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ANALYSIS OF THE STATE OF INNOVATIVE DEVELOPMENT OF AGRICULTURE IN THE REGION

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ABSTRACT

This article analyzes the state of innovative development of the agricultural sector at the regional level and concludes that innovations include not only technical or technological developments, but also any changes in all areas of scientific and production activities that ensure a qualitative increase in the efficiency of processes or products. As a result of the ongoing reforms in the field of science, such innovative technologies as organic agriculture, precision agriculture, large-scale livestock farming, arable farming, loose livestock keeping, drip irrigation, integrated pest control, urbanized agriculture, automation and computerization, waste-free agriculture, etc. are also being consistently introduced into practice. It should be noted that the most common innovations in agriculture are new varieties and hybrids of plants, animal breeds. However, as practice shows, their implementation is quite slow.

KEYWORDS: *Innovation, competition, the innovative development of the agricultural sector, the volume of innovative products, research and development projects, the volume of research and development projects, investments, innovations, investment activity.*

INTRODUCTION

It has long been proven that the decisive factor in increasing the efficiency and competitiveness of enterprises is their transition to an innovative path of development. The implementation of innovative activities associated with the development and use of new technical and technological developments leads to an increase in production volumes, a decrease in production costs, an increase in labor productivity, an increase in the profitability of production and other production and financial indicators of enterprises. Innovations are even more in demand in agriculture,

where the main factor of production is land and water resources, the amount of which is decreasing from year to year.

According to the Food and Agriculture Organization of the United Nations, as a result of unsustainable economic activity and soil degradation in the world, the area of agricultural land is declining by 6-7 million hectares annually. The shortage of fresh water in the world is more than 250 billion cubic meters per year, about 4000 km3 / year are spent on household, industrial and agricultural water supply, i.e. about 4.5% of fresh water concentrated in lakes, reservoirs and rivers [2]. Agriculture is both one of the main causes of water scarcity and the industry that suffers most from this scarcity. Agriculture accounts for almost 70 per cent of all water intakes, and in a number of developing countries this figure reaches 95 per cent.

In the coming decades, agriculture finds itself in a difficult situation – it is necessary to solve the problem of increasing food production so that the growth of agricultural production outstrips the growth of the population, while ensuring improved product quality and rational use of land and water resources without compromising the environment.

It is possible to solve this problem, first of all, by providing conditions for the creation and implementation of resource-saving, innovative technologies. Innovations in agriculture or innovations in- this is the final result of innovative activity, embodied in the form of a new or improved product sold on the market, a new or improved technological process used in practice, or in a new approach to social services, affecting directly (or indirectly, within the technological chain) processes involving a person, means of production (machinery, equipment, tools, etc.) and a component of the biological environment (animals, plants) whose existence in the natural environment is impossible without human participation, or is possible only with the loss of basic functional characteristics.

As in many countries of the world, in Uzbekistan, the accelerated and effective development of agriculture as a factor in ensuring food security is a key issue. But, despite the implementation of consistent measures to ensure a broader integration of science, education and production in the republic, the creation and application of new knowledge, the introduction of innovative technologies and best practices, there are problems on the way to further accelerated development of agriculture, primarily due to the lack of funds spent on innovations in agriculture. For example, in 2019, Uzbekistan spent only 0.02% of the value of gross agricultural output on applied agricultural science and education, while middle - income countries with successful agriculture spend 1% of the value of gross agricultural output on agricultural science and development, and high-income countries spend an average of 2.5%. If in the republic as a whole in 2012-2019, total research and development projects expenditures increased from 197.9 billion to 602.3 billion. for 7 years, expenditures in the branches of agricultural sciences increased by only 36.3 percent, or by 304.3%. [3]

A more detailed analysis of the indicators that determine the innovative development of the agricultural sector is given at the regional level.

MATERIALS AND METHODS

The study was conducted on the basis of determining the level of innovative development of the Tashkent region of the Republic of Uzbekistan using such indicators as the volume of innovative products (works, services) and innovation costs, the number of organizations that performed

research and development projects and the amount of work performed, the number of patents, etc. When determining the regional innovative development of agriculture, it is necessary to take into account its socio-economic situation, which is characterized by a certain combination of factors and production results. Therefore, the analysis of the innovative development of the Tashkent region begins with bringing the general characteristics of this region in dynamics based on the use of statistical indicators and comparative analysis.

RESULTS AND DISCUSSIONS

Tashkent Region is an administrative unit within Uzbekistan, which includes 15 districts (tumans) and 7 cities of regional significance. The area of the region is 15,300 km2, the population is 2941.4 thousand people, of which 1,471 (50.8%) live in rural areas. The Tashkent region has developed such branches of agriculture as beekeeping, fish farming, horticulture, cotton growing, vegetable and melon growing, viticulture, greenhouses, animal husbandry, poultry farming. According to the results of 2019, the Tashkent region produced agricultural, forestry and fisheries products in the amount of 20417.1 billion sum, which is 9.4% of the total volume of production of the republic (Table 1). For comparison, in the context of regions, significant volumes of agricultural, forestry and fisheries products (services) were noted in the Samarkand (28379.5 billion sum) and Andijan (23686.7 billion sum) regions, their share in the total volume of agricultural, forestry and fisheries products (services) of the republic amounted to 13.1% and 10.9%, respectively.

TABLE 1. DYNAMICS OF THE MAIN INDICATORS OF THE TASHKENT REGION

Indicators	2015	2016	2017	2018	2019
The volume of products (services) of agriculture, forestry and fisheries in the republic, billion sum	99604,6	115599,2	148199,3	187425,6	216283,1
The volume of products (services) of agriculture, forestry and fisheries of the Tashkent region, in fact. prices, billion sum	10735,5	12034,2	15594,8	18359,1	20417,1
The share of the region in the total volume of agricultural products, %	10,8	10,4	10,5	9,8	9,4
Growth rates of agriculture, forestry and fisheries of the Tashkent region*, %	103,3	101,9	96,9	98,8	93,8
Investments in fixed assets in the republic, billion sum	44810,4	51232,0	72155,2	124231,3	195927,3
Investments in fixed assets in the Tashkent region, billion sum	4428,1	4238,7	5938,4	11226,9	20353,9

The region's share in the total investment volume, %	9,9	8,3	8,2	9,04	10,4
Investments in fixed assets in agriculture, forestry and fisheries of the Tashkent region, billion sum	159,9	226,3	267,3	521,4	769,0
The total population of the Tashkent region, thousand people	2758,3	2794,1	2829,3	2861,2	2941,4
The number of employed people in the economy, thousand people	1281,8	1287,6	1289,6	1227,7	1232,9
Including the number of people employed in agriculture, thousand people	331,0	335,1	338,4	322,9	322,2

* The growth rates of agriculture, forestry and fisheries of the Tashkent region are presented in comparable prices (compared to the previous year).

In 2019, 20353.9 billion rubles were spent in the Tashkent region. the sum of investments in fixed assets, the share of the region in the total investment volume was 10.4 %. The structure of investments in fixed assets by type of economic activity is dominated by the manufacturing industry with an indicator of 5041.7 billion sum, or 24.8 % of the total investment in fixed assets. 769.0 billion sum (4.5%) of investments in fixed assets were mastered in agriculture. Investment is crucial not only as a source of capital, but, more importantly, as a source of new technologies.

The reasons for the incomplete use of the existing potential opportunities of the region lie in the existing low levels of transformation of the achieved structural changes in the agricultural sector. The use of new technologies and technological changes play a crucial role in the transformation of agriculture. At the same time, in the agricultural sector, unlike other areas, the development of innovations is very slow, which requires special attention. Conducting fundamental and applied research and development, despite the fact that this is associated with a certain risk of obtaining unsatisfactory results, is a necessary stage in the process of creating scientific and technical products.

The analysis of innovation activity shows that in the Tashkent region the total volume of innovative products, works, services produced by own forces in 2019 amounted to 2793716.0 million sum, which is 3.5 times more than in 2015 (349.1%). In 2019, a total of 633 innovations were introduced, of which 623 were technological innovations, including 556 product innovations and 67 process innovations. Compared to 2015, the number of technological innovations increased by 2.9 times, organizational innovations-by 8 times, and marketing innovations decreased from 4 to 2 units, although in 2017-2018 their number was 11 and 12 units, respectively (Table 2).

TABLE 2. DYNAMICS OF THE VOLUME OF INNOVATIVE PRODUCTS (WORKS, SERVICES) AND INNOVATION COSTS IN THE TASHKENT REGION

Indicators	2015	2016	2017	2018	2019
The volume of innovative products, works, services produced by own forces, million sum	800367,0	993662,9	1179511,2	2501418,0	2793716,0
The number of implemented innovations,	221	203	235	308	633
including units:					
Technological innovations	216	200	219	291	623
including product innovations	-	-	-	255	556
process innovations	-	-	-	36	67
Marketing innovations	4	1	11	12	2
Organizational innovations	1	2	5	5	8
Costs for technological, marketing and organizational innovations, million sum	547656,4	463908,9	295498,4	1055526,0	884191,4

The costs of technological, marketing and organizational innovations, which amounted to 884191.4 million sum in 2019, were financed mainly from the organizations ' own funds – 442007.8 million sum. sums (50%) and loans from commercial banks – 410337.1 million. sum (46.4%). The expenses covered by foreign investments amounted to 22019.4 million rubles. sum (2.5 %), at the expense of budget funds 5776.3 million. sum (0.7 %) and other funds - 4050.9 million. sum (0.5 %).

As for the key types of innovative activities, among enterprises, the main share of them acquire machinery and equipment, new technologies, software tools, carry out production design, marketing research, and only about 6.4 percent (25 organizations out of 388) carry out any research and development work.

According to the Statistics Department of the Tashkent region, the total expenditures by branches of science for research and development in 2019, compared to 2015, increased by 2.4 times, amounting to 68596.4 million sum.

As can be seen from Table 3, positive dynamics is observed in all sectors except medical sciences. As a result: expenditures on natural sciences reached 11151.8 million sum in 2019, technical sciences-16319.5 million sum, agricultural sciences-40589.1 million sum, social sciences-179.6 million sum, humanities - 343.8 million sum, expenditures on medical sciences decreased from 510.3 million sum in 2016 to 12.6 million sum. sum in 2019. The main share of

expenditures on research and development by branches of science falls on agricultural sciences-59.2 %, technical sciences-23.8% and natural sciences-16.3% (Table 3).

TABLE 3. INDICATORS OF RESEARCH AND DEVELOPMENT IN THE TASHKENT REGION

Indicators	2015	2016	2017	2018	2019
The number of organizations engaged in research and development projects, units	31	39	32	59	25
The volume of research and development projects, million sum	24667,9	31543,2	55843,1	52965,3	70080,6
The costs of research and development work in the branches of science	28744,4	33700,6	55403,6	52295,2	68596,4
Including:					
Natural sciences	6267,6	9328,6	10760,2	8738,0	11151,8
Technical sciences	7961,2	5956,6	11859,4	14097,6	16319,5
Medical sciences	-	510,3	350,8	-	12,6
Agricultural sciences	14281,1	17551,7	25147,9	29000,2	40589,1
Social sciences	116,2	121,4	6783,8	293,3	179,6
Humanities	118,3	232,1	501,6	166,1	343,8

At the same time, half of the research and development projects in agricultural sciences are accounted for by the public sector – 34366.5 million. sum or 84.6%. Research and development projects in the business sector amounted to 4153.0 million sum, in the higher education sector - 2069.7 million sum. The private non-profit sector did not participate in the implementation of research and development projects in the analyzed region (Table 4).

TABLE 4. EXPENDITURES ON RESEARCH AND DEVELOPMENT PROJECTS BY BRANCHES OF AGRICULTURAL SCIENCES OF THE TASHKENT REGION (MILLION SUM)

Indicators	2015	2016	2017	2018	2019
Total	14281,1	17551,7	25147,9	29000,2	40589,1
Including:					
Public sector	11768,9	14503,2	20507,2	24877,6	34366,5
Business sector	1182,3	1698,5	2922,8	2291,0	4153,0
Higher education sector	1329,9	1350,0	1717,9	1831,6	2069,7
Private non-profit sector	-	-	-	-	-

In the practice of international comparisons, the results of scientific and technical activities are evaluated by indicators of patent activity. Patent statistics are the main indicator of innovation potential and one of the key indicators of technological development of countries and regions. Patents facilitate interaction between participants in the innovation process, confirming their

competence; promote technology transfer; serve as a means of exchange (a patent is often used as a protective tool aimed at acquiring access rights to new technologies through the exchange of patents); they structure collective innovations. However, many modern researchers and practitioners question the role of the patent system in stimulating innovation. [4, 5]

Adhering to the opinion that patenting still has more positive aspects, in particular, intellectual property protection, reimbursement of on research and development projects costs, increased opportunities to attract financial resources to promote products to the market, etc., and the results of patenting are one of the important indicators of innovation activity, we decided to also analyze the state of patenting in the innovation activity of the agro-industrial complex.

As noted in the annual report of the Agency for Intellectual Property under the Ministry of Justice of the Republic of Uzbekistan, in 2019, the growth trend of applications for intellectual property objects submitted to the Agency continued, the total number of which amounted to 10142, which is the highest indicator for the last 27 years. Compared to 2018, the volume of applications submitted increased by 17.7 %. The reporting year was characterized by an increase in the volume of applications for most intellectual property objects, including 77 applications for selection achievements, which is an increase of 54% compared to 2018. It should be noted that this is the highest indicator since the introduction of legal protection of selection achievements in the country. The applications submitted in the reporting year relate to plant varieties. Three applications were received from foreign applicants - two applications from France, one application from Australia. Applications from national applicants were submitted from seven regions of the republic, among which the Tashkent region is the leader – 49 applications.

According to the statistical collection of the Tashkent region, the number of patent applications for inventions registered with the patent office of the country in 2019 compared to 2015, the number of patents for innovations and inventions increased 10.9 times, amounting to 207 units, of which registered patents for breeding achievements of national applicants in the form of improved plant varieties and animal breeds amounted to 26 units. For 5 years, the total number of registered breeding achievements in the Tashkent region has reached 89 units. This is the highest indicator in the regional context. For comparison: in 2015-2019, the number of patents for new plant varieties in the Republic of Karakalpakstan and the Andijan region amounted to 6 units each, 16 new plant varieties were patented in the Jizzakh region, 8 units each in Kashkadarya and Samarkand, 6 patents in Tashkent, 1 patent for breeding achievements in the Ferghana and Khorezm regions.

CONCLUSION

The following conclusions can be drawn from the above analysis:

1. The main reason hindering innovative activity in the field of agriculture is the lack of financial resources, the high cost of innovation and high economic risk. The high economic risk in agricultural production is primarily associated with the features of the innovation process in this industry, including:

- The creation and implementation of innovations is associated with long-term breeding work;

- Most innovations are of an improving nature (due to their focus on increasing the yield, quality, productivity of the object, and not on inventing a completely new one);

- The results of innovations are related to living organisms (plants, animals, microorganisms) and depend on their biological potential;

- Innovations give different results depending on natural zones and climatic conditions;

- Multiplicity of types of agricultural products and products of its processing; significant differentiation of production conditions in some regions of the country;

- A large difference in the production period for certain types of agricultural products and products of its processing;

- The multiplicity of different forms and connections of agricultural producers with innovative formations;

- The lack of a clear and scientifically based organizational and economic mechanism for transferring scientific achievements to agricultural producers and, as a result, a significant lag in the development of innovations in production in the industry.

2.Taking into account the fact that the main source of financing of innovative enterprises today is self-financing and credit funds, the principles of financing organization should be focused on a plurality of sources of financing and assume rapid and effective implementation of innovations with their commercialization, ensuring an increase in the financial return from innovation activities. To do this, it is necessary to establish a mechanism for stimulating the attraction of funds at the expense of extra-budgetary and private funds.

3. The conducted analysis can be used not only as a tool for assessing the achieved level of innovation activity and sustainability of regions or industries, but also for assessing changes in this level under the influence of various organizational and economic factors. At the same time, the analysis is the most important means of identifying internal reserves for increasing the level of innovation activity, the effectiveness of innovation activities and the sustainability of the functioning of the industry and the region.

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