country on average, both in 2002 and in 2011.

In addition, the distance between Eastern Poland and the remaining regions of the state increased in the analysed period. The difference between the proportion of the least educated group of people in Poland and in Eastern Poland in 2002 amounted to (minus) -3.5 pp whereas in 2011 it reached (minus) -3.9 pp. In the case of Western Poland this difference reached +1.6 pp and in 2011 +1.9 pp. In turn, in Central Poland this distance slightly declined from 1.3 pp to 1.2 pp.

Summary

The presented analysis allows the following to be stated:

1. The educational structure of the population in the rural areas of Poland underwent favourable changes between 2002 and 2011. The proportion of people with at least secondary education grew while proportion of those with the lowest level of educational attainment decreased.
2. The growth rate of the population with the highest qualifications is the biggest in those places where the number of people with such qualifications was the highest in the initial period and *vice versa* – in the areas where the percentage of the best educated citizens was low, growth rate of their number is low (below average for rural areas). A thesis about the self-duplication of structures can be proposed.
3. Well-developed non-agricultural functions favour the fast growth of number of people graduating from at least secondary school level (comp. Mularczyk 2011).
4. Agriculture fixes an unfavourable educational structure for inhabitants, especially in the areas where state-owned farms used to dominate (the highest share of people with the lowest qualifications and low growth rate of the number of people who have secondary school or higher education facility graduation certificates were observed in these areas).
5. There is an overrepresentation of people who have vocational school graduation certificates and people with the lowest level of educational attainment in relation to the total population in rural areas. Such a situation was observed both in 2002 and 2011. A deficit of people with the highest formal qualifications is also noted.
6. The influence of urban centres on the educational structure of the *powiaty* surrounding them is apparent. They mainly affect the concentration of people with

secondary and higher education. This is caused by the accessibility of schools in the cities and the migration of well-educated people to the suburban areas.

7. The influence of historical conditions (sectors during the partitions of Poland) on the distribution of people with a vocational education is observed. The proportion of people with this level of education is highest in the areas of the Prussian sector, and lowest in the areas of the Russian sector.
8. Location near the western border of the state is a factor which favours the concentration of people with secondary and higher education, whereas location near to the eastern border is a factor which pushes away the best educated part of society.
9. The number of people with a basic vocational education increased in the rural areas. Unfortunately, there is a deficit of this group of people in relation to the demographic potential in Eastern Poland, which is exceptionally unfavourable. The weakly developed innovative economy in these areas [Stryjakiewicz 1999], the progressing multifunctional development of the rural areas [Stola, Bański 2002] and high unemployment should favour the attainment of skills related to a particular profession. Such a situation occurs in Western Poland where the share of people with a basic vocational education even reaches 38.7% (peak value).
10. The distance between the cities and the rural areas in terms of proportion of people with the highest formal education grew between 2002 and 2011 (divergence tendency) whereas differences in terms of the proportion of people with a secondary education and the percentage of the least educated people decreased (convergence tendency).
11. The distance between Eastern Poland and the remaining regions of the country in terms of educational structure increased (percentage of people with the highest level of educational attainment was the lowest with the proportion of citizens with the lowest formal qualifications exceeding the average). The proportions between number of the best educated people and number of inhabitants do not improve in Eastern Poland. Quotients of location in these areas do not reach 1.

The structure of the rural population by education has been presented in the paper in terms of quantity. Qualitative issues have been omitted due to a lack of data.

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