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Demographic processes in rural areas of Belarus: geographical structure and spatial dynamics

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Abstract. The study presents the spatiotemporal regularities and shifts in geo-demographic development of rural areas of Belarus at the multiscale level. Trends in rural population size dynamics for the period of 1959–2009 are detected and characterised. In accordance with the trends in the dynamics of the rural population of Belarus spatial regularities were identified. The geo-demographic territory of Belarus is typified on character of demographic dynamics and natural movement processes of rural population. We have identified three types of districts by the nature of the rural population dynamics for the period of 1970–2009: stable, growing and shrinking; and three types of natural population movement dynamics for the same period in accordance with spatial and temporal heterogeneity of the rural depopulation.

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1. Introduction

It is distinctive for rural population of Belarus to have a complicated historical way of development. Population size was changing on the score of political, socio-economic and ecological factors. The aim of this study is to identify and present the spatiotemporal regularities of geo-demographic transformation of rural areas of Belarus in order to substantiate the territorially differentiated regional demographic policy

as well as to insure sustainable development of the Republic of Belarus.

2. Trends in rural population size dynamics

Natural increase or decrease, migratory movement, losses caused by war and other political influences (deportation, repression), losses caused by the effects

of the Chernobyl disaster and losses caused by the waves of emigration determined historical population dynamics of Belarus in the 20th century. The distinctive features of the periods between censuses and the main types of population trends were identified. Identification was based on the analysis of the factors of the rural population dynamics, the rate of population size (increase/decrease) and rural population proportion in the total population size of Belarus (Antipova, 2008).

The period of 1959–1970 is characterised by the dominant influence of economic factors. Urbanisation played a special role as a significant factor during this period. This period is the first sustained period of the negative rural population dynamics on macro-geographical level. Micro-geographical level of research indicates the first wave of rural demographic disaggregation and the territorial lack of homogeneity of demographic dynamics. So, the districts with a positive population size dynamics were elicited in the background of the general Belarus rural population decline (0.1% per year) as a result of migratory outflow. There was 69.2% of rural population in the structure of Belarusian population in 1959. Thus, the rural population played a basic role in the demographic space frame formation in Belarus during this period.

The period of 1970–1979 is characterised by an increased rate of rural population decline (1.5% per year), the second wave of rural demographic disaggregation, the demographic space frame of settlement violation, and the overall restructuring. The ‘urbanisation transition’ was completed for the first time on the macro-geographical level and a natural decrease of the rural population started.

The period of 1979–1989 is distinguished by the influence of an ecological factor. The further decline and the spatial redistribution of demographic potential are characteristic for rural population during this period. Ecological disturbance under the influence of the Chernobyl disaster and the socio-economic development of the country did not change tendencies of the dynamics of rural population significantly at this stage. Negative rural population dynamics was not increasing.

The period of 1989–1999 changed the usual demographic course in the country due to the impact of transformational factors. There were political and socio-economic changes during these years: the disintegration of the Soviet Union, the transition of the USSR republics towards independent development, restructuring and reforming the economy and social

sphere, etc. Socio-economic crisis changed the living conditions of people. This caused a breach in the dynamics and spatial distribution of the population, and the nature of demographic reproduction.

The process of urbanisation slowed down markedly. The scale of rural-urban migration changed. Changes in population reproduction were followed by the disturbances in the migration process. Radiophobia (exaggerated fear of ionising radiation, in particular, fear of X-rays) and insecurity, unemployment and poverty caused a sharp decline of fertility. Deterioration of living conditions and health contributed to the increase of mortality. In the end, natural decrease began to grow instead of natural increase, and universally embraced not only strongly aged rural population, but also relatively young urban population (Manak, 1992; Manak, Antipova, 1998).

The major trends in rural population size dynamics of the period are: (a) rural areas of Belarus was characterised by a stable negative dynamics (1.2% per year), but the peak of the highest annual rate of decrease (2% per year) was recorded in the late 1980s; (b) only a few of the districts remained on a micro-geographical level with a positive or stable dynamics of the rural population as acceptors areas of demographic capacities. These districts were usually located in the zone of city influence (Brest, Gomel, Minsk). This type of districts in the Grodno and Mogilev regions was absent; (c) districts with negative demographic dynamics become a dominant type in the rural areas (113 out of 118 districts) with the threshold rate of annual population decline from 0.01% in the Stolbtsy district in the Minsk region up to 4% in the Narovlya district in the Gomel region.

This period is characterised by a second evolutionary trend of rural population dynamics in Belarus: there was a structural castling on the macro-level between the ratio of urban and rural populations. In 1959 share of rural population was 70% and urban – 30%. This ratio became a diametrically opposed in 1999. ‘The urbanisation transition’ was completed in the Minsk region later than in all other regions on the meso-geographical level (Antipova, 2008).

The above-mentioned trends increased the structural imbalances and spatial polarisation in the distribution of demographic potential of the rural population in many European countries (Szymańska et al., 2009). There was the third wave of demographic disaggregation of rural areas. It changed the usual pattern, which became focal. Thus, Belarus started the 21st century with the negative population dynamics. The total population reduction of Belarus for the

period of 1999–2009 was 0.05%; for rural areas it was –0.2%.

Major trends in rural population dynamics at the end of the 20th century remained typical for the beginning of the 21st century: (a) negative dynamics develops under the influence of various factors; the major ones include: the demographic ageing, changes in the population reproductive attitudes and migration outflow of the young working population; (b) compared to 1999 the annual decline of the rural population tends to increase as a result of the enhanced impact of the above-mentioned factors: in the Brest region it was 1.3%, in the Vitebsk region – 2.4%, in the Gomel region – 1.9%, in the Grodno region – 2.2%, in the Minsk region – 1.9%, in the Mogilev region – 2.5%.

In accordance with the dynamics trend of the rural population of Belarus characterised by the constant downsizing for the period of 1970–2009, we identified the following spatial regularities: (a) permanent long-term negative rural population dynamics is distinctive for peripheral districts with low agricultural potential or with large natural systems; (b) periodical reduction of the rural population starts later in transition areas with high agricultural or recreation potential, as well as in the zone of ‘special Chernobyl region’; (c) large (support) cities attracted rural migrants during the whole research period; (d) the capital region is an active and potential area of demographic growth due to migration factors as well as due to natural factors, such as fertility, which is more important for improving the demographic situation in the country.

The change of this share of districts in the total rural population was calculated in order to study the spatial dynamics. The direction of the demographic potential spatial shifts for the period of 1970–2009 was identified with the qualitative characteristics of the dynamics (stability, growth or decline). As

a result, we have identified three types of districts by the nature of the rural population dynamics: stable, growing and shrinking (Table 1).

Type 1. Growing. Southern agricultural districts of Polesye have an increasing share of the population. This region has traditionally more advantageous demographic situation (Stolin, Gantsevichi, Luninets). These are typical districts with high agricultural potential, characterised by increasing share of the republic population over the whole study period. A larger group of the growing districts do not have an integrated area of distribution. This subtype consists of dispersed districts located in the suburban zones of major cities and transport corridors. The share of this subtype is constantly increasing. The Mogilev region is the only exception where the period of growth alternated with decline in accordance with Fig. 1.

Type 2. Stable. This type is represented by agrarian districts with centres in medium and small urban settlements. Districts with conditional stability did not change significantly their share of the total rural population. Geographical areas of this type relate to the zones of the average level of intensity dynamics of the basic demographic processes.

Type 3. Shrinking. This type is represented by rural and administrative regions, peripheral districts of environmental and recreational profile, and the regions affected by a man-made disaster. The Gomel and Mogilev regions had the largest decrease in population over the study period. This territory was affected by the Chernobyl catastrophe and reduced the share of population more than twice.

These districts reduced the share of their population over the research period. The process has a reverse vector at the present stage only, but the intensity and duration is still very low to cover the significant and long-time thirty-years losses. The peripheral districts of the Mogilev region and districts along the line of Mogilev-Babruysk have the second-largest decline in the share in total population over the study period. Peripheral districts of the northwest Minsk region, west Vitebsk and east Grodno belong to the type with the shrinking dynamics, too.

The absolute decrease values are minimal among districts of this type. Thus, the centre of gravity of the rural population shifted in two directions: zonal – from northeast to southwest, and azonal – to the suburbs of large cities. The second vector is becoming more and more significant with each passing year and the share of the population of suburban areas is increasing faster and more intensely than the homogeneous agricultural areas.

Table 1. Characteristics of district types by the nature of the rural population dynamics

Type	A	B		C	D	
		1970	2009		1970	2009
Type 1	22	18.85	36.59	19.97	47.12	84.01
Type 2	60	49.62	42.44	48.72	47.95	62.2
Type 3	36	31.53	20.97	31.31	33.22	61.25

Explanation: A – number of districts; B – share of population (%); C – share of area (%); D – urbanisation rate (%)

Source: Own compilation based on Population of Belarus: statistical digests 1970–2009

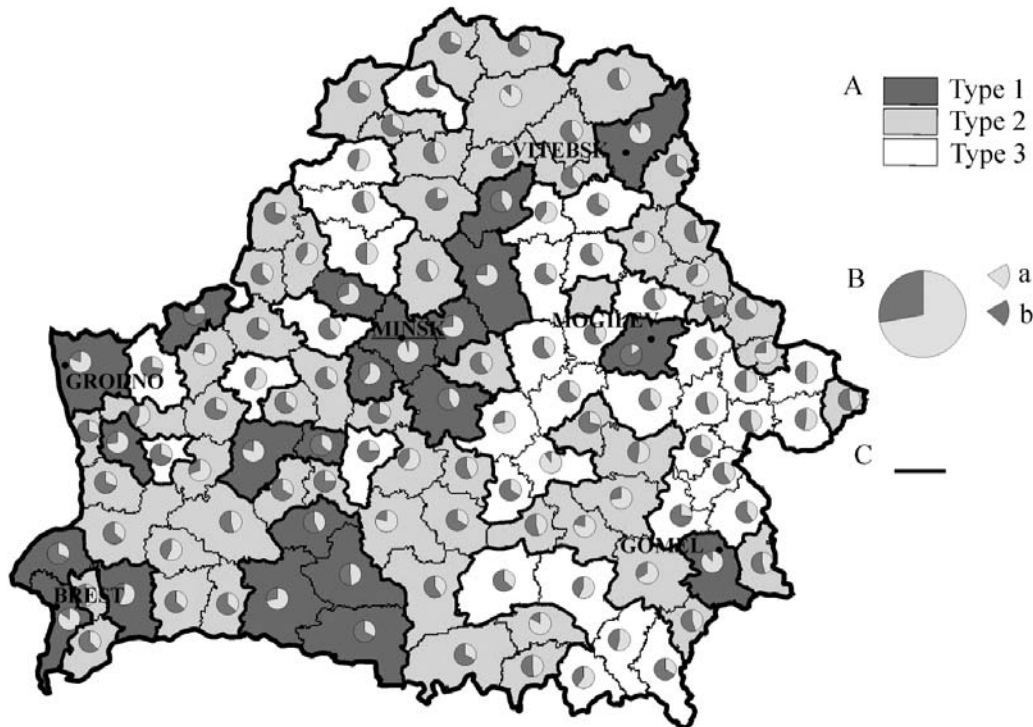


Fig. 1. Regional types of rural population dynamics in Belarus for the years 1970–2009

Explanation: A– regional types of rural population dynamics; Type 1 – growing; Type 2 – stable; Type 3 – shrinking; B – population structure (percentage), 2009; a – urban population (74.3%); b – rural population (25.7%); C – boundaries of the regional types

Source: Own compilation based on Population of Belarus: statistical digests 1970–2009

3. Spatial and temporal shifts in natural movement of rural population

There was a natural decline of the rural population in the Republic of Belarus during the study period of 1970–2009. Rural population was reduced predominantly due to natural population decline which since 1992 exceeds migration outflow. Regressive demographic trends in Belarus appeared in connection with the completion of the first ‘demographic transition’ in rural areas by the mid-1960s.

These regressive demographic trends took place throughout the republic, but the process of expansion and development were uneven in time and space. The differences in the duration and intensity of the increase in mortality and fertility declines are manifested on the meso-level of the regions and intensify on the micro-level of districts. Natural rural population decline had increased up to 3.8‰ both by reducing the birth rate to 12.3‰, and mortality increase up to 16.1‰ by the end of 1980. Natural decrease had reached 13.8‰ in ten years by 1999. In 2009, the difference between births and deaths was minus 13.0‰.

The natural decrease in rural population of Belarus began in the late 1970s as a whole. It was recorded in 1975 in the Vitebsk, Grodno and Mogilev regions, while in the Minsk region in 1980, and the Brest and Gomel regions in 1985. Meso-level differences in the completion of the first ‘demographic transition’ are clearly seen from northeast to southwest from the agro-extensive areas to agro-intensive areas (Pirozhnik, 1986). The Minsk region is an exception. It is the region with the highest socio-economic development, concentrating role of a large urban centre and relatively more stable demographic development (Fakeyeva, 2008).

The direction of the population distribution axis is explained by the territorial differentiation of population losses in the Great Patriotic War (eastern front of WWII). In the pre-war period the population on the territory of Belarus was located fairly evenly and significant meso-level differences were not observed. Demographic potential shifted to the Minsk and Brest regions during the second half of the 20th century (Antipova, 2007). The differentiation in development of demographic processes is greatly enhanced on

the micro-level. Spatial spreading of the rural depopulation process in the direction from northeast to southwest, i.e. from the agro-extensive districts to agro-intensive districts, is closely related to the settlement system which changes in the same direction from small-sized to the large-sized.

The first 'demographic transition' had been completed in all rural areas of Belarus by the end of 1980. Five Polesye districts and typical suburban Minsk, Gomel and Brest had small natural growth only. The stimulating role of cities in the Gomel and Brest regions enhanced zonal features, which are expressed in a high fertility and low mortality in the southern

part of Belarus. Currently, all Belarusian districts, except the Minsk and Brest ones, are characterised by a rural population natural decrease. Three types of dynamics of natural population movement were identified in accordance with spatial and temporal heterogeneity of the rural depopulation (Table 2, 3).

Type 1. Developing. It includes suburban and urban, agrarian Polesye districts with a relatively advantageous demographic dynamics (for the period of 1970–2009 Crude Birth Rate – CBR 16.5–12.6‰, Crude Mortality Rate – CMR 8.5–19.4‰). Type 2. Stable. It combines transitional districts, the demographic development is close to the average (CBR

Table 2. Characteristics of district types by the dynamics of natural movement of rural population

Type	A	B	C	D	E	F	
						1970	2009
Type 1	11	18.00	8.66	670.4	476.5	13.3	19.7
Subtype 1.1	8	12.67	6.09	422.2	232.4	8.4	9.6
Subtype 1.2	3	5.33	2.56	248.2	244.1	4.9	10.1
Type 2	60	109.67	52.76	2,615.5	1,238.8	52.1	51.3
Subtype 2.1	33	58.32	28.06	1,439.9	743.3	28.7	30.8
Subtype 2.2	22	42.20	20.30	836.9	301.3	16.7	12.4
Subtype 2.3	5	9.16	4.41	338.7	194.2	6.7	8.1
Type 3	47	80.20	38.58	1,737.7	698.1	34.6	29
Subtype 3.1	39	67.47	32.46	1,370.9	544.9	27.3	22.6
Subtype 3.2	8	12.72	6.12	366.8	153.2	7.3	6.4

Explanation: A – number of districts; B – area (1,000 km²); C – share of area (%); D – population, 1970 (1,000 people); E – population, 2009 (1,000 people); F – share of population (%)

Source: Own compilation based on Population of Belarus: statistical digests 1970–2009

Table 3. District types by the natural movement of rural population – in the context of some characteristics

Type	A		B	C		D	E	
	1970	2009		1970	2009		1970	2009
Type 1	16.5	12.6	0.77	8.5	19.4	2.28	0.52	1.54
Subtype 1.1	16.4	11.8	0.72	8.4	21.3	2.53	0.51	1.80
Subtype 1.2	16.7	14.6	0.88	8.8	14.5	1.64	0.53	0.99
Type 2	15.8	10.9	0.69	9.6	24.7	2.57	0.61	2.26
Subtype 2.1	17.6	10.2	0.58	10.1	24.2	2.39	0.58	2.37
Subtype 2.2	13.9	12.1	0.87	8.8	26.1	2.95	0.64	2.15
Subtype 2.3	12.6	10.5	0.83	9.5	22.0	2.32	0.75	2.10
Type 3	12.5	9.3	0.74	10.4	28.2	2.72	0.83	3.03
Subtype 3.1	12.3	9.7	0.79	10.4	27.9	2.67	0.85	2.87
Subtype 3.2	13.6	7.3	0.54	9.9	29.8	3.01	0.73	4.07

Explanation: A – GFR (‰); B – fertility dynamics index 2009/1970; C – GMR (‰); D – mortality dynamics index 2009/1970; E – CDI

Source: Own compilation based on Population of Belarus: statistical digests 1970–2009

15.8–10.9‰, CMR 9.6–24.7‰). Type 3. Depressive. It combines adverse peripheral districts (CBR 12.5–9.3‰, CMR 10.4–28.2‰), with low demographic and agricultural potential located in Polatsk, on the Neman Lowland and Lida Plain, with high agricultural or tourist recreational potential in accordance with Fig. 2 (Fakeyeva, 2009).

Type 1. Developing type includes 11 districts, characterised by stable high fertility and low mortality, and positive dynamics of natural movement. Currently, only those areas of Belarus are capable of self-development and demographic reproduction. The developing type includes two subtypes: southern and dispersed.

Subtype 1.1. Developing southern type comprises eight Polesye agrarian districts that traditionally have an advantageous demographic situation. The combination of the confessional and ethnic structure, economic activities and settlement system features in these extensive agrarian areas forms a stable area with the lowest level of rural depopulation in Belarus.

Subtype 1.2. Developing dispersed subtype includes three suburban, industrial districts (Pirozhnik, 1986): Minsk, Gomel and Brest, where 10% of rural

population is concentrated and the proportion of these areas is constantly increasing in the rural population.

Type 2. Stable type comprises 60 districts with 53% of Belarus area, where 51% of the rural population is concentrated. The stability of these districts with regard to the average indicators of Belarus determines the stagnation of the demographic development. Currently, the most stable areas are not able to keep the natural population increase without migration inflow, except of the areas of suburban subtype.

Subtype 2.1. Stable central-west region includes 33 districts of the Belarusian ridge and large-sized settlement districts of lowland areas of the Pripyat River, the majority of which relates to industrial and industrial-agrarian, while eight of them to agro-extensive and seven to agro-intensive section (Pirozhnik, 1986).

The subtype 2.2. Stable southeast region consists of 22 large- and middle-sized settlement districts of the Polesye Gomel region, where about 12.5% of the rural demographic potential is concentrated. Generally, there are agro-extensive districts in this subtype, while five related to industrial and agricultural, and Mazyr, Babruysk and Svetlahorsk – to industrial

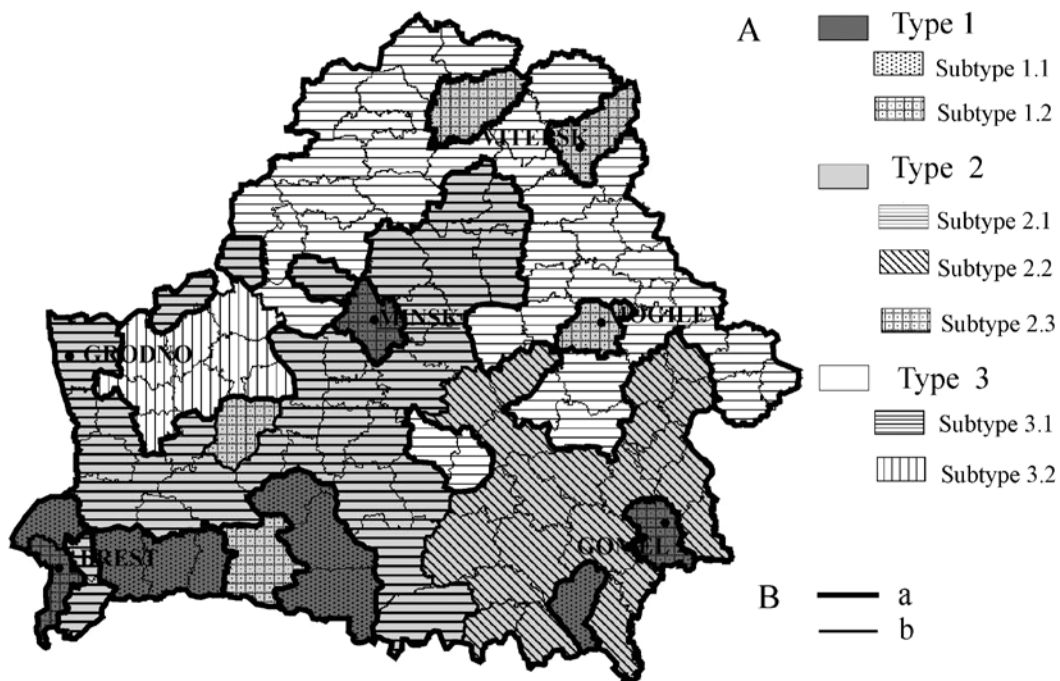


Fig. 2. Regional types of rural population natural movement in Belarus for the years 1970–2009

Explanation: A – regional types of population natural movement; Type 1 – developing; subtype 1.1. – southern developing; subtype 1.2. – dispersed developing; Type 2 – stable; subtype 2.1 – stable Central-West; subtype 2.2 – stable South-East; subtype 2.3 – stable suburban; Type 3 – depressive; subtype 3.1 – depressive North-East; subtype 3.2 – depressive West; B – boundaries; a – type; b – subtype

Source: Own compilation based on Population of Belarus: statistical digests 1970–2009

(Pirozhnik, 1986). The stable suburban subtype 2.3 includes five urban industrial districts, where more than 8% of rural population lives and the proportion of the demographic potential of these areas is constantly increasing.

Type 3. Depressive. It contains 47 districts which represent 39% of the area and concentrate about 28.9% of the rural demographic potential. These districts are characterised by low fertility and high mortality during the whole research period. Already in 1970 the Conditional Depopulation Index (CDI) was less than one in the regions of this type, indicating narrowed type of the population reproduction of the population. Depopulation Index rose up to 3.03 in 2009.

3.1. Depressive northeast subtype contains 39 districts, which are home to 22.6% of the population and where the proportion of the demographic potential is declining. Most of them are represented by the northern lakeland area; they have a low demographic and agricultural potential. Districts of this subtype reduced their demographic potential throughout the study period. This process cannot be stopped in a natural way due to sudden disturbances in the age structure.

3.2. West depressive subtype includes eight districts, concentrating around 6.4% of the demographic potential and occupying 6% of the rural areas, located on the Neman Lowland and Lida Plain. These are the districts with high agricultural, tourist and recreational potential, which are characterised by later onset of depopulation, but fertility decline occurred rapidly and more intensively with the average national growth rate of mortality.

4. Conclusions

The spatial and temporal analysis of the rural population dynamics conducted for the period of 1970–2009 enabled the authors to formulate the following conclusions:

- the dynamics of rural population of Belarus has an evolutionary character. The increasing reduction in the population size is the main modern trend that leads to the decreasing role of the rural population in the geo-demographic space formation;
- macro-geographic trends illustrate the end of ‘urbanisation transition’, which is characterised by structural shift in rural areas from the dominant rural type of districts to suburban type, and the ‘castling’ of the urban and rural populations in the formation of geo-demographic space;

- on one hand, spatial and temporal combination of the factors shows the cyclicity of population dynamics character; on the other hand, it shows the centre-periphery polarisation properties on the micro-geographic level;
- economic and geographical characteristics of the rural population dynamics in Belarus testifies geographically differentiated roles of districts in the country’s demographic space formation, which is determined by a strong presence of suburban and suburban-ring districts, and by weak presence of the peripheral districts.

The main spatial and temporal trends in the rural population natural movement in the period of 1970–2009 are:

- the demographic depression area is expanding in the direction from northeast to southwest; the southern Polesye districts are characterised by the highest stability of the zonal demographic parameters;
- the demographic space is fragmented under the influence of the development of urban settlement network and the improvement of demographic parameters in suburban districts.

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