

ISSN 2181-9408

Scientific and
technical journal

Sustainable Agriculture

№1(21).2024



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Our address: 39, Kari-Niyaziy str., Tashkent 100000 Uzbekistan , www.sa.tiame.uz

The journal "Sustainable Agriculture" is registered in the Press Agency of Uzbekistan on the 12th of February in 2018 (license № 0957).

In 2019, the journal is included in the list of recommended scientific publications by the Higher Attestation Commission of the Republic of Uzbekistan.



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INNOVATION AS THE MAIN FACTOR IN THE DEVELOPMENT OF AGRICULTURE IN THE REGION

Sh.Murodov – PhD, Associate Professor, TIAME National Research University

Abstract

This paper reviews new developments in high-tech greenhouse horticulture. It will focus on sensors, energy solutions, covering materials, production technology and robotics. Driving forces for new technologies are identified and Dutch greenhouse crop production is used as an example. Sensors are introduced in horticulture using the latest techniques from medical and industrial research. A 3D volumetric intersection technique is used to sort tomato seedlings at a speed of 40.000 pieces per hour and measures the full 3D geometric features, which is clearly an impossible challenge when done manually.

Keywords: agriculture, agro-industrial complex, innovation, technology, innovation activity, innovation process.

Introduction. The innovation crisis of the agro-industrial complex is associated with the insufficient development of scientific and technical areas in the field of agriculture. Currently, the innovation process in the agro-industrial complex has three complementary directions: the development of human capital, investing in the continuous development of biological resources, and the creation of new technologies.

The following measures are proposed to support agricultural enterprises: rebuild the structure of agricultural production in order to adapt enterprises to global conditions; develop and implement quickly payback and resource-saving equipment and technologies; introduce incentive measures (tax subsidies and benefits) for agro-industrial cooperation and agricultural integration; develop leasing and increase the efficiency of using government credit resources; develop a state program for training agricultural entrepreneurs, then in our country there will be a revival of the agricultural industry; increase the efficiency of federal subsidies to the agro-industrial sector through the reorientation of subsidies from the level of producers of agricultural products to the level of their consumers. As an additional method of maintaining the agro-industrial complex, the use of asset incentives and value added tax on fuel and other agricultural resources should be started. All this is possible using new management techniques and other innovations in management.

The agro-industrial complex is now experiencing a huge innovation crisis, which is associated with the insufficient development of scientific and technical areas in the field of agriculture. If we compare the use of the country's innovative potential in comparison with the leading countries of the world, then it is used only 5-6%, while in the USA this figure is 50%. Every year, about 40-50% of scientific and technical achievements and developments remain unclaimed by agriculture.

Methods and discussion. Artificial intelligence (AI) applications are an integral and emerging component of digital agriculture. AI can help ensure sustainable production in agriculture by enhancing agricultural operations and decision-making. Recommendations about soil condition and pesticides or automatic devices for milking and apple picking are examples of AI applications in digital agriculture. Although AI offers many benefits in farming, AI systems may raise ethical issues and risks that should be assessed and proactively managed. Poor design and configuration of intelligent systems may impose harm and unintended consequences on digital

agriculture. Invasion of farmers' privacy, damaging animal welfare due to robotic technologies, and lack of accountability for issues resulting from the use of AI tools are only some examples of ethical challenges in digital agriculture. This paper examines the ethical challenges of the use of AI in agriculture in six categories including fairness, transparency, accountability, sustainability, privacy, and robustness. This study further provides recommendations for agriculture technology providers (ATPs) and policymakers on how to proactively mitigate ethical issues that may arise from the use of AI in farming. These recommendations cover a wide range of ethical considerations, such as addressing farmers' privacy concerns, ensuring reliable AI performance, enhancing sustainability in AI systems, and reducing AI bias.

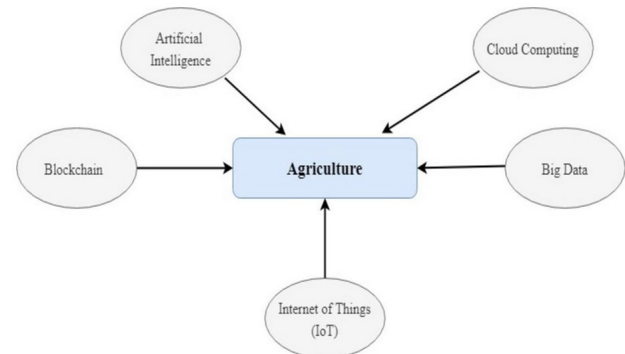


Figure 1. Artificial intelligence.

Currently, the innovation process in the agro-industrial complex has three complementary directions:

Development of human capital. The implementation of this direction is possible only with the improvement of education, the creation and support of research enterprises and organizations, a data bank on innovation, as well as a system for informing and consulting economic agents involved in the agricultural sector.

Investing in the continued development of biological resources. This direction is carried out on the basis of the creation and use of innovations that increase soil fertility, increase crop yields and livestock productivity.

Creation of new technologies. It ensures the improvement of the agro-industrial complex through the use of energy-saving, as well as resource-saving, high-tech equipment and technologies that can increase labor productivity and the efficiency of the entire agricultural industry. Only through accelerated modernization of the industry, based on new technologies, is it possible to overcome many negative factors and negative aspects in

agricultural production: low labor productivity, which is 8-10 times lower than in economically developed countries, low crop yields and productivity of farm animals, outdated material and technical base, low level of use of labor, natural landscape and financial resources.

There are a number of factors in agriculture that hinder the stable growth of innovative activity. These include the following:

- obsolescence of the existing technological and scientific-technical base of the agricultural industry and its inconsistency with new global production and economic requirements. A decrease in agricultural production, weak state policy, which practically does not contribute to maintaining the agro-industrial complex, and the high cost of new equipment and technologies do not allow the development of innovative activities in the agricultural sector;

- the remaining imbalances in the exchange between the agro-industrial complex and other sectors of the economy lead to its degradation. It is worth noting that the situation in the agricultural industry is significantly worsened by constantly rising energy prices, and this in turn leads to even greater depletion of the agro-industrial complex as a whole;

- unfavorable investment situation in the agricultural sector and low rate of return of a huge number of economic agents involved in this sector of the country's economy. Despite the fact that in recent years there has been a process of intensifying investment activity in agriculture, its share is still not higher than one percent of budget expenditures, with the share of products in the country's GDP at 4.4%.

- ensure an increase in the investment attractiveness of the agricultural industry for private investors, both native and foreign;
- increase the growth rate of technical and technological re-equipment of agricultural enterprises and organizations;
- carry out a balanced development of social infrastructure at the regional level, which should ensure an influx of qualified personnel into the village;
- develop and implement new technologies on an innovative basis.

To successfully implement these tasks, it is necessary to pursue an effective economic policy.

On a republican scale, the following key goals of regional agricultural policy for 2023–2030 can be identified.

- Improving the financial sustainability of the agro-industrial sector and creating the basis for continuous growth in the efficiency of agriculture in the region;
- Modernization of the main sectors of the region's agro-industrial complex;
- Ensuring accelerated growth of crop and livestock production in order to increase the competitiveness of the product, both in the domestic and foreign markets;
- Creation of socio-economic conditions for increasing the living standards of villagers and the creation of special educational institutions for the training of qualified personnel;
- Reanimation, through public investment and budget allocations, of the most valuable agricultural organizations, enterprises and lands.
- Balanced and effective development of the agro-industrial sector should be aimed not only at solving the economic, social and other problems accumulated in the region, but also at increasing the country's GDP, improving living standards, that is, ensuring the socio-economic development of the state as a whole.

The main goals on which the state agricultural development program is based are::

- Stable development of municipalities (mainly rural areas), increase in jobs and incomes of the population;
- Increasing the competitiveness of agricultural products;
- Proper use of agricultural resources, their conservation and reproduction.

In order for these goals to be achieved, it is necessary to create a favorable climate for the stable development of rural areas. To do this, it is necessary to implement a set of measures, including improving social infrastructure, allocating state and regional subsidies in order to improve living conditions in rural areas, increasing employment and income of the rural population through various types of activities, both agricultural and non-agricultural (crafts, rural tourism, etc.). In addition, it is necessary to improve land and tax legislation, implement a competent antimonopoly policy, create associations and unions of agricultural organizations, improve the information base and access to it, and maintain soil fertility.

It is also important to ensure the accelerated development of priority areas of the region's agricultural industry, primarily livestock farming, by improving and purchasing new fixed assets, effectively using resource and production potential, and building a more advanced

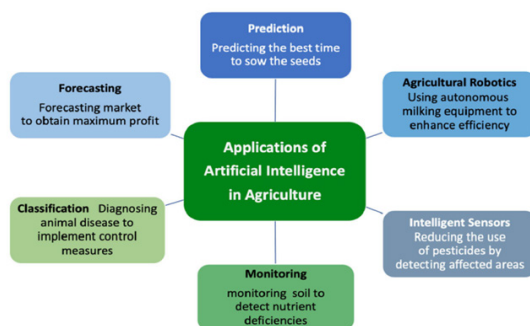


Figure 2. Artificial intelligence applications in digital agriculture.

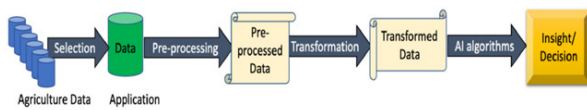


Figure 3. Knowledge discovery and information extraction process in artificial intelligence.

Analysis. It is worth noting that the resources required for effective innovation activities are significantly less than those required for the balanced development of the agricultural industry. In addition, over the past seven years, the own funds of agricultural enterprises, which serve as the main source of investment in fixed capital and agricultural production, have decreased by 1.5 times, which is not only a constraining aspect of the innovative activities of the agro-industrial complex, but also creates a threat of non-payment of loans received.

In this regard, it is necessary to solve the following problems:

mechanism for regulating the region's agricultural industry. An important task is to eliminate imbalances in the agro-industrial sector of the region, by supporting those enterprises that are the most profitable and competitive, but without government subsidies and grants will not be able to be fully realized.

In 2023-2030 The main government support will be provided in the livestock sector, especially in enterprises producing meat products. The emphasis is on such areas of the agro-industrial complex as pig farming and poultry farming, which will dramatically increase the volume of production of several types of meat.

It is possible to strengthen the financial stability of the region's agro-industrial complex through financial support for agricultural producers through their access to new credit resources, as well as insurance for agricultural producers. It is also necessary to create a system for informing and consulting agricultural enterprises and organizations, land mortgage institutions, create and improve technological regulations, which is provided for by the state program "Development of agriculture and regulation of markets for agricultural products, raw materials and food for 2023-2030."

In 2023-2030 The state program provides for the preservation of tax benefits for agricultural producers and the improvement of antimonopoly legislation. The adoption of a number of laws and government projects to reduce transaction costs is of great importance. This will stop the decline in agricultural potential of both regions and the country as a whole, as well as speed up the work of the cadastral system.

In addition, it is important to improve the mechanism of foreign economic regulation, including the operational regulation of foreign trade operations with agricultural raw materials and products, the creation of promising areas for attracting foreign investment in the agricultural sector, and the formation of a new quality control system for domestic agricultural products that meets international standards. This will ensure increased competitiveness of domestic agricultural products and the replacement of imports throughout the country, as well as increase the profitability of agricultural enterprises and organizations.

In increasing the competitiveness of the country's agro-industrial sector, the macroeconomic policy of the state and federal subjects plays an important role. It must be borne in mind that, from the point of view of the state of resource potential, antimonopoly policy will have very important consequences for the agro-industrial complex of the regions. Currently, the agricultural industry in the country's regions uses the world's cheapest fuels and lubricants, mineral fertilizers, electricity and natural gas, grain harvesting tractors and combines (which do not differ in the quality and reliability of agricultural machinery compared to global competitors).

Conclusion. According to recent independent studies, all other things being equal, the cost of agricultural products in Uzbekistan is one of the lowest in the world. The too low cost of the main means of production of agricultural products provides a margin of competitiveness, which is currently being used by the country's agricultural industry. If, at the end of the reforms, domestic prices for means of production begin to reach world prices, this will lead to dire consequences, if not disaster, for the national agro-industrial complex.

The following can be proposed as urgent measures to support agricultural enterprises:

1. Rebuilding the structure of agricultural production in order to adapt enterprises to global conditions.

2. Development and implementation of quickly payback and resource-saving equipment and technologies.

3. Introduce incentive measures (tax subsidies and benefits) for agro-industrial cooperation and agricultural integration.

4. Development of leasing and increasing the efficiency of using federal credit resources.

5. Development of a state program for training agricultural entrepreneurs. According to leading experts, there are at least 1.6 milliard of them. If they learn to use the land wisely, then there will be a revival of the agricultural industry in Uzbekistan.

6. Increase the efficiency of government subsidies for the agro-industrial sector through reorientation of subsidies from the level of the producer of agricultural products to the level of their consumer.

7. As an additional method of maintaining the agro-industrial complex, the use of asset incentives and value added tax on fuel and other agricultural resources should be started.

9. Use of new management techniques and other management innovations.

Our society as a whole must realize the importance of agricultural production for the security of the country and contribute to the creation of an atmosphere where no one wants to quietly observe the stagnation of such an important sector of the economy as agriculture, and everyone wants to consume high-quality food products of their own production and obliges the government to do everything for this necessary. The introduction of innovations in agriculture is the right path to achieving society's expectations.

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