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Forecasts and demographic development of the population of Fergana Valley regions of Uzbekistan until 2040

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Abstract. The world's population is growing rapidly and today exceeds 7.8 billion people. World population growth is expected to slow down slowly in the future. A decade ago, the world's population increased by 1.24 percent; today it is 1.1 percent, an increase of 83 million a year. The world's population is expected to reach 8.6 billion by 2030. (UNFPA 2015). This

creates a regional imbalance between population growth and the development of employment, production and social infrastructure. Information is needed on the creation of new jobs in the regions, for planning the construction of preschool institutions, schools, higher and secondary specialized educational institutions, how many children will be able to attend preschool institutions in the future, how many children will reach school age and how many children will be transferred to specialized secondary and higher education, how much the labor force will increase. The population of Uzbekistan is constantly growing. From 1991 to 2020, the country's population increased by 1.7 times. For comparison: during this period, the population of neighboring Kyrgyzstan increased by 1.3 times, the population of Kazakhstan – by 1.02 times, the population of Tajikistan – by 1.5 times, the population of Turkmenistan – by 1.4 times. During the years of independence in Uzbekistan, special attention was paid to demographic issues based on the population and the human factor, the principles of a healthy mother and a healthy child. The course of demographic processes changes in accordance with the natural, socio-economic geographical conditions of the regions (Tojiev Z. N. 2019). The Fergana Valley is the most densely populated region of Uzbekistan with a small territory, a large demographic load and the largest demographic potential (Abdullaev O. 2000). Land resources with limited, high demographic pressure require research aimed at identifying, predicting and preventing future adverse events specific to the development of demographic processes in the regions of the valley. The article makes a forecast for 2025–2040 and draws conclusions using the method of age shift of the population of regions, districts and cities of the Fergana Valley, demographic regions and gender and age composition.

Ключові слова: *population, population forecast, demographic processes, age shift method, Fergana Valley regions, demographic regions.*

Прогноз щодо демографічного розвитку населення регіонів Ферганської долини Узбекистану до 2040 року

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Анотація. Населення світу стрімко зростає і на сьогоднішній день перевищує 7,8 мільярдів осіб. Очікується, що у майбутньому зростання світового населення буде поступово уповільнюватися. Десять років тому населення світу збільшилося на 1,24 відсотка; сьогодні це 1,1 відсотка, що на 83 млн більше на рік. Очікується, що населення планети досягне 8,6 млрд до 2030 року (ЮНФПА 2015). Це створює регіональний дисбаланс між зростанням населення та розвитком зайнятості, виробництва та соціальної інфраструктури. Потрібна інформація про створення нових робочих місць у регіонах, для планування будівництва дошкільних закладів, шкіл, вищих та середніх спеціалізованих навчальних закладів, скільки дітей зможуть відвідувати дошкільні заклади в майбутньому, скільки дітей досягне шкільного віку і скільки дітей переведеться до середньої та вищої спеціальної освіти, наскільки збільшиться робоча сила. Населення Узбекистану постійно зростає. З 1991 по 2020 рік населення країни зросло в 1,7 рази. Для порівняння: за цей період населення сусіднього Киргизстану зросло в 1,3 рази, населення Казахстану – у 1,02 рази, населення Таджикистану – у 1,5 рази, населення Туркменістану – у 1,4 рази. За роки незалежності в Узбекистані особлива увага приділялася демографічним питанням, що ґрунтуються на кількості населення та людському факторі, принципах здорової матері та здорової дитини. Хід демографічних процесів змінюється відповідно до природних, соціально-економічних географічних умов регіонів (Тоджєва З. Н. 2019). Ферганська долина – найбільш густонаселений регіон Узбекистану з невеликою територією, великим демографічним навантаженням та найбільшим демографічним потенціалом (Абдуллаєв О. 2000). Земельні ресурси з обмеженням, високим демографічним тиском потребують досліджень, спрямованих на виявлення, прогнозування та запобігання майбутнім несприятливим подіям, характерним для розвитку демографічних

процесів у регіонах долини. У статті зроблено прогноз на 2025–2040 роки та зроблено висновки з використанням методу вікових змін населення регіонів, районів та міст Ферганської долини, демографічних регіонів та щодо статеві-вікового складу.

Ключові слова: населення, прогноз населення, демографічні процеси, метод вікових змін, регіони Ферганської долини, демографія регіонів.

Introduction.

Demographic processes, population and dynamics, changes in its composition and territorial location determine its future status. Population forecasting plays an important role in the creation of new jobs, housing, kindergartens, schools, hospitals and other similar construction and material needs, as well as in the development, planning and territorial organization of production and infrastructure. In his address to the Oliy Majlis, President Shavkat Mirziyoyev said: “Fifth, employment and support for entrepreneurship will be in the spotlight. To this end, next year the vocational education system will be reformed on the basis of new approaches in accordance with the requirements of the labor market and international standards” (Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the Oliy Majlis // Xalq suzi, 2020. December 30. No 276 (7778)). It is important to predict changes in population, age and gender composition in the coming years.

The first demographic forecasts in Uzbekistan were developed under the leadership of M. K. Karakhanov in 1962–1980 (Karakhanov M., Kayumov A., 1984). In subsequent years, on these issues, R. N. Ubaydullaeva, O. B. Ata-Mirzaev (Ata-Mirzaev O.B., 1979), A. A. Kayumov, M. R. Burieva (Buryeva M. R., 2001), S. S. Zokirov, Z. N. Tojjeva (Tojjeva Z. N., 2002), H. H. Abduramanov (Abdurakhmonov K., Abduramanov H., 2011), R. B. Kadirov and others.

Research method.

Several methods are used in population forecasting, which vary in accuracy. Methods such as extrapolation, logical curves, age shifts are widely and effectively used (Valentey D. I., Kvasha A. Ya., 1989; EUROPEAN UNION, 2021; Isokova T., Khodjakulov H., 2004; Kayumov A. A., Yakubov O., 2011; Shryork, Henry S. 1976).

The following 3 formulas are often used to estimate the population using the extrapolation method:

1. The following formula is given in **the arithmetic method**:

$$P_n = P_0 (1 + nr) \quad (1)$$

R in this formula is determined using the following formula:

$$r = \frac{(Pn - P_0)}{n * P_0} \quad (2)$$

2. The following formula is used in the **geometric method** of population forecasting:

$$P_n = P_0 (1 + r)^n \quad (3)$$

The value r in this formula is determined using the following formula:

$$r = \sqrt[n]{\frac{P_0}{P_n}} - 1 \quad (4)$$

3. In the exponential method, the following formula is given:

$$P_n = P_0 p^m \quad (5)$$

In this formula r:

$r = \ln(P_n / P_0) / n$ is determined using the formula;

here: P_n = Number of population in the forecast year;

P_0 = Population in the current year;

n = difference between current year and forecasted year;

r = population growth rate;

In determining r, P_0 is the population in the initial year;

P_n - population in the current year;

P_{0-} is the population in the initial year;

n – is the difference between the starting year and the current year.

Forecasting the population using **the age shift method**, taking into account changes in demographic processes, allows to draw clear conclusions. In this case, the future population is determined using the following formula:

$$L_x x P_x = L_{x+1} \quad (6)$$

Here: L_x - x is the number of people who can live up to the age; $P_x - x + 1$ is the coefficient of probability to survive up; $L_{x+1} - x + 1$ is the number of people who can live up.

Therefore, the population at each age (L_x) is shifted from one age (L_x) to another age ($L_x + 1$) using the coefficient of probability (P_x) that each age can be achieved. In most cases, projections are made in the 5 or 10 year old age group.

Results and discussion.

In this study, forecasts for 2025, 2030, 2035 and 2040 were made at the district and city levels for the population of the country and the regions of the Fergana Valley by five-year age groups. It is based on indicators of population, birth and death rates in 2015–2020.

During the years of independence, Uzbekistan has had its own demographic development. Regions of the country have regional differences in terms of demographic development and population share. Territorial differences between regions are associated with their geographic location, natural conditions,

socio-economic development. Thus, a relatively high demographic potential is observed in the ancient Samarkand, Kashkadarya, Fergana and Andijan regions. On the contrary, most of its territory consists of deserts, and the lowest population growth rates are observed in the Syrdarya, Jizzakh and Navoi regions, which are the last among the regions of the country. This can be assessed as a significant inconvenience for the living conditions of the desert population. Consequently, the demographic potential of these regions is also low (Tojiev, 2010).

The unfavorable, difficult ecological situation for the population of the Lower Amu Darya also leads to a negative balance of population migration, the spread of diseases and illnesses. Despite the high birth rate and natural increase, the demographic potential of the region's population is declining.

The level of urbanization, high employment, the level of industrial development, as well as the location of the capital are the main factors of the low rates of natural population growth in the Tashkent region.

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of the capital are the main factors of the low rates of natural population growth in the Tashkent region.

In general, the current demographic processes in the country in the future will reduce the demographic potential of the population due to the unfavorable environmental situation in the Lower Amudarya region, unfavorable natural conditions in the Syrdarya, Jizzakh and Navoi regions. In addition, high fertility and low natural growth in the Tashkent region as a result of such factors as high urbanization and industrial development are important factors in reducing the demographic potential (Temirov, 2018).

In the central and southern regions of the country and in the Fergana Valley, the demographic potential will continue to grow. In other words, in the future, the country's population will "move" to the central, southern and eastern regions. The Fergana Valley is also expected to remain the most populous region in the country. In the first year of independence, 26.9 % of the country's population lived in the Fergana Valley. In recent years, the share of valley regions in the country's population has increased and amounted to 27.7 % in 2000 and 28.6 % in 2020.

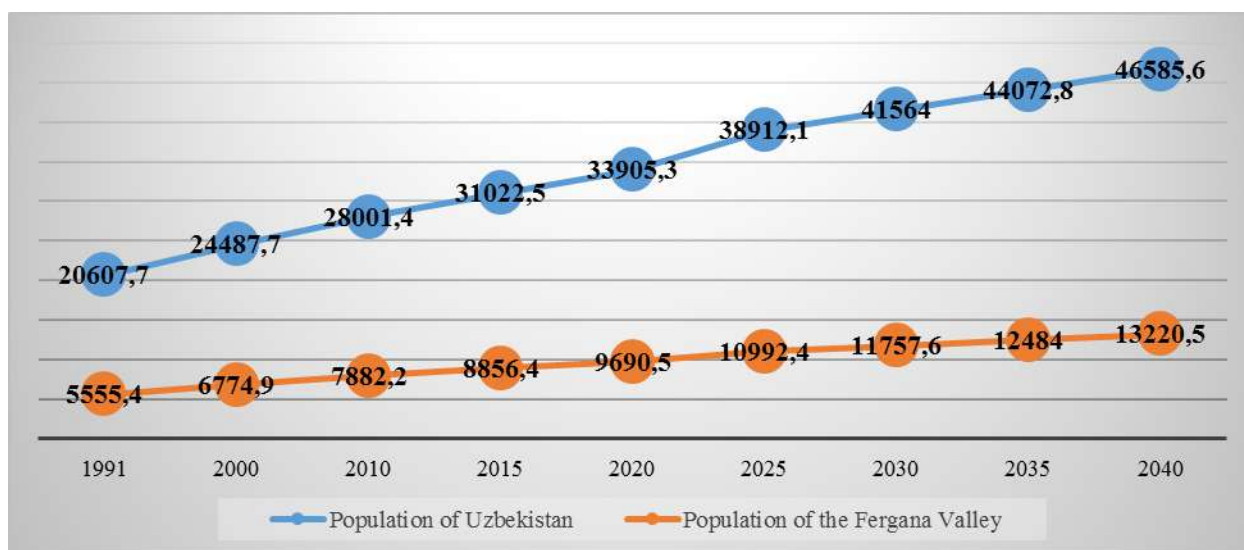


Fig. 1. Population forecast of the Republic of Uzbekistan and the Fergana Valley regions (thousand people)

According to the forecast, the valley regions' population is expected to be 28.3 % of the total country's population in 2030 and 28.4 % in 2040. Even in the forecast period, the population of the valley will hardly change in the country, and will also remain the region with the largest share in the country. (Fig. 1).

The natural increase in the urban population was lower than in the countryside. An important role is played by such factors as the complexity of the national and ethnic composition of the urban population, the high level of education of the population, the development

of industrial production, and the level of employment of women in production. The share of urban population in Uzbekistan is expected to decline from 50.6 % to 48.4 % in 2020–2040. In the Fergana Valley, a decline is projected from 57.4 % to 56.4 % (Table 1). An important factor in this is the high level of urbanization of the valleys above the national average, a small difference in the natural growth of the urban and rural population.

During the forecast period, along with the high level of urbanization in the valley regions, there are also regional differences between the regions.

Table 1. Population forecast of the Republic of Uzbekistan and Fergana valley regions (2020–2040) (thousand people)

Republic of Uzbekistan		1991	2000	2010	2015	2020	2025	2030	2035	2040
	Total	20607.7	24487.7	28001.4	31022.5	33905.3	38912.1	41564.0	44072.8	46585.6
	City	8305.2	9165.5	14425.9	15748.0	17144.2	19413.0	20542.3	21557.0	22546.1
	Village	12302.5	15322.2	13575.5	15274.5	16761.1	19499.1	21022.7	22515.8	24039.5
Andijan region	Total	1789.0	2186.2	2549.1	2857.3	3127.7	3447.5	3708.9	3960.2	4219.0
	City	574.7	657.6	1358.4	1499.9	1633.9	1785.8	1905.3	2014.7	2125.7
	Village	1214.3	1528.6	1190.7	1357.4	1493.8	1661.7	1803.6	1945.5	2093.3
Namangan region	Total	1551.8	1924.3	2258.5	2554.2	2810.8	3258.8	3493.5	3713.9	3933.6
	City	591.3	722.6	1458.8	1618.8	1815.2	2098.0	2247.7	2377.4	2504.9
	Village	960.5	1201.7	799.7	935.4	995.6	1160.8	1245.8	1336.5	1428.7
Fergana region	Total	2214.6	2664.4	3074.6	3444.9	3752.0	4286.2	4555.1	4809.9	5068.0
	City	686.2	776.1	1802.6	1965.9	2117.6	2406.0	2555.1	2693.6	2827.8
	Village	1528.4	1888.3	1272.0	1479.0	1634.4	1880.2	2000.0	2116.3	2240.2
Fergana Valley	Total	5555.4	6774.9	7882.2	8856.4	9690.5	10992.4	11757.6	12484.0	13220.5
	City	1883.3	2156.2	4619.7	5084.7	5566.7	6289.7	6708.1	7085.7	7458.4
	Village	3672.1	4618.7	3262.5	3771.7	4123.8	4702.7	5049.5	5398.3	5762.1
The weight of the Fergana region	Total	26.9	27.7	28.1	28.5	28.6	28.4	28.3	28.3	28.4

The table was prepared by the author based on the data of the Statistical Committee of the Republic of Uzbekistan.

In particular, Andijan region, which has the lowest level of urbanization among the valley regions, will decrease from 52.2 % to 50.4 % in 2020–2040, and Namangan region, which has the highest level of urbanization, will decrease from 64.6 % up to 63.7 %. The main factor is the decrease in urbanization in the Andijan region by 1.8 %, the high natural growth of the rural population, while in the Namangan region there is no significant difference between the high natural growth of the urban population and the natural growth of the rural population. In the Fergana region, a decrease in the level of urbanization is expected from 56.4 % to 55.8 % in the forecast period. Natural population growth in the Fergana region is low compared to neighboring regions.

Regional differences in the rates of natural population growth in the valleys will lead to a decrease in the proportion of the population in the Andijan and Fergana regions and an increase in the proportion of the population in the Namangan region, which has a high population growth rate.

The growth of the population of the Fergana Valley leads to a change in its sex and age composition. In particular, low fertility leads to a decrease in the

proportion of young people in the population, and low mortality and, accordingly, an increase in life expectancy leads to an increase in the proportion of older people in the age group. In the forecast years, the share of the population of the valleys at the age of 0–15 is expected to decrease, i. e. to working age from 29 % to 25.5 % (Fig. 2).

In addition, low mortality and an increase in life expectancy will lead to an increase in the proportion of retirement age from 10 % to 16.9 %. The share of the working-age population decreased from 60.6 % to 57.6 %. Such changes in the age structure of the population mean that in the future there will be an increase in the demographic pressure of children and the elderly per 100 people of working age. According to the analysis, for every 100 people of working age in 2020, there were 47.9 children under the age of 15 and 17.1 people of retirement age with a total demographic pressure of 65.0, while in 2030 this figure is going to be 49.6 and 25 people, respectively, the total amount is in 2040 is 74.7, 44.3 and 29.3, 73.6. Demographic pressures in the valleys are expected to intensify in the future, and the ratio between children under 15 and retirement age will also change. This is important when planning future material production.



Fig. 2. Forecast of age changes in the population of the Fergana Valley NOTE in grey “ over working age ‘ not “over “

Demographic pressures also have regional differences between the regions of the valley, where the development of demographic processes is different (Table 2).

Table 2. Growth of demographic pressure in the Fergana Valley due to the working age population

Regions of the Fergana Valley	2020				2030				2040			
	Andijon	Namangan	Fergana	Regions of the Fergana Valley	Andijon	Namangan	Fergana	Regions of the Fergana Valley	Andijon	Namangan	Fergana	Regions of the Fergana Valley
Young people of 0–15 years	49.0	48.4	46.8	47.9	51.6	50.3	47.3	49.6	46.1	44.4	42.8	44.3
Retirement age	17.1	15.9	18.0	17.1	24.3	24.0	26.7	25.1	28.4	28.2	30.9	29.3
Total	66.0	64.3	64.7	65.0	75.9	74.3	74.0	74.7	74.5	72.7	73.7	73.6

The table was calculated by the author on the basis of data from the Statistics Committee of the Republic of Uzbekistan

In particular, Andijan region is characterized by high demographic pressure in the valley. Factors such as high birth rates in rural areas, high population density, negative migration balance can be considered as important factors in the high demographic pressure in Andijan region. In Andijan region, the demographic pressure of children under 15 years of age in 2020–2040 is high, while in Fergana region, where the birth rate is low, the demographic pressure of the population of retirement age is high.

The gender composition of the population also plays an important role, taking into account the future development of demographic processes. The sex composition of the Fergana Valley is expected to be

higher in the future. According to the analysis, in 2020, men made up 50.6 percent of the total population in the valley regions, up from 51.8 percent in 2030 and 51.4 percent in 2040. In 2020, most men will be under the age of 44, and after 2030, this figure is expected to reach 64. The key factor here is the reduction in the mortality rate of men in different age groups. Accordingly, the gap between the average life expectancy of men and women is narrowing. The decline in the proportion of women in the total population, especially in the 15 to 49 age group, also affects marriage and fertility. In the Fergana Valley, the proportion of women of childbearing age in 2020 was 26.3 %, while according to the analysis, this figure is expected to be 23.7 % and 23.4 % in 2030. In

the Fergana Valley, the proportion of women aged 15–49 in the total population will decrease, as well as the proportion of women in the total population, which in the future will lead to a decrease in the birth rate and natural population growth.

The steady growth of the population of the Fergana Valley, the growth of population density in the region leads to the aggravation of a number of related social problems. The Fergana Valley is one of the most densely populated regions of the country. In 2020, the population density in Uzbekistan will be every km.sq. On average, 523.0 people in the Fergana Valley, 727.4 people in the Andijan region, 377.8 people in the Namangan region and 555.0 people in the Fergana region. In the future, as the population of the regions of the valley increases, its density will also increase.

Natural and climatic conditions in the distribution of the population are a key factor in the emergence of territorial differences. The distribution of the population of the valley regions is also influenced by natural and climatic conditions, as well as the state of urban planning and socio-economic development of regions and other factors. This led to differences in the location of the regions of the valley, its density and the demographic potential of the regions. In the regions of the Fergana Valley, the territorial distribution of the population was divided into demographic regions based on regional differences in demographic processes (Temirov, 2020) (Fig.3.). The course of demographic processes in these demographic regions has led to differences and fluctuations in population and demographic potential (Table 3).

Table 3. Population and share change in the demographic regions of the Fergana Valley (2020–2040)

Demographic regions	Area	2020	2025	2030	2035	2040
Northern Fergana	<u>15.4</u> 2.85	<u>22.7</u> 2201451	<u>23.3</u> 2559710	<u>23.4</u> 2749033	<u>23.5</u> 2931466	<u>23.6</u> 3114441
Central Fergana	<u>9.6</u> 1.79	<u>3.8</u> 366683	<u>3.8</u> 416740	<u>3.8</u> 447330	<u>3.8</u> 476551	<u>3.8</u> 506350
North-Western Fergana	<u>20.7</u> 3.85	<u>5.0</u> 483699	<u>5.0</u> 554193	<u>5.0</u> 588493	<u>4.9</u> 616365	<u>4.9</u> 643922
South-Western Fergana	<u>19.7</u> 3.66	<u>20.2</u> 1955012	<u>20.4</u> 2245010	<u>20.4</u> 2393836	<u>20.3</u> 2540397	<u>20.4</u> 2691137
Eastern Fergana	<u>20.0</u> 3.70	<u>30.9</u> 2996697	<u>30.0</u> 3302835	<u>30.2</u> 3553576	<u>30.4</u> 3794730	<u>30.6</u> 4042671
Southern Fergana	<u>14.5</u> 2.70	<u>17.4</u> 1687018	<u>17.4</u> 1913938	<u>17.2</u> 2025329	<u>17.0</u> 2124493	<u>16.8</u> 2222001
The total for the valley regions	<u>100</u> 18.5	<u>100</u> 9690560	<u>100</u> 10992425	<u>100</u> 11757598	<u>100</u> 12484002	<u>100</u> 13220521

The table was by the author on the basis of the data from the Statistics Committee of the Republic of Uzbekistan by the method of age.

Note: The proportion of the population in fractions and the number of people in denominators

The predominance of the Adyr region in the demographic region of the Northern Fergana is favorable for horticulture, viticulture and animal husbandry, and the demographic region has favorable natural and climatic conditions for the accommodation and residence of the population. This demographic region accounts for 15.4 % of the valley's area and 22.7 % of the population. Fertility and natural increase in the demographic region of northern Fergana are high with the valley's population projected to reach 23.4 percent in 2030 and 23.7 percent in 2040.

The demographic region of the North-Western Fergana is sparsely populated due to the presence of mountains and hills, which are inconvenient for the population and agriculture. This demographic region

accounts for 9.6 % of the territory of the Fergana Valley and only 5.0 % of the population. The unfavorable relief conditions in the region have led to low fertility, mortality and natural increase. The share of the population of the demographic region will decrease slightly in the future.

The demographic region of Central Fergana received new development and settlement in the second half of the last century. Due to the fact that the demographic region consists mainly of desert and semi-desert plains, the population is small. Although, the valleys make up about 10 percent of the province's land area, they make up 3.8 percent of the population. In the projected years, the proportion of the population of this demographic region will not change.

The demographic region of South-Western Fergana, including the western regions of the Fergana region, is located mainly in mountainous, foothill and lowland areas. The demographic region has territorial differences in the location of the population and demographic

processes. Population density, birth rate and natural increase are increasing from the west to the east of the region. This demographic region accounts for 19.7 %

of the valley's area and 20.2 % of the population. Even in the forecast period, there are almost no changes in the population of the demographic region.

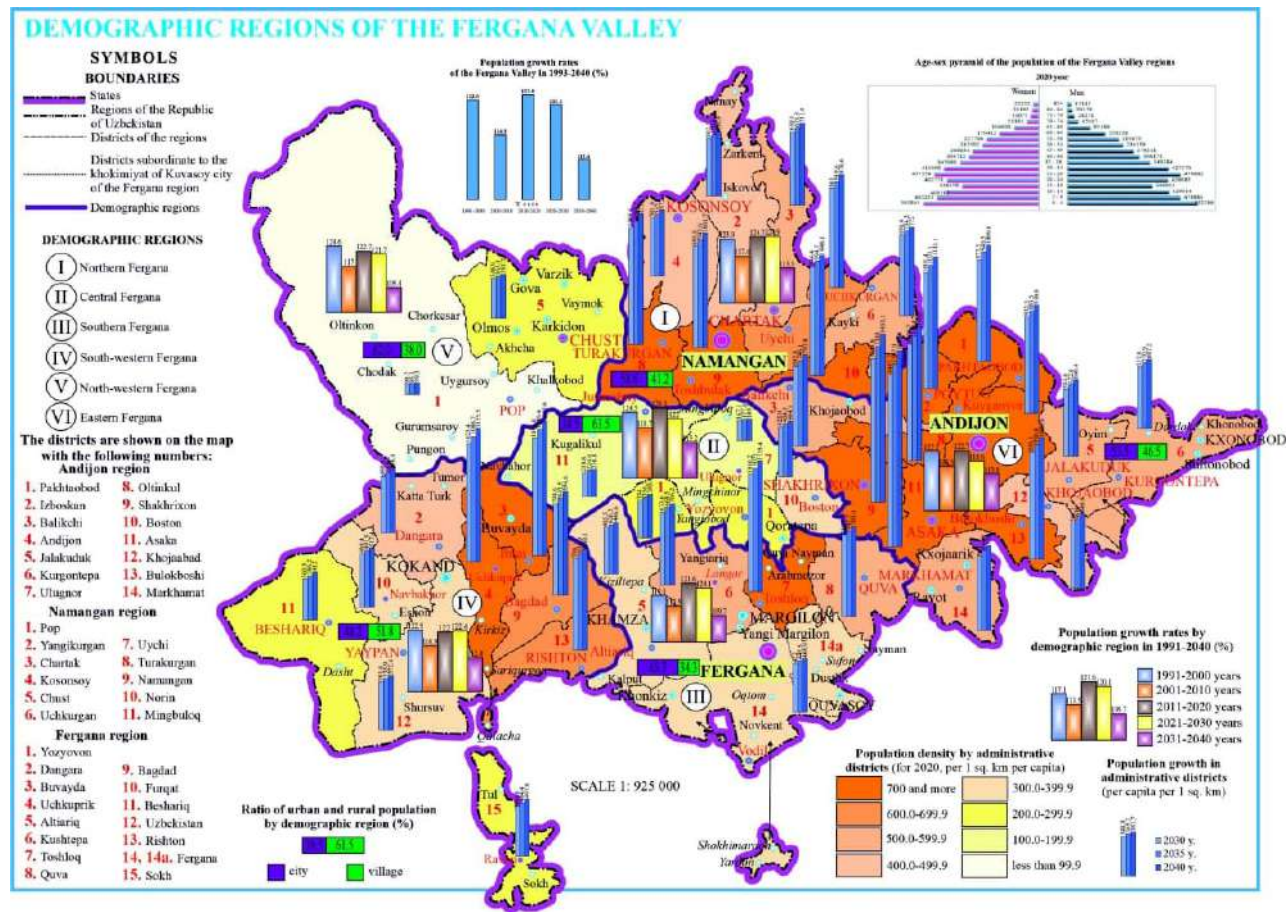


Fig. 3. Demographic regions of the Fergana Valley

Favorable natural and climatic conditions, favorable relief (hills) for the development of agriculture, good climate and good water resources are important factors of high population density in the demographic region of Eastern Fergana. Thus, this demographic region accounts for about 31 percent. In the future, the extreme population size and density will have an impact on population growth, and the region share is projected to decline.

The high level of urbanization in the demographic region of southern Fergana influenced the demographic

ic processes. Low fertility and natural growth in the future will lead to a decrease in the population of the demographic region. According to forecasts, in 2020, 17.4 percent of the valley's population will live in the region, in 2030 the population will decline to 17.2 percent, and in 2040 – to 16.8 percent.

It is known that the birth rate and natural increase in cities is lower than in rural areas. In the demographic regions of the Fergana Valley, it is easy to feel the influence of the central and large cities of the regions on demographic processes (Table 4).

Table 4. Population growth rate in the demographic regions of the Fergana Valley

Demographic regions	Level of urbanization	1991–2000	2000–2010	2010–2020	2020–2030	2030–2040
South-western Fergana	48.2	122.9	116.9	122.0	122.4	112.4
Southern Fergana	65.7	117.1	113.5	121.6	120.1	109.7
Eastern Fergana	53.5	122.2	116.5	122.7	118.6	113.8
Northern Fergana	58.8	123.9	117.4	124.7	124.9	113.3
North-western Fergana	62.0	124.6	117.0	122.7	121.7	109.4
Central Fergana	38.5	124.5	118.7	126.1	122.0	113.2
The total of the valley regions	57.4	122.0	116.3	122.9	121.3	112.4

The table was developed by the author on the basis of data from the Statistics Committee of the Republic of Uzbekistan by the method of age

In the Fergana Valley, population growth was 122 percent in 1991–2000 and declined over the next decade. The population growth rate in 2000–2010 was 116.3 %, and the decline in this period is due to the low population growth rate in 2030–2040, i. e. periodic fluctuations. Also, the level of urbanization of demographic regions affects the rate of population growth, creating a peculiar geodemographic wave.

The Southern Demographic Region has the highest urbanization and the lowest population growth rates. In 2000–2010, a decline in population growth was observed in the Eastern and South-Western demographic regions in the east and west of the southern demographic region. High population growth rates in 1991–2000 are an important factor behind high growth rates in 2010–2020. The greatest growth in this decade was observed in the demographic regions of Central and Northern Fergana. The lowest growth is expected in East Fergana in 2020–2030, and the lowest population growth is expected in North Fergana and North-West Fergana in 2030–2040. In general, in the demographic valley regions, it is expected that geodemographic waves will begin in South Fergana and end in Northern and North-Western Fergana.

Conclusion.

– According to forecasts, in the future the population of the Fergana Valley will grow and Fergana Valley will remain one of the largest regions of the country. The central and large cities of the Fergana Valley play an important role in the demographic processes of the regions. With the distance from large cities, the population density and the level of urbanization decrease and demographic processes change. Territorial differences in the natural rates of population growth in the valleys will lead to a further decrease in the population of the Andijan and Fergana regions and an

increase in the population of the Namangan region, which has a high population growth rate;

– Among the demographic regions there is a possibility of territorial organization of the population in the Central Fergana demographic region. It is advisable to carry out “internal migration” from regions with a heavy demographic burden by creating new highly profitable jobs in the central demographic region;

– Future population growth in the valley regions will lead to changes in both its age and sexual composition. The low birth rate leads to a decrease in the proportion of young people in the age structure of the population, while the low mortality rate and, consequently, the increase in the life expectancy of the population leads to an increase in the proportion of the elderly. The increase of the share of the elderly people, their biological aging leads to an increase in the burden on health care. It requires further development of sanatorium activities for the treatment and rehabilitation of the elderly;

– A decrease in the proportion of the population aged 15–59 leads to an increase in demographic pressure per 100 people of working age. This situation creates the need to create new jobs, increase employment, income and livelihoods through the placement in the future of industries of international importance;

– Periodic fluctuations in the birth rate and natural population growth in the valleys, the demographic urbanization of the region, the level of employment and education and other factors affect the rate of population growth and create a unique geodemographic wave. In the demographic regions of the Fergana Valley, geodemographic waves are expected to begin in the southern part of Fergana and end in Northern and North-Western Fergana. When planning the socio-economic development of the Fergana Valley, creating new jobs and decent living conditions for the population, it is advisable to take into account the development of demographic processes in demographic regions.

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