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Innovations and analysis of their use in the agricultural sector of the economy of Uzbekistan

[1]Samatov Gaffor Allakulovich, [2]Rustamova Iroda Baxramjanovna, [3]Galimova Firyuza Rafikovna, [4]Dekhkanova Nilufar Sagdullaevna, [5]Juraev Farkhod Mamadiyorovich
[1]Professor, [2, 3, 5]Assistant professor, (PhD), [4]Senior Lecturer,
[1]Department of Transport Logistics, [2, 5]Department of Agrologistics,
[3, 4]Department of Agribusiness and Investment Activities,
[1]Tashkent Institute of Design, Construction & Maintenance of Automotive Roads, Tashkent city, Uzbekistan,
[2, 3, 4, 5]Tashkent State Agrarian University, Tashkent city, Uzbekistan
Email - [2]irodarustamova@mail.ru, [3]firuzaza@mail.ru, [4]dexkanova17@mail.ru

Abstract: *The development of agriculture on an innovative basis is a factor in increasing production efficiency, and also helps to meet the demand for agricultural products, taking into account the efficient use of natural resources. In this paper, the essence of innovations is revealed, and an analysis of the use of innovations in the agricultural sector of Uzbekistan is carried out: the number of product and process innovations in Uzbekistan; the number of organizations performing R&D and the volume of work performed; R&D expenses by branches of agricultural sciences, etc. On the basis of the analysis, proposals are made to improve investment activity in the agricultural sector.*

Key Words: *Innovation, agrarian sphere, R&D, innovative activity, innovative development, technological innovation, marketing innovation, organizational innovation, economics, agricultural production.*

1. INTRODUCTION:

World experience shows that in the conditions of a knowledge-based economy, there are no alternative ways, except for the way of innovative development of the economy. The creation, implementation and wide dissemination of new products, services and technological processes is becoming an important factor in production, employment and investment volumes. It is here that the reserves of improving the quality of products, saving labor and material costs, increasing labor productivity, improving the organization of production and increasing its efficiency are hidden. All this, ultimately, determines the competitiveness of enterprises and their products in the domestic and world markets, and the improvement of socio-economic situations. The experience of the USA, Great Britain, Germany, Denmark, Singapore, Finland, Switzerland, Sweden, the Netherlands, Ireland, Japan, Korea, the Russian Federation (leaders of the global innovation index) and a number of other countries that have achieved sustainable economic growth based on innovation is noteworthy.

Scientific research indicates the existence of a comprehensive and effective system for the development of innovative activity in agriculture of developed foreign countries. One of the highest priority areas for increasing the effectiveness of institutional and economic reforms in the country's agricultural sector is the development of innovative processes. The need to intensify innovation processes is due to the relatively low level of technical and technological equipment of agricultural enterprises, insufficient activity in the implementation of scientific developments and innovations, the length of the adaptation time to rapidly changing consumer requirements, and virtually no competition in the agricultural sector (1). In the conditions of abrupt global climate change, innovations are the basis for ensuring competitive advantages, and also contribute to increasing the efficiency of production development and maintaining market positions. This is confirmed by a number of expert assessments, according to which economic growth by about a third is ensured by innovative technologies (2). The purpose of this study is to analyze the use of innovation in the agricultural sector of the economy of Uzbekistan.

2. MATERIALS AND METHODS:

The work used economic-statistical, abstract-logical, monographic and expert research methods. The empirical basis for the study was the data of the State Statistics Committee of the Republic of Uzbekistan, studies conducted at the Tashkent State Agrarian University in the framework of the applied project No. AT -20170928458 "Improving the use of innovative, resource-saving technologies in agriculture."

3. RESULT AND CONCLUSIONS:

The economic essence of innovation is to obtain the final result of innovation, embodied in the form of a new or improved product (service) sold on the market, as well as a new or improved technological process used in practice

(3). In accordance with international methodological recommendations and standards (Oslo Manual, 2005), four main types of innovations are widely used abroad in public life - product, process, marketing and organizational, which determine their economic essence (3). As world experience shows, effective innovation is possible if at least the following conditions are present: state support at the stages of research and development (R&D), the formation of intellectual property and the creation of prototypes; creation of appropriate conditions and developed infrastructure for the practical implementation of innovations at the stage of R&D implementation; expanding the sources of financing innovation through attracting private investors at the stage of commercializing R&D results (4). However, the interests of private investors and the state in their implementation of innovative activities do not always coincide. In most cases, the main goals of private entrepreneurs are the industrial development of R&D results with the introduction of new or improved products (services) and the capitalization of innovative enterprises created by them for the implementation of specific innovative projects. After reaching the peak of capitalization, a private investor seeks to sell his stake in an innovative enterprise and refocuses on the implementation of a new innovative project. The goals of the state in the implementation of innovative projects are the launch of new products on the market and their subsequent production, which contributes to the transition of production to a qualitatively higher level and increase the competitiveness of domestic products in the domestic and international markets. To solve the problem of large-scale technological modernization of the domestic economy, a radical increase in the efficiency of spending allocated from the budget to support science and the concentration of scientific potential in the priority areas of scientific and technological development, as well as the formation of tools and mechanisms for interaction among all participants in innovation, is required (5).

According to official data, in 2018 in Uzbekistan, only 2558 innovations were introduced, of which 2482 were technological innovations, 42 were marketing innovations, 34 were organizational innovations. Compared to 2012, the number of technological innovations increased by 397.8%, marketing innovations - by 247.1%, and organizational innovations decreased by 58.6% (Fig. 1).

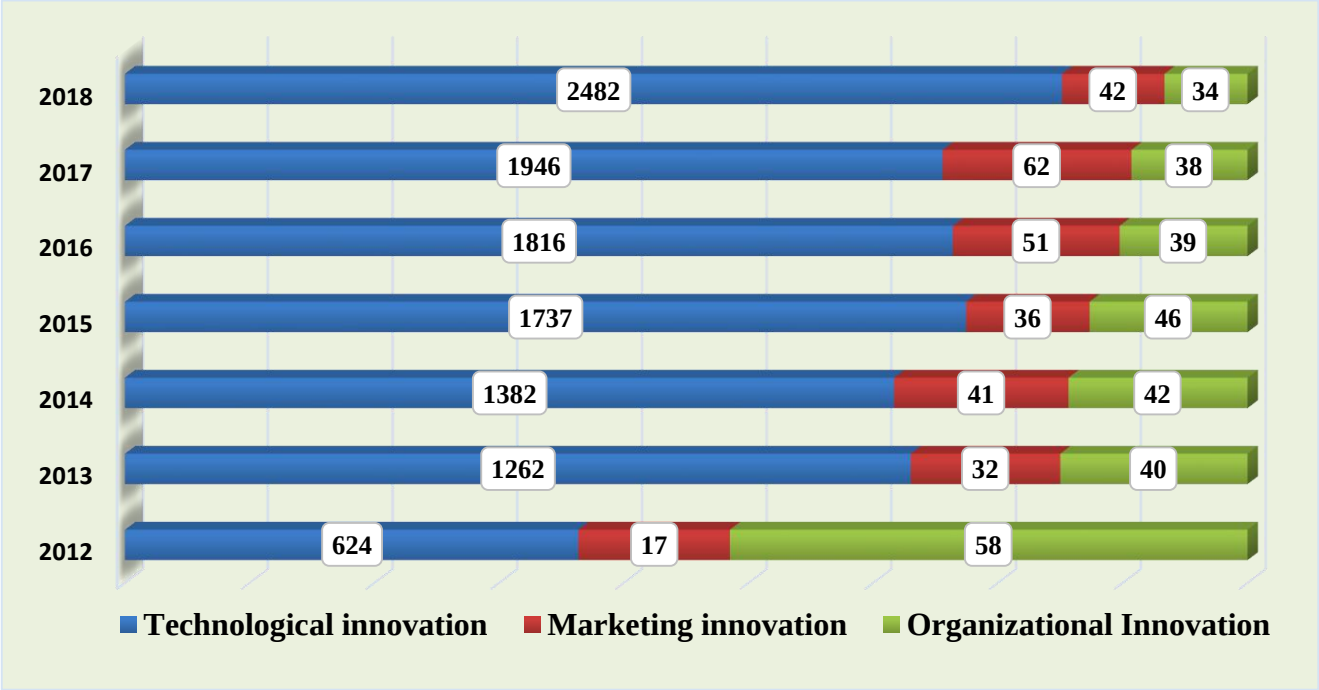

Figure 1. The number of innovations in Uzbekistan in 2012–2018[1]

Technological innovations consist of product (aimed at the development and implementation of technologically new or improved innovative products) and process (aimed at the development and implementation of technologically new or improved production or educational methods, including methods of transferring innovative products) innovations, which grew by 279.7 over the analyzed period and 544.1%, respectively (Fig. 2). In our country, large-scale work is underway to ensure the effective use of available financial and material resources while creating favorable conditions for innovative development, the implementation of scientific and scientific-technical activities.

[1] Compiled by the authors based on data from the State Committee of the Republic of Uzbekistan on Statistics

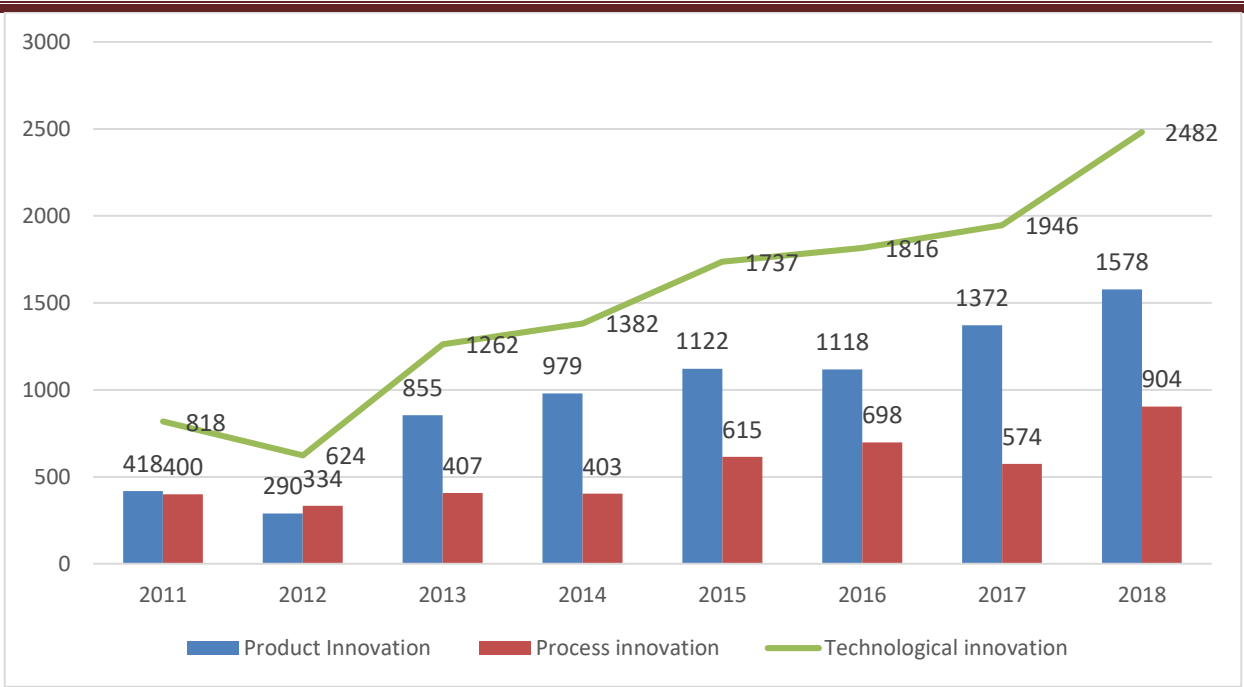

Figure 2. The number of product and process innovations in Uzbekistan in 2012–2018[2]

So, according to the data of 2018, more than 668 organizations engaged in research and development in the Republic of Uzbekistan rendered services in the amount of 680038.0 million soums (Fig. 3). Compared to 2010, the number of organizations performing R&D increased by 266, and the total amount of work performed by them increased by 5.6 times.

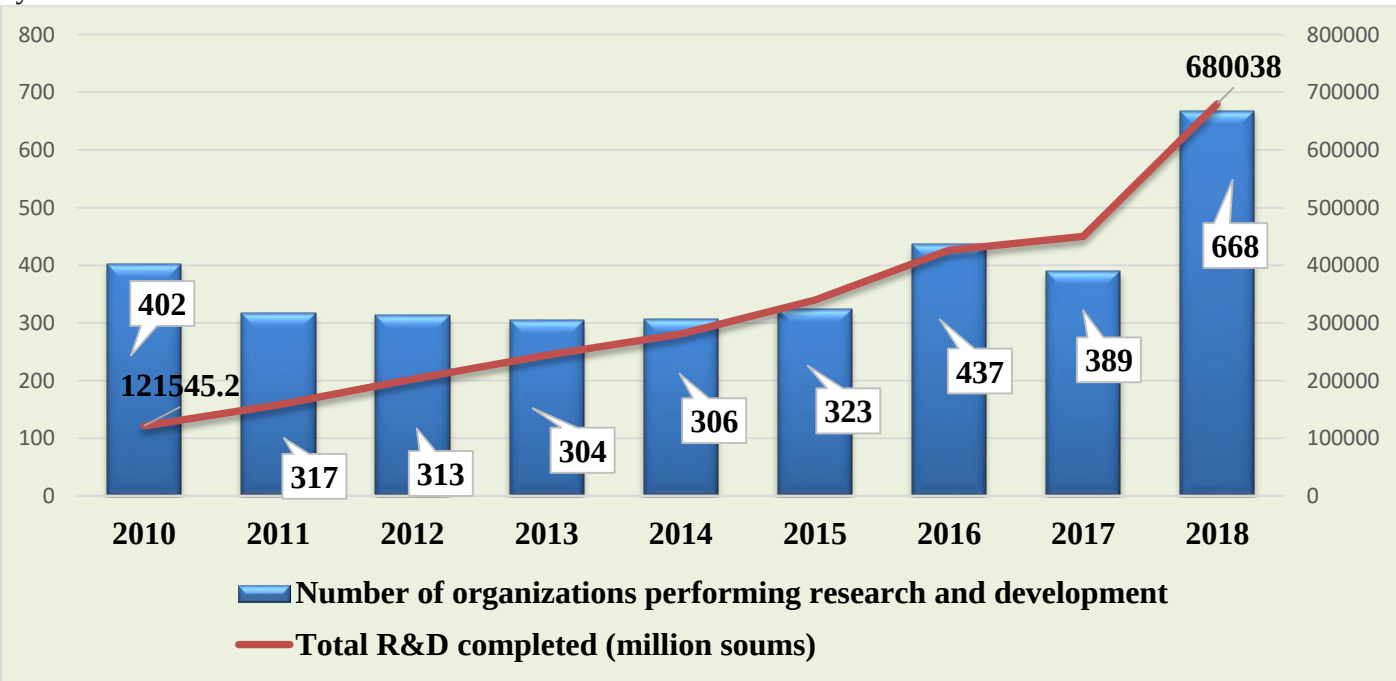

Figure 3. The number of organizations performing R&D and the volume of work performed in 2010-2018 (million soums)[3]

The financing of innovation is carried out at the expense of state and regional budgets and extra-budgetary sources, such as own or borrowed funds and funds of customers. So, in 2018, more than 815.9 billion soums were allocated from innovation to the budget. The main source of financing for innovative enterprises today is self-financing - own funds, retained earnings and depreciation charges. In particular, in 2018, the costs of technological, marketing and organizational innovations were financed from own funds - 62.9% (2959.2 billion soums), from foreign capital - 6.5% (307.1 billion soums), due to loans from commercial banks - 10.7% (501.5 billion soums), from other funds - 4.1% (122.7 billion soums) (Table 1).

[2] Compiled by the authors based on data from the State Committee of the Republic of Uzbekistan on Statistics
[3] Compiled by the authors based on data from the State Committee of the Republic of Uzbekistan on Statistics

Table 1
Costs of technological, marketing and organizational innovations by sources of financing in 2012–2018[4]

billion soums

Year	Total	Of these, by source of funding				
		Own funds of organizations	Foreign investment	Commercial Bank Loans	Budget resources	Other sources
2012	311,9	213,4	39,9	26,8		31,7
2013	4634,2	2501,5	1228,6	533,5		370,6
2014	3757,4	1381.5	32,3	262,5		2081,0
2015	5528,3	1251,8	156,6	280.1		3839,7
2016	2571,4	1180,0	314,9	157.3		919,1
2017	4162,3	2956,0	799,0	88,4	262,0	524,8
2018	4707,2	2959,2	307,1	501,5	815,9	122,7

The costs of technological, marketing and organizational innovations in agriculture, forestry and fisheries are presented in table 2. As can be seen from the table, the total volume of innovative products, works and services produced by own forces in 2018 increased by 15.6 times compared to 2010 and amounted to 28871465.3 million soums. Including, the volume of innovative products, works and services in agriculture, forestry and fisheries increased from 3874.8 million soums in 2010 to 118539.4 million soums in 2018. At the same time, a sharp decline in 2018 compared to 2017, the share of agriculture, forestry and fisheries in total expenditures on technological, marketing and organizational innovations, which amounted to less than 0.1%, indicates the presence of serious problems in this area.

Table 2
Dynamics of volumes and costs of production of innovative products, works, services in the Republic of Uzbekistan[5]

million soums

Years	The volume of innovative products, works and services - total	Of these, agriculture, forestry and fisheries	The costs of innovative products, work and services - total	Of these, agriculture, forestry and fisheries
2010	1849026,5	3874,8	264445,8	34,5
2011	1348657,8	3920.5	372646,3	119,7
2012	3635933,2	1443,3	311879,9	942,7
2013	4614656,2	6488,1	4634230,1	3988,2
2014	7042964,5	33912,1	3757372,2	1841,9
2015	8023628,5	16105,8	5528278,7	1775,3
2016	10688245,6	35520,3	2571405,6	8144,3
2017	18543331,0	47941,3	4162263,7	15684,6
2018	28871465,3	118539,4	4707211,8	71,3

An analysis of the total expenditures on research and development (R&D) in the context of branches of science also shows that the share of branches of agricultural sciences in total costs is relatively small (Fig. 4). As you can see, in 2010-2018, the total cost of R&D increased from 197.9 billion to 528.8 billion soums, or 167.2%, while expenditures on agricultural sciences increased from 36.6 billion to 49 , 9 billion soums, i.e. only 36.3 percent.

At the same time, 41.5 percent accounted for natural sciences in the total cost structure, 29 percent for technical sciences, and only 9.4 percent for agricultural sciences. Relatively low indicators of production of innovative products in the field of agriculture, forestry and fisheries in the republic are primarily associated with the peculiarities of agriculture, which lead to an increase in the risk level of the industry. In addition, the underdevelopment of the innovation market in agriculture becomes the reason for insufficient knowledge of the demand for innovations in this industry. Until now, marketing has not become an integral part of the formation of orders for research and development (1). The main reasons that hinder innovation in the agricultural sector are the lack of financial resources, the high cost of innovation and high economic risk.

[4] Compiled by the authors based on data from the State Committee of the Republic of Uzbekistan on Statistics
[5] Compiled by the authors based on data from the State Committee of the Republic of Uzbekistan on Statistics

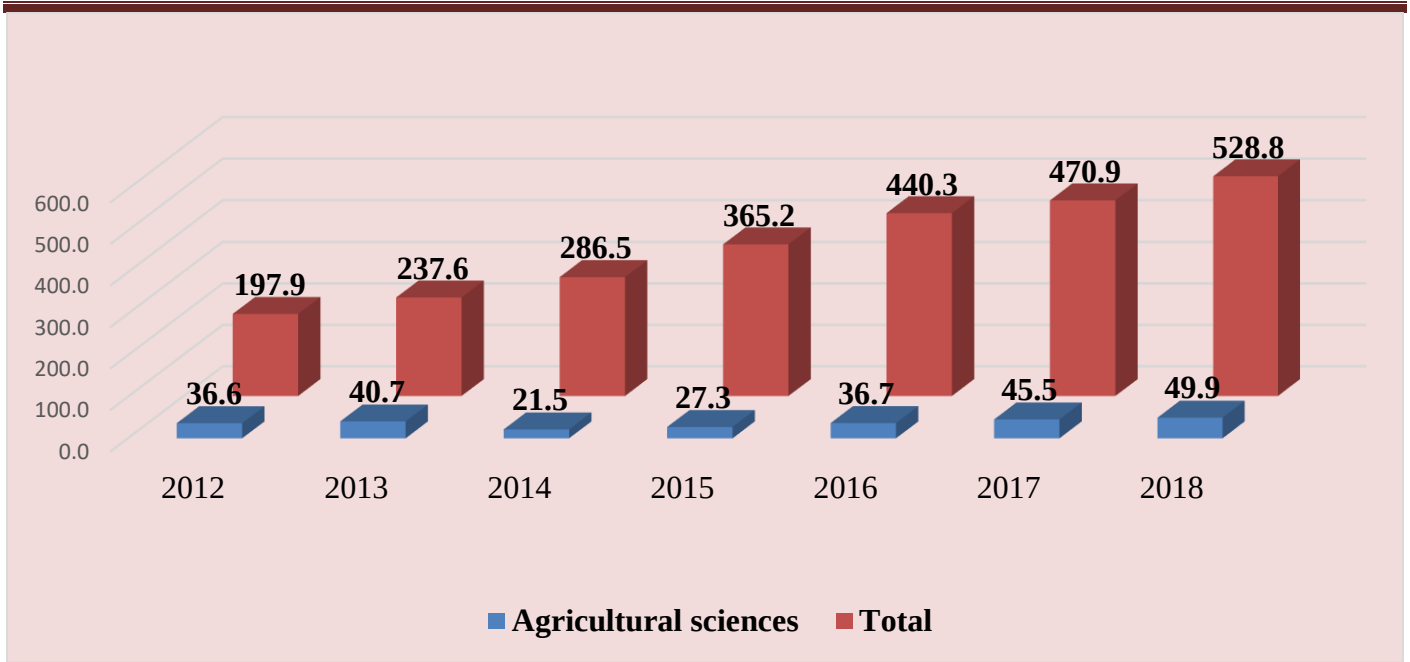

Figure 4. **R&D expenditures by branches of agricultural sciences in 2012-2018, billion soums**

High economic risk in agricultural production is primarily associated with the features of the innovation process in this industry, such as:

- great dependence on natural and climatic conditions, road-transport networks, remoteness from supply centers and markets for products and other factors;
- differences in the regions of the country according to climatic conditions and specialization of production;
- a long process of developing innovations and testing fundamental innovations in agriculture, which is associated with breeding;
- a significant difference in processing technology, keeping and feeding animals;
- research of living organisms (plants, animals, microorganisms), etc.

From the above analysis, we can draw the following conclusions:

- The principles of the organization of financing should be focused on a plurality of sources of financing and suggest the rapid and effective implementation of innovations with their commercialization, ensuring the growth of financial returns from innovation.
- The introduction and market development of innovations in the agricultural sector is constrained by a number of factors, among which the most important are the low solvency of farms, poor management of scientific and technical progress, lack of training, low marketing work, lack of mechanisms to stimulate the development of the innovation process in the agricultural sector, etc.
- Innovation policy should be based on:

- selection and implementation of basic innovations that have a decisive influence on improving production efficiency and product competitiveness;
- creating a system of integrated support for innovation;
- development of the infrastructure of the innovation process, including a system of information and consulting support for producers, as well as personnel training;
- promoting the development of innovative entrepreneurship and interaction with other forms of business;
- enhancing cooperation of all interested parties;
- improving the economic and legal conditions of innovation policy.

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