Arctic Zone of the North-Eastern region of Russia: problems of demographic development

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The Arctic zone of the North-Eastern region of Russia is one of the most extreme regions of the world. Territories located after the Arctic a circle are included in the Arctic zone. Residence of people on this territory is attended with the whole complex of problems from which we will consider only demographic features. The Arctic zone of the North-Eastern region of Russia includes the Chukotka Autonomous District and half of the territory of the Republic of Sakha (Yakutia).

Since 1991 Russia has undergone radical changes in politics and economics. One of the main consequences of these changes was the out-migration of population from the eastern and northern regions, causing a significant decrease in the population of these territories.

The Russian Federation is divided into 83 large administrative territories or subjects; in this article we examine the features of the formation and development of the population of the two members of the Far Eastern Federal District: the Republic of Sakha (Yakutia) and Chukotka Autonomous Okrug. This area has always been sparsely populated with an average population density of 0.31 people per 1,000 square kilometers, which is 27 times less than the Russian average. The most of the population lives in the Republic of Sakha (Yakutia) while the most sparsely populated subject in Russia is Chukotka Autonomous Okrug (Table 1).

Table 1. Breakdown of the territories of northeastern Russia in relation to all subjects of the Russian Federation as of January 1, 2013

Territory	Territorial rank	Population density (persons per sq. km)	Population density rank	Population (thousands)	Population rank
Russian Federation	…	8.4	…	143,347	…
Republic of Sakha (Yakutia)	1	0.3	81	955.6	55
Chukotka Autonomous Okrug	7	0.1	83	51.0	82

Source: Demographic Yearbook (2013: 230–245).

Population Dynamics and Components of Population Changes

The absolute increase in population in the Russian northeast reached its maximum in the 1980s (Sukneva 2010). The beginning of a second period of population dynamics is associated with its reduction, as during the past two decades in the territory in question there has been a considerable decline in population. Between the censuses of 1989 and 2002, the population decreased by 269,000 people. The fastest rates of decline were found in the Chukotka Autonomous Okrug (in 2002, its population was only 34% of the 1989 figure) and the Republic of Sakha (Yakutia) did not experience such dramatic decline (Table 2).

In subsequent years, the population continued to decline; however, the scale of decline decreased significantly. For the next period between the censuses in 2002 and 2010, the tendency toward reduction that had been witnessed in the Republic of Sakha (Yakutia) since the 1980s had reversed. According to the 2010 census, the population of the Republic had increased by 9,000 people since 2002.

Table 2. Population dynamics between 1979 and 2013 (thousands)

Territory		Year								
	1979	1990	1995	2000	2002	2005	2010	2011	2012	2013
Russian Federation (millions)	137.6	147.7	148.5	146.9	145.6	143.8	142.8	142.9	143.1	143.4
Republic of Sakha (Yakutia)	852	1111	1037	963	949	953	958	958	956	956
Chukotka Autonomous Okrug	140	162	96	61	55	52	51	51	51	51

Source: Demographic Yearbook (2013: 231)
Note: Population at the beginning of the year

For many decades growth due to in-migration was a dominant feature of the formation of the region's population. Out-migration is now the leading cause of downsizing, though in the 2000s the influence of this factor has markedly decreased. The fluctuation in population directly reflects the stages of economic development in the Russian northeast; the strategy of economic development of the territory is based on attracting labor from other regions, which in turn caused the increase in population growth. This was due to the changes in the directions and volumes of migration flows and the levels of natural and net migratory components (Table 3).

Comparison of the values of natural and migratory growth allowed us to estimate the contribution of these components to the total increase (or decrease) of the population. In the Republic of Sakha (Yakutia) and Chukotka Autonomous Okrug there was a natural increase.

Thus, the major cause for the reduction of the population between 1991 and 2012 was a decline in migration to the region.

Table 3. Dynamics of the components of population change per 1,000 individuals

Year	Components of the increase (decrease) in population	Territory		
		Russian Federation	Republic of Sakha (Yakutia)	Chukotka Autonomous Okrug
1990	natural	2.2	12.7	10.1
	migratory	1.9	−6.0	−35.5
1995	natural	−5.7	5.5	1.3
	migratory	4.5	−21.9	−126.9
2000	natural	−6.6	4.0	1.9
	migratory	2.5	−8.2	−70.4
2005	natural	−5.9	4.0	3.8
	migratory	0.8	−5.3	−7.3
2010	natural	−1.7	7.0	0.9
	migratory	1.1	−7.4	−16.8
2011	natural	−0.9	7.7	2.5
	migratory	2.2	−10.3	10.2
2012	natural	0.0	8.5	2.6
	migratory	2.1	-8.6	-6.6

Source: Demographic Yearbook (2013: 233).

Features of the Age Structure of the Population

The natural and migratory movement led to changes in the size and structure of the population by sex and age. Changes in the distribution of population by age segments have a direct impact on the demographic development and reproduction of the population, since the processes of mortality, marriage, fertility, and migration are determined by a person's age. The most important feature of the age structure of the population in the northeast, compared to the Russian Federation as a whole, is the high proportion of children and working age population and a low specific percentage of pensioners in the total population. Changes in population structure associated with an aging demographic as a result of out-migration and fertility reductions in the last decade of the twentieth century resulted in a significant decrease in the proportion of children and an increase in the proportion of individuals of retirement age (Table 4).

Table 4. Age structure in the territories of the Russian northeast (%)

Territory	Population					
	Younger than working age		Working age		Retirement age	
	1990	2012	1990	2012	1990	2012
Russian Federation	24.3	16.8	56.7	60.1	19.0	23.1
Republic of Sakha (Yakutia)	32.2	23.8	60.8	62.3	7.0	13.9
Chukotka Autonomous Okrug	29.6	22.2	67.7	66.5	2.7	11.3

Source: Demographic Yearbook (2013: 230).

It should be noted that the genesis of the aforementioned trends in the age structure of the population are characteristic of almost all regions of Russia; a declining proportion of children with a simultaneous increase in the proportion of the elderly population is seen across the country.

However, significant differences lie in the magnitude of these changes. For example, despite the fact that the proportion of children in the northeast decreased, it is significantly higher than the Russian average (16.8%). The proportion of pensioners in this territory is also significantly lower compared to the Federation average, though it has increased over the past two decades.

Fertility Rate and Its Determining Factors

After a significant deterioration in the 1990s, the fertility rate of the population is improving. In the 2000s, the number of births per 1,000 individuals increased significantly (Table 5). However, it should also be noted that the birth rate in 1990 was only achieved in Chukotka Autonomous Okrug.

The increase in the fertility rate has been caused by several factors, including improvements to the economic situation in the early 2000s, the realization of a deferred desire to have children, as well as a response to demographic policy measures undertaken in the Russian Federation since 2006. Part of the increase in births is due to the favorable age structure of the population. Currently, the populous generation born in the mid-1980s – when the Russian Federation implemented pronatalist policies – has come of marriageable and active reproductive age.

However, the effect of favorable age structure on fertility, defined by a demographic wave, soon exhausts itself. Furthermore, as noted by demographers, the active response to demographic policy measures is manifested in the first few years (Arkhangelsky 2006). The reduction in the annual number of births is evidence of this. For example, in the Republic of Sakha (Yakutia), the peak annual increase of births occurred in 2007, and in subsequent years, the increase in the birth rate persisted mainly within the rural population. In urban areas in 2010–12, there was a decrease in the annual rate of the number of births (2010–2011) (Fig. 1).

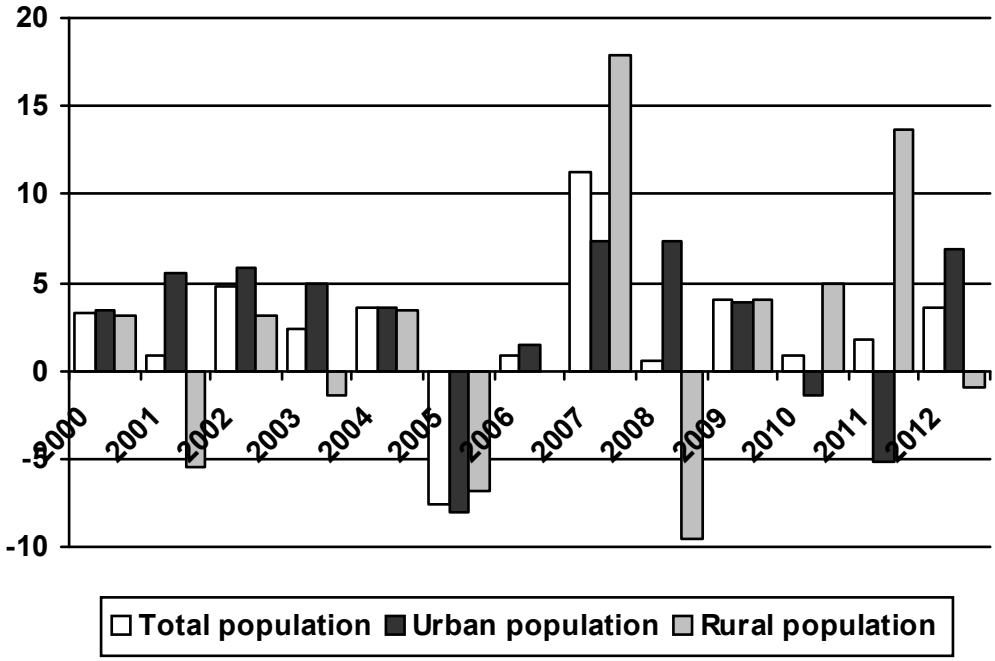

Figure 1. Yearly increase (decrease) in the number of births in the Republic of Sakha (Yakutia) in 2000–12

Figure 2 shows the breakdown of growth in the number of births into components by changes in the age structure and intensity of births, as a consequence of the population's response to demographic policy measures. The index method was used to evaluate the role of these factors in the changes in the birth rate.

In the early 1990s, the unfavorable age structure of the population was complemented by a reduction in births, as the difficult socio-economic situation in the country forced families to postpone having children; this is evidenced by the negative dynamics of the birth intensity contributing to the fertility rate.

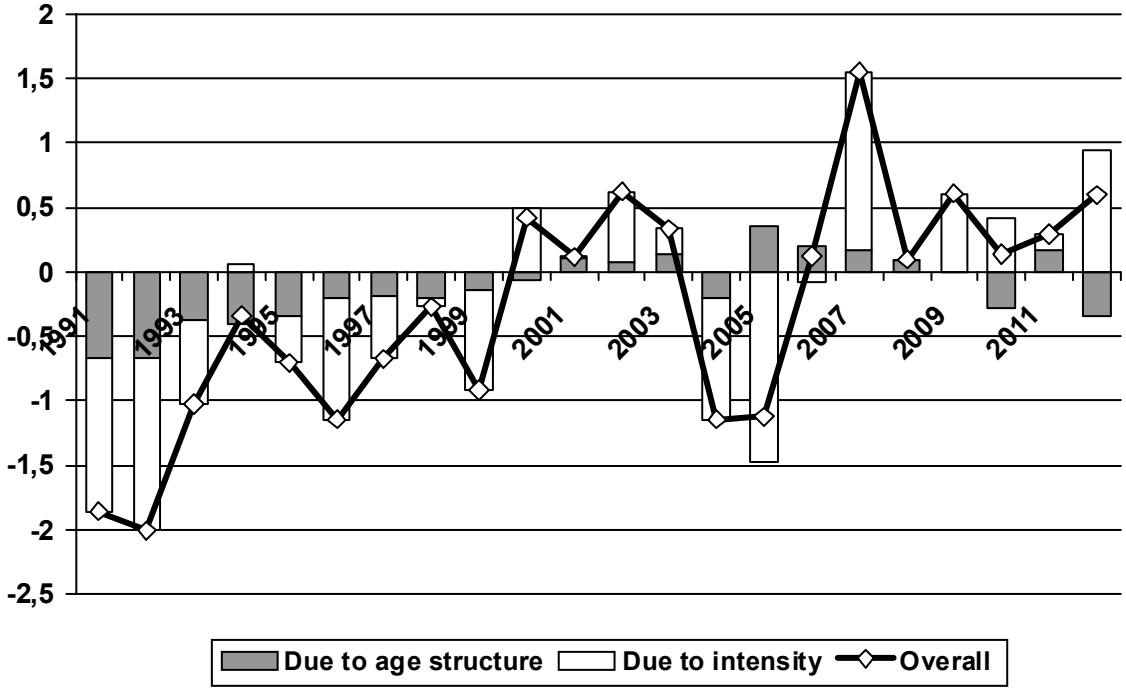

Figure 2. Change in the number of births in the Republic of Sakha (Yakutia) between 1991 and 2012 by age structure and birth intensity (in thousands of individuals)

The unfavorable structural factor of the fertility of the population continued to have an effect throughout the 1990s, coupled with the declining birth intensity. The rise in births in the 2000s clearly demonstrated the effect of the increase in birth intensity.

Table 5. Dynamics of population fertility rates between 1990 and 2012 (number of births per 1,000 inhabitants)

Territory	Year									
	1990	1995	2000	2005	2007	2008	2009	2010	2011	2012
Russian Federation	13.4	9.3	8.7	10.2	11.3	12.0	12.3	12.5	12.6	13.3
Republic of Sakha (Yakutia)	19.4	15.3	13.7	14.2	15.9	16.0	16.7	16.8	17.1	17.8
Chukotka Autonomous Okrug	13.8	10.4	11.5	15.3	15.2	14.3	13.5	14.7	13.6	14.0

Source: Demographic Yearbook (2013: 232).

A sharp jump in the birth rate can be clearly seen in 2007 as a response to the creation of additional measures to support families. The state adopted a set of measures to increase the birth rate, including those aimed at stimulating the birth of children in families. These include

providing the mother (or the family) capital in the form of allowances per child, and partial payment for children in preschool institutions (Federal law 2006). An increase in the number of births, primarily due to second and third births, can be explained by another important factor. In recent years, representatives of the 1980s generation have become young parents, and more than half of these individuals were not the only children in their families. It was thus easier to for this generation to respond to measures to encourage childbirth (Elizarov 2012).

A significant factor in maintaining a high level of fertility in the Republic of Sakha (Yakutia) and Chukotka Autonomous Okrug is the ethnic composition of the population, more than half of which is comprised of Sakha (Yakuts) and indigenous peoples of the North. These ethnic groups have higher fertility rates compared to other nationalities. In addition, a significant parts of Yakutia's (35.1%) and Chukotka Autonomous Okrug's population (33.3%) live in rural areas (Demographic Yearbook 2013: 230); this also contributes to the preservation of the traditional model of reproductive behavior.

Analysis of the Mortality Rate

Compared to fertility, mortality is more susceptible to external influences. It can occur as the result of the level of socio-economic development, environment, lifestyle, the effectiveness of health care, and the formation of a public culture that promotes a conscious attitude toward one's own health and the health of others (Sukneva 2009).

Changes in mortality rates reflect the dynamics of the number of deaths per 1,000 inhabitants. In Russia, the increase in mortality rates has ceased, and a downward trend is now taking place. From 1990 to 2005, the overall mortality rate in the Russian Federation increased by 44 percent, but in 2012 it had fallen by 17.4 percent compared to 2005.

The Republic of Sakha (Yakutia) also tend to have a lower mortality rate, while in the Chukotka Autonomous Okrug there has been a continued increase in mortality, with the 2012 level exceeding the that of 1990 by more than 3.1 times (Table 6). The main causes of mortality in Russia are cardiovascular diseases, cancer, and external causes. Mortality rates from external causes in the northeast are significantly higher than the average rate within the Russian Federation, and by 1995 it had increased almost twofold.

The socio-economic transformation of the country has had a negative impact on the level of mortality from these causes, and in subsequent years, a decrease in mortality from the first two reasons was seen. However, external factors remain stable in second place when looking at regional mortality rates. By 2010, an increase in mortality from diseases of the circulatory system is noted. This is primarily due to changes in the age composition of the

population – its aging being the result of active out-migration – as well as a rejuvenation in mortality due to circulatory diseases. There is also an upward trend in cancer related mortality.

Table 6. Mortality rate by cause (number of deaths per 1,000 individuals)

Cause of death	Year	Territory		
		Russian Federation	Republic of Sakha (Yakutia)	Chukotka Autonomous Okrug
All causes	1990	11.2	6.7	3.7
	1995	15.0	9.8	9.1
	2000	15.3	9.7	9.6
	2005	16.1	10.2	11.5
	2010	14.2	9.8	13.8
	2012	13.3	9.3	11.4
Cardiovascular diseases	1990	6.2	2.3	…
	1995	7.8	3.4	2.9
	2000	8.4	3.8	3.2
	2005	9.1	4.7	4.6
	2010	8.1	4.7	6.1
	2012	7.4	4.4	4.6
External causes	1990	1.3	1.6	…
	1995	2.4	2.6	3.0
	2000	2.2	2.4	3.0
	2005	2.2	2.3	3.7
	2010	1.5	2.0	3.3
	2012	1.4	1.7	2.5
Cancer	1990	1.9	1.2	…
	1995	2.0	1.3	0.9
	2000	2.0	1.3	1.1
	2005	2.0	1.3	1.2
	2010	2.0	1.2	1.4
	2012	2.0	1.3	1.5

Source: Demographic Yearbook (2013: 232–237).

The mortality of the working population remains very high; in addition we can see a significant differentiation in mortality by sex (Sukneva 2010: 69). The sharp increase in mortality in the mid-1990s led to a decrease in life expectancy at birth (Table 7).

The increase in life expectancy in recent years is determined by a reduction of mortality, especially premature, coming under the influence of external factors, as well as a reduction of infant mortality. However, it should be noted that the average life expectancy of the population in the Russian northeast is significantly lower than the average for the Russian

Federation, not to mention that of developed countries (United Nations Development Programme 2011). A significant gap in life expectancy exists between men and women, with the men's average being 11–12 years shorter.

Table 7. Life expectancy at birth, 1990–2012 (in years)

Territory	Year					
	1990	1995	2000	2005	2010	2012
Men and women						
Russian Federation	69.2	64.5	65.3	65.4	68.9	70.2
Republic of Sakha (Yakutia)	66.2	62.2	63.7	64.7	66.8	67.9
Chukotka Autonomous Okrug	68.0	59.8	60.2	58.5	57.5	60.8
Men						
Russian Federation	63.7	58.1	59.1	58.9	63.1	64.6
Republic of Sakha (Yakutia)	62.5	56.5	57.9	58.6	60.1	62.4
Chukotka Autonomous Okrug	64.4	55.2	54.9	54.1	52.7	56.6
Women						
Russian Federation	74.3	71.6	72.3	72.4	74.9	75.9
Republic of Sakha (Yakutia)	71.5	69.0	70.3	71.6	73.2	73.9
Chukotka Autonomous Okrug	72.1	66.2	67.1	63.1	63.6	64.9

Source: Demographic Yearbook (2013: 234)

Conclusion

The analysis of the demographic development of the Arctic Zone of the North-Eastern region of Russia presented in this article has revealed the following:

Demographic specifics of the territories considered are determined by their sparse population. These regions have small populations exhibiting extremely uneven distribution over a large area due to the history of development and settlement of the northeast and the heterogeneity of the socio-economic environment; ethnic identity and the structural characteristics of the population are also important.

The population changes on this territory can be divided into two periods. The first period, until 1990, was characterized by stable growth in the population. The second period of population dynamics began after 1990 and is characterized by a population decline. Our analysis of the causes of depopulation was conducted using the method of decomposition of the total increase (decrease) of the population into two component parts: natural and net

migration. The calculation of the components of the overall increase (decrease) of the population during this period revealed a predominant contribution of migration to population decline.

The age structure of the population is characterized by the maintenance of a high proportion of children and working-age population. The growth of the older population has increased 2.2 times over the past two decades, indicating the beginning of the process of demographic aging of the northeastern population.

The fluctuating character of changes in fertility (1990–2012) is defined by a combination of factors, of which we have considered age structure and birth intensity as a response to the changing socio-economic conditions and demographic policy measures in urban or rural areas, the marriage rate, and the ethnic composition of the population. The observed increase in the birth rate in the 2000s did not reach the 1990 level in the Republic of Sakha (Yakutia). An index analysis of fertility factors allowed us to estimate the effect of age structure and birth intensity on changes in fertility in the Republic of Sakha (Yakutia). In the 1990s, the adverse effect of the age structure of the population and a reduction in birth intensity resulted in a reduction in the number of births. The increase in the number of births in the 2000s was marked by a positive contribution of birth intensity in combination with a favorable age structure.

The mortality of the northeastern population remains high. External causes remain firmly in second place in as the causes of regional mortality. By 2010, an increase in mortality from diseases of the circulatory system was noted; this is due to the resulting active out-migration, as well as the rejuvenation of mortality from these diseases. The indicators of life expectancy in the Russian northeast are below the national average, not to mention that of developed countries. The male mortality rate is significantly higher than that of women, which is reflected in men's life expectancy being 11–12 years shorter than that of women's.

So, the main reason of population reduction territory under consideration is migration. The population of the Arctic zone travels to places beyond the Northeast and to the central areas of the Republic of Sakha (Yakutia). Reproduction in the region shows a positive trend of natural increase.

Relatively high birth rate remains due to higher reproductive attitudes of the rural population. Indigenous peoples of the North predominantly live in rural areas of the Arctic zone. Positive dynamics fertility has been accompanied by negative processes in the demographic behavior of the population. The Arctic areas have the highest rates of

illegitimate births and celibacy among indigenous peoples of the Republic of Sakha (Yakutia).

The adverse trends were observed in the mortality of the Arctic region. In Russia, in recent years, mortality rates are currently falling. The high mortality rate is observed in the Arctic zone. The reason for this situation is the high level of mortality from external causes, which is one and a half to two times higher than the average rate within the Russian Federation.

The solution of the demographic problems is possible only in interaction with the economic policy of the state and the changing socio-economic situation in the Arctic zone. Priority directions to improve the demographic situation in the Arctic should be to reduce mortality and improve active healthy living, migration managements, strengthen the family and increase fertility in marriage. Demographic processes have considerable inertia, so to improve the demographic situation is necessary to preserve the demographic potential of the region and to eliminate the negative trends in demographic processes prevailing in the Arctic zone.

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