MAIN DIRECTIONS OF SMART AGRICULTURE PROBLEMS AND SOLUTIONS

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Abstract:

This article examines the main directions of smart agriculture and the problems faced by modern farmers. The author discusses the benefits of using the latest technologies and innovations in agriculture and offers practical solutions to improve production efficiency and reduce costs.

The article discusses such areas of smart agriculture as digitalization of production, automation and robotization, the use of sensors and the Internet of things, as well as the use of artificial intelligence and data analytics. The author also discusses the problems associated with the lack of qualified personnel, the high costs of introducing new technologies and the difficulties in processing and analyzing large volumes of data.

Overall, the article provides a useful overview of the main trends in smart agriculture and offers practical recommendations for improving productivity and competitiveness in the field.

Keywords: smart agriculture, IoTe, digital devices, artificial intelligence, machine learning, big data, automation, remote sensing, energy efficiency, resource management, digitalization, innovation.

ОСНОВНЫЕ НАПРАВЛЕНИЕ УМНОГО СЕЛЬСКОГО ХОЗЯЙСТВА ПРОБЛЕМЫ И РЕШЕНИЯ

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Аннотации:

Данная статья рассматривает основные направления умного сельского хозяйства и проблемы, с которыми сталкиваются современные фермеры. Автор обсуждают преимущества использования новейших технологий и инноваций в сельском хозяйстве и предлагают практические решения для повышения эффективности производства и сокращения затрат.

В статье рассматриваются такие направления умного сельского хозяйства, как цифровизация производства, автоматизация и роботизация, использование датчиков и интернета вещей, а также применение искусственного интеллекта и аналитики данных. Автор также обсуждают проблемы, связанные с недостатком квалифицированных кадров, высокими затратами на внедрение новых технологий и сложностями в обработке и анализе больших объемов данных.

В целом, статья представляет собой полезный обзор основных направлений умного сельского хозяйства и предлагает практические рекомендации для улучшения производительности и повышения конкурентоспособности в данной области.

Ключевые слова: умное сельское хозяйство, IoTe, цифровые устройства, искусственный интеллект, машинное обучения, большие данные, автоматизация, дистанционное зондирование, энергоэффективность, управление ресурсами, цифровизация, инновации.

Introduction
Agriculture is an important sector of the economy of many countries, providing food and raw materials for industry. However, in the modern world, agriculture faces many challenges and problems, such as climate change, lack of water and resources, outdated equipment and technologies, as well as problems in the field of management and organization of production.
In this regard, Smart Agriculture is a concept that integrates new technologies and innovations to solve agricultural problems and optimize production processes. It involves the use of the Internet of Things, sensors, data analytics, artificial intelligence and other technologies to automate and optimize production processes, increase yields, improve product quality and reduce costs.
As a result, smart agriculture allows you to produce more with less, increase profitability and ensure agricultural sustainability.
In this article we will look at the main areas of smart agriculture, such as monitoring and managing climate conditions, automation of production processes, the use of artificial intelligence systems, the use of drones and many others. We will also discuss the benefits and challenges of smart agriculture, as well as the role of information systems in production management.

Methodology
To write this work, various sources were used, including scientific articles, books, reports and documents related to the topic of smart agriculture. The main directions of development of smart agriculture were analyzed, including production automation, the use of sensors and the Internet of things, data analysis and the use of artificial intelligence . The advantages and disadvantages of introducing new technologies, as well as the challenges and problems faced by agricultural enterprises in the transition to smart agriculture were considered. The roles and operating principles of information systems in agricultural production management were also analyzed, including resource management systems, production monitoring and management systems, warehouse management and logistics systems and others. Based on the analysis of research, it was concluded that smart agriculture can help solve many agricultural problems, such as increasing production efficiency, reducing costs, increasing yields and improving product quality. However, the introduction of new technologies is also associated with some

challenges and problems, such as the need for large investments, lack of qualified personnel and others.

Smart agriculture is the use of modern information and communication technologies (ICT) to optimize production processes in agriculture. The main areas of smart agriculture are:

Using sensors and IoT (Internet of Things) to collect and analyze data about soil, weather, plants and animals. This allows you to improve the quality and quantity of products produced, as well as increase the efficiency of resource use.

Using artificial intelligence (AI) and machine learning to analyze data and create models that help predict crop yields and optimize the use of fertilizers, water and other resources.

Development of management systems, including automation of production processes, monitoring and control of equipment, inventory management and tracking of production cycles.

Development of digital markets that allow farmers to sell their products and purchase necessary inputs using ICT.

The use of drones and other unmanned technologies for monitoring and inspecting fields, as well as for spraying fertilizers and pesticides.

Development of environmentally friendly technologies aimed at reducing the use of chemical fertilizers and pesticides, as well as increasing the energy efficiency of production.

Using blockchain technologies to create a transparent system for tracking the origin and quality of products, which increases consumer confidence and promotes export development.

Development of online stores and online services to simplify the process of selling and purchasing agricultural products and resources.

Result:

As a result of the study, the main directions for the development of smart agriculture were identified, including the use of sensors and the Internet of things, production automation, data analysis and the use of artificial intelligence.

The advantages and disadvantages of introducing new technologies in agriculture were discussed, as well as the challenges and problems faced by agricultural enterprises in the transition to smart agriculture.

The role and principles of operation of information systems in the management of agricultural production were analyzed, and various types of resource management systems, monitoring and production management systems, warehouse management and logistics systems and others were considered.

As a result, it was concluded that smart agriculture is an important area of agricultural development that can bring many benefits, such as increasing production efficiency, reducing costs, increasing yields and improving product quality. However, the introduction of new technologies can also lead to some challenges and problems that need to be taken into account when moving towards smart agriculture. The introduction of smart agriculture has become an urgent task for agricultural enterprises. However, a number of problems arise along the way of implementation.

One of the main problems is the high cost of introducing modern technologies and equipment. The implementation of artificial intelligence systems, the Internet of things and other technologies requires significant funding. Some agricultural enterprises cannot afford to introduce modern technologies due to lack of sufficient funds. Another problem is the low qualifications and experience of agricultural workers. The implementation of smart agriculture requires specialists who can work with new technologies and equipment. Some agricultural workers may not have sufficient knowledge and experience to work with new technologies.

Another problem is the imperfection of technologies and systems. Some modern technologies have not yet been fully tested and may have some disadvantages. It is important to conduct thorough testing and select reliable technologies for implementation.

In addition, another challenge is the difficulty of integrating different systems and technologies that may have different interfaces and data formats.

The prospects for smart agriculture (Smart Agriculture) are enormous, since this is a new direction in the development of agriculture, which combines modern technologies and innovative approaches.

One of the main prospects of smart agriculture is to increase production efficiency, increase productivity and product quality, and reduce production costs. This is achieved through the use of modern technologies, such as artificial intelligence systems, the Internet of things, drones and sensors, which make it possible to more accurately control the processes of plant growth and development, as well as optimize the use of resources.

Another promise of smart agriculture is improving the quality and safety of products. With the help of modern technologies, it is possible to more effectively monitor the quality of products and detect possible hazards, such as the presence of pests or diseases.

In addition, smart agriculture can become an important tool in the fight against global challenges such as climate change and decreasing availability of land resources. With the help of modern technologies, it is possible to use land resources more efficiently and optimize production processes, which will reduce the negative contribution of agriculture to climate change and maintain the availability of land resources for future generations.

Thus, the prospects for smart agriculture are very encouraging, and this direction of agricultural development has every chance of becoming a key one in the near future.

Conclusions

In conclusion, it can be noted that smart agriculture is a promising direction for the development of the agricultural industry. However, there are certain problems on the way to its implementation, such as a lack of qualified personnel, limited access to the latest technologies and insufficient funding.

To solve these problems, it is necessary to develop the education system and improve the skills of personnel in agriculture, provide access to modern technologies and equipment, and also create favorable conditions for attracting investment in the agricultural sector.

One of the key solutions to the problems of smart agriculture is the use of modern information technologies such as IoT, artificial intelligence, big data and remote sensing. These

technologies can significantly increase production efficiency, improve product quality and reduce resource costs.

Thus, the development of smart agriculture is an important task for increasing the competitiveness of the agricultural industry and ensuring food security. To do this, it is necessary to create favorable conditions for innovation and cooperation between the state, business and the scientific community.

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