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Possibilities of Effective Use of "Intelligent" Technologies in Sustainable Development of Agriculture in Uzbekistan

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Abstract: In this article, the rapid development of "Smart" technologies in Uzbekistan is creating new opportunities to fundamentally change the agricultural economy. Innovative technologies such as the Internet of Things (IoT), artificial intelligence (AI), big data analytics, and blockchain help improve agricultural efficiency, use resources wisely, and support sustainable development. These digital approaches can increase productivity, reduce environmental impact and create new economic opportunities in rural areas. The analysis is based on the correlation and interaction of scientific development with innovative development. During the study, it was determined that it is important to increase the number of venture funds and companies for the development of education, science, information technology and other service sectors in our country; In order to improve the position of Uzbekistan in the Global Innovation Index, it is necessary to accelerate the development of scientific research, creative potential, knowledge and technologies. In this process, the state should be the main reformer, but the place and role of enterprising and innovative entrepreneurs should be great. A proposal was made to improve the relations of medical aid with scientific research institutes, to treat most of the number of technological production.

Key words: Innovation, entrepreneurship, innovative technologies, artificial intelligence, smart technology, resource, efficiency.

Introduction

Modernization of economic sectors, technical and technological updating, production and export of high-quality innovative products and products are important professions in the implementation of economic products in Uzbekistan today. At the same time, the effective loading of scientific and technical efficiency, the introduction of advanced scientific achievements and prospects into the production of innovative technologies, the cultivation of this efficiency, the development of the new economy is becoming one of the important directions of the work being carried out in Uzbekistan. Today, Uzbekistan is boldly taking a step along the path of innovative production defined by the head of our state. Great work has been done to create favorable conditions for the development of scientific and innovative activities in the development of production in the state agriculture. A strong legal framework was created and strengthened, which increased the level of improvement of state resources for the state, science and innovation..

In particular, a strong legal framework was created and reforms were implemented, which significantly increased state spending on science and innovation. Implementation of new infrastructure and personnel training are being carried out rapidly. President of the Republic of Uzbekistan Sh. Mirziyoyev: "Today, we are on the path of innovative development aimed at radically renewing all spheres of state and community life. It's not for nothing, of course. Because

who wins in today's cutthroat world? A new idea, a new idea, a state based on innovation will win. Innovation is the future. If we want to start building our great future today, we must start it on the basis of innovative ideas, innovative approaches".[1] One of the most important applications of smart technologies in agriculture is precision farming. Analytical systems based on IoT sensors, drones, and artificial intelligence enable real-time monitoring of soil conditions, weather conditions, and crop growth. This data-driven approach helps to use water, fertilizers and pesticides more efficiently and reduces environmental damage while increasing productivity. In addition, automated irrigation systems increase the water consumption for the development of farm agriculture. The current model of industrial development leads to a rethinking of the fundamentals of global agricultural development: the way to increase food production while looking for solutions to the resource situation and environmental and climate problems. There is every reason to believe that one of the technology groups that will support the transition of the agricultural industry to a new production model will be artificial intelligence. They will help to realize a new industrial shift in agriculture, to optimize the transportation of resources, to save its productivity by automating the production and production of agricultural production. Broad adoption of smart solutions in agriculture, restoration of biosecurity, production process and environmental cleanliness. The results of the implementation of Smart Technology in agriculture can be a change in the management of data-driven decision-making.[2]

Smart technology plays a role in the introduction of important renewable energy sources in the village. Solar panels, wind turbines and biogas systems combine with IoT and artificial intelligence to optimize energy production and consumption. Smart power grids to effectively manage energy distribution, to determine the dependency of rural areas, which are traditional phenomena. These sustainable energy solutions not only reduce costs, but also help protect the environment and ensure energy security. Precision agriculture (precision farming) is an agricultural management strategy based on observing, measuring and responding to temporal and spatial variability to increase the stability and productivity of agricultural production. [3]

The main idea of precision farming is the use of many sensors that monitor the state and composition of the soil, satellite technologies that allow creating extremely accurate maps of agricultural land taking into account the different composition of the soil, and UAVs that can monitor the state and dynamics of crops. UAV (Unmanned Aerial Vehicle) is an unmanned aerial vehicle (UAV) that is remotely controlled by an operator or flies autonomously according to a given program. The main application of UAV:

- Military affairs - reconnaissance, surveillance, combat operations
- Use for civilian purposes - delivery of goods, aerial photography, monitoring of objects

Agriculture - field spraying, crop monitoring

- Science and ecology - study of natural phenomena, fire and pollution monitoring
- Entertainment and sports - drone racing, amateur aerial photography

Air spraying technologies, which are available and actively used both for watering plants and spraying with fertilizers and chemicals, show their inefficiency. Air sprayers cannot adjust the spray volumes according to the individual characteristics of each plant and show significant losses and consumption of spray fluids.[4]

Methodology

Development of a system of science, education, information and consulting services, including the use of effective forms of knowledge and information dissemination integrated with the production of research, education and consulting services in agriculture. Creation of a transparent system of network statistics, which involves the introduction of reliable methods of statistical data collection, analysis and distribution through the widespread introduction of modern information technologies. AI in agriculture is helping to shift to something new, more. effective management model - is called. data-driven management. Smart irrigation startups.[5]

Italian startup Idroplan is developing an irrigation management system for vegetable and fruit farmers. The startup installs sensors that measure temperature, air and soil moisture, leaf moisture, and rainfall to determine the required frequency of watering based on the type of crop. Help from the Idroplan app, to your data to review fields with permanent support for farmers. • Sri Lanka's SenzAgro manufactures micro-irrigation systems for open field, produce and urban agriculture. The company's services include field and environmental studies, remote irrigation and farm studies. In addition, the SenzAgro application allows farmers to analyze data from their fields, adjust the frequency of irrigation and water consumption. According to the form of application of smart irrigation, sprinkler irrigation (sprinkling the field), central circulation irrigation (moving irrigation from sprinklers), drip irrigation (irrigation of plant roots), micro-irrigation (spot irrigation of plant roots) are distinguished. A unified digital platform for intelligent monitoring of agricultural land In addition to the development of individual technologies for intelligent monitoring of fields, unified digital platforms are entering the market that combine various intelligent methods of monitoring and analyzing soil quality, crop condition and irrigation processes to create digital twins of agricultural land. At present, a new paradigm of world economic development is being formed on the basis of the use of innovations. Uzbekistan cannot deny these processes and must ensure the intensification of innovation processes in all sectors of the economy, including agriculture. The transition to an innovative path of economic development is associated not only with the need to address the problems that have accumulated in the agricultural sector of the Uzbek economy, but also the main tasks facing this sector. In the current situation, innovative activity is a key factor in agricultural development. Making the most of this factor is the only way to ensure the sustainable development of the agro- industrial complex in our country.[6]

It should be noted that the scientist N.D. Kondratev, who developed the models of conjunctural cycles, based on the theory of large cycles with a duration of 50-60 years, made a significant contribution to the implementation of innovations. He proved that the transition to a new cycle is associated with the expansion of the stock of capital goods, which allows to create conditions for the introduction of accumulated inventions.N.D.[7] Kondratev connected the transition to a new cycle with the development of technology: These changes are usually reflected in one or another combination, in technical inventions and discoveries, in profound changes in production and exchange techniques. According to N.D. Kondratev, scientific and technical innovations play an important role in changes in the economic life of society. Given the need to ensure the cost-effectiveness of innovation, a number of Russian economists viewed innovation as "innovation in a new product or service, production method, organizational, financial, research and other areas that provide cost savings or create conditions for such savings." In the research of economists of our country, the term "innovation" began to be widely used in connection with the transition to market relations. [8]

A number of economists who studied the problems of innovative development of the agricultural sector, including A.A. Abduganiev, A.V. Vahobov, A.M. Kadyrov, S.S. Gulomov, Yo.A. Abdullaev, Ch. Murodov, T.H. Farmonov, O.P. Umurzakov, N.S. Khushmatov, A. Mukhtorov and others have carried out important scientific research. Thus, summarizing the above definitions, the concept of innovation can be defined as follows. Innovation is the introduction of a new or significantly improved product (product, service) or process, a new method of marketing, a new organizational style in the organization of workplaces or in external relations. [9]

Results

According to the results of the analysis, there are problems related to the improvement of currency operations in Uzbekistan. A systematic approach, data summarization, situational and structural methods were used during the analysis. This paper consists of both quantitative and qualitative research methods. Because seven large farmers were interviewed in their farming about the advantages and disadvantages of digital transformation, following the research questions and its impact on work efficiency. At the same time, an analysis was made of the economic and financial

consequences of digital transformation in agriculture using state accessibility. Semi-structured interviews took place in Kashkadarya region, Uzbekistan. Every interview took about five minutes to discuss the research questions.[10]

Despite significant methodological progress, many program evaluation and monitoring data were limited utility due to excessive dependence only on quantitative methods. While surveys provided generalizable findings with regard to what results or impact have or have not taken place, qualitative methods are better able to identify the explanations behind these results and impact and therefore allow for more effective answers [11]. Qualitative methods also inform the design of the survey, identify social and institutional factors and the impacts that are difficult to quantify, to discover unforeseen problems and to follow the paths of impact. When used together, quantitatively and qualitative approaches offer more coherent, reliable and useful conclusions than each does on its own. This note identifies the key elements of good mixed-method design and provides examples of these applied principles in several countries.[12]

Quantitative methods are less effective in an explanation of these results, especially when the explanations involve issues that are difficult to quantify, but are often fundamental to understanding program outcomes such as beliefs and representations, social relations, administrative difficulties, or institutional dynamics. Qualitative methods it is better to fix these problems, because of using more flexible questions, ask open-ended responses, carefully study the topic and promote mutual understanding between researcher and research theme. As mentioned above the methods helped to carry out research efficiently about digital agriculture of Uzbekistan.[13]

Although farmers reported that it is now the season for harvesting and growing cotton and other crops, so they are busy but they were so welcome and showed every necessary data in their farming, farmers and experts were interviewed to find the answer and saw all the farming works in real life.

In the following section the results of the three simulation experiments which have been described above will be presented. Again it should be born in mind that the simulation has been carried out with a rather stylized model which represents "work in progress". Hence, the results should be interpreted with caution.[14]

Discussions

The first policy simulation looks into the effects of introducing water user fees. The results support what one would expect a priori: Under the given assumptions (e.g. the state procurement system for cotton remains in place) the introduction of water pricing will decrease the total production of rice, which is the most water intensive crop in the region. Additionally, production of most crops will decrease in the region. As result, there is a price increase for the commodities with endogenous prices which also reduces consumer surplus. Moreover, the introduction of water charges shifted the regional cropping pattern towards the less water demanding crops. While the latter is positive and associated with a general decline in the level of water and marginal land use, the results of the simulation on economic indicators are rather negative. Higher production costs caused by the water charges decrease the producer surplus. Hence the total regional welfare decreases However, these results are strongly determined by the rigid structure of the model economy. If in reality the economy would be more open and, hence, more flexible, such policy changes could be accommodated more easily by a restructuring of respective trade flows. Furthermore, the economic welfare function in this model does not take into account the social benefits which are expected from discontinuation of high-intensive agricultural production on marginal land and the reduction of scarce water resources.[15]

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