

## Directions for stimulating the application of innovations in the agricultural field and legal basis

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**Abstract.** The legislation of the Republic of Azerbaijan contains provisions aimed at stimulating innovation activities. At the same time, the issues of promotion and support of innovation activities are reflected in relevant state programs and strategic development documents. In the "Strategic Road Map of the perspective of the national economy of the Republic of Azerbaijan" approved by the Decree of the President of the Republic of Azerbaijan "On the approval of strategic road maps for the main sectors of the national economy and the economy", a number of measures related to innovation policy and the establishment of an innovative economy were determined. In this document, innovation activity is defined as the main driving force for increasing labor productivity and competitiveness in the fields of production and management, ensuring continuity in the development of human capital, and it is intended to pay attention to the importance of this activity when preparing action plans and state programs that will stimulate the promotion of innovation in the country.<sup>1</sup> In the "Azerbaijan 2030: National Priorities for socio-economic development" approved by the Decree of the President of the Republic of Azerbaijan

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<sup>1</sup><https://monitoring.az/assets/upload/files/15075d6928310402cd152c96db0d6835.pdf>

dated February 2, 2021, the formation of competitive human capital and the space of modern innovations is included among the main priorities to be realized in the next decade. As already mentioned, selection work in the agricultural field is an important direction of innovation. According to the current legislation, selection works in Azerbaijan, production of original, super-elite and elite seeds are carried out in experimental farms of scientific-research and educational institutions under the control of the author of the variety or the patent holder. Plant varieties produced in the country and imported into the country are registered in the "State Register of Selection Achievements, whose use is permitted and protected for the production of agricultural products in the territory of the Republic of Azerbaijan". Currently, the State Register contains 1,753 varieties of agricultural plants, hybrids and breeds, including 455 varieties of cereals, legumes, technical and fodder plants, 877 varieties of vegetables, melons and root-fruit plants, 378 varieties of fruits, berries, decorative flowers and ornamental plants. /hybrid, there are 3 sheep breeds and 40 silkworm hybrids/breeds<sup>2</sup>

The share of local varieties in the total number of new varieties and hybrids registered in 2019 was 10.7 percent, and in 2020 it was 8.1 percent. 28.6 tons of original seeds were produced in the country in 2019 and 43.8 tons in 2020.

**Key words:** agriculture, investment, capital, productivity, stimulation, legal basis

**Introduction.** The legislation of the Republic of Azerbaijan contains provisions aimed at stimulating innovation activity. At the same time, the issues of promotion and support of innovation activities are reflected in relevant state programs and strategic development documents. In the "Strategic Road Map of the perspective of the national economy of the Republic of Azerbaijan" approved by the Decree of the President of the Republic of Azerbaijan "On the approval of strategic road maps for the main sectors of the national economy and the economy", a number of measures related to innovation policy and the establishment of an innovative economy were determined. In this document, innovation activity is defined as the main driving force for increasing labor productivity and competitiveness in the fields of production and management, ensuring continuity in the development of human capital, and it is intended to pay attention to the importance of this activity when preparing action plans and state programs that will stimulate the promotion of innovation in the country ["Strategic Road Map of the perspective of the national economy of the Republic of Azerbaijan", 2016]]. In the "Azerbaijan 2030: National Priorities for socio-economic development" approved by the Decree of the President of the Republic of Azerbaijan dated February 2, 2021, the formation of competitive human capital and the space of modern innovations is included among the main priorities to be realized in the next decade [[<http://axa.gov.az/files/2021-20cil%20D%C3%B6v1%C9%99t%20Reyestri.pdf>; p. 4]. As already mentioned, selection work in the agricultural field is an important direction of innovation. According to the current legislation, selection works in Azerbaijan, production of original, super-elite and elite seeds are carried out in experimental farms of scientific-research and educational institutions under the control of the author of the variety or the patent holder. Plant varieties produced in the country and imported into the country are registered in the "State Register of Selection Achievements, whose use is permitted and protected for the production of agricultural products in the territory of the Republic of Azerbaijan". Currently, the State Register contains 1,753 varieties of agricultural plants, hybrids and breeds, including 455 varieties of cereals, legumes, technical and fodder plants, 877 varieties of vegetables, melons and root-fruit plants, 378 varieties of fruits, berries, decorative flowers and ornamental plants. The share of local varieties in the total number of new varieties and hybrids registered in 2019 was 10.7 percent, and in 2020 it was 8.1 percent. 28.6 tons of original seeds were produced in the country in 2019 and 43.8 tons in 2020.

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<sup>2</sup><https://atm.gov.az/az/news/562/qubada-innovasiya-festivali-kecirilib/>

**The aim of the article.** Currently, investments in the non-oil sector are increasing in Azerbaijan. In particular, the specific weight of innovation-oriented investments in the agricultural sector is increasing. I believe that the legal basis of innovation-oriented investments in the agricultural sector, which has its own characteristics in the development of the economy, is of interest to both domestic and foreign investors.

**Discussion.** At present, in addition to traditional breeding, in vitro breeding of seeds and seedlings has been started in Azerbaijan. In 2021, in vitro propagation of blueberry and tea plant was started for the first time in the Biotechnology laboratory of the Scientific Research Institute of Fruit and Tea Cultivation of the Ministry of Agriculture in Guba. In 2021, 5 varieties of pome fruit plants were propagated by in vitro method. Although this type of tea was brought to the country in 2003, its production was first started by the Fruit and Tea Plantation Institute "Plants propagated by the in vitro method in our country have been transplanted to the fields". Also, a modern biotechnological laboratory operates in the Scientific Research Institute of Vegetables for the purpose of obtaining potato virus-free mini-tubers in vitro in the laboratory "For the first time in Azerbaijan, a biotechnology laboratory for potatoes was established"<sup>3</sup>In 2021, potato seed materials were obtained by the in vitro method by the Vegetable Research Institute "Jelilabad seed and equipment exhibition-sale fair was held". At present, along with state research institutes, seedling cultivation has started in the private sector as well. "Grand-Agro Invitro" LLC is an Azerbaijani company operating on virus-free plant propagation by cloning method and has the potential of growing 4 million plants per year. The institution consists of a plant tissue laboratory and a greenhouse complex with special adaptation indicators, and cooperates with enterprises and institutions operating in the fruit growing and nursery sector at the local and international level. Thanks to the company's applied modern technologies, there are opportunities to grow high-quality products that cannot be reproduced by traditional methods, as well as can withstand domestic and foreign market competition Official website of "Grand-Agro Invitro" LLC, "Agro Food Investments" LLC.<sup>4</sup> Another direction of the implementation of innovation activities in the agricultural field includes the application of new methods and technological equipment during the organization of production. This includes the implementation of activities such as planting, harvesting, storage and packaging of products with the application of new modern techniques. Measures are being taken in the field of cotton growing in Azerbaijan with the application of innovative methods. Currently, cotton cultivation is carried out by Chinese, Turkish, and Greek methods, and other methods are also being studied in the field of applying advanced technologies. In 2020, cotton planting was carried out on 3.7 thousand hectares using the Turkish method, on 18 hectares using Chinese technology, as well as using modern irrigation systems, including the pivot irrigation method on 5.2 thousand hectares, and the drip method on 114 hectares. The service sector related to the application of NDVI technologies in the field of using innovative technologies in the efficient organization of production in the agricultural field is being formed. Currently, "AZDynamics" in Azerbaijan provides innovative services as an independent innovation company conducting research and development in the field of high technologies [Information about "AZDynamics" innovation company, <https://www.dynamics.az/about>]. With the application of these technologies, manufacturers have the ability to perform forecasting and production planning. The implementation of improvements and innovations in the management system in the agrarian field is manifested especially in the activities carried out in the direction of increasing the efficiency of state support measures. The Electronic Agricultural Information System (EAIS) is a single system that contains the main principles of the Ministry of Agriculture of the Republic of Azerbaijan (closeness to farmers, transparent and efficient management, and the application of innovation), includes a wide range of integration opportunities with internal and external systems, and creates a foundation for the establishment of an agricultural chain. is a system. EAIS is, first of all, a transparent and operational management tool that includes the formation of modules covering business processes related to all stages

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<sup>3</sup><https://marja.az/29520/azerbaycanda-ilk-defe-kartof-ucun-biotekhnoloji-laboratoriya-yaradilibmusahibe>

<sup>4</sup><https://grandagroinvitro.az>

of state support measures for agricultural producers. EAIS is a unified system that covers all areas of agriculture over time, and also enables the establishment of a logical connection of all processes related to agriculture, the completion of processes, conducting analyses, the application of modern technical solutions, and the provision of forecasts based on accurate data. In EAIS, there are opportunities to establish control mechanisms to ensure proper implementation and development of agricultural processes, as well as to monitor processes in real time. EAIS has opportunities to prepare analytical reports and build models that will help decision-making and form the basis of planning for future development, as well as the collection and creation of "Big Data", which is the main requirement of the modern era. Also, the introduction of EAIS allows for the collection and extensive analysis of agrodata, providing full transparency in the provision of subsidies for the first time in Azerbaijan "What is EKTIS?"<sup>5</sup>

**Certain measures have been implemented in the direction of expansion of innovation activities in the agricultural sector in Azerbaijan.**

Certain measures have been implemented in the direction of expansion of innovation activities in the agricultural sector in Azerbaijan "Ways of increasing the effectiveness of innovation policy in Azerbaijan"<sup>6</sup> Propaganda work related to the application of innovative approaches has been increased, especially in recent times. Implementation of activities related to dissemination of innovations in the form of small projects and start-ups has been started. The importance of innovations in terms of farmers and the development of the agricultural sector, their application possibilities, and the latest innovative technologies available in the world economy have been studied. At present, support measures are implemented by the state in order to stimulate the production of agricultural products using innovative methods. Thus, in order to expand the application of modern water-saving irrigation systems, the application of these systems for intensive gardens is defined as a condition in the existing subsidy regulations. At the same time, 40% of the cost of the equipment is subsidized by the state in order to compensate a certain part of the investment costs of the farmers for the installation of modern irrigation systems. Modern irrigation infrastructure has been created on approximately 75,000 hectares of cultivated land in the country. In 2020, a discount of 20.5 million manats was applied for this purpose. Also, a 40% discount is applied by the state to the sale of drones, robotics and intelligent management technological equipment intended for use in agriculture. At the same time, in order to promote the innovation environment in the country and expand the scope of innovation activities, according to Article 102.1.31 of the Tax Code, startups that are micro or small business entities and operate as individual entrepreneurs receive income from innovation activities for 3 years from the date they receive a "Startup Certificate" is exempt from income tax for the period [Tax Code of the Republic of Azerbaijan, Baku 2000.<sup>7</sup> In general, the organization and implementation of innovation product production in the country is a field that requires high investment. Also, the application of innovative approaches is considered to be a financially intensive as well as a scientifically intensive field. However, in the future, the sustainable development of the agricultural sector in Azerbaijan will be possible precisely with the application of innovative technologies. In this regard, the expansion of the application of innovative technologies in the context of agricultural producers is directly related to state support. In other words, the development of the agricultural sector in the country with the application of innovative technologies depends on the state's promotion measures in this field. Based on the conducted research, it is appropriate to implement state support measures in the following directions in order to stimulate the expansion of the application of innovations in the agricultural sector in Azerbaijan.

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<sup>5</sup><https://www.agro.gov.az/az/ekt>

<sup>6</sup>[http://edf.az/uploads/documents/innovasiya\\_siyaseti.pdf](http://edf.az/uploads/documents/innovasiya_siyaseti.pdf)

<sup>7</sup><http://e-ganun.az/framework/46948>

**Creation of an agro-innovation park** It is envisaged to create a single space in the country for the state, academic institutions and the private sector to work together for the purpose of applied research and economic development. For governments, innovation parks are a tool for economic development. For the private sector, innovation parks are a tool that minimizes labor and investment costs, and allows universities to use highly qualified workers and researchers, as well as physical and laboratory facilities. For academic institutions, innovation parks are a means of obtaining grants from the government and the private sector to finance research. All three parties are closely related to each other and are interested in cost reduction. There are three forms of state intervention in innovation parks: Science policy, Technology policy, Innovation policy. The main focus of science policy is new scientific findings, and the state regulates the implementation of this policy through means such as research funds, tax incentives for entrepreneurs, higher education and intellectual property rights. Technology policy is broader than science policy and is aimed at improving and commercializing sectoral technical knowledge. The state achieves these goals through public procurement, state aid to strategic sectors, employment and professional skills enhancement, standardization, and providing performance measurement tools to industrial sectors. Innovation policy, which is a combination of science and technology policies, aims to develop the overall innovative performance of the economy. Innovation policy aims to create synergies between corporate law, competition regulation, consumer protection and education, labor and environment, which shape industrial policy.

### **Expanding the scope of application of NDVI technologies**

With the application of NDVI technologies, it is possible to create an agroanalytical system that provides complex solutions for farms. NDVI is a relative index derived from the absorption of electromagnetic waves in the red range (RED) and reflection of infrared waves (NIR) by plant leaves based on satellite images. Agroanalytics is a hardware-software complex based on the analysis of soil temperature and humidity coefficients during the growing season of plants, as well as sensor data installed on equipment and trailers, with reference to data transmitted from satellites"AZDynamics", NDVI (Normalized Difference Vegetation Index - Multispectral analysis,<sup>8</sup> The application of the system creates opportunities such as i) real-time control of the performance of farm work, ii) control of the quality of work done, iii) support for productivity forecasting, iv) control of harvest and transportation, v) automatic calculation of work done in the fields. In order to stimulate the application of these technologies, incentive tools can be defined in the state support mechanism. Increasing the use of innovative technologies that increase efficiency in the production of agricultural products (plowing, planting, harvesting, storage, transportation, etc. operations). Stimulation of the introduction of new techniques and technologies in the production process includes the implementation of state incentives to accelerate the transition to intensive farming methods (BirgölUyan, 2018). Incentive measures include the provision of information and advisory services to farmers on the introduction, use and benefits of new techniques and technologies, the provision of certain concessions for the acquisition of these techniques and technologies, and the formation of a service sector in the field of application of innovative technologies (GökhanÖzertan, 2013). The creation of exemplary farms with the application of innovative technologies can also be considered here.

**Conclusion.** The introduction of innovations in the field of agriculture acts as one of the main factors determining the dynamic development of the agrarian sector. Agrarian innovations also play an important role in the implementation of sustainable development principles. The innovative development of agriculture is a science-intensive and investment-intensive process. From this point of view, there is a need to create an innovation environment in the agricultural sector of the country's economy, increase access to innovative techniques and technologies, and accelerate adaptation to new technologies. Stimulating the application of innovative technologies in irrigation at the current stage, as well as the use

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<sup>8</sup><http://www.dynamics.az/multispektral-analiz.html>



of drones and other innovative tools through the subsidy mechanism, providing tax incentives to start-ups operating in the field, and organizing information and consulting services related to the spread of innovations have the potential to have a significant impact in the indicated areas. At the same time, it is appropriate to expand the scope of state support measures in terms of accelerating the innovative development of agriculture. Taking into account the relevant world experience, the main directions of the actions to be implemented in this field can be attributed to the support of the creation and operation of agro-innovation parks, the promotion of the expansion of the scope of the application of NDVI technologies, the strengthening of the stimulation of the use of innovative technologies that increase the efficiency of operations in the production of agricultural products.

In recent years, a number of decisions have been made in the country to implement the investment-based development model and strengthen investment activity, and a number of important steps have been taken in the direction of improving the business environment, stimulating investment activity and non-oil exports. However, our research and analysis lead to the conclusion that the adopted decisions and implemented measures are not enough to strengthen investment activity in the country. Therefore, in order to strengthen the investment stimulation policy, we consider it necessary to implement the proposed recommendations in the following directions: 1. In the field of investment stimulation policy formation:

- a unified government investment policy should be developed in the field of increasing investment activity and investment stimulation in the country. Here, all the reasons hindering the activity of potential investors and specific policy tools and measures for their elimination should be reflected in a systematic and consistent manner;
- the institutional reforms to be implemented in the country and the behaviors targeted by them should be presented to the public and potential investors in detail, indicating the implementation periods;
- in order to improve the investment environment, the mechanisms that ensure the protection of property rights in real rather than formal terms should be provided in the short term, official entrepreneurship should be eliminated, and the public disclosure of official income approvals should be ensured;

- the fate of investment activity and business development depends primarily on ensuring the independence and fairness of the judicial system. Establishing an independent and fair judiciary is the number one issue of institutional reforms: because solving many of the obstacles to business development and investment activity depends primarily on ensuring the fairness of the courts;

- mechanisms for making business-oriented government decisions should be changed: the drafts of such decisions should be submitted to public discussions in advance, the position of various interested parties should be studied, the reasons for these steps and the results of assessing their impact on business should be disclosed to the public;

- the government's practice of making secret decisions affecting business costs and revenues should be abandoned. There should be a government program for such changes, which should provide the timelines and justifications for expected changes. The public and the business should be informed at least 6 months in advance about such planned changes so that the business can properly plan its work;

- the government's macroeconomic stabilization, budget-tax, monetary-credit and investment stimulation policies should be efficiently coordinated;

- "Competition Code", as well as new laws "On Investment Activity" and "On Protection of Foreign Investments" should be adopted, etc. 2. In the field of state investments:

- taking into account that sufficient physical capital has been created in the country, the main center of gravity of state investment activity should be shifted to the development of "human capital". It is necessary to improve the quality of education at all levels, adapt education to modern market requirements, and increase attention to the development of technical education in the country;

- the scale of the public sector should be reduced: the "state expansion" policy implemented during the period of large oil revenues should be abandoned, steps should be taken in the direction of increasing the

efficiency of the activities of state enterprises and applying modern efficient management; implementation of corporate governance standards in large state enterprises should be accelerated;

- mechanisms for evaluating state investment projects should be developed and implemented (for example, in 2009, the World Bank proposed to the government to prepare such a mechanism - to prepare an "Annual Report Card" on the quality of infrastructure for government investment projects);

- criteria and mechanisms for the selection of areas to be involved in special support programs by the state should be worked out, selections should be justified, fairness and objectivity should be ensured in order to contribute to the rapid growth. For this, the competitive advantages of the field, the export potential of products and export markets, the dynamics of expected growth of market shares during the period of state support, the period of suspension of state support and guarantees for the competitive development of the field in the period after that can act as selection criteria;

- processing industry areas should be given preference when choosing areas that will provide breakthrough growth; 3. In the field of stimulation of foreign investments:

- a comprehensive system of measures aimed at attracting direct foreign investments to the country's non-oil sector, especially export-oriented processing industry areas, should be developed and implemented;

- to conduct individual negotiations with several world-renowned companies for the production of certain products in our country and create conditions for their activities; • in order to improve the work of attracting foreign investors to the country's non-oil sector, serious changes should be made in the activity of AZPROMO: its activity should be based on more specific goals, the result indicators of its activity should be applied, an accountable activity system should be established, the efficiency of the institution and the costs of its activity should be attracted to the country during the year should be compared with the amount of investments made. The institution's website should be improved and enriched with detailed information that would interest potential investors regarding the country's investment potential and investment environment. Such information should be provided on the website in at least 6 languages (Azerbaijani, English, Russian, Turkish, Arabic, Chinese, etc.). 4. In the field of stimulation of domestic investments:

- to improve and strengthen the activity of state investment promotion institutions operating in the country:

- i) to reorganize the work of these institutions based on the experience of similar institutions in foreign countries;

- ii) for the efficient and effective establishment of the activity of these institutions, evaluation indicators of their work should be developed and applied; a long-term accountability system should be established for the projects implemented at the expense of their funds, so that it is possible to assess the benefit of the allocated resources to the society;

- iii) i employees working in these institutions should be provided with exchange of experience in similar foreign institutions and it is necessary to achieve mastery of advanced practices of those institutions;

- iv) after improving the activities of these institutions, the amount of funds allocated to them from the state budget should be increased; • taking into account the activities of similar organizations in foreign practice, priority should be given to micro and small entrepreneurs, especially those who have just started a business, in the granting of SKMF loans. The accountability system of the Fund's activity brings to the society the number of successful entrepreneurs who have expanded their business, the share of enterprises established with the Fund's loans in exports and added value, etc. should be based on specific indicators. • creation of specialized field banks (Agrarian Development Bank, Export Bank, Investment Bank, etc.) should be ensured with the close participation of the state; • A fund for insurance and guarantee of loans given to SMEs should be created, etc.

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