



Article

The Impact of Innovations in Agriculture on The Efficiency of Crop Production

J.P. Pirimkulov*¹

1. Doctoral student of Karshi Engineering and Economic Institute, Uzbekistan

*Correspondence: pirimkulov9210@mail.ru

Abstract: In this article, one of the most important branches of agriculture - the problems and advantages of growing plant products through innovations, is discussed, and the proposals of the research subjects are summarized. In addition, advanced foreign experiences of innovative cultivation of plant products are studied and technologies suitable for the natural climate of the Republic of Uzbekistan and agriculture are recommended.

Keywords: Crop Production, Food Security, Productivity, Smart Agriculture

1. Introduction

In global practice, the innovative development of the plant breeding network is of great importance in solving a number of problems related to the food security of the population and the sustainable development of agriculture. Currently, 735 million people in the world are undernourished. In 2022 year, 2.4 billion people, or 29.6 percent of the world's population, will not have sustainable access to food [1].

The world population is predicted to reach 9.7 billion people by 2050[2], which poses a serious threat to meeting the food needs of everyone on a global scale. For this, it is necessary to increase the production of agricultural products by almost 60% [3]. Wide application of science and technology achievements in practice is one of the effective ways to provide the world population with food products and sustainable development of agriculture, and the introduction of innovative technologies in agriculture will further expand this opportunity. Since it is difficult to predict climate changes in agriculture, we need to turn to innovations in agricultural technology to sustainably grow our products.

2. Materials and Methods

The article uses methods of scientific abstraction, analysis and synthesis, induction and deduction, comparative analysis and statistical grouping. The information of this research was obtained from official sources, based on the comparative analysis of the scientific and theoretical views of famous economists on agricultural production, summarization of foreign experiences, monographic research and survey results, an in-depth study of the role of innovations in the sustainable development of agriculture was achieved.

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3. Results

We don't have to wait decades to see how innovative agricultural solutions will impact human lives in the future. On the contrary, we need to take an important step for our economy by quickly introducing the latest technologies that will change the methods of cultivation, transportation, storage and management of products of farmers and peasant farms [4].

In the course of our research, we conducted a survey among farmers and peasant households. According to the results of the survey, among the total of 560 respondents, the most produced agricultural product is vegetables, which is grown by 41 percent of respondents, in addition, 38% are engaged in growing grapes, 37% cotton, 35% potatoes, and 31% grain, also, fruit growers made up 29 percent, citrus fruit growers made up 9 percent [5]. During the research, it became known that most of the farms are limited to the production of cotton and grain products. The fact that farms growing grapes and potatoes are 4-11 times less than households growing these products shows that the specialization of farms should be changed to other products at the same time as cotton and grain.

In response to the question about the innovations used in the process of growing plant products in the farm, 26 percent of the respondents noted that they used drip irrigation technology, and 9 percent of farmers and peasant households use sprinkler irrigation technology. But they say that these technologies, although they save water, often do not cover their costs. This is because installing drip or sprinkler irrigation technology over large areas requires a lot of money [6]. The monthly interest payments for technologies purchased through bank loans put farmers in a very difficult situation. In addition, if the drip irrigation technology installed on large areas is not constantly monitored, the weeds growing between the plants will increase and cover this technology, and there is a high probability of many malfunctions in the process of its cleaning. Even in some cases, when the climate conditions in open areas are bad, these technologies can serve as a detriment instead of a benefit. These technologies can be effective mainly in farms or homesteads with small land areas. Because installing and controlling technology in small areas does not require a lot of work and large funds, even one person - the owner of the land - can do it. 12% of the farmers and peasants who participated in the questionnaire said that their incomes increased significantly with the help of bee technology, as well as that it does not require a lot of money and effort [7]. According to them, bees simultaneously pollinate crops and collect honey for themselves. All you have to do is keep an eye on their nests near the field. Bees come out of their nests, land on the flowers of crops and pollinate them. The yield of pollinated crops also increases significantly. Through this technology, farms can produce two products at the same time. The main goal of our survey is to determine the extent to which farms use innovations in production, therefore, to assess their level of knowledge, and to develop proposals and recommendations based on these results. 27 percent of the respondents said that they did not use any innovation in product development, relying only on experience. 26 percent of participants reported a significant increase in income through crop rotation technology. In response to our question about the problems in crop irrigation, 43 percent of the participants said that measures for efficient use of water were not taken, that is, a large amount of water is being wasted due to the fact that the waterways of canals and ditches do not meet the level of demand. Also, 19 percent of the respondents said that due to the sloping location of the cultivated fields, water does not arrive regularly, and 14 percent said that the natural precipitation is too low [8].

To our question about what agrotechnical measures are used to achieve high economic efficiency in the farm, almost all participants said that they benefit from mineral fertilizers, 78 percent said that they protect crops from harmful insects, and 19 percent said that they try to improve the quality of the land before planting.

During the research, we also analyzed the annual costs of one hectare of land for the production of products on the farm and what the main part of these costs are spent on. It was found that 40 percent of 560 respondents spend 5-10 million per hectare of land for growing crops, 30 percent spend 10-15 million, 18 percent spend 2-5 million, 2 percent spend up to 2 million, and 10 percent spend more than 15 million. It turned out that the main part of these costs is spent on chemical drugs and agrotechnical activities [9].

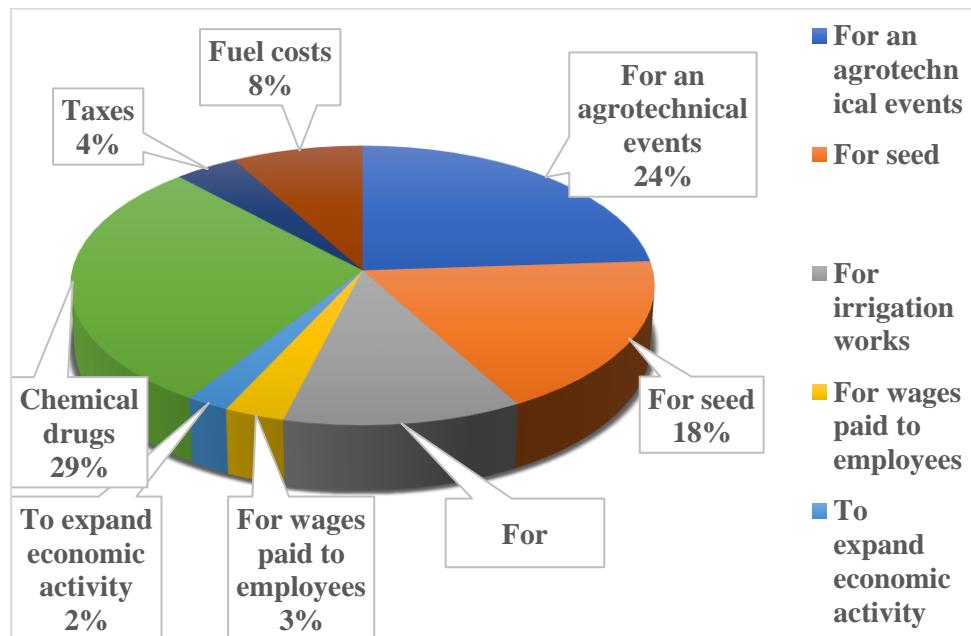


Figure 1. Spending of the main expenses during the production of products in the farm.

29% of the respondents believe that chemical drugs are the main cost in crop production [10]. Also, it was determined that 24% for agrotechnical activities, 18% for seeds, 12% for irrigation, 8% for fuel, and 4% for taxes.

Based on the results of the survey, we developed a SWOT analysis of the factors affecting the productivity of farmers and peasant farms operating in Kashkadarya region (Table 1) [11].

Table 1. SWOT analysis of factors affecting the efficiency of farmers and peasant farms in Kashkadarya region.

INTERNAL FACTORS	
POSITIVE FACTORS	<p>S= Strengths</p> <ol style="list-style-type: none"> 1. Reforms in the agrarian sector and the creation of legal frameworks for the development of farms and peasant farms. 2. Introduction of new varieties of innovative agricultural crops resistant to diseases and pests, adapted to local climatic conditions. 3. Bringing high-quality seeds and seedlings from abroad to farmers and peasant farms. 4. Creation of new jobs in the agricultural sector. 5. Presence of competitive environment in domestic and foreign markets. 6. Expansion of export potential due to innovative solutions in production.
NEGATIVE FACTORS	<p>W= Weaknesses</p> <ol style="list-style-type: none"> 1. Lack of financial means, low income. 2. Lack of material and technical base in farms and peasant farms. 3. Technological backwardness as well as low adoption and use of innovations. 4. High costs and product costs. 5. Low possibilities of maintaining product quality. 6. Lack of information about innovative products and ideas of business managers. 7. Limitation of rational use of water. 8. Low state subsidies and high interest rates.

INTERNAL FACTORS	
O= Opportunities	T= Threats
<ol style="list-style-type: none"> 1. Reducing the unemployment rate. 2. Growth of product production. 3. The variety of agricultural products produced. 4. Availability of skills and experience exchange for the production of innovative products. 5. Availability of a free price for the manufactured product. 6. Increasing opportunities to attract local and foreign investments in the industry. 	<ol style="list-style-type: none"> 1. High risk in innovative production of products. 2. Natural climatic conditions and environmental problems. 3. The difference between the price growth of agricultural products and material and technical resources is high. 4. Lack of highly qualified personnel capable of forming and implementing innovative activities. 5. Unsustainable economic policy towards farmers and peasant farms.
EXTERNAL FACTORS	

4. Discussion

In the course of our scientific research, we also studied the amount of annual income from one hectare of land in farmers' and peasant farms. As a result of the analysis, it was found that 33 percent of the farmers and peasant farms participating in the survey have 15-30 million. up to 37 percent 7-15 mln. up to 22% - 1-7 million and 8% - 30-40 million. earns [12]. Therefore, we can achieve measures to further increase the amount of income, first of all, by implementing innovations in farmers and peasant farms engaged in the cultivation of plant products.

5. Conclusion

Based on the above SWOT analysis, we make several suggestions to eliminate weaknesses and reduce threats.

First, taking into account the lack of financial resources and the low income of farms, to study the possibilities of increasing it, according to it, to give tax benefits to farms for the year with low income, thereby supporting farmers and peasant farms [13].

Secondly, to update the material and technical base of farmers and peasant farms, for this, to allocate low-interest and long-term loans for obtaining agricultural machinery..

Thirdly, to introduce innovative innovations and increase the level of use. For this purpose, through social networks, radio and television, broadcasting and broadcasting to regularly inform farm managers about new innovations and developments in agriculture, new varieties, as well as organizing an exhibition of the most advanced examples of foreign experiences twice a year in the regions, and creating conditions for the purchase of advanced solutions by the state [14].

Fourthly, to increase the possibilities of maintaining the quality of products, for this purpose, to build refrigerators in the areas of specialization of crops and to rent them at low prices.

Fifth, in order to rationally organize the use of water, control the distribution of water in the farms near the canal and farthest from the canal, penalize the wasteful farms, and develop a new system for the introduction of water-saving and sprinkler irrigation technologies. to give at zero interest rate. In addition, based on the experience of the United Arab Emirates, it is possible to meet the water demand of crops by introducing artificial rain technology in dry lands and desert areas where water does not reach. The UAE conducts around 300 cloud seeding missions each year as part of its efforts to increase rainfall [15].

Sixth, to train highly qualified personnel who can form and implement innovative activities, for this purpose, make a tripartite agreement together with HEIs and ITIs.

According to the contract, it is assumed that the customer will cover the amount of the contract for the staff engaged in scientific research. After the end of the study, the ready staff will be able to work in the contracted farm. By implementing the above proposals, we can increase the innovative efficiency of farmers and peasant farms, as well as increase the volume of product production to the maximum.

REFERENCES

- [1] U. of R. Island, "URI Researcher: Laser Scarecrows Successful at Keeping Birds from Eating Sweet Corn," 2019. [Online]. Available: <https://www.uri.edu/news/2019/08/.uri-researcher-laser-scarecrows-successful-at-keeping-birds-from-eating-sweetcorn/>.
- [2] Food and A. Organization (FAO), "The state of food security and nutrition in the world 2023," 2023. [Online]. Available: <https://www.fao.org/3/cc3017ru/online/cc3017ru.html>.
- [3] W. Post, "The Netherlands Has Used Advances in Vertical Farming, Seed Technology and Robotics to Become a Global Model," 2022. [Online]. Available: <https://www.washingtonpost.com/business/interactive/2022/netherlands-agriculture-technology/>.
- [4] Unknown, "Robotic Laser Scarecrows: A Tool for Controlling Bird Damage in Sweet Corn," ScienceDirect, 2021. [Online]. Available: <https://www.sciencedirect.com/science/article/abs/pii/S0261219421001228>.
- [5] N. Geographic, "Punching Above Its Weight," 2024. [Online]. Available: <https://education.nationalgeographic.org/resource./punching-above-its-weight/#punching-above-its-weight>.
- [6] N. Atlas, "Laser Scarecrows Help Keep Cornfields Clear of Bird Pests," 2024. [Online]. Available: <https://newatlas.com/environment/.laser-scarecrows-helps-keep-cornfields-clear-of-bird-pests/>.
- [7] W. O. UAE, "In Pics: Cloud Seeding with the UAE's Flying Weather-Changers," 2024. [Online]. Available: <https://whatson.ae/2024/03/.in-pics-cloud-seeding-with-the-uaes-flying-weather-changers/>.
- [8] L. Y. J. Li, "Hybrid Rice: Genetics, Breeding, and Seed Production," *Plant Breed. Rev.*, vol. 17, pp. 15–158, 2000.
- [9] T. C. Guys, "How China Is Using Technology to Solve Its Food Security Concerns," 2024. [Online]. Available: <https://thechinaguys.com/china-solve-food-insecurity-digital-technology/>.
- [10] W. I. P. Organization (WIPO), "Global Innovation Index 2017: Switzerland, Sweden, Netherlands, USA, and the UK Lead the Rankings," 2017. [Online]. Available: https://www.wipo.int/pressroom/ru/articles/2017/article_0006.html.
- [11] Food and A. Organization (FAO), "FAO Report," 2017. [Online]. Available: <https://www.fao.org/3/i6273r/i6273r.pdf>.
- [12] L. L. D. Dou and F. Li, "Food Science and Nutrition," *Food Sci. Nutr.*, vol. 11, no. 3, pp. 1507–1520, 2023, doi: 10.1002/fsn3.3190.
- [13] B. N. N. Bloomberg, "Bee Vectoring Technologies Uses Bees to Safeguard Crops with All-Natural Disease-Fighting Solution," 2024. [Online]. Available: <https://www.bnbbloomberg.ca/.bee-vectoring-technologies-uses-bees-to-safeguard-crops-with-all-natural-disease-fighting-solution>.
- [14] MassChallenge, "Agriculture Innovation," 2024. [Online]. Available: <https://masschallenge.org/articles/.agriculture-innovation/>.
- [15] Unknown, "Agriculture and Crop Science in China: Innovation and Sustainability," ScienceDirect, 2017. [Online]. Available: <https://www.sciencedirect.com/science/article/abs/pii/S2214514117300144>.