

The research of demographical indicators of the population's quality of life for sustainable development of Almaty region

Gulnara Nyussupova^{1,*}, Roza Kelinbayeva¹, Alla Makhrova², Gaukhar Kairanbayeva¹

¹Al-Farabi Kazakh National University, Department of Geography, Land Management and Cadastre, Almaty, Kazakhstan

²Lomonosov Moscow State University, Faculty of Geography, Department of Economic and Social Geography of Russia, Moscow, Russia

Abstract Sustainable socio-economic development of the region can be achieved only if the strategic priority of development is a socially significant goal-improving the quality of life of the population. A system of quality of life's indicators includes both objective characteristics of a person or society, their life and standards of it and subjective estimated characteristics, that show subject's attitude to his life's realities. Demographical indicators, that characterize regularities of human reproduction, take an important place in the system of indicators, that determine quality of life. The "Concept of sustainable development" itself has a direct reproductive content and implies sustainable reproduction of a person, his quality parameters and living conditions, consistent with the laws of development and the principles of conservation of the natural environment. The issues of improving demographic indicators of the quality of life of the population are particularly relevant for the Almaty region – a region with a high demographic and labor potential, which plays an important role in the socio-economic and geopolitical development of the Republic, as a region with an agricultural orientation, occupying a transit position.

1 Introduction

The sustainable development of the regions of Kazakhstan today is one of the priority tasks, since dynamically developing and competitive regions are the source of growth for the whole country, the support for pursuing the national policy of reducing territorial imbalances, and promoting a more balanced and sustainable development of the regions. The main goal of sustainable development can be represented as maintaining the integrity of the territory, improving the quality of life of people who live in harmony with the environment. The prospects for the sustainable development of the regions of the Republic of Kazakhstan depend on a detailed study of regional characteristics of the indicators of quality of life of the population (QOL). When determining the quality of life, it is necessary to analyze the indicators characterizing it. The application of key indicators of QOL provides an opportunity to assess the quality of life of the population of the regions of Kazakhstan and the formation of regional socio-economic policy.

* Corresponding author: gulnaran@mail.ru

The diversity of aspects of human life determines the diversity of the very concept of “quality of life” and the criteria for evaluating it. In the national geographic scientific school, the assessment of the quality of life of population (QOL) is usually determined by four groups of factors that together constitute the conditions for the formation of quality of life at the regional level – social, demographic, economic, and environmental.

The studied region – Almaty region occupies an important geopolitical position and has a unique natural, demographic, economic and historical-cultural potential. The effective use of the region’s potential can ensure sustainable development, high level and quality of life of the population.

An important place in assessing the level of QOL of Almaty region is occupied by demographic processes such as birth rate, mortality, natural growth, migration, life expectancy, age and sex composition of the population, demographic burden, their changes, causes and consequences of these changes. The population of Almaty region is 11% of the population of the republic. The region is characterized by low urbanization, with a significant preponderance in the structure of the population of rural residents (76%), high birth rates, high migration outflow from villages, decline in living standard of certain districts, etc. [1]

In our study, a geodatabase with key demographic indicators of the quality of life of the population of Almaty region by using geoinformation technologies was created. This will facilitate more in-depth knowledge of the regional aspects, clearly demonstrate, adequately and promptly analyze the trends in demographic processes, and, therefore, the differentiation of quality of life of the population in the region.

2 Materials and research methods

Nowadays, a lot of attention is paid to the problem of quality of life and sustainable development of the regions. Many scientists take an objective approach in their studies to assessing the quality of life, the following authors can be noted in Russian science: M.N. Porfenenko, N.V. Zubarevich, A.B. Prokopovich, K.N. Misevich, C. B. Ryashchenko, S.A. Merkushev et al. [2-4]. The study of quality of life as an indicator of sustainable development is considered in the works of P. Leochi, M.Yu. Saenko et al. [5-6] A number of works is devoted to the quality of life as an indicator of the sustainable development of rural areas: L.A. Tretyakova, N.I. Lavrikova, E. Zhanabekova. The demographic aspects of quality of life are studied in the works of B.Ts. Uralnis, A.Ya. Kvasha, A.P. Burjan, P.O. Kosyakov, V.A. Belova, A.E. Krupko et al. [7-8]. Among Kazakhstani works devoted to the various aspects of socio-economic and socio-demographic studies of quality of life, such as living standards of the population, human development, and spatial and territorial differences in the indicators of quality of life, there are works by the following Kazakhstani geographers: Sh.M. Nadyrov, G.N. Nyussupova, A.M. Kalimurzina, G.K. Kairanbaeva, E.Zh. Imashev, and others. [9-13].

In this study, the analysis of the demographic components of the quality of life of the population of Almaty region was carried out for the indicators that are key indicators of quality of life. These include population dynamics, life expectancy, indicators of migration movement and natural movement. Mortality indicators are indicators of the quality of the environment and the socio-economic status of society. The important indicator of the quality of life is the level of infant mortality, which reflects the health of the population, determines the reproductive and labor potential of future generations of the country, which is at the same time an important indicator of the socio-economic conditions of society and the level of health care.

The analysis of demographic indicators of the population of Almaty region is based on the calculation of official statistics for the administrative districts of Almaty region for the period from 1999 to 2018. Research methods: statistical, comparative, analytical groupings,

standardization, cartographic method by using new geographic information technologies, etc.

3 Results and discussion

Almaty region is one of the largest regions of the Republic of Kazakhstan (occupies 8.2% of the area of the Republic of Kazakhstan) with agro-industrial specialization, most of the population (76%) lives in rural areas. The region includes 3 cities of regional subordination (Taldykorgan, Kapshagai and Tekeli) and 17 administrative districts. Among the latest changes in the administrative-territorial division of the region, it is worth noting the separation of the Rayymbek district on April 2, 2018. The Kegen district with an administrative center in the village of Kegen was taken out from its structure, and therefore, the analysis of data on this area was not carried out until 2018 [14].

In the course of the study, the key demographic indicators characterizing the QOL of the districts of the Almaty region, presented in separate tables, were collected into a unified geodatabase. This data management model made it possible to structure all statistical information and integrate them with spatially coordinated objects of geodatabase. As a result, integrated and synthetic cartographic models of the development of demographic processes occurring in the region were created by using GIS. Thus, statistical information was interpreted into cartographic one, including one based on geomodeling. In addition, the geodatabase allows one to perform queries between indicators, to create selections with the necessary conditions for presenting the situation. The digitalization of demographic indicators allows updating and actualizing current statistical information, identifying regional imbalances, identifying areas of growth and risk, conducting operational monitoring of districts to manage demographic processes for the sustainable development of regions, especially Almaty region. Based on the formed geodatabase, a spatial geographic analysis of the demographic indicators of the quality of life of the population was made, which made it possible to identify the characteristics of the demographic development of the districts of Almaty region. [15].

Over the past decades, the dynamics of the population of Almaty region underwent repeated changes, on the whole increasing by 455 thousand people over the period from 1999 to 2018. (Figure 1)

For the studied period from 1999 to 2018, there was a stable population growth in the region, which was mainly due to the influence of two factors - natural growth and a positive migration balance in certain districts of the region. In the district context, population decline occurred over the entire studied period in Sarkand, Kerbulak, Alakol, Aksu and Eskeldinsky districts, which is associated with a significant outflow of the rural population to cities in connection with studies, the search for new jobs and the outflow of non-native people to their historical homeland. The largest population growth is observed in the areas forming the suburban zone of the Almaty agglomeration – Karasai, Ili, Enbekshikazakh, Talgar, Zhambyl districts, as well as in the city of Taldykorgan. The population of Balkhash and Uigur districts remained unchanged. (Figure 1)

At the beginning of 2019, the population of Almaty region was 2038.9 thousand people or 11% of the population of the republic. The largest population was concentrated in the following districts of the region: Enbekshikazakh (16%), Karasai (11.0%), Ili 9.5%. The least was characteristic one for the Balkhash district and the city of Tekeli (Figure 2).

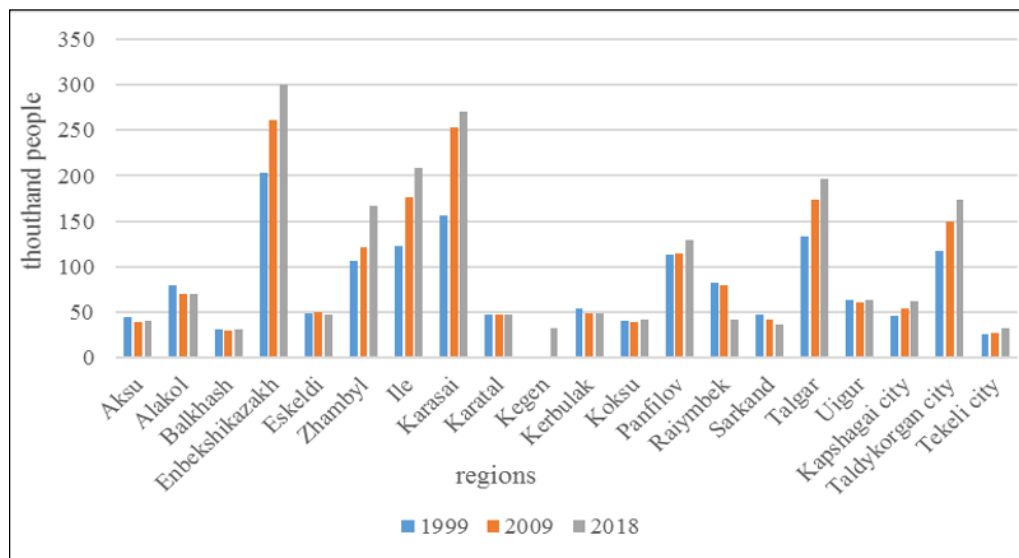


Fig.1. Dynamics of the population of districts of Almaty region

The urban population of the region is growing, however, a low level of urbanization remains, which is associated with the predominantly agricultural orientation of the region's economy. The region ranks second in the republic after the South Kazakhstan region, in terms of the number of people living in rural areas. So, 76% of the region's population lives in rural areas, 24% in urban areas, while the average rural population in the republic is 57%.

One of the important key indicators of QOL in the region are the indicators of natural growth, which is an indicator of economic well-being, quality of health care, strengthening and maintaining the health of mothers and children, healthy lifestyles and overall effectiveness of demographic policy.

The indicators of natural population growth in the whole Almaty region increased by 13 %: from 5.2% in 1999 to 18.3% in 2018. In the regional context, there was a positive trend in all districts of the region where there was a positive natural growth in recent years, at the same time there were high rates in indicators of natural population growth. From 1999 to 2018 there were the highest rates of natural growth in Karasai, Ili, Zhambyl and Talgar district, the lowest – in Kerbulak district (Figure 2).

As it can be seen from Figure 3, the highest rates of natural population growth in 2018 were in Ili (23.6%) and Karasai (23.2%) and Panfilov districts (20.4 %), the lowest – in Tekeli (7.0%) and Karatal districts (7.8%). The high rates of natural population growth were the result of the increase in the birth rate and the decrease in the mortality rate in the region.

In Almaty region over the studied years, there was an increase in the birth rate of the population. The birth rates indicators for 1991-2018 increased by 2 times, and the birth rate increased from 14.2% to 24.9%, respectively.

The birth rate indicators in the region were higher than the national average ones (21.6%). In the district context, the general trend of increasing birth rate continues. The lowest indicators in 2018 were typical for the districts: Karatalsky – 17.5 %, Raiymbek - 17.0 % and Tekeli – 16.7 %. High birth rates were observed in Ili (29.8 % in 2018), Karasai (28.3 % in 2018) districts. (Figure 4).

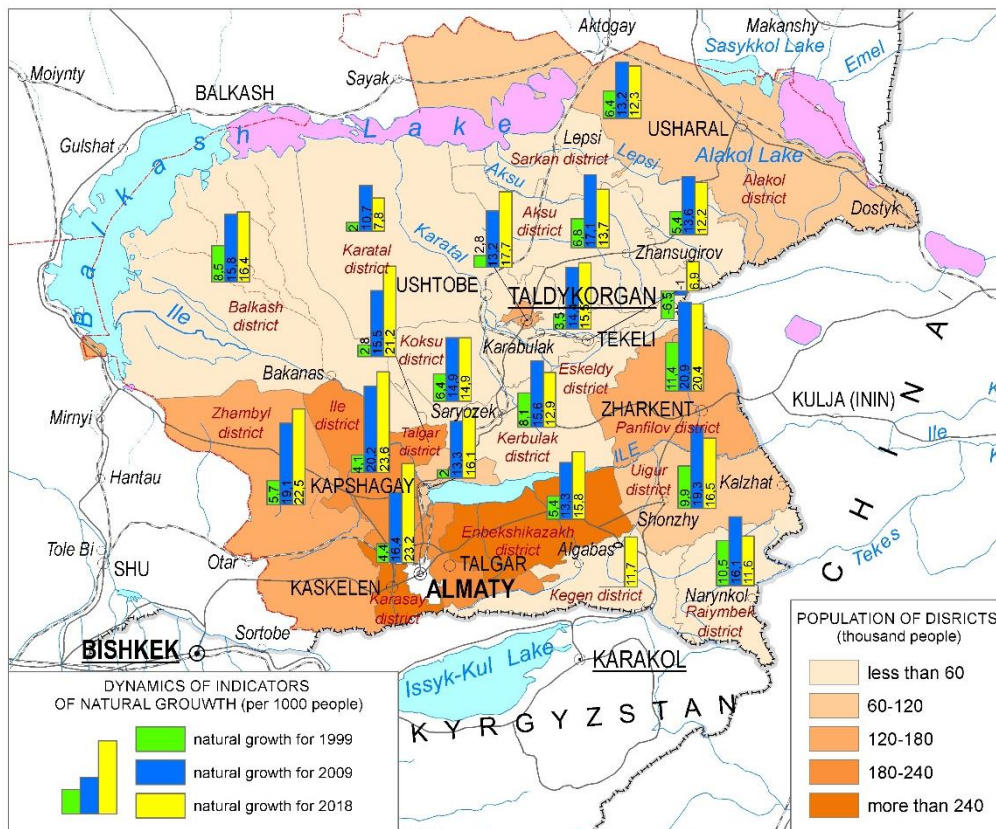


Fig.2. Dynamics of indicators of natural population growth in districts of Almaty region

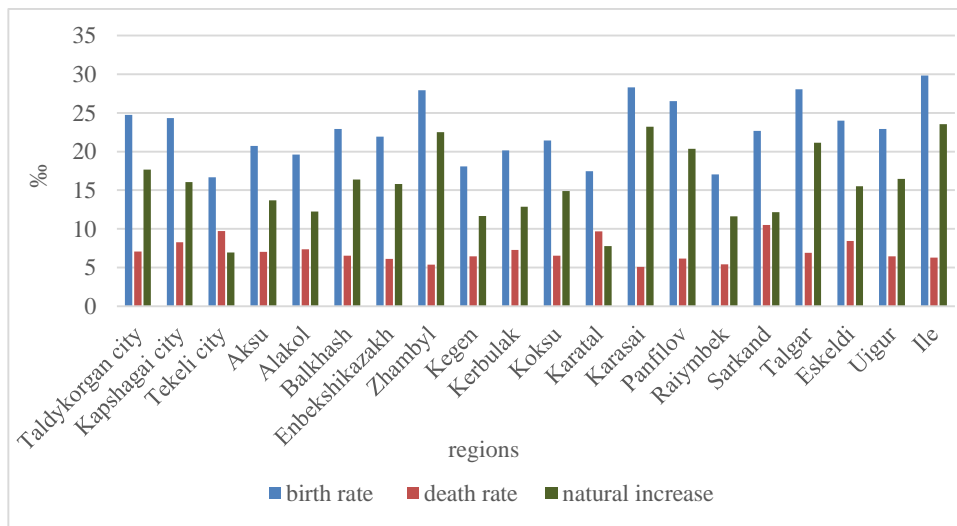


Fig.3. Indicators of the natural movement of the population of the districts of Almaty region for 2018

Most urban settlements of the region were characterized by higher birth rates than rural areas and in 2018 were 29.9 24 and 24.8 %, respectively. The exception was urban settlements of the Karatal district (13.4 % and 18.4 %, respectively) and the city of Tekeli (10.6% and 16.7%, respectively), where the lowest birth rate indicators for the period of 1999-2018 were noted. This is explained by the younger age structure of the population in the cities of Almaty region and, consequently, the higher reproductive potential of the population, the influx of people of working and child-bearing age into the cities from rural areas, the adoption and registration of births in urban maternity hospitals. At present, apart from traditional demographic behavior of young people, religious attitudes also have a great influence

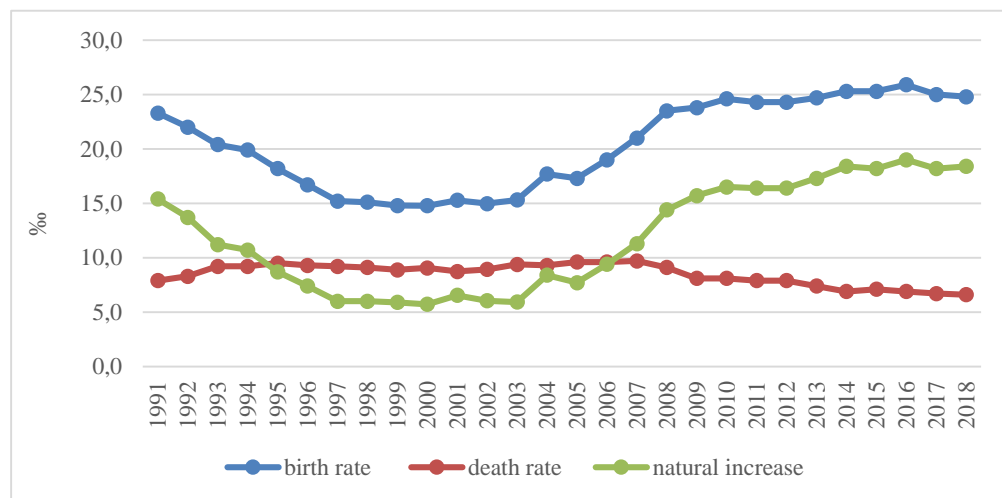


Fig.4. Dynamics of indicators of the natural movement of the population of Almaty region from 1991 to 2018

The main fertile age of women in Kazakhstan is 20-29 years, which in 2018 in the Almaty region was 59% of the all giving birth in the region, and for the 30-34 year old age period – 23%. It is interesting to note that 14211 women decided to give birth to their first child, and 3408 decided to give birth to their fifth child and more, which indicates a revival of the tradition of having many children. The proportion of children born to women who were not registered in a marriage is decreasing, for example, in 1999 it was 25%, and in 2018 - 16% of all those born.

In world practice, life expectancy is the main one in determining the level of quality of life, since it is considered as a basic need of a person, the main condition for his life. The ability to live a long and healthy life is one of the conditions of a “quality life”. [16]. The indicator of life expectancy (LE) of the population in the region is growing from year to year. In 2018, this indicator was 73.44 years, while the life expectancy of men was 69.89 years, and that of women was 77.0 years. Life expectancy in rural areas is higher than in urban area, and in 2018 was 74.33 and 71.05, respectively.

The statistics of mortality indicators in the region reflects a positive trend, having decreased from 9.7% in 1999 to 6.5 % in 2018, which is 0.5 % lower than the national indicator. The mortality rate of the urban population is higher than the rural one and was 8.7 % in 2018, and the rural – 5.9 %. In the Almaty region, in the context of administrative districts, the lowest mortality rates in 2018 in Karasai district was 5.1 % and Zhambyl district was 5.4 %, and the highest ones were in Sarkand district(10.5 %), Karatalsky (9.7 %) and in the city of Tekeli (9.7%).Of the total number of deaths, a significant preponderance of males is observed. For

example, in the region in 1999, the mortality rates for men were 9.8 %, and for women were 8.1 %, in 2009 – for men – 9.0 % and for women – 6.1 %, in 2018, for men – 7.3 % and women 5.8 %. In all age groups, the mortality of males is more than 2 times higher than the mortality of the female population, as evidenced by the data in Table 1.

In the analysis of demographic indicators of QOL, the differentiation of the mortality structure of the causes of death plays an important role. The structure of the causes of mortality reflects the impact of internal factors of the human body and its external environment. The incidences of respiratory and digestive diseases by the population are the indicators reflecting the influence of the environment on human health.

Age groups	The number of deaths in the corresponding age group, %					
	men			women		
	1999	2009	2018	1999	2009	2018
40-44 years	9,5	7,5	5,18	3,4	2,8	2,08
45-49 years	12,6	10,5	7,29	5,5	4,0	3,15
50-54 years	18,6	16,2	9,35	7,9	5,9	5,21
55-59 years	25,9	21,9	15,09	12,3	10,1	8,43
60-64 years	36,3	32,0	24,33	17,7	15,2	14,38
65-69 years	53,1	45,0	40,22	26,6	24,6	25,03

Table 1. The mortality rate of the population of Almaty region in age groups

The respiratory and digestive organs are directly affected by environmental factors through drinking water, food and air. The increase in mortality rates in Almaty region was mainly due to an increase in deaths from diseases of the circulatory system, which occupy the first place in the structure of the causes of mortality in the region and in the republic (18%), as well as from respiratory diseases (18.3%). There were a significant proportion of deaths from diseases of the digestive system (11.8%), accidents, poisoning and injuries (10.5%) and neoplasms (9.1%) (Figure 5).

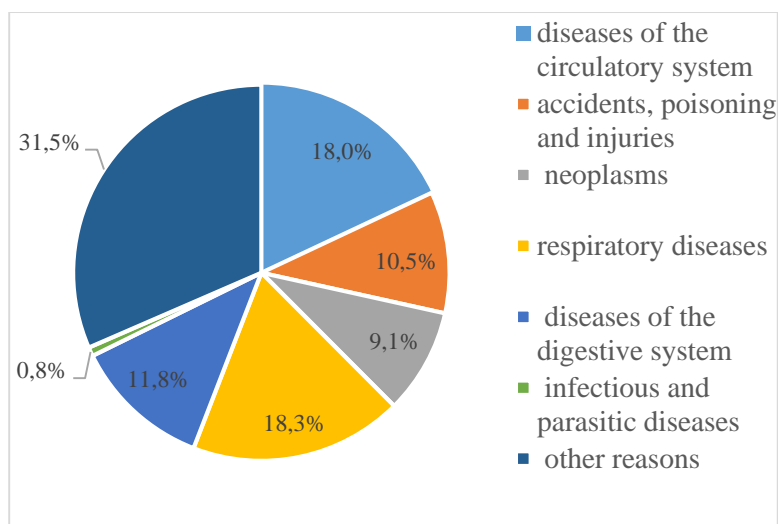


Fig.5. Structure of the causes of mortality in Almaty region in 2018, (%)

When studying age-specific mortality rates, infant mortality is usually distinguished. The indicators of infant mortality in the Almaty region in 2018 (7.0 %) were lower than the national average ones and were to 8.0%. There were higher mortality rates for boys (8.0%) than for girls (6.0%). In the rural area, mortality among children under 1 year of age is higher than in the city, one of the reasons is the lack of qualified medical personnel, and the low level of medical care provided.

In terms of districts, the highest infant mortality rates in 2018 were observed in Balkhash (15.7%), Karatalsky district (12 %) and Tekeli district (10.8%), the lowest – in Enbekshikazakh district (5.2 %) and the cities of Taldykorgan (5.4%) and Kapshagay (5.3 %).

An important key demographic indicator of QOL is indicators of the mechanical movement of the population. In the Almaty region in the period of 1999-2018, the demographic structure of the population was also affected by migration processes. From 1999 to 2003, the negative balance of migration remained in the region, as well as throughout the republic. Only from 2004 to 2013 the number of arrivals in the region exceeded the number of departures. And, only in the last 7 years, the outflow of the population from the region again exceeds its inflow. For urban areas, a negative migration balance is characteristic, and for rural areas, the balance is positive. Almost all districts of the region are characterized by the migration decline.

Migration processes taking place in the Almaty region are mainly characterized by the outflow of the population from small and medium-sized towns and rural settlements of the region. Almaty is a kind of “magnet”, where the working age population from the regions is attracted, mainly the arrived population “settles” in the Zhambyl, Ili, Karasai and Talgar districts, where the migration balance is positive. This is due to the fact that there is a demand for labor, as well as better living conditions and developed infrastructure, which also attracts residents of the districts (Figure 6).

The characteristic of the migration mobility of the population of the Almaty region is a significant influx of returnees from China, Mongolia, Uzbekistan, Kyrgyzstan and others. The balance of external migration is positive and was 542 people in 2018, 74% of the arrivals were in Zhambyl and Enbekshikazakh districts. The bulk of immigrants (up to 90%) are people of working age.

4 Conclusions

The study of the development of demographic indicators of the quality of life of the population of the Almaty region was based on the formed geodatabase by using GIS technologies, which allowed for a spatial analysis of demographic processes in the context of the districts of regions in dynamics from 1999 to 2018. The geodatabase includes the key demographic indicators of the QOL of districts of Almaty region, on the basis of which integrated, synthetic cartographic models of the development of demographic processes are created. The results of the analysis of demographic indicators of the Almaty region made it possible to identify their differentiation according to structural, territorial and temporal aspects.. High birth rates are observed in Karasai and Ili districts (over 30%) as well as in most towns of the region. The mortality rate in the region for the studied period is reduced by more than 2%. The lowest mortality rates are in Karasai and Zhambyl districts (more than 5%). An increase in natural growth is characteristic of Karasai, Ili, Enbekshikazakh districts. The region is characterized by one of the lowest infant mortality rates in the republic (in 2018, 7.0%). Most districts of the Almaty region are characterized by a negative migration balance, except for Karasai, Ili, Talgar, and Zhambyl districts.

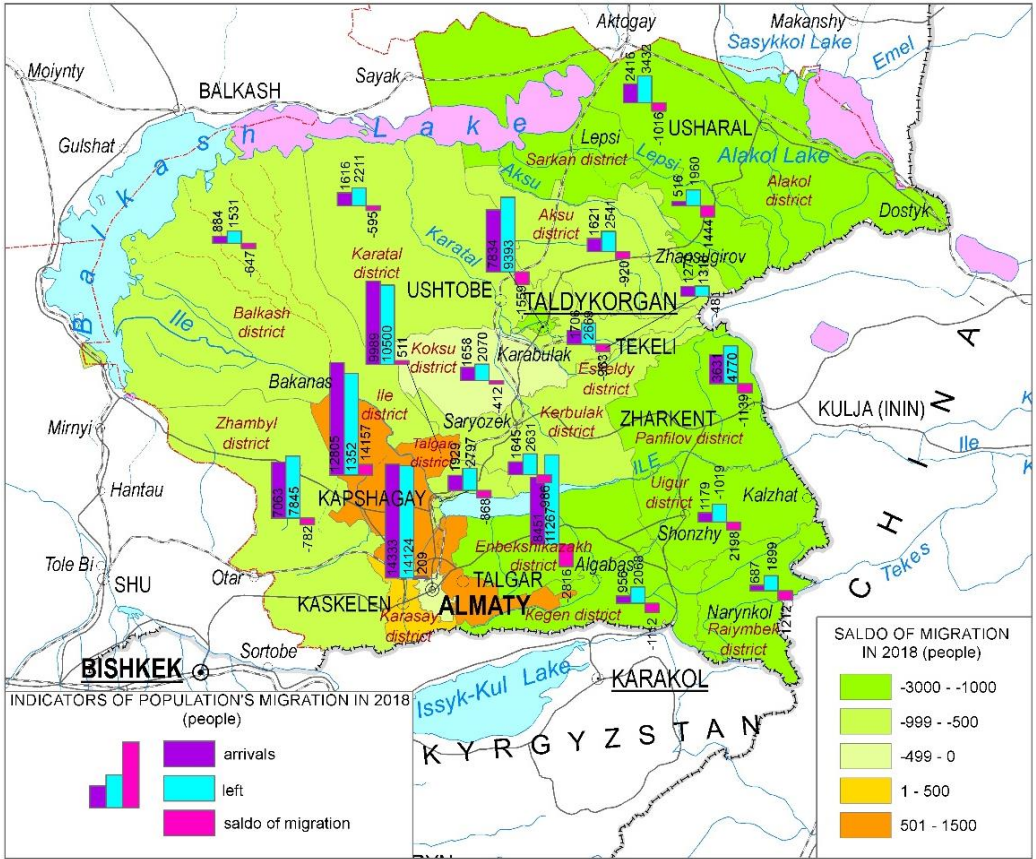


Fig.6. Migration movement of the population of Almaty region

As a result of research, a group of districts was identified, in which key indicators of the quality of life of the population are characterized by a positive trend. These are the areas forming the suburban zone of the Almaty agglomeration – Karasai, Ili, Talgar and Zhambyl districts, as well as the city of Tal'dykorgan.

A group of districts of the Almaty region with low demographic potential was identified, which is characterized by a negative migration balance, high mortality, including infant mortality, and low birth rates. This group can include Aksu, Sarkand, Alakol, Kerbulak, Eskeldinsky and Rayymbek districts. The city of Tekeli stands out especially in this group, in which from 1999 to 2009, the depopulation was recorded i.e. negative natural growth. The city has the highest mortality rate in the region (11.8 %) and the lowest birth rate.

The identification of regions with low demographic potential is necessary for the adoption of comprehensive regional policy measures to reduce territorial disparities and improve the demographic indicators. The application of geoinformation technologies in such studies allows updating and actualizing current statistical information, identifying regional imbalances, determining growth and risk zones, and conducting operational monitoring of districts to manage demographic processes for the sustainable development of the regions

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