HUMAN GEOGRAPHY

INNOVATIVE DIRECTION OF DEVELOPMENT OF AGRICULTURE IN THE GAZAKH-TOVUZ ECONOMIC REGION (IN THE EXAMPLE OF AGROPARKS)

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Abstract

The article is devoted to the study of the modern state of agroparks, which are one of the latest innovative models of agriculture in the Gazakh-Tovuz economic region, and their development prospects. Rich materials have been collected on the topic, and an extensive analysis of the modern development directions of agroparks existing in the Gazakh-Tovuz economic region has been conducted. Here, first of all, the natural and economic factors affecting the effective territorial organization of agroparks created in the research region were studied, and its priorities in accordance with the requirements of the modern era were analyzed. Also, the production of various types of agricultural crops cultivated in agroparks based on new techniques and technologies and intensive farming methods to achieve high productivity in them were investigated, and ways of intensive and dynamic development of agroparks in a short period of time were determined. By solving the goals and tasks set during the research, a map was compiled on a scale of 1:900,000 for the first time, reflecting modern production indicators in the agroparks of the region, and a package of relevant results and recommendations was prepared.

1. Introduction

In order to strengthen the processes of economic modernization and development in Azerbaijan against the background of new socio-economic challenges, the development of the non-oil sector of the economy, especially agriculture, the efficient use of the existing natural resource potential in this area, as well as ensuring the active participation of local entrepreneurs in these processes are among the main priority issues of great importance for the future of the country. In this case, the application of new, systematic and effective approaches to agriculture, which is of particular importance in the employment of the country's population, as well as in ensuring food security, is required. Currently, as in the whole world, more advanced, modern models are used in this direction in our republic. The creation of agroparks, which is one of the most modern models in this area, is of a relevant nature in our republic. Although many agroparks have been created in the country with the support of the state, the fact that this model has a new formation and has not yet taken a fully developed form is considered one of the main reasons for conducting research in this direction. According to the Economic Zones Development Agency (EZDA) operating under the Ministry of Economic Development, there are currently 24 agroparks operating in the republic, 4 of which are in the Gazakh-Tovuz economic region. In order to analyze the principles of operation of agroparks organized in accordance with the intensive activities of agriculture in the study region and to eliminate the existing shortcomings, relevant materials were collected and research work was carried out. The main goal of the research work is to analyze in detail all components of the complex activities of newly created agroparks in the region, to investigate the possibilities of applying international agricultural practices in order to increase the efficiency of production in individual economic sectors. Currently, agroparks operating in the Gazakh-Tovuz economic region, in addition to being an important tool in the coordination of agricultural and industrial relations, play an important role in the sustainable develop-

ment of the agricultural sector, in increasing the incomes of workers working in this field, in expanding the export potential of high-quality agricultural products, and in providing the population of the republic with organic food products.

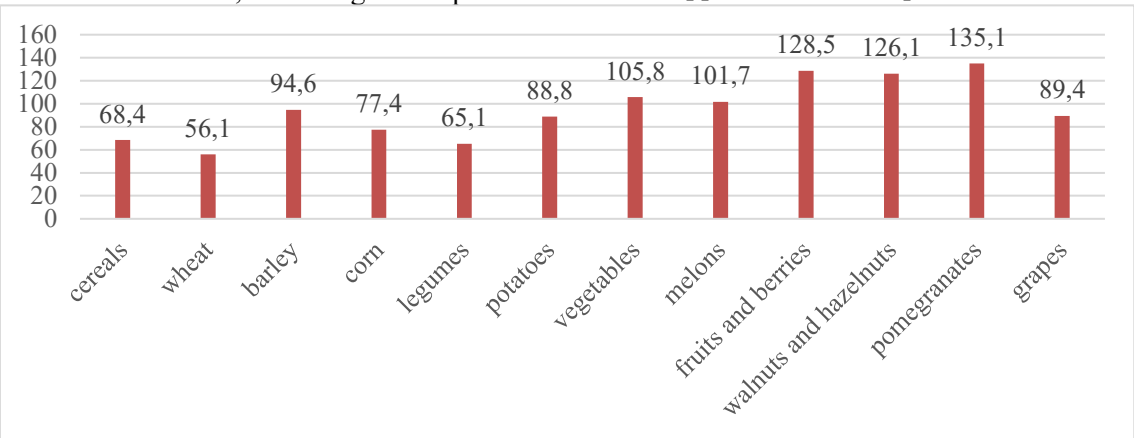
2. Material and method

During the study, methods of parallel application of qualitative and quantitative methods were used. In order to obtain more effective results in agriculture, statistical analyses of the development dynamics of the real situation over the past few years, as well as the creation of the existing base in the places, and the assessment of the changing conjuncture within the framework of various programs implemented by the state were conducted. For this purpose, decisions and orders issued by the President of the Republic of Azerbaijan, information from the Economic Zones Development Agency operating under the Ministry of Economic Development, the State Agrarian Development Centers operating under the Ministry of Agriculture, as well as scientific research work conducted by local and foreign scientists in this field were used. We also held discussions in various farmer and family farms of the regions belonging to the study region, and conducted social surveys. Discussions and social surveys conducted to improve the quality of the results play an important role in better reflecting the visibility of the research work. During the study, a statistical, systematic approach, comparative analysis, cartographic (using the GIS method), etc. methods were used.

3. Analysis and discussion

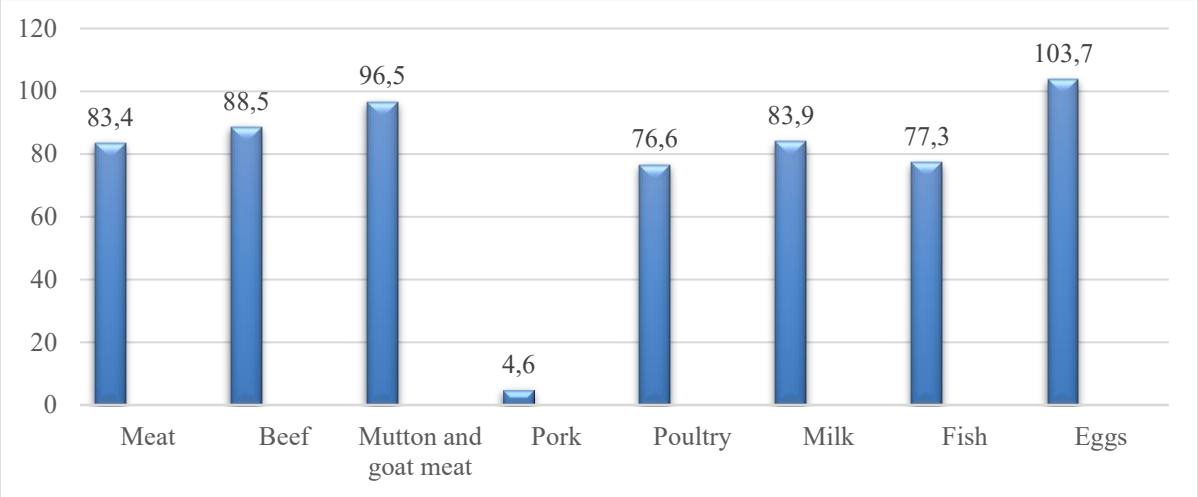
The growth of the population of the Republic of Azerbaijan has led not only to an increase in the total volume of consumption, but also to a number of changes in the structure of demand for food products. In this case, it is of great importance to assess the country's domestic production capabilities and determine the level of self-sufficiency [2]. At the international level, self-sufficiency indicators have been determined by FAO and WHO and are compiled on the basis of food safety standards. This allows us to more objectively assess the current state and prospective opportunities of the country's food security, to determine the dependence on imports of produced agricultural products, their full provision or the presence of export potential.

According to Figure 1, the overall self-sufficiency indicator for cereals in the calculations conducted across the republic is 68.4%, which indicates that domestic production does not fully meet the country's demand. The indicator for wheat is the lowest at 56.1% and confirms the existence of serious dependence on imports in this area as a strategic food product. Barley production fully satisfies the domestic market at 94.6%, while corn partially satisfies the demand with an indicator of 77.4%. Therefore, increasing corn production is considered appropriate in terms of fully satisfying the domestic market. The self-sufficiency level for legumes, which are a source of protein, is 65.1%. This indicator is considered a risk factor for the balanced nutrition of the population. In such conditions, reducing dependence on imports and strengthening domestic production come to the fore as a strategic necessity. The self-sufficiency level for potatoes is 88.8%, which partially satisfies the domestic demand. However, it is important to increase production for full satisfaction. Vegetable production fully meets domestic demand at 105.8% and forms export potential. The indicator for melon plants is 101.7%, fully satisfying the domestic market and creating additional opportunities for export.



Source: Food balances of Azerbaijan /Statistical collection/Baku, 2025

Figure 1. Indicators of self-sufficiency of the population with crop products in the Republic of Azerbaijan, in percentage



Source: Food balances of Azerbaijan /Statistical collection/Baku, 2025

Figure 2. Level of self-sufficiency of the population of the Republic of Azerbaijan with livestock products, in percent

The self-sufficiency level for fruits and berries is 128.5%, which proves that the country has high production potential. The indicator for walnuts and hazelnuts is 126.1%, and for pomegranates is 135.1%, indicating the presence of export-oriented production. The indicator for grapes is 89.4%, which mainly meets domestic demand, but increasing production in this area is considered advisable.

From the above analysis, it can be concluded that while there is a serious dependence on imports for cereals and legumes in the republic, the production of potatoes, grapes, vegetables and melons can mainly meet the demand. The production of pomegranates, fruits and berries, nuts and hazelnuts, in addition to meeting domestic demand, has a serious export potential.

As for livestock products, the self-sufficiency level for meat products of 83.4% indicates that the country meets its main demand in this area through domestic production. However, the indicators for product types are different. For example, the self-sufficiency level for beef products is estimated to be relatively high at 88.5%, which confirms that cattle breeding is widespread in the country and that production is somewhat stable. However, the dependence of the feed base on imports and the relatively low productivity act as the main factors limiting complete self-sufficiency.

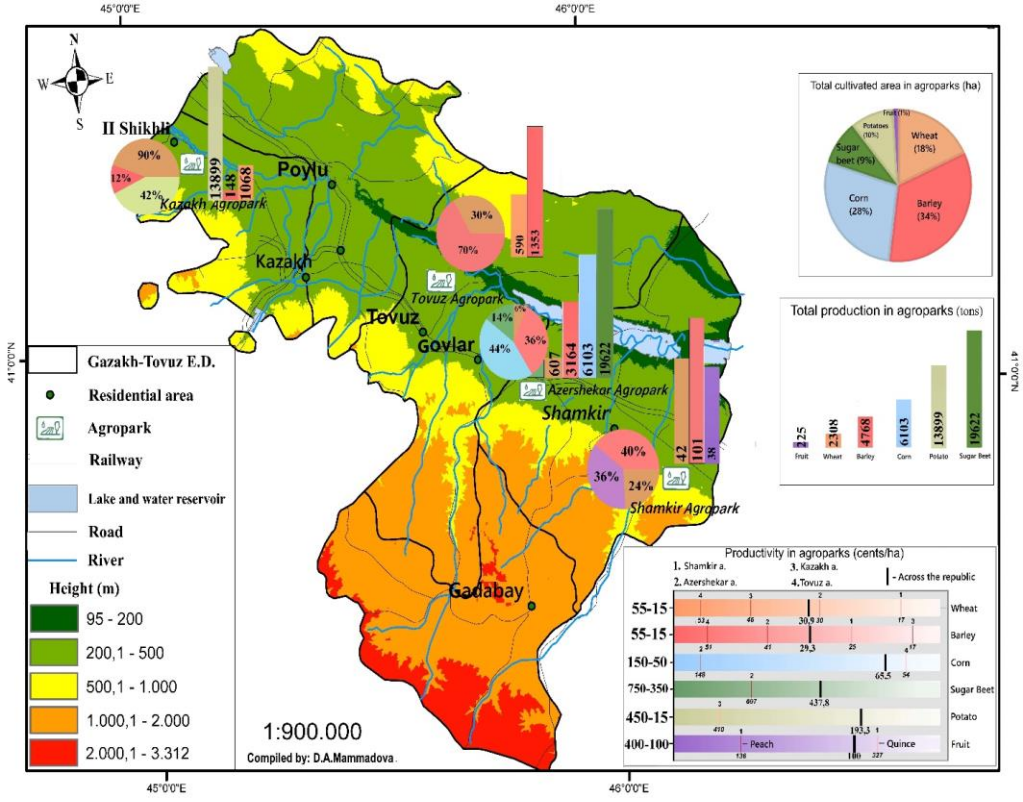
The self-sufficiency level in sheep and goat meat products reaching 96.5% indicates that this sector is one of the most sustainable areas in the country's agricultural sector. The presence of natural pastures and traditional forms of farming create favorable conditions for the development of small-horned livestock. Although the self-sufficiency level in milk and dairy products of 83.9% indicates that the country has sufficient production potential in this area, full self-suffi-ciency has not yet been achieved. Low productivity in milk production, the predominance of small farms, and losses in the processing chain are assessed as the main problems of this sector. The self-sufficiency level in pork products has a share of only 4.6%. This is due to its limited share in the domestic consumption structure and religious and cultural factors. The self-sufficiency level in poultry products is 76.6%, which is considered an average indicator. Against the background of in-creasing demand for poultry meat in the diet of the population, dependence on imports remains in this sector. The self-sufficiency level for eggs, which is 103.7%, indicates that domestic demand is fully met and surplus production has been formed (Figure 2). This indicator reflects the presence of a relatively high technological level and production efficiency in the poultry industry. The surplus production potential is favorable in terms of expanding export and industrial processing opportunities.

The self-sufficiency level for fish products, which is 77.3%, indicates the presence of an average level of supply in this area. The limited natural water bodies and the underdevelopment of aquaculture are the main reasons for dependence on imports for fish products. The expansion of aquaculture farms can be considered a strategic priority in this area.

The process of increasing export opportunities in the country requires the development of agricultural production and the creation of a coordinated system in this sector, the increase of inno-

vative practices of small and medium-sized farms, the provision of integration between workers, producers and consumers, as well as the achievement of high productivity in this context. Therefore, in order to produce competitive products in different regions of the republic according to specialization directions, create national brands in connection with the transition to intensive agriculture, train highly qualified specialists in the agricultural sector and open new jobs, the "Agropark" development concept was created, taking advantage of the experience of countries such as Germany, the Netherlands, Italy, Sweden, etc. In 2021, in accordance with the decree of the President of the Republic of Azerbaijan, the "Model Regulations on Agroparks" were developed in order to develop intensive agriculture in our country. According to this regulation, as in the whole world, in our country, it is envisaged to carry out entrepreneurial activities related to the production, processing, packaging, storage, sorting and sale of high-quality agricultural products by applying innovative techniques and technological methods in newly created agroparks. In addition, the adoption of State Programs for the socio-economic development of regions to support agriculture, the implementation of infrastructure projects in the regions, the provision of approximately 142.4 million manats of preferential loans to farmers and other producers by the National Fund for Entrepreneurship Support in 2023 and their provision with agricultural machinery, as well as the allocation of subsidies in the amount of 362.5 million manats to support the purchase of pedigree livestock, as well as the creation of agroparks are the main steps aimed at the development of this sector.

The Gazakh-Tovuz economic region accounts for 1689.4 million manats or 13% of the total agricultural output of the republic, of which 1190.8 million manats or 70.5% are for crop production, and 498.7 million manats or 29.5% are for animal husbandry. The favorable natural and climatic conditions, fertile soil and water resources of the Gazakh-Tovuz economic region, which is one of the main agricultural regions, as well as the availability of modern irrigation systems (pivot, drip, sprinkler, etc.), the possibility of using additional labor, the provision of extensive transport potential, and developed production and social infrastructure areas make it possible to create modern production enterprises - agroparks here, which is of great state importance in establishing economic relations not only within the country, but also with foreign countries (mainly the CIS, Georgia, Ukraine, etc.) [12].



Source: Prepared by the author based on materials from the Agency for the Development of Economic Zones under the Ministry of Economy of the Republic of Azerbaijan.

Figure 3. Territorial organization of agroparks in the Gazakh-Tovuz economic region

Table 1

General indicators of agroparks in the Gazakh-Tovuz economic region (2024), in ha

Name	Direction of action	General area	Cultivable area	Total irrigated area	Pivotal field	Roof irrigation
Gazakh A.	agriculture, horticulture, sorting and packaging, logistics	808,21	798,21	794	-	-
Azershekar Shamkir A.	agriculture	8000	4000	1461,2	1404	40
Tovuz A.	meat-oriented livestock breeding and agriculture	550	430	430	430	-
Shamkir A.	Intensive gardening, sorting, packaging and logistics	557.33	450	105.76	-	39.76
Total	-	9823.17	5678.21	2790.96	1807	79.76

Source: Compiled by the author based on data from the Economic Zones Development Agency operating under the Ministry of Economy of the Republic of Azerbaijan.

Agroparks operating in the study region play an important role in intensifying agricultural production through the application of modern technologies, developing processing and logistics infrastructure, as well as increasing employment in rural areas [1].

As can be seen from Figure 3, although grain crops (2720.5 ha or 80%) dominate the total agroparks' cultivated area in the Gazakh-Tovuz economic region, wheat (2308 tons or 4.9%), barley (4768 tons or 10.2%), corn (6103 tons or 13%) and potatoes (13899 tons or 29.6%) and sugar beet (19622 tons or 41.8%) also have a high share in the total crop production. The application of innovative technologies in agroparks has had a positive impact on crop productivity [10]. Thus, the productivity of wheat and barley from grain crops is 1.7 times (in the Tovuz agropark) higher than the average indicators for the republic (30.9 and 29.3 centners/ha, respectively), the productivity of corn is 2.3 times (in the Azershekar Shamkir agropark), the productivity of sugar beet, potatoes and fruits is 1.4 times (in the Azershekar Shamkir agropark), 2.1 times (in the Gazakh agropark) and 1.4 times (in the Shamkir agropark), respectively.

Agroparks operating in the study area aim not only at crop processing and food production, but also at increasing export-oriented products. Thus, potatoes produced in the Gazakh Agropark, sugar processed in the Shamkir branch of Azershekar, meat produced in the Tovuz Agropark, as well as fruits grown in the Shamkir Agropark, in addition to meeting local demand, are also exported abroad under the “Made in Azerbaijan” brand. These agroparks, implemented with the support of the state and in partnership with the private sector, contribute to the modernization of agricultural infrastructure in the region, increasing the level of food self-sufficiency, and overall, the country's socio-economic development strategy.

Shamkir Agropark, one of the first modern enterprises established in the South Caucasus, as well as in the Republic of Azerbaijan, combines many areas. The main areas of production in this agropark are intensive gardening, sorting, packaging and logistics. The area of Shamkir Agropark is 557.33 ha, of which 450 ha or 80.8% are arable land (Table 1).

With favorable soil and climatic conditions, mainly grain, various fruit and vegetable crops are grown in Shamkir Agropark. Water supply for irrigation of cultivated areas is provided through canals drawn from the Shamkirchay reservoir. In the total irrigated cultivated areas (105.76 ha), mainly traditional (66 ha or 62.4%) and modern drip irrigation systems (39.76 ha or 37.6%) are used.

Various machines and equipment have been purchased from "Agroleasing" OJSC on preferential terms for the cultivation of both grain fields and intensive orchards in the agropark. Of the 17 agricultural machineries currently in use by the enterprise, 3 are tractors and combines, and 14 are other agricultural machinery. Also, the number of employees in the agropark is a total of 135 people, of whom 126 are permanent and 9 are seasonal workers [11].

Table 2

General production indicators of Shamkir Agropark

	2022			2023			2024		
	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)
Wheat	130	25	325	61	6	34,5	25	17	42,6
Barley	5	37	18,6	41	-	-	41	25	101,4
Apricot	6,7	66	44,35	7,68	54	41,50	7,80	59	46,17
Cherry	3,8	9	3,54	3,82	27	10,3	3,68	41	15
Plum	1,3	32	4,28	3,44	21,4	7,36	3,40	34	11,53
Peach	0,2	69	1,39	0,20	14,1	0,26	0,21	193	3,43
Pear	3,2	64	20,6	3,22	-	-	3,24	8	2,61
Quince	2,7	150	40,8	2,72	22,1	6	2,75	327	89,79
Almonds	1,9	15	3	2,20	2,5	0,55	2,27	42	9,59
Dates	6,6	-	-	30,90	4, 9	15,10	14,28	33	46,93
Total:	161,4	-	461,6	156,2	-	115,6	103,6	-	369,1

Source: Compiled by the author based on data from the Economic Zones Development Agency operating under the Ministry of Economy of the Republic of Azerbaijan.

As can be seen from the table above, in 2024, 66 ha (64%) of the total arable land in Shamkir Agropark was planted with grain crops, and 37.66 ha (36%) was planted with mixed orchards. Wheat (food) was planted on 25 ha or 38% of the grain areas, and barley (feed) was planted on 41 ha or 62%. The productivity of the sown wheat was 17 centners/ha, the production was 42.6 tons, and the productivity of barley was 25 centners/ha, the production was 101.4 ha [11]. Currently, in addition to grain fields, Shamkir Agropark has intensive orchards consisting of mixed, i.e., mainly apricots, peaches, almonds, dates, quince, plums, cherries, etc. fruits. The area of intensive or-chards belonging to the Agropark is 37.66 ha, of which 14.28 ha (38%) are planted with dates, 2.75 ha (7.3%) with quince, 2.27 ha (6%) with almonds, 0.24 ha (0.7%) with peaches, and 14.9 ha (38.8%) with other fruits (apricots, plums, cherries, etc.) (Table 2). Among these fruits, quince (327 cents/ha), peach (193 cents/ha) and almond (42 cents/ha) stand out for their high productivity, which is 3.2, 2.2 and 1.8 times higher than the average productivity indicators in the republic, respectively. The production of the animal, which ranks first in terms of both productivity and production, was 89.79 tons in 2024. Although the yield of apricots is higher than that of dates, their production indicators (46.17 and 46.93 tons, respectively) were almost the same. As for the cultivation of peaches, the nectarine variety was produced more (2.85 tons or 83%) [11].

The products produced in the agropark are tested in a laboratory equipped with modern technologies, sorted according to the color, size and quality of fruits and vegetables, offering consumers higher quality and environmentally friendly products. These products are stored in ULO-type refrigerated storage chambers [3]. Thus, it is possible to reduce losses during the supply of agricultural products and maintain the quality of products for a long time.

One of the advantages of Shamkir Agropark is the provision of large-scale services to farmers and entrepreneurs in the processing enterprises operating here. Thus, entrepreneurs store their products in the refrigerated warehouses of Shamkir Agropark on a lease basis, benefit from the sorting, packaging and other services of the agropark, and gain the opportunity to participate in organized agricultural fairs and exhibitions.

The agropark operates a modern greenhouse complex, fruit and vegetable processing plants, refrigerated warehouses, logistics, agroservice, scientific research and innovation centers. Having a favorable economic and geographical position, branded products supplied in this Shamkir Agropark are also exported to local and foreign markets.

The second modern enterprise put into operation in the Shamkir region is the Shamkir Agropark of Azershekar LLC, located in the Jeyran-

chol area. The total area of the Azershekar Shamkir Agropark, which specializes mainly in grain and sugar beet farming, is 8,000 ha. Of the total arable area of 4000 hectares of Azershekar Shamkir Agropark, 1404 hectares are planted with pivot irrigation, 17.2 hectares with sprinklers, and 40 hectares with modern drip irrigation, for a total of 1461.2 hectares (Table 1). In addition, for the first time in the agropark, mobile or hybrid irrigation systems and agricultural techniques with modern irrigation technology are used, which plays an important role in saving water and preventing water losses. One of these is the "Mzuri" sowing technique, which is mainly used when sowing barley and wheat. Mzuri Pro-Til technology is an innovative approach that ensures the efficient use of resources and the protection of soil health in modern agriculture [9]. The application of this technology helps to optimize sowing processes and increase productivity. It is with the application of this technique that wheat was planted on a total of 131.7 ha (7%) of the agropark's grain sowing areas in 2024. If in previous years approximately 40% of wheat was planted as food, 10% as feed, and 50% as seed wheat, in 2024 all of the wheat planted was food wheat. Of the total grain crops, barley was planted on 776 ha (41%), of which 719.5 ha (93%) was used for food and 56.4 ha (7%) for seed (Table 3).

In the territory of Azershekar Shamkir Agropark, corn, which has the largest area of cultivation among grain crops (980.4 ha or 52%), is planted and cultivated using the "Strip till" technology [13]. Thanks to this technology, the productivity of corn was 153 centners/ha, which is 2.3 times higher than the average productivity indicator in the republic. As a result, the economic indicators of corn produced in the agropark increased by 2 times compared to previous years, amounting to 6.1 thousand tons [11]. The advantage of using this technology is that it allows both to increase the productivity of plants and to prevent soil and water erosion in the cultivated areas.

Compared to other agroparks in the region, sugar beet is planted in 323.2 ha (14.6%) of the area in Azershekar Shamkir Agropark. The "Ropa Maus" technique is used to harvest the planted sugar beet [5]. The applied "Ropa Maus" technique, which has a harvesting capacity of about 400 tons per hour, increases the harvesting speed by 2 times. As a result, sugar beet production exceeded 19.6 thousand tons, which is the highest indicator in the Gazakh-Tovuz economic region. The productivity of sugar beet, which is used both in sugar production and as feed in livestock breeding, reaches 607 centners/ha in the agropark, which is the highest indicator in the entire republic. (Figure 2).

Compared to other agroparks located in the study area, the highest provision of technical equipment (202 units or 65.4%) falls on the share of Azershekar Shamkir Agropark. Thus, 37 of the equipment used here consists of tractors and combines, and 165 of other agricultural equipment. However, although this agropark is in the first place in terms of equipment with technical means, the number of employees is relatively small. Thus, out of 125 employees working in the agropark, 85 are permanently employed and 40 are seasonally employed [11].

Table 3

Main production indicators of Azershekar Shamkir Agropark

	2022			2023			2024		
	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)
Wheat	130	59,5	772,9	331	54	1777	131,7	46	607,3
Barley	164,7	52	851,5	341	50	1692	776	41	3164,8
Corn	190,8	62	1179,72	448	67	2987	980,4	153	6103,1
Sugar beet	163	770	12551	423	413	17471	323,2	607	19622
Total:	648,5	-	15355,12	1543	-	23927	2211,3	-	29497,2

Source: Compiled by the author based on data from the Economic Zones Development Agency operating under the Ministry of Economy of the Republic of Azerbaijan.

Table 4

Main indicators of production activity of Gazakh Agropark

	2022			2023			2024		
	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)
Wheat	509,7	31	1580,1	356	52	1851,2	356	30	1068
Barley	161,5	30	484,5	99	28	277,2	99	15	148,5
Potatoes	339,9	420	14275,8	339	390	13221	339	410	13899
Total	1011,1	-	16340,4	794	-	15349,4	794	-	15115,5

Source: Compiled by the author based on data from the Economic Zones Development Agency operating under the Ministry of Economy of the Republic of Azerbaijan.

The Gazakh Agropark also has a high share in the development of the agrarian sector in the Gazakh-Tovuz economic region. The total area of the Gazakh Agropark, which operates in the fields of agriculture, horticulture, sorting and packaging, as well as logistics, is 808.21 ha, of which 798.21 ha or 98.8% is suitable for cultivation (Table 1). Of this arable area, 794 ha or 99.5% is used for agriculture (potatoes, wheat and barley).

In order to provide the domestic market with higher quality products, as well as to achieve high productivity in the fields, the Gazakh Agropark mainly uses local productive grain seed varieties such as "Qarabag 22" barley seeds, "Zirve 85", "Qırmızı gul". Local and foreign potato varieties such as "Soraya", "Bernina", "Kolomna", "Aqila", "Silvania", "Qafqaz" and others, which are distinguished by their high productivity, are also cultivated here, and elite potato seeds are also produced and sold.

In previous years, the crop was grown mainly in the fields of the region under rain conditions, but in recent years, due to the hot weather, there has been a greater need for artificial irrigation in places. For this purpose, irrigation canals have been laid from the Khram River to intensively irrigate the fields in the Agropark. The most progressive methods are used here for irrigation of the fields, which both prevents water losses and creates conditions for achieving high productivity. In the Gazakh Agropark, 339.9 ha of the total irrigated arable land of 794 ha is irrigated by sprinkler irrigation, and 454.1 ha by tanbur irrigation systems [6]. Although these irrigation systems have different operating principles, both ensure more effective water supply to the soil. By using such innovative technologies in the agropark, both water losses are prevented and plant productivity is ensured.

Machinery and equipment have been purchased through leasing to provide the intensive farming developed in the Gazakh Agropark with modern equipment. Currently, 11 of the 54 agricultural equipment in use by the enterprise are tractors and combines, and 43 are other agricultural equipment. In addition, the Gazakh Agropark, in addition to contributing to ensuring the food security of the region, also plays a major role in ensuring employment of the population. Compared to other agroparks in the region, this agropark has the largest workforce. Thus, the number of permanent employees working in the agropark is 217 people, and the number of seasonal employees is 500 people. Also, there are wide opportunities to achieve high productivity in crop production in the agropark. Thus, 356 ha or 44.8% of the total arable land in the agropark is under wheat (food), 99 ha or 12.5% is under barley (feed), and 339 ha or 42.7% is under potato cultivation [11].

Agricultural products produced in the agropark 13.9 thousand tons or 92% are potatoes, 1068 tons or 7% are wheat, and 148.5 tons or 1% are barley. The potato yield in this agropark, which specializes mainly in potato growing, is 410 centners/ha, which is 2.1 times higher than the average indicator for the republic (193.3 centners/ha). The wheat yield is 30 centners/ha, and the barley yield is 15 centners/ha (Table 4).

The Gazakh agropark operates a daily cleaning, sorting and packaging line for 250 tons of potatoes, as well as a refrigeration warehouse complex with a total capacity of 7800 m^3 for long-term storage of products. In addition to meeting

local demand, there are also ample opportunities for exporting products produced in the agropark to foreign markets.

The next modern intensive enterprise built on an area of 550 ha in the Jeyranchol area of the Gazakh-Tovuz economic region is the Tovuz Agropark. Mainly engaged in the production of ecologically clean livestock products, the Tovuz Agropark specializes in three areas of activity - beef cattle breeding, agriculture (feed) and meat processing. The Agropark's 1,500-head livestock complex keeps 1,200 heads of cattle. The live weight of the animals sometimes reaches 1 ton. This farm, where the animals are bred, keeps imported cattle of the “Simmental”, “Aberdeen Angus”, “Limousin”, “Charolais”, “Lebedin” and “Agh Bash” breeds.

The formation of the feed base on the farm was organized mainly at the expense of internal resources. Thus, wheat, barley, corn, and alfalfa are mainly grown in the enterprise to meet the animals' need for feed. A 3-kilometer water line was laid from the Kura River to provide irrigation water to the cultivated areas. Irrigation works here are mainly carried out through pivot irrigation systems [4]. In this case, the water is distributed evenly to the soil, ensuring that the plants receive the same amount of water, and also creating conditions for its efficient use and preventing the risk of soil erosion. In addition, in order to facilitate production processes in the agropark, 11 tractors and combines, and 25 other agricultural machinery were purchased and put into use through leasing. This agropark, which is well-equipped with technical equipment, employs 71 people permanently and 50 people in seasonal work. Also, wheat (83.1 ha of fodder and 28.9 ha of seed) is planted on 112 hectares of land equipped with modern pivot irrigation systems in the Gazakh Agropark, barley on 265.4 hectares, and grain corn, alfalfa and other plants on 52.7 hectares. According to statistics for 2024, the agropark produced 1,353.3 tons of barley, 590.5 tons of wheat, and 1,000 tons of meat. The average yield for barley was 51 centners/ha and for wheat was 53 centners/ha, which is a very good indicator [11].

Currently, there are 4 silo wells in the Tovuz Agropark, where the silo is buried using modern technological equipment manufactured by the Turkish company "Most". In addition, the agropark has a modern grain warehouse with a total capacity of 3000 m^3, a mixed feed plant built on Turkish technology and with a production capacity of 10 tons per hour, a workshop for slaughtering 90 large and small horned animals per day, and refrigeration chambers with a total capacity of 40 tons.

4. Conclusions and suggestions. As a result of the research, the following were determined:

- If in 2009 the volume of agricultural products in the Gazakh-Tovuz economic region was 539 million manats or 1.6% of the republic's GDP, then after 2014 the agroparks operating in the region ensured the transition of the agricultural sector to an intensive development method, following the growth dynamics every year and amounted to 1689.4 million manats or 13% in 2024. Accordingly, agroparks have a share of 6.4% in the production of grain crops, especially wheat - 2.3%, barley - 8.3%; sugar beet - 22.4% and potatoes - 2.6%.

- It has been determined that agroparks have a high potential in the production of livestock products, with a share of 1,500 tons or 7%. Also, 3.5% of the employed population or 1,200 people in the economic region are employed in agroparks.

- For the first time, tables, diagrams and maps (on a scale of 1:900,000) reflecting the general development patterns of agroparks in the region have been compiled.

Table 5

Main economic indicators of production activities of Tovuz Agropark

	2022			2023			2024		
	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)	Cultivated area (ha)	Productivity (cents/ha)	Production (ton)
Wheat	203,3	59,7	1214,3	368,9	40	1484,5	112	53	590,5
Barley	347,3	50	1742,3	-	-	-	265,4	51	1353,3
Corns	40	60	240	61,3	54	329,5	-	-	-
Total:	590,6	-	3196,6	430,2	-	1814	377,4	-	1943,8

Source: Compiled by the author based on data from the Economic Zones Development Agency operating under the Ministry of Economy of the Republic of Azerbaijan.

In the future, in order to ensure sustainable and balanced development of agroparks in the region, it is advisable to accelerate the innovative approach to production processes in agriculture and its long-term planning, strengthen irrigation, energy and transport infrastructure, support small and medium-sized businesses, as well as increase the potential of qualified personnel. In addition, minimizing environmental damage caused by production processes, ensuring the transition to waste-free technology, and preserving ecological balance are also important issues ahead.

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QAZAX-TOVUZ İQTİSADİ RAYONUNDA KƏND TƏSƏRRÜFATININ İNNOVATİV İNKİŞAF İSTİQAMƏTİ (AQROPARKLARIN TİMSALINDA)

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Xülasə. Məqalə Qazax-Tovuz iqtisadi rayonunda kənd təsərrüfatının ən son innovativ modellərindən biri olan aqroparkların müasir vəziyyəti və onların inkişaf perspektivlərinin tədqiqinə həsr edilmişdir. Mövzu ilə əlaqədar zəngin materiallar toplanmış, Qazax-Tovuz iqtisadi rayonunda mövcud olan aqroparkların müasir inkişaf istiqamətlərinin geniş təhlili aparılmışdır. Burada ilk növbədə tədqiqat regionunda yaradılmış aqroparkların səmərəli ərazi təşkilinə təsir göstərən təbii və iqtisadi amillər öyrənilmiş, onun müasir dövrün tələblərinə uyğun prioritetləri təhlil edilmişdir. Həmçinin, aqroparklarda becərilən müxtəlif növ kənd təsərrüfatı bitkilərinin yeni texnika və texnologiyalar əsasında istehsalı və onlarda yüksək məhsuldarlığa nail olmaq üçün intensiv təsərrüfat yolları araşdırılmış, aqroparkların qısa müddət ərzində intensiv və dinamik inkişaf yolları müəyyən edilmişdir. Tədqiqat zamanı qarşıya qoyulan məqsəd və vəzifələr həll edilməklə, ilk dəfə olaraq regionun aqroparklarında müasir istehsal göstəricilərini əks etdirən 1:900000 miqyasda xəritəsi tərtib edilmiş, müvafiq nəticə və tövsiyyələr paketi hazırlanmışdır.

Açar sözlər: aqropark, aqrar təsərrüfat, intensiv kənd təsərrüfatı, iqtisadi rayon, heyvandarlıq, bitkiçilik, innovativ texnologiya