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THE IMPACT OF AGRICULTURE ON DEMOGRAPHIC PROCESSES IN THE GANJA-DASHKASAN ECONOMIC REGION

In the article the long-term development dynamics of agriculture, which is the main occupation of the population in the study area, especially in rural areas, and demographic processes were analyzed. Although the cities of republican subordination Ganja and Naftalan are located in this economic region, the natural growth rate in all districts of the region continuously decreased between 1990–2000. The rational organization of economic, social, and environmental conditions in the region creates the basis for the sustainable development of agriculture. Developing agriculture leads to an increase in the standard of living of people and their material well-being, which in turn affects the positive direction of demographic processes. During the observation, it was revealed that the natural growth rate has a close correlation with the physical volume index of agricultural production by farm categories. The fact that demographic processes have been particularly weak in recent years in the Ganja-Dashkasan economic region, which has the lowest population growth rate in the republic, and the negative trend in the natural growth rate in Ganja city indicate the need to take preventive measures. The overall consumption of basic food products and the corresponding agricultural production indicators in the region were compared and the development directions of agriculture were determined.

Keywords: demography, agriculture, rural, urban, natural growth rate.

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Гянджа-Дашқасан экономикалық ауданындағы ауыл шаруашылығының демографиялық процестерге әсері

Мақалада зерттеліп отырған аумақтағы, әсіресе ауылдық жерлерде халықтың негізгі жұмыспен қамту саласы болып табылатын ауыл шаруашылығының ұзақ мерзімді даму үрдістері, сондай-ақ демографиялық процестер талданды. Экономикалық өңірге республикалық маңызы бар Гянджа және Нафталан қалалары кіргеніне қарамастан, өңірдің барлық аудандарында 1990–2000 жж. аралығында табиғи өсім коэффициентінің тұрақты төмендеуі байқалды. Өңірдегі экономикалық, әлеуметтік және экологиялық жағдайларды ұтымды ұйымдастыру ауыл шаруашылығының тұрақты дамуының негізін қалыптастырады. Аграрлық сектордың дамуы халықтың өмір сүру деңгейін және оның материалдық әл-ауқатын арттыруға ықпал етіп, өз кезегінде демографиялық процестерге оң әсерін тигізеді. Бақылау нәтижелері бойынша табиғи өсім коэффициентінің шаруашылық санаттары бойынша ауыл шаруашылығы өндірісінің физикалық көлем индексімен тығыз корреляциясы анықталды. Соңғы жылдары республика бойынша халық санының ең төменгі өсімі тіркелген Гянджа-Дашкесан экономикалық өңіріндегі демографиялық процестердің аса баяу динамикасы, сондай-ақ Гянджа қаласында табиғи өсімнің теріс үрдісінің байқалуы алдын алу шараларын қабылдаудың қажеттілігін көрсетеді. Мақалада, сондай-ақ өңірдегі негізгі азық-түлік өнімдерін тұтыну көлемдері ауыл шаруашылығы өндірісінің сәйкес көрсеткіштерімен салыстырылып, аграрлық секторды дамытудың бағыттары айқындалды.

Түйін сөздер: демография, ауыл шаруашылығы, ауыл, қала, табиғи өсім.

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Влияние сельского хозяйства на демографические процессы в Гянджа-Дашкесанском экономическом районе

В статье проанализированы долгосрочные тенденции развития сельского хозяйства, являющегося основным видом занятости населения исследуемой территории, особенно в сельских районах, а также демографические процессы. Несмотря на то, что в данный экономический

регион входят города республиканского подчинения Гянджа и Нафталан, во всех районах региона наблюдалось непрерывное снижение коэффициента естественного прироста в период 1990–2000 гг. Рациональная организация экономических, социальных и экологических условий в регионе формирует основу для устойчивого развития сельского хозяйства. Развитие аграрного сектора способствует повышению уровня жизни населения и его материального благосостояния, что, в свою очередь, положительно влияет на демографические процессы. В ходе наблюдений выявлено, что коэффициент естественного прироста имеет тесную корреляцию с индексом физического объема сельскохозяйственного производства по категориям хозяйств. Тот факт, что в последние годы демографические процессы в Гянджа-Дашкесанском экономическом регионе, где зафиксированы самые низкие показатели прироста населения в республике, проявляют особенно слабую динамику, а в городе Гянджа отмечается отрицательная тенденция естественного прироста, указывает на необходимость принятия превентивных мер. В статье также сопоставлены объемы потребления основных продуктов питания с соответствующими показателями сельскохозяйственного производства в регионе и определены направления развития аграрного сектора.

Ключевые слова: демография, сельское хозяйство, село, город, естественный прирост.

Introduction

Demographic trends such as urbanization, changes in family structure, aging, migration, fertility are a complex process that largely depends on socio-economic development, cultural and political processes, environmental protection, and social stability (Danan Gu, 2021:605). Forecasting population trends and expected demographic changes is of particular importance for addressing current issues and implementing national development plans (O'Sullivan, 2023:547). One of the main issues to direct its development in a positive direction in the region is the implementation of sustainable agricultural development mechanisms. One of the factors preventing population growth in developing countries is the unsustainable development of agricultural production (Rafael, 2023:157). Ensuring the dynamic development of agriculture in modern conditions is connected with the adoption of innovations in this field. Innovations play a key role in increasing productivity and expanding the production of competitive products based on the renewal of the technical, technological and organizational foundations of production in the agrarian sector of the economy (Fikretzade, 2022:10). Innovative development of agriculture, in connection with solving sustainable development issues, primarily creates favorable opportunities for the protection and efficient use of land and water resources in the agricultural sector, leading to a gradual increase in the share of processed products that create higher added value in global exports of agricultural and food products. Through the implementation of the Strategic Road-

map for 2016–2020, it is envisaged to implement 9 strategic goals to create a favorable environment in terms of achieving the formation of a competitive agricultural production and processing sector based on the principles of sustainable development in the country. These strategic goals encompass the concept of socio-economic development of the regions and are closely linked to factors affecting the improvement of well-being in the regions, including rural areas ("Strategic Roadmap for the Production and Processing of Agricultural Products in the Republic of Azerbaijan", 2016: 19).

Materials and methods

The Ganja-Dashkasan economic region covers an area of 5.27 thousand square kilometers. This region, which accounts for 6% of the country's territory and population, is one of the 14 economic regions of Azerbaijan. It consists of the republican cities of Ganja and Naftalan, and Goranboy, Samukh, Goygol and Dashkasan districts (fig.1).

Data from the State Statistics Service of the Republic of Azerbaijan such as Statistical collection of Azerbaijani agriculture, demographic indicators, household and labor market were widely used in the study. Mathematical statistical, functional and comparative methods were chosen as the research method. The study assessed demographic indicators in a variety of ways. The main goal is to identify the relationship between the current demographic processes and the development of agriculture in the region, which is the main type of activity.

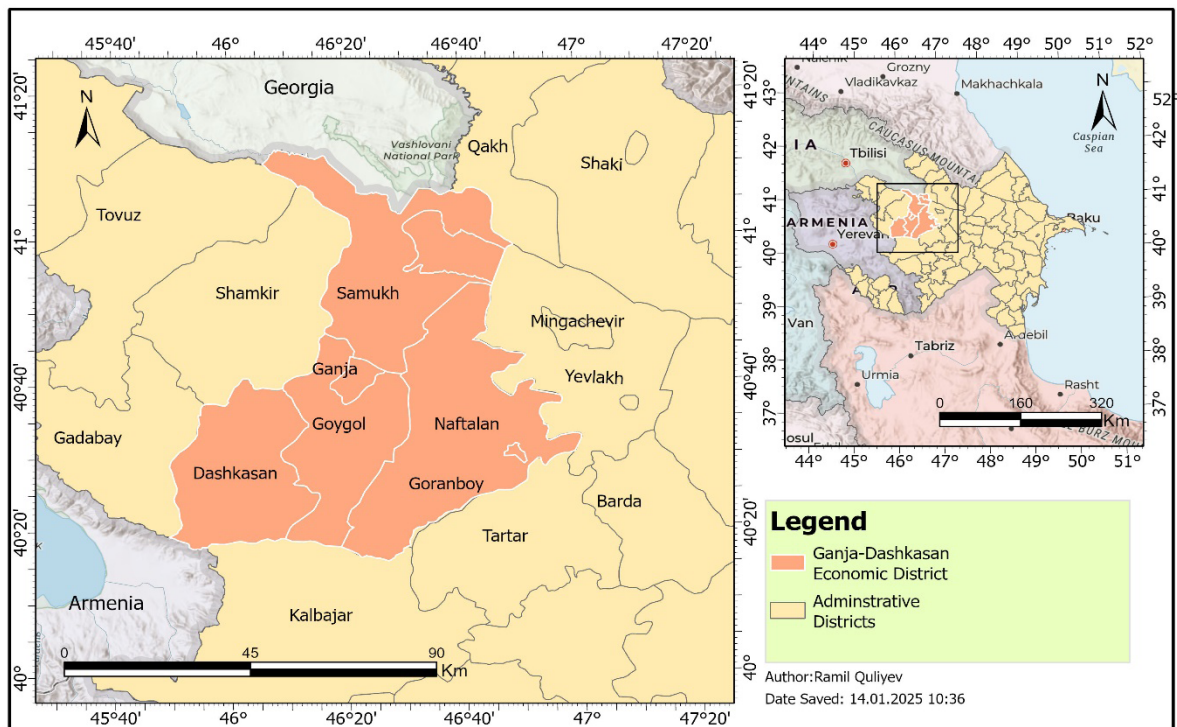


Figure 1 – Map of the study area

Analysis and discussion

The main demographic problems of the regions in the modern era are the low natural growth rate, the weak growth rate, and the strengthening of the urbanization process, which is directly related to the development of agriculture, which is the main labor-

intensive sector. In the study area, in administrative territorial units with urban and rural populations, as of 2024, 66% of the total population is rural, and 34% is urban (Fig.2.). The 5% change in this indicator in favor of the urban population compared to the 1990s can be explained as a result of urbanization or a weak growth trend in the rural population.

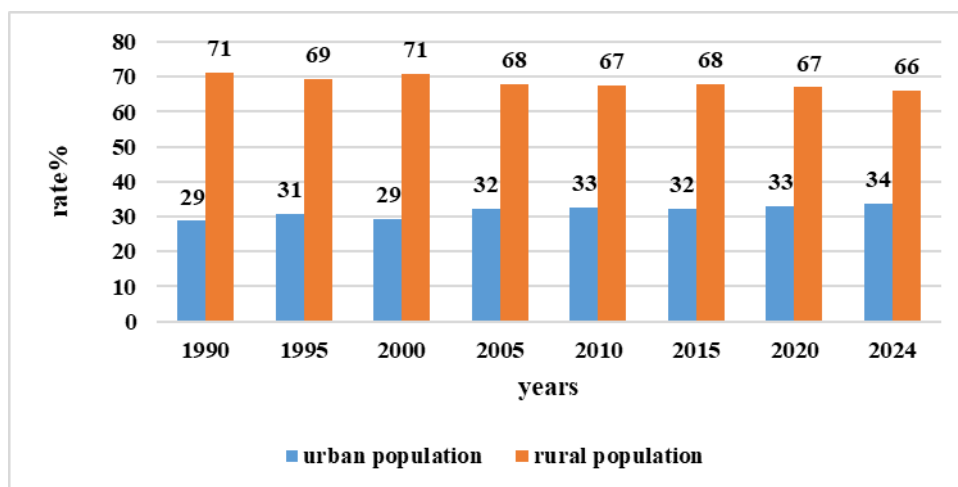


Figure 2 – Growth rate of urban and rural population of Ganja-Dashkasan region(%)

In modern times, the agricultural sector plays a significant role in terms of increasing socio-economic development only in countries with a low level of development. In countries where relevant industrial and service sectors are developed or have a targeted development strategy in these areas, agriculture is primarily a means of ensuring food security, employment, and partly a means of diversifying exports (Blakeney, 2022:16). The

downward trend in employment and demographic processes in agriculture in the regions also necessitates the continuation of research in this direction. Thus, in the study area, the ratio of the population employed in agriculture, forestry and fishing activities to the total number of employed people continues to decrease in 2018-2023. This indicator has decreased by 3% in the last 5 years (Table 1.).

Table 1 – The number of employed population in agriculture, forestry and fishing activities of the region (cities and districts), thousand people

Years	2018	2019	2020	2021	2022	2023	2024
Number of people employed in agriculture in the region	92,3	93,5	75,1	72,9	74,8	75,8	77,1
Ganja city	24,7	24,5	13,7	12,7	13	13,2	13,3
Naftalan city	0,9	1,1	0,4	0,4	0,4	0,4	0,4
Dashkasan district	8,2	8,4	8	7,9	8,1	8,2	8,3
Goranboy district	25,6	26	24,5	24,1	24,7	25,0	25,5
Goygol district	16,4	16,8	14,5	14,2	14,6	14,8	15,1
Samukh district	16,5	16,7	14	13,6	14	14,2	14,5
Total employed population	311,2	313,4	274	268,6	276,2	280,7	285,1
Percentage in total	29	30	27	27	27	27	27

Source: “Labor market” statistical collection 2024

Currently, the share of agriculture in total employment in the region is 27% (“Labor market 2024”: 125). For comparison, this indicator for the republic was 39.1% in 2000 and 36.4% in 2015 (“Strategic Roadmap for the Production and Processing of Agricultural Products in the Republic of Azerbaijan”, 2016: 26).

The low level of wages of the employed population operating in the agricultural sector is due to the widespread use of the extensive method of production in this sector, which creates a small amount of added value for the products produced (Khalilov, 2020:16). The diversification of various structures of agriculture, the establishment of mutual relations, and the expansion of other production and service sectors is an economic and social process that serves to increase employment in rural areas and, as a result, encourages demographic processes to move in a positive direction. The Ganja-Dashkasan economic region lags behind other economic regions in terms of natural growth rate, with the exception of the Absheron-Khizi economic region. Although the cit-

ies of republican subordination Ganja and Naftalan are located in this economic region, the decreasing trend in the natural growth rate is characteristic not only of this region, but also of other regions of our country. The collapse of the Soviet Union in 1991 led to the severe consequences of the restructuring of the economic and social spheres in most post-Soviet countries, both in economic indicators and demographic processes (Ryazantseva, 2021:519). As a result of the analysis of the demographic situation of the study area over the last 30 years (1990-2023), it was determined that the natural growth rate in all districts of the region continuously decreased between 1990-2000 (Fig. 3.). It can be observed from the data that the highest natural growth rate coincides with the period before independence. Between 2000-2005, natural growth was observed in all administrative territorial units, except for Dashkasan district. Although Dashkasan district joined this trend between 2005-2010, stability prevailed in Ganja city. In 2010-2015, there was an increase in Samukh district, a decrease in Dashkasan district,

and stagnation continued in other administrative territorial units. In 2014-2021, a decrease was observed in the entire economic region, and in 2021 it reached its peak in the last 30 years. In 2021-2022, the process of returning to growth has begun to develop. In general, it has not been possible to reach the natural growth rates between 1990-1996 to this day. For comparison, it can be said that in 2020-21, the average natural growth rate for the total territory

decreased by at least 3 times compared to 1990. In addition, the fact that the Second Karabakh War and Covid-19 pandemic coincided with these periods did not remain without an impact on the development of these processes. In Ganja, the second largest city of the country, which accounts for 55% of the population of the economic region, it can be observed that there was no natural growth, but rather a decrease, in the corresponding periods.

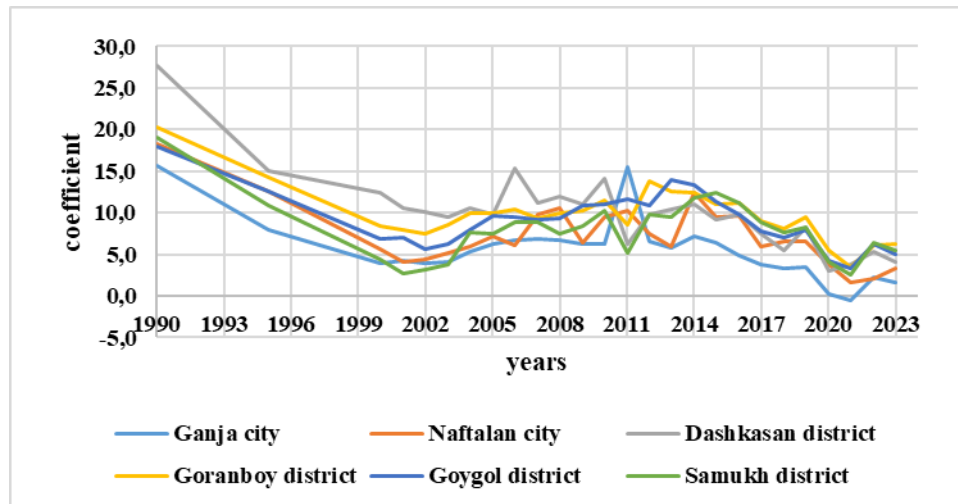


Figure 3 – Natural growth rate per 1000 people of the population

The growth rate of the permanent population in the region over the past 20 years (1999-2019) was 11%. For the same period before that (1979-1999), this growth was 23% (Table 2). The growth rate in the last 20 years was 10-11.8% in Ganja and Naftalan cities, 8.2% in Dashkasan, 10.6% in Goranboy, 18.6% in Goygol, and 14.7% in Samukh. Thus, Ganja was one of the 7 regions with the slowest population growth rate in 2000-2020. The urban population increased by only 10% over 20 years. However, the average for the country was 26%, the highest was 135% (in Absheron district), and close to 30% in Baku city. Compared to other economic regions, the growth rate in this region has always been low and continues to decline (Fig. 4.). The trend is of global importance. The world population continues to grow, but the growth rate is developing at a low pace. Thus, the latest UN reports predict that the world population will be 8.5 billion in 2030, 9.7 in 2050, and 10.4 billion in 2100 (World Population Prospects 2022:).

According to the situation in the first months of 2024, the total population of the region is 597.8 thousand people, of which Ganja city has 330.7 thousand people, Naftalan city has 8.6 thousand people, Dashkasan district has 33.3 thousand people, Goranboy district has 101.8 thousand people, Goygol district has 64.8 thousand people, and Samukh district has 58.6 thousand people.

The fact that the population growth rate in the study area is consistently low compared to other regions provides a basis for a new research study and necessitates conducting mutual social, economic, and political analyses with other regions. When analyzing the districts of the region separately, relatively high demographic indicators over the past 35 years fall on the share of Goygol and Samukh regions. Goranboy and Dashkasan regions lag behind these regions by at least 2-3 times in terms of the growth rate of both urban and rural populations, respectively (Fig. 5, 6).

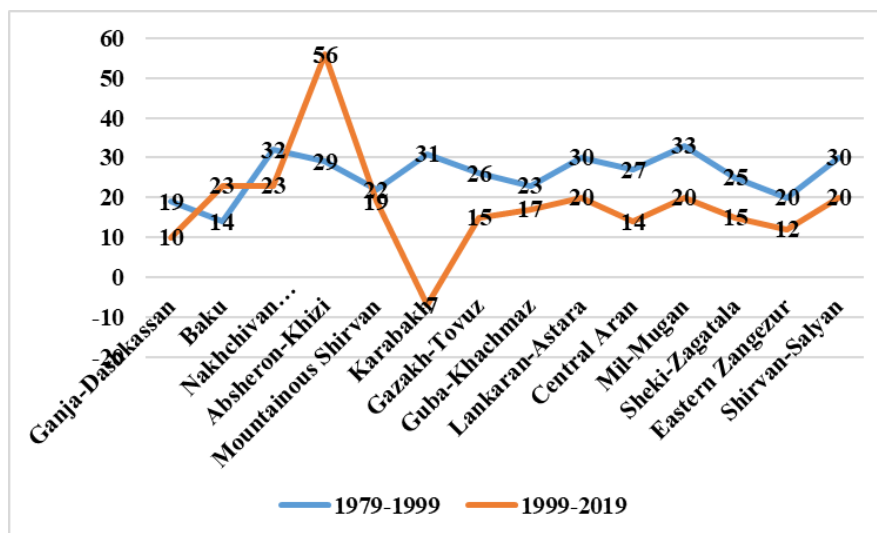


Figure 4 – Population growth rate (%) in the economic regions.

Table 2 –Number of permanent population in the region (thousand people)

Economic region and administrative territorial units	1979	1989	1999	2009	2019
Ganja-Dashkasan economic region – total	426,8	484,5	527	560	586,3
Ganja city	231,7	280,6	299,3	313,3	328,8
Naftalan city	3,6	7	7,6	8,9	8,5
Dashkasan district	33,6	28,5	30,4	32,7	32,9
Goranboy district	81,3	88,2	86,7	94,2	95,9
Goygol district	41,2	43,1	53,3	57,2	63,2
Samukh district	35,4	37,1	49,7	53,7	57

Source: Demographic Indicators of Azerbaijan 2024[3]

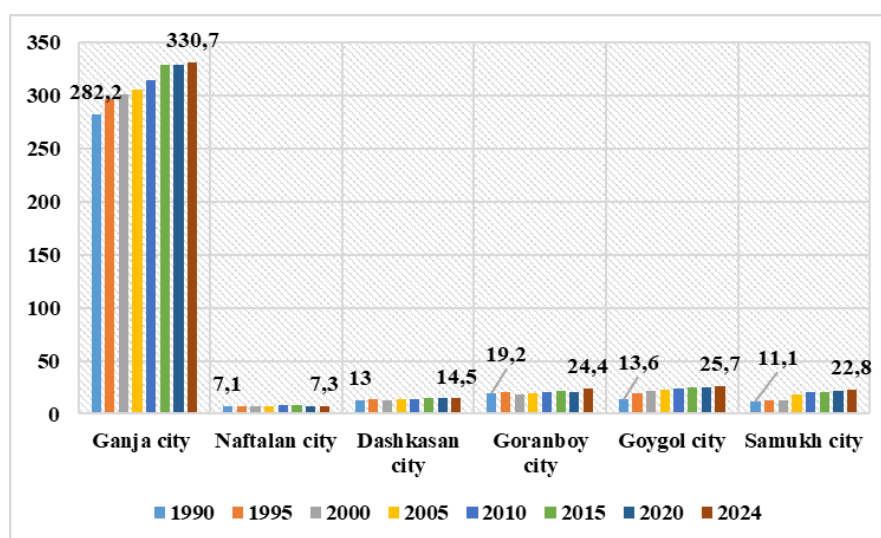


Figure 5 – Urban population growth rate (thousand people)

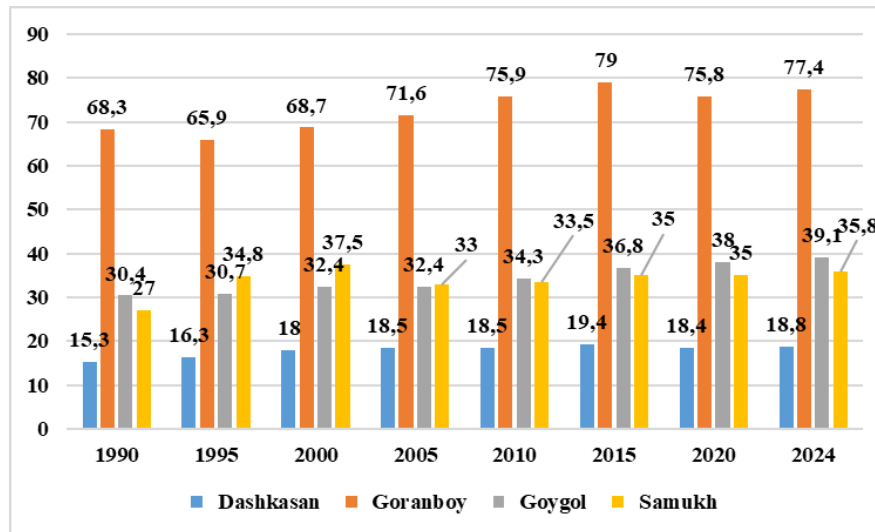


Figure 6 – Rural population of the districts growth rate (thousand people)

The analysis, preparation and implementation of a detailed development plan for the implementation of sustainable agricultural development mechanisms is reflected in the “Strategic Roadmap for the Production and Processing of Agricultural Products in the Republic of Azerbaijan”. A number of issues such as the development of regions, improving the living standards of the population, preventing urbanization, increasing food security, and optimizing demographic processes largely depend on the way in which economic and social issues are resolved and the degree of its organization. There are many methods for analyzing the economic indicators of the region’s agriculture and the extent to which it is operating effectively. However, at the initial stage, it is necessary to determine the extent to which the region is self-sufficient in basic agricultural products.

The region’s location in an area with soil-climatic factors and rich water resources creates favorable opportunities for the development of rural economy. In addition, the fact that the territory has rich mineral and recreational reserves can be of great importance in solving the factors that cause demographic problems. For this, the main task ahead is to implement the territorial organization of agriculture based on the efficient use of natural resources, accelerate the transition to a liberal and competitive market economy, and implement a number of global trends such as coordination of the driving forces of the agricultural system, consolidation of farms, and territorial clusters.

The Ganja-Dashkasan economic region specializes mainly in cereals and cereal legumes, fruits and berries (dates, grapes, pomegranates, etc.), and sunflower and corn for grain (Fig. 7.). Since the main production falls on the share of agricultural products for food purposes, the proportion of the production of industrial agricultural products in the total share is very low. Despite the privileges created by the state for labor-intensive sectors such as tobacco and cotton growing, traditional and sustainable development has not been achieved in this area and economic indicators are incomparably low. It is no coincidence that, despite the fact that the vast majority of land resources are land suitable for agriculture, according to 2023 data, the share of those working in agriculture in the total employed population is 27%. A large part of this falls on family farmers, especially households, who carry out production and other economic activities in rural areas without creating a legal entity on the basis of property they own or lease. Regarding the characteristics of land areas of household enterprises, according to the data of 2022, the use of land area is 76.7% for production only for personal consumption, 11% for products produced for personal consumption and sale, 11% for unused land, and 1% for other land (Fikretzade, 2022:11). According to the data of 2023, 35,132 hectares of land suitable for agriculture are owned by agricultural enterprises and 2,999 hectares by individual entrepreneurs. This figure is 7,061 hectares more and 2,698 hectares less, respectively, compared to 2014. The majority of the increase in agricultural enterprises is accounted for by agroparks.

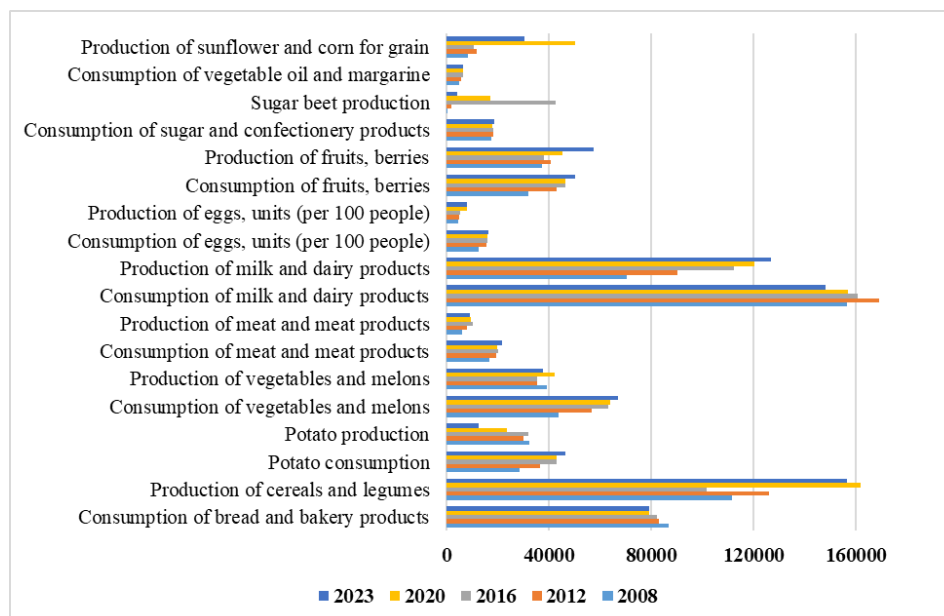


Figure 7 – Consumption and production of food products in the Ganja-Dashkasan economic region (in tons and units per year)

When looking at the dynamics of the growth rates of agricultural production in the region between 2003 and 2023, it is clearly observed that the region's agriculture does not have sustainable development. Ups and downs in the development trend occur periodically, and a negative direction is also developing. (Fig. 8.) Comparative analysis of production growth rates with the natural growth rate has led to the emergence of their correlative relationships. (Fig. 9.) Thus, it is possible to clearly observe the correspondence of the natural growth rate trend of the population with the production rate. In the natural growth rate trend (Fig. 3.), as in the production of agricultural products (Fig. 8.), a decline process begins after 2013-2014, and this process reaches a minimum in 2019-2021. The results of this negative trend can also be observed in the 3% decrease in the number of labor force working in agriculture after 2019. (table.1.).

In general, crop production in the economic region has developed more than livestock farming. The main reason for this is that livestock production is increasingly organized on the basis of crop production and the sparse settlement in mountainous areas that are favorable for the development of

livestock production. In addition, the decrease in pastures around villages in densely populated areas has had a negative impact on livestock production.

The largest increase in terms of production growth rate belongs to the city of Ganja (Fig. 10.). The lack of land suitable for agriculture here is formed entirely due to the processing of industrial plant products along the value chain, and livestock and poultry farms operating on the basis of coarse and strong feeds harvested from the fields and hayfields of perennial and annual fodder crops, as well as from the harvest of grain products. A similar trend can be cited as an example of the development of livestock farming in the city of Naftalan.

The growth in the production of total agricultural products in individual administrative territorial units, with the exception of Dashkesan district, has been 95-97% over the past 20 years. Despite the favorable conditions for the development of livestock breeding in Dashkesan district, the production of plant products has developed on a larger scale. The relative advantage in plant production in terms of agricultural production belongs to Goranboy district, and in livestock breeding to Goygol and Samukh districts (Agriculture of Azerbaijan ,2019: 349).

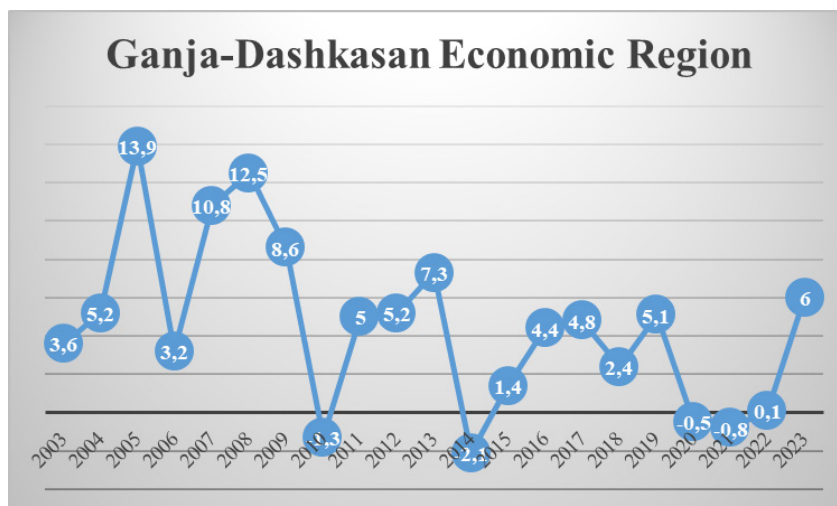


Figure 8 – Dynamics of growth rates of agricultural production in %

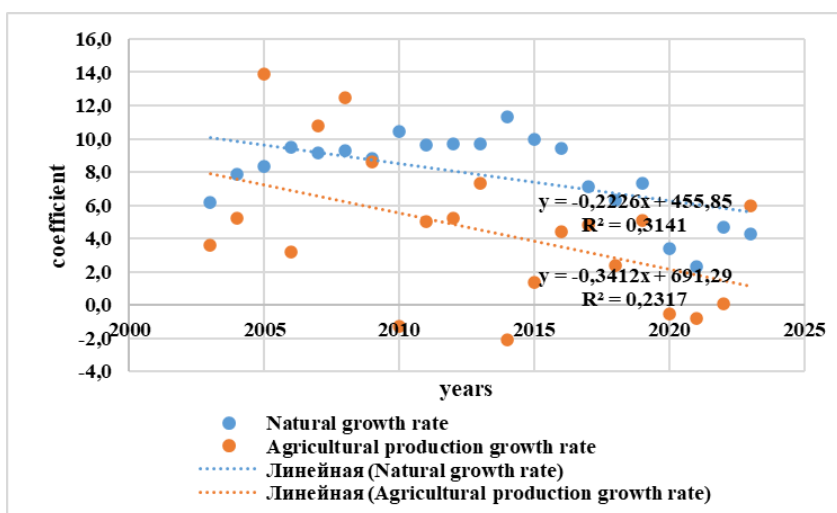


Figure 9 – Correlation between the growth rate of agricultural production and the natural growth rate of population in the Ganja-Dashkasan economic region between 2003 and 2023

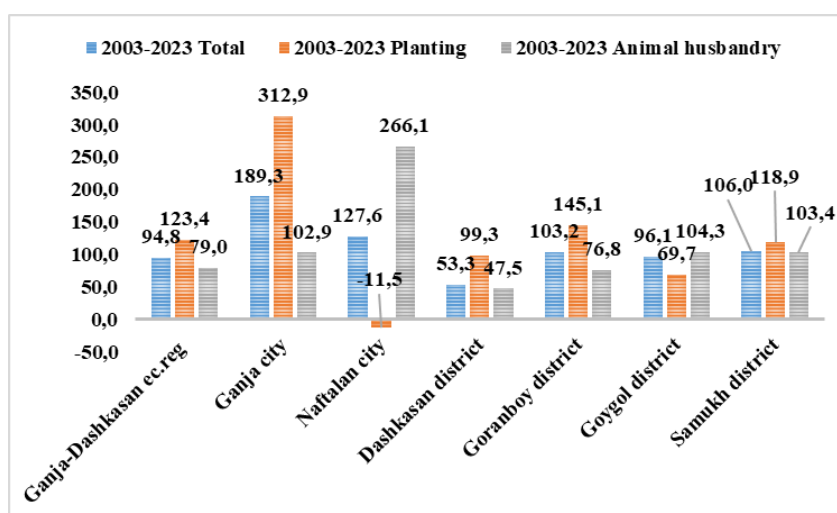


Figure 10 – Growth rate (%) based on the physical volume index of agricultural production

Conclusions

1. The predominance of food products over industrial products in the production of agricultural products causes the number of people employed in agriculture to lag behind the average for the country.

2. The more extensive development of plant breeding compared to livestock breeding is due to the dense settlement of the population in areas suitable for agriculture close to water resources and the deprivation of pastures in the areas surrounding the villages. In addition, the increase in livestock breeding through breeding and selection methods, the occupation of productive summer pasture areas and the reduction of land areas suitable for agriculture

have made its extensive development ineffective.

3. Looking at the growth rate of the urban population of the region over the last 33 years, it can be observed that the growth of the urban population in Samukh and Goygol districts is at least 3-4 times faster than in other districts and cities of the region. The growth trend of the rural population is higher in these districts.

4. The population growth rate of the Ganja-Dashkan economic region for 2009-2019 ranks last compared to other economic regions.

5. Close correlation has been found between the region's natural growth rate and the growth rate of agricultural production in 2003-2023 based on physical volume index of agricultural production.

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