

Innovative Development Directions of the Agrarian Economic Sphere: the Example of Azerbaijan

Mohubbat Huseynov^{1*}

¹University of Cooperation, Narimanov district, 93, Najaf Narimanov str., Baku, Azerbaijan

Abstract. As we know, from the history of mankind until now, man has fought for food and life. For this reason, the innovative development of the agricultural sector is one of the main priorities in the modern era. In the article, the factors of innovative development of the agricultural sector in Azerbaijan were fundamentally analyzed. In recent years, important successes have been achieved in the direction of modernization of agriculture in our country, a systematic and complex approach to the solution of existing problems in the agricultural sector, promotion of the country's agricultural potential. The decisions taken by President Ilham Aliyev regarding the modern stage of agrarian reforms, the implementation of complex measures in the direction of improving the mechanisms of institutional, economic and technological development of this field in the country have encouraged the transition of agriculture to a qualitatively new stage of development. Keywords: Innovation, development, economy, agrarian, Azerbaijan

1 Introduction

Application of organizational and economic measures together with scientific and technical progress and application of advanced technologies lays the foundation for further development of agriculture in our country. Currently, a new paradigm is being formed based on the use of innovations for the development of the world economy. Azerbaijan cannot ignore these processes in the conditions of integration into the world economy and must ensure the intensification of innovative processes in all areas of the national economy, including agriculture. The agrarian sector, which is a strategically important sector of the economy, needs to be built on a qualitatively new technical and technological basis that meets modern trends.

In modern conditions, innovative activity is the main factor in the development of agriculture, maximum use of it in our country will ensure sustainable development of the agricultural sector. Innovative development implies the creation of an innovative product, its carrier is an innovative agro-industrial enterprise. In the world experience, innovative enterprises include enterprises formed with innovative product production of more than 70% of the total product production during the reporting period. If this criterion is applied to local

* Corresponding author: hmohubbat22@gmail.com

enterprises, it will be known that there are very few innovative enterprises in our country. One of the problems of innovative development is the weak motivation and interest in the development of innovation among agricultural producers.

2 As a Strategy that Ensures Innovation-Oriented Development of the Agrarian Sector Economy

Achieving high progress and renaissance in all spheres of public life, rapidly modernizing and reaching its strategic goals, Azerbaijan has in recent years demonstrated its determination to become a new economic phenomenon of the modern world with its unique national development model. The fact that our republic, which managed to quickly name the stages of development that a number of advanced Western countries went through for decades, emerged from the global crisis that shook the world with minimal losses and maintained the previous high rate of gross domestic product production is also welcomed in the prestigious economic and financial circles of the world. Discussions about the specific aspects of the rapid transformation to the market economy system of Azerbaijan, leaving behind the transition period in the economic field, "Azerbaijan model of development" are currently treated with sufficient seriousness in the prestigious scientific centers of the world.

As a result of successfully implemented socio-economic reforms - state programs that stimulate sustainable and balanced development, decrees and orders covering all areas of social life, our republic has risen to the ranks of countries that are on the path of rapid development in the world and have resolutely resisted the global financial and economic crisis. Mr. Ilham Aliyev's economic strategy based on a scientific foundation ensured dynamism and purposefulness in the process of comprehensive development of the republic, opened up real opportunities for solving the tasks ahead for each stage, and formed a reliable basis for mobilizing the general potential of society for the sake of national goals.

The scientific analysis and justification of this effective economic strategy, which emphasizes the formation of human capital as a priority goal and places an important place on the role of modern knowledge and nanotechnologies in the innovation development of the state, is extremely important in terms of ensuring the sustainability of existing successes. What makes the issue more urgent is that Azerbaijan has entered a qualitatively new stage of socio-economic modernization by completing the extremely difficult and sad process characterized as a period of transition in the economic sphere.

In order to scientifically substantiate and predict the paradigms of the post-transition period, first of all, it is necessary to evaluate the economic reforms that the republic has confidently implemented in the last 15 years from the prism of scientific and philosophical analysis, and to summarize the obtained theoretical and practical conclusions. The need to study the national development model of Azerbaijan on the basis of scientific principles puts serious tasks before the economic scientists of the republic.

The completion of the transition period in the economic field makes it an objective necessity to ensure the unbreakable unity of science and economy based on the mechanisms of interaction, to form an economy based on innovative knowledge, to modernize various fields of science according to the requirements of the new era, as well as to use purposeful scientific forecasts in political management. First of all, Azerbaijan's statehood interests demand that science get rid of the provincial atmosphere and inertia and keep up with the times, and become the main driving factor in the process of economic development.

3 Agriculture in the Economy of Azerbaijan after Gaining Independence

Azerbaijan has very favorable natural conditions in terms of agricultural production. 45.9 thousand km² of the country's land area, which is 86.6 thousand km², is arable land. Currently, agricultural production is carried out on an area of 16.2 thousand km². This means 32% of the total potential agricultural area. Irrigated agriculture is carried out in 10.9 thousand km² of this area. The total irrigable area is calculated as 32 thousand km². The country, whose forest land area is 10.4 thousand km², has suitable agricultural areas, but cannot make use of its current potential due to the inability to use modern agricultural methods.

After oil and natural gas, agriculture is the most important sector in Azerbaijan's economy. Approximately 45% of the country's population operates in the agricultural sector. The agricultural sector is the sector that provides the most employment in Azerbaijan. However, this sector is heavily dependent on subsidies due to structural inadequacies and lack of investment.

As in all countries, another factor that directly affects the agricultural sector and the development in this sector is the form and characteristics of the sector's structure. In addition, since Azerbaijan is a transition country, a system change is in question in the agricultural sector, as in other sectors. As a result of the reforms implemented within the framework of the system change, different forms of property and land ownership system have been shaped in the country. Agricultural land is divided into three areas: state, municipality, and private property.

The population's demand for food products and industry for raw materials and the food reserve fund were predetermined by the state. The products produced by the Soviets' types of business, namely collective farm (hereinafter collective farm) and "sovhoz", that is, soviet business (hereinafter sovhoz), are generally sent to state supply institutions, manufacturing factories and retail traders on the basis of planned and pre-made agreements. were sent to their offices. Manufactured products were essentially sold on a government-approved general price schedule, as demanded by the Soviet planned economy. Purchases made by the government have been the most reliable and secure way of selling for the further development of agricultural trade for these years. Another sales channel of agricultural trade in the Soviet era was the purchase and sale of products through consumer associations.

Thus, in this period, until the end of the eighties, the production of agricultural products was developing at an increasing pace. Only XX. As a result of the disintegration of the Soviet Union at the end of the century, economic relations were cut and traditional markets were lost. On the other hand, the emergence of the Nagorno-Karabakh conflict and the loss of up to 20% of lands as a result of Armenia's military encroachment on Azerbaijan, the formation of an army of refugees affected the national economy and weakened its development.

4 Innovative Development Directions of the Agrarian Field

Innovation means the result of scientific and technical activity in the form of a new or improved product (product, service) or technology. The main feature of the innovation is its application. A new or improved product is considered an innovative product only after it enters the market.

In accordance with the Decree of the President of the Republic of Azerbaijan dated December 19, 2018, the provision of agricultural equipment with machinery has been liberalized. Equipment is brought by various companies and leased to farmers with certain discounts (40%).

In addition, unused lands are brought into circulation, new agroparks, collective farms are created, as well as the application of new technical tools, electronic agricultural

information system, innovative energy and resource saving technologies, "Pivot" automatic irrigation system is given great priority.

Precision farming is considered one of the most relevant technologies of the modern era. Precision farming is a system of complex approach to the productive management of crops with the application of computer and satellite technologies. It includes: a multi-functional tracking system GPS (through which it is possible to monitor the movement of equipment along the route, the work process, the amount of work performed at any time, the path of the unit, the speed of movement, fuel consumption, etc.) and make electronic registration), productivity determination system - YMT, geographic information system - GIS, remote field survey system - DZZ, variable rationing system - VRT.

The "eyesore" plowing, sowing and fertilizing performed throughout the previous history of agriculture is carried out precisely in this system, and no additional loss is allowed. On the basis of satellite and laboratory data, a map of characteristic indicators for each part of the field is drawn up, and resources are distributed in the most rational way.

In modern conditions, there are three ways of innovative development of agriculture with mutual and interdependent direction:

1. Investment in human capital - priority development of agricultural education, fundamental and applied research organizations, creation of a data bank on innovations, as well as creation of an information and advisory system serving agricultural producers;
2. Investment in biological resources - increasing soil fertility and productivity of agricultural production by applying innovative methods;
3. Investment in new technology - investments in the development of technologies that ensure the improvement of the technical and technological potential of agriculture by using energy and resource-saving equipment and high technologies, and can dramatically increase labor productivity and the efficiency of agricultural activity.

It should be noted that it is possible to eliminate many negative factors in agricultural production through technological modernization of industry based on new technology.

According to the statement of the World Bank for 2020, Azerbaijan ranked 83rd among 174 countries in the "Human Capital Index" report. Among the CIS countries, the lowest indicator is Tajikistan (0.50), the highest is Belarus (0.70). The index indicator of Azerbaijan was 0.58. The way to increase this indicator is to increase human capital.

4.1 Chart 1. Human Capital Index for 2020

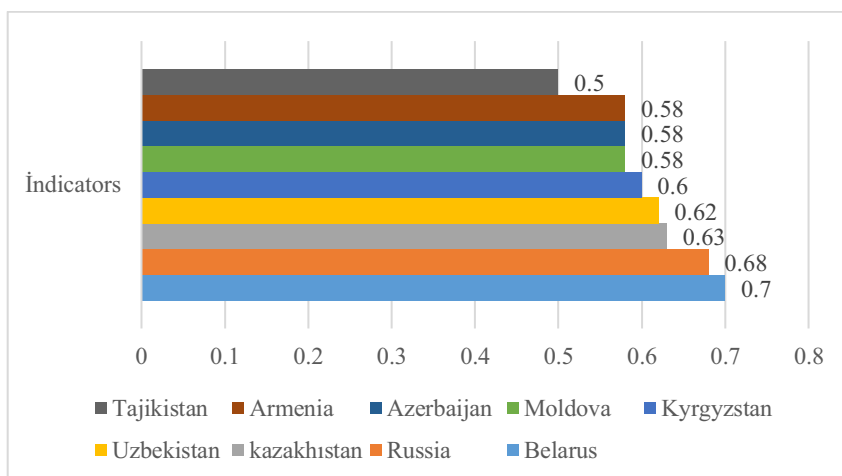


Fig. 1. Source: <https://www.worldbank.org/en/publication/human-capital>.

One of the priority areas of the "Strategic Roadmap for the National Economy and the Main Sectors of the Economy" approved by Decree No. 1138 of the President of the Republic of Azerbaijan dated December 6, 2016, it is also mentioned in the paragraph "Stimulating the development of human capital to ensure the increase of labor productivity" that , the main requirement for the competitive, inclusive and sustainable development of Azerbaijan's economy is to achieve the development of human capital and labor productivity to the level of developed countries. At the same time, it is noted that in order to stimulate innovation activity, various supports should be provided to scientific research and improvements in the country. If we look at the formation of research expenses based on the financing of research and educational institutions and experience centers by type of work in Azerbaijan, it can be seen that expenses in the field of science are mainly spent on conducting fundamental research. Although the funds allocated to applied research in 2019 increased by 64.5% compared to 2015, and by 50.0% in 2018, the funds spent on applied research during the years 2015-2019 accounted for approximately 20% of total expenditures. This creates difficulties in the practical application of the results of innovations in the field of science. We believe that increasing attention to this area is very important. Internal current costs of research and development according to the types of works are given in Table 1.

Table 1. Internal current costs of research and development by types of works. Source: <https://www.stat.gov.az/>.

Years	Total expenses, thousand manats	Basic research	Applied studies	Works
2015	118 643.3	61 025.6	23 585.9	34 031.8
2016	120 782.3	67 130.7	21 227.8	32 423.8
2017	127 997.0	68 841.9	24 157.0	34 998.1
2018	144 997.9	80 537.0	25 876.3	38 584.6
2019	161 299.9	86 620.9	38 804.3	35 874.7

In 2019, domestic current expenses for research and development in agriculture increased 2.2 times compared to 2015, and increased by 42.9 percent compared to 2018, amounting to 15.1 million manats, this amount is 9.4 percent of the total expenses.

There is a great need to stimulate investment activity in order to expand innovative activity in the agricultural field. In 2015-2019, there is an increase in the amount of investment allocated to agriculture, forestry and fisheries. The dynamics of fixed capital investment is given in Table 2.

Table 2. Dynamics of fixed capital investment, million manats. Source: <https://www.stat.gov.az/>.

	2015	2016	2017	2018	2019	2019 /2015, %	2019 /2018, %
Investment directed to fixed capital by sectors of the economy, total	15957.0	16772.8	17430.3	17244.9	18539.5	+16.2	+7.5
From it: agriculture, forestry and fishing	355.4	325.1	617.8	764.4	769.5	+2.2 d.	+0.7
The share of investment directed to the agricultural sector, in %	2.2	2.1	3.5	4.4	4.2	-	-

As can be seen from the table, the amount of investment allocated to the agricultural sector in 2019 increased by 2.2 times compared to 2015 and amounted to 769.5 million manats, which is 4.2 percent of the total investment directed to the fixed capital in the sectors of the economy.

5 Development Prospects and Problems of Agricultural Science

Independent Azerbaijan is at such a decisive stage of its socio-economic development that currently, in terms of national interests, all fields of science stand at the same distance: the exclusivity and importance of each is clearly recognized. We believe that it is necessary to look at the reforms implemented in the agrarian sector, the existing problems, and define the tasks facing the agrarian science from the point of view of the theoretical and practical justification of the national economic development model of the republic. This necessity is determined by the fact that Azerbaijan, along with choosing a development path based on the priority of the non-oil sector, is historically known and specialized as an agro-industrial republic.

Experience shows that it is crucial to have the personnel potential that meets modern requirements in the field of reliable supply of food products to the population. The level of professional training of highly and medium-skilled agricultural specialists in terms of modern requirements is still low. In order for these specialties to be attractive in rural areas, it is necessary to implement appropriate measures and solve social and household problems of specialists. At present, specialists in the field of production, processing, storage and economics of agricultural and food products are being trained in 30 higher schools, 6 in secondary specialized schools, and 23 in technical vocational schools.

Azerbaijan State Agrarian University, which is the basic higher education institution for agriculture in the country, offers "technology of storage and processing of plant products", "economy and management of agricultural production", "marketing", "management" in the field of agriculture and its products processing, economy and marketing. Specialist training is being conducted. However, we must admit that the material and technical base for training highly qualified specialists in these fields does not meet the necessary requirements. The lack of modern laboratories and equipment to conduct effective experimental research in the field of agriculture also causes certain problems. The lack of highly qualified teaching staff is also a prominent problem.

In general, the main problems currently faced by agricultural science can be characterized as follows:

- As a result of the lack of material and technical support at a satisfactory level, the subjects of scientific research and experimental design work have decreased, the volume and quality of scientific and technical research has decreased. It is practically impossible to conduct experiments at the modern level in most scientific organizations;
- the "aging" of scientific workers in the agrarian field is observed, the interest of the young generation in scientific researches in the field of agriculture is not at the desired level;
- the mechanisms of applying agricultural science to production do not meet the requirements of the time. Scientific-research organizations, when determining their research plans, do not consider the state's capabilities, socially important priorities, but "their own capabilities".
- slowness is observed in the study and application of the modern development trends of agricultural science in the world;
- there are no significant scientific-research works on the problem of food safety. The efficiency of the forecasts related to the development prospects of agriculture for political management is not at the required level;

6 Conclusion

Every innovation applied in the agricultural field increases productivity, income and, as a result, ensures faster development of this field. In recent years, a number of innovative methods and techniques have been used in the agriculture of Azerbaijan. Use of drones in

agriculture, smart garden, modern planting methods, organization of modern biological control against pests, cultivation of virus-free seeds and seedlings in biotechnology laboratories, determination of the coordinates of agricultural fields and which crops to plant in the field through satellites, etc. can be attributed to it. In the Electronic Agricultural Information System implemented by the Ministry of Agriculture of the Republic of Azerbaijan, all processes from the initial stage to the final stage of the business activities of farmers and the production of agricultural products will be reflected. Also, this system will make it possible to achieve many goals. This includes increasing transparency and efficiency in the state support of the agricultural sector, innovative support for the implementation of state policy in all areas, ensuring the management and efficient use of agricultural land and other natural resources, increasing the effectiveness of information and advisory services, etc. belongs to. Creation of a single database on the agrarian field is a very important factor in the future development and management of this field.

References

1. A. Grante, *International Journal of Economics and Financial Issues* **4(3)**, 572-579 (2014) <https://dergipark.org.tr/tr/download/article-file/362888>
2. F. Peixun, *Hybrid livelihoods: Maize and agrarian transformation in Southeast Asia's uplands* **95**, 521-532 (2022) <https://doi.org/10.1016/j.jrurstud.2022.09.036>
3. R. Stock, *Arrays and algorithms: Emerging regimes of dispossession at the frontiers of agrarian technological governance* **12**, 100137 (2022) <https://doi.org/10.1016/j.esg.2022.100137>
4. S. Butorin, *MATEC Web of Conferences* **212**, 07007 (2018) <https://doi.org/10.1051/matecconf/201821207007>
5. F.K. Shafkarov, *Educational Research in Universal Sciences* **1(5)**, 269-277 (2022) <http://erus.uz/index.php/er/article/view/300>