

## THE CURRENT SITUATION OF AGRICULTURAL INNOVATION- DERIVED INVESTMENTS AND ACCESS TO FUNDING IN AZERBAIJAN

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### **Abstract**

*Agricultural producers' financial resources should be available to undertake agricultural innovation-derived investments. Although Azerbaijan is now undergoing a lot of reforms in this area, the situation is still far from satisfactory. The article emphasizes the importance of state support in particular for ensuring the sustainability of the activities of agricultural producers. Nowadays, more than 90 percent of agricultural products are owned by private owners, family-peasant farms and households. Nonetheless, those economic subjects' access to financial sources is not at a satisfactory level. The article also discussed the effect of subsidies in agricultural producers' revenue and established the unique weight of subsidies in income for a number of major goods. The state's policies in this direction in Azerbaijan, as well as its positive outcomes, were also highlighted. The data collected by the systematic approach were analyzed utilizing horizontal, vertical, and trend analysis methods from financial analysis techniques. To ensure the data's legibility, comparison charts have been created. Based on the economic growth in this industry during the previous two years, it was determined that the manufacturing of crops is a priority.*

**Key words:** food security, innovation-derived investment, agricultural producers, agricultural cooperatives, farmers, subsidies

### **INTRODUCTION**

Having access to financial resources is one of the most significant factors for agriculture's long-term development. Farmers who wish to expand their farmland and/or grow higher value-added products are unable to access funding, limiting their ability to boost their earnings. As a result, that farmer is unable to contribute to the growth of Azerbaijan's gross domestic product. On the other side, the main obstacle for food security is low agricultural production, which is exacerbated by farmers' lack of access to financial resources. Adequate agricultural finance is one of the methods of strengthening that has the potential to boost productivity, assure food security, increase farmers' export potential, and raise the rural population's standard of life in the long run [5]. Access to financial resources also increases farmers' investment capacity in terms of acquiring and using

current technology for growing abundant and high-quality crops. It demonstrates the importance of finance in this industry, both in terms of productivity and the quality standards necessary in global markets for export-oriented agricultural products.

Agricultural financing is typically used in two distinct ways: 1) as working capital to cover current production expenses, and 2) as investment capital to acquire new equipment and technology. Farmers' investment and production decisions appear to be impacted by simple access to financial instruments and fair interest rates [12].

The purpose of this research is to investigate the current state of innovation-derived investments in the agricultural field, to identify opportunities for access to financial sources and the problems that may arise in this regard, and to study the role of financial institutions in the application of innovative investment in Azerbaijan by examining global

experience. To explore the aforesaid, the following tasks have been assigned:

- to investigate the current state of agricultural innovation-derived investment funding in the Republic of Azerbaijan;
- to explore advanced world experience of interactions with financial sources in agricultural innovation-derived investment;
- to determine the role of financial institutions in funding agricultural innovation-derived investment;
- to study the possibilities of access to financial sources in funding agricultural innovation-derived investments of farm producers.

## MATERIALS AND METHODS

If there is no systematic approach to the study of the complex economic life of society, then we will collect contradictory facts and events. It is vital to employ scientific approaches to collect systematic data and identify the internal regularities of the economy. Understanding the essence of economic phenomena is only achievable via the use of the research system. The study of the economy as an economic system implies the presence of a specific technology, which is the consistency of this research.

As the facts characterizing a certain economic phenomenon were collected in the first stage of the research, we also collected the necessary information and facts by examining the theoretical issues, advantages, and existing problems in the direction of access to financial sources in innovation-derived investments in agriculture. Collected facts were analyzed and summarized and a general analysis of those data was conducted. One of the stages of the research methodology is the examination of the global experience in the direction of the application of innovation-derived investment. In this regard, the experience of the United States, European countries and Turkey has been carefully considered, as well as the prospective application of the method utilized in these countries in the Republic of Azerbaijan has been explored. In the next stage, the impact of innovation-derived investments in agriculture

across the country on productivity in Azerbaijan was investigated.

Analysis of the data obtained as a result of the research is based on horizontal, vertical, and trend analysis methods. The horizontal analysis method reflects the percentage increase or decrease of two or more indicators, this method allows us to find out how the state support affected agriculture in the last 5 years. The vertical analysis method reflects the percentage ratio of relevant indicators within their groups (when calculating, the amount is multiplied by 100 and divided by the total amount of the group) in order to make the research work comparable, the trend analysis method reflects an increase or decrease of indicators covering a period of more than 4 or 5 years compared to the first year. MAX EXCEL program was used to minimize deviations in calculations [10]. To ensure the readability of the data and the efficiency of the analysis methods in the paper, many graphs were created in computer programs.

During the research, the materials of the State Statistics Committee of the Republic of Azerbaijan, as well as the data obtained from surveys conducted with farmers and agricultural cooperatives in Ganja-Dashkasan and Mil-Mugan economic regions of the republic were broadly used.

## RESULTS AND DISCUSSIONS

Azerbaijan has recently taken significant progress in the innovation of economic processes. Innovative approaches predominate in the Strategic Roadmap of the National Economy and the Main Sectors of the Economy adopted by the Decree of the President of the Republic of Azerbaijan dated December 6, 2016 [8]. Azerbaijan is already taking practical steps to establish a management framework for innovative processes. The Decree of the President of the Republic of Azerbaijan dated November 6, 2018 on the formation of the Innovation Agency under the Ministry of Transport, Communications, and High Technologies of the Republic of Azerbaijan comes into force and is now being implemented. Furthermore,

starting from 2012, the process of organizing the Hi-Tech Park in Pirallahi is underway, and enterprises are being formed here [1]. Thus, in the near future, Azerbaijan will need to considerably strengthen strategic approaches to the formulation of innovation policy and innovation processes, and we believe it is crucial to concentrate on a number of issues:

- Azerbaijan's innovative growth potential should be thoroughly studied and appraised;
- the processes of creating the national innovation system should be completed and the justified strategic directions of innovative development should be defined;
- the structure of the management system of innovation processes and the application processes of flexible management mechanisms should be assured;
- in accordance with Azerbaijan's strategic goals for economic growth, goals for the national economy's immediate and long-term innovation should be developed, creative development plans and big innovation-investment projects should be created and implemented, and so on.

Also, innovation is crucial for every nation including Azerbaijan where countries have equal access to cutting edge technologies and infrastructures. Each country's strategic goals are founded on a cohesive vision that is commonly accepted. According to the European Union's Sustainable Development Goals, innovation in all countries' technological value chains must be built on the utilization of ICT resources, and innovative approaches must be applied in all processes [9]. To accomplish the intended goals, the sources of funding for innovative agricultural investment must first be identified. In reality, each approved creative development plan is largely achieved through investments. Considering that agriculture is a high-risk sector across the world that is continually in need of government assistance, the precise identification and investigation of investment sources is the basis of innovative development. As a result, analyzing the funding sources of agricultural innovation-derived investments might help to solve the problem. The primary issue in this process is

determining the ratio of the specific weight of the types of agricultural funding sources.

Real life has shown that a one-sided approach to the source of agricultural investments has failed. This approach overlooked the core aspects of agriculture. This fundamental feature is that agricultural producers' low level of income limited their utilization of the market type. The low level of income is explained by the high risk in this area. The market approach of investment financing is distinguished by the fact that it directs investments solely to high-profit regions. As a result, beginning in the early 2000s, the government began to play a prominent role in agricultural funding. Agriculture is a multifunctional area, hence state funding is required.

Its relevance is not limited to the country's food security, it also plays a vital part in the country's social and cultural development, the construction of other areas of the economy (light industry), and providing the fundamental necessities of the population. In addition to the broad features of agriculture given above, it is critical to evaluate its current position while analyzing the sources of innovation-derived investments in this industry. This includes the country's geographical climatic conditions, farm size, and production weight, the strategic importance of the area, level of self-sufficiency with foodstuffs, agricultural product import and export ratio, the modern state of the material and technological basis, and so on [4].

As a result, one of the primary factors determining the success of agricultural modernization strategy is the cardinal (fundamental) solution to the problems of funding innovation-derived investments in the field by the government. Due to the features of agriculture outlined above, it is difficult to create and update its contemporary infrastructure without active governmental engagement in the investment process in this field.

At the moment, global experience in the field of financing investment projects suggests that the loan portion of new projects typically ranges between 20 and 30%, with the

remaining 70-80% covered by other sources. As an example of the establishment of such sources, we may consider the emission of securities. The primary role of financial markets is to transform saved money into an investment. In this context, financial markets may be a major source of agricultural investment. According to 2022 statistics, the world's leading stock markets include 43 significant corporations that manufacture agricultural products and provide services in this industry. The share prices of these firms range from \$0.33 to \$3675.16. Dividends paid per share range from 0 to 18.9 dollars. The market valuation of the corporations ranges from 3 billion dollars to 126.5 billion dollars [11]. The data we are referring to are from the world's leading agricultural production and service companies. Furthermore, the engagement of large farmers in financial

markets grows each year. One of the key paths of diversification of agricultural firms' foreign investment sources is active engagement in financial markets. Unfortunately, Azerbaijan's financial markets are largely underdeveloped and serve as a limited source of investment. However, the expansion of this market can ensure the expansion of agricultural investment sources. Given that Azerbaijan's significant agricultural firms are now formed on the basis of agro parks, the participation of such companies in financial markets with their securities can be ensured in the future. As a result, we believe that as Azerbaijan's financial markets grow, the issuance of agricultural enterprise securities as the primary source of funding may become the primary choice in the future.

Table 1. Dynamics of fixed capital investment, million manats

	2016	2017	2018	2019	2020	2021	2021/2016 %
Investment directed to fixed capital by sectors of the economy, total	16,772.8	17,430.3	17,244.9	18,539.5	17,226.1	16,815.5	0.3
including: agriculture, forestry and fishing	325.1	617.8	764.4	769.5	520.6	341.9	5.2
The share of investment directed to agriculture, %	2.1	3.5	4.4	4.2	3.0	2.0	-4.7

Source: Own calculations based on the data from The State Statistical Committee of the Republic of Azerbaijan, Statistical indicators of Azerbaijan 2022. p. 506 [7].

According to the data of the State Statistics Committee, as can be seen from the dynamics of the investment directed to the fixed capital, the rise of agricultural investments by 2020 is visible in absolute numbers. In 2019, fixed capital investment in the relevant area increased more than twice as much as it did in 2016 [7]. This upward tendency was mirrored in the particular weight of total investments. However, after 2020, there has been a reduction. This is because to the COVID-19 pandemic, which is hitting Azerbaijan as well as the rest of the world. To begin with, COVID-19 caused an economic supply problem and had a negative influence on investment volume. However, in 2021, the

beneficial effect of prior years' increasing agricultural investment was reflected in a rise in overall agricultural production.

As can be seen from Figure 1, in 2021, despite the complications caused by the COVID-19 pandemic, an increase of 3.4 percent was observed in the production of overall agricultural products compared to 2020. It should also be noted that this growth occurred at the expense of agricultural products. Compared to 2020, the increase in the relevant area was 3.2 percent. In animal husbandry, it decreased by 0.3 percent. Achieving such productivity in the field of horticulture can be explained primarily by innovation-derived investments in this field [7].

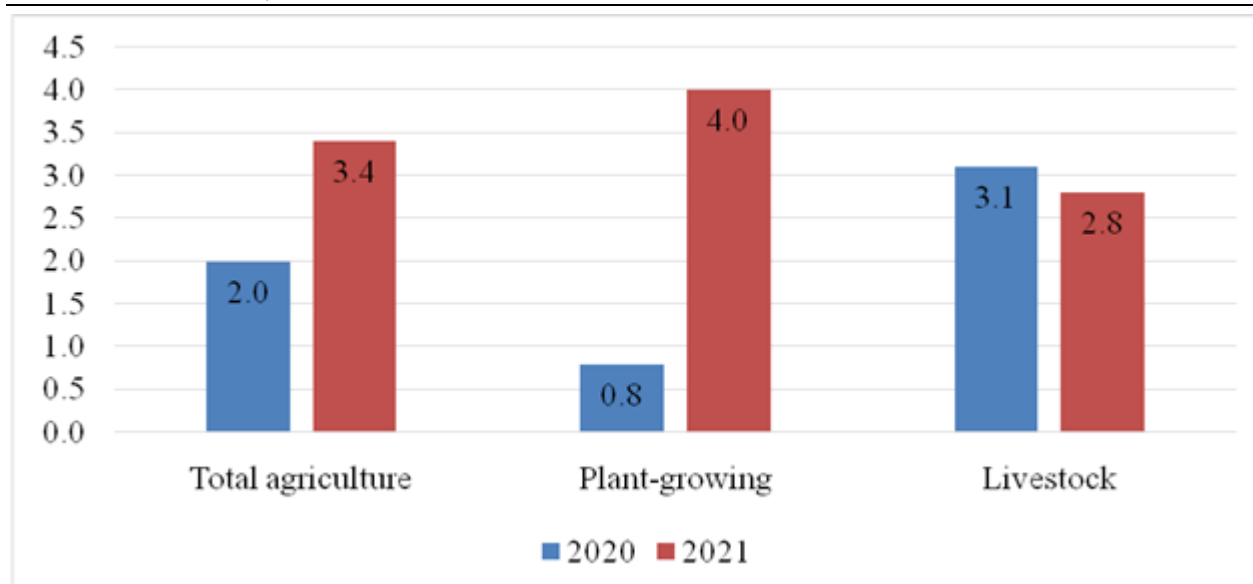


Fig. 1. Agriculture physical volume index (with comparable pricing compared to the previous year, (%))  
 Own calculations based on the data from The State Statistical Committee of the Republic of Azerbaijan, The Agriculture of Azerbaijan 2022. p. 506 [7].

As can be seen from Table 2, the number of tractors and their aggregates has increased over the previous six years. The number of tractors in 2021 has more than doubled compared to 2016 and reached 36,808 units. The similar upward tendency may be seen in the number of aggregates. For example, the

number of plows increased about 5.6 times, cultivators increased nearly 20 times, grain-seed sowers increased approximately 13 times, mowers increased approximately 13.3 times, and threshers increased approximately 2.5 times [7].

Table 2. Park of the main types of agricultural machinery, by the end of the year, number

Years	Tractors	Plows	Cultivators	Grain and seeds sower	Mowers	Threshers
2016	17,043	1,002	79	294	128	683
2017	21,787	1,624	192	603	440	824
2018	34,829	4,350	589	1,697	660	1,656
2019	34,936	4,413	1,094	1,797	755	1,580
2020	34,954	4,519	1,277	3,233	1,312	1,512
2021	36,808	5,602	1,618	3,819	1,703	1,697
2021/2016 %	116	559	2,048	1,299	1,330	248

Source: Own calculations based on the data from The State Statistical Committee of the Republic of Azerbaijan, Statistical indicators of Azerbaijan 2022. p. 70 [7].

This tendency may also be seen in the increase in the use of other farm machinery (Table 3).

Statistical analyses demonstrate that the number of agricultural machinery has increased during the previous six years.

Thus, in comparison to 2016, the number of potato harvesters climbed 12 times, sugar beet harvesters increased 142 times, solid mineral fertilizers disintegrators increased 10 times, and sprinklers and pollinators increased 13 times [7].

Without the state's support in the relevant sector, recording the aforementioned rapid growth indicators would be impossible.

Thus, agricultural machinery leasing is governed by Cabinet of Ministers of the Republic of Azerbaijan Decision No. 58 of March 31, 2005, "Rules for leasing agricultural machinery and technological equipment belonging to Agroleasing Open Joint-Stock Company to legal and natural persons," and is carried out in accordance with the approved Rules.

Table 3. A park of the main type of agricultural machinery, by the end of year, unit

Years	Machineries			
	Potato harvester	Sugar beat harvester	Solid mineral fertilizers disintegrators	Sprayers and pollinators
2016	5	1	54	130
2017	12	8	82	194
2018	39	31	211	849
2019	43	35	281	961
2020	49	34	335	1,299
2021	59	142	518	1,665
2021/2016%	1,180	14,200	959	1,280

Source: Own calculations based on the data from The State Statistical Committee of the Republic of Azerbaijan, Statistical indicators of Azerbaijan 2022. p. 70 [7].

Legal and natural persons who seek to purchase agricultural machinery through leasing must pay at least 10% of the total cost of the machinery in advance, and the remaining part no later than 10 years, by applying to "Agroleasing" OJSC by electronic application or directly, including the insurance charge. At the same time, keep in mind that the lease procedure has been made as simple as possible. The following are the simplified rules:

1. An entrepreneur can buy agricultural machinery through leasing by providing an ID card and the requisite payment.
2. When 20 percent of the initial cost of agricultural machinery is paid, a 40 percent incentive is applied at the expense of the state budget [6].

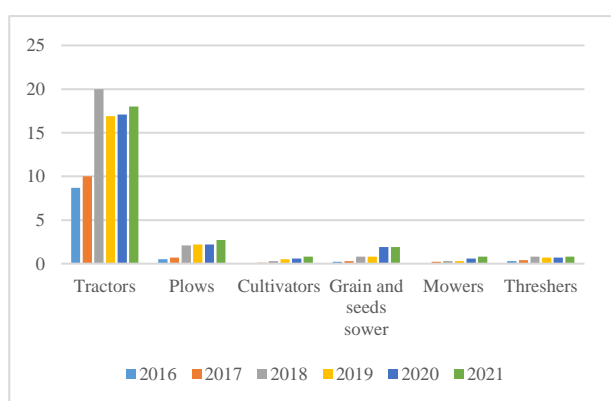


Fig. 2. The main indicators reflecting the machinery per 1,000 ha arable land, 2016-2021 ( number/1,000 ha)  
 Source: Own calculations based on the data from The State Statistical Committee of the Republic of Azerbaijan, Statistical indicators of Azerbaijan 2022. p. 52, 70 [7].

Despite a recent growth in the quantity of agricultural machines, the existing machinery

is still insufficient for agricultural development. As can be seen from the figures, the number of machines per hectare of arable land is not even 0.1 units. As a result, Azerbaijan's agriculture productivity is quite poor by global standards.

According to this viewpoint, increasing the amount of machinery will create circumstances for increased production, and as a result, agricultural product producers' earnings will rise.

In comparison, Azerbaijan's cereal yield in 2021 was 32.8 centners, whereas Germany's yield reached 70 centners (2.1 times more) [3].

In developed countries like Germany, innovative technologies make it possible to make concrete proposals to promote economic, social and environmental sustainability. This necessitates the upgrading of agri-food systems [2].

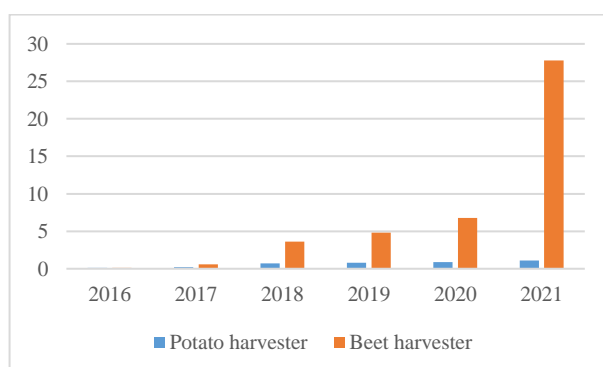


Fig. 3. The main indicators reflecting the number of harvesters per ha of potato and sugar beet cultivated area 2016-2021 (Number/1,000 ha)  
 Source: State Statistical Committee of the Republic of Azerbaijan, Statistical indicators of Azerbaijan 2022. p. 52,70,71 [7].

This circumstance is likewise comparable to potato and beet harvesters. Potatoes grown in Azerbaijan, particularly in remote areas, are harvested only mechanically. This eventually leads to low productivity and increased imports to fulfill domestic demand for those products. The number of beet pickers has recently increased in comparison to potato pickers. However, this figure is also not at a satisfactory level. As can be observed, the lack of machinery, in general, has a significant impact on crop cultivation productivity in Azerbaijan's agriculture. We consider that there is an essential need in our country to study overseas experience in this area and apply that knowledge to local settings.

It was vital to emphasize the importance of subsidies in funding sources for farmers to focus on innovative agricultural initiatives. As a result, our research indicates that the special weight of the subsidy on income is significant. Cotton plant subsidies range from 21 to 24 percent, grain crops from 6 to 9 percent, seedlings from 7 to 10 percent, cabbage crops from 12 to 19 percent, and onions from 5 to 18 percent. These figures highlight the unique role of government assistance in agricultural financing. Because credit and insurance institutions' involvement in the agricultural sector in Azerbaijan is now unsatisfactory.

It should also be noted that regional state structures and private institutions should cooperate more closely, natural and economic resources in the region should be productively involved in the financial circulation of the economy, the creation of reliable and sustainable sources of taxation, ensuring the honesty and transparency of financial reports, protecting the principles of business and healthy competition in the business environment will all be significant.

## CONCLUSIONS

In recent years, monies devoted to machinery and equipment used in horticulture have expanded several times in Azerbaijan as part of fixed capital investments. Despite the negative impacts of the pandemic, this has

resulted in a rise in production in the relevant sector. Investors will invest more in locations where financial and investment activity is high, firms are not operating at a loss, business entities are developing, and the payback potential of the resultant investments is formed. In addition, the formation and development of relevant institutions and structures that have the authority to implement the functions of formation, concentration, and distribution of regional financial and credit resources at the local level should be ensured. Evaluation of various segments of financial markets at the regional level, provision of access to financial and credit resources are characterized as very important issues. In addition, the funding sources of Azerbaijan's innovation-derived agricultural investment should be properly identified and analyzed. Access to financial resources for agricultural innovation-derived investments is essentially determined by the direction of these investments. As a result, such directions should be researched and their priority status established. Internal and external funding are the two primary means of financing innovative agricultural investments. Based on our research, we came to the conclusion that the absolute dominance of small producers in Azerbaijan's agriculture significantly limits domestic resources. For this reason, external sources play the main role in accelerating investment. Public-private partnership plays an important role in the wide spread and development of innovation-oriented investments. First of all, this partnership should be considered as a strategic tool that will ensure the competitiveness and sustainable development of local producers in both domestic and foreign markets. At the same time, along with the creation of this partnership, it is proposed to create an appropriate infrastructure system for access to the sources of innovative investment.

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