

Research on the Development of Smart Agriculture of China

Wanxin Zhao^a, Wen Bao^{b,*}

Management School, Chengdu University of Information Technology, Chengdu, Sichuan, China

^a1920395412@qq.com, ^bbaowen@cuit.edu.cn

*Corresponding author

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Abstract: Smart agriculture will provide more diversified solutions for China to solve food security problems and promote sustainable agricultural development. Smart agriculture combines modern technology with agriculture to help farmers manage farmland and crops more intelligently, so as to achieve efficient agricultural production. Through the combination of modern information technology and intelligent equipment, smart agriculture realizes a new agricultural production mode of information processing, auxiliary decision-making, intelligent control, personalized service and precise input in the whole process of agricultural production.

1. Introduction

With the large-scale application of new infrastructure such as 5G, cloud computing, big data, block-chain, artificial intelligence and satellite Internet, the whole agricultural industry chain is being reshaped. Using big data, scientific and technological equipment and control system to help people carry out cluster, standardized, automated and unmanned agricultural production is the production change brought by smart agriculture [1]. Smart agriculture is a kind of technology as the main body of agriculture, with the continuous development and improvement of related science and technology application, from agricultural production, processing, logistics transportation to electricity sales whole life cycle adopts the big data, Internet of things, cloud computing technology, to the greatest extent, improve the efficiency and stability of agricultural production [2], thus develop wisdom agriculture is of great significance to promote economic development.

2. The Importance of Smart Agriculture in China

2.1. Provide Data Analysis and Promote Information Transparency

Smart agriculture is characterized by relying on big data, the Internet of things technology to obtain, analysis, information, the growth of crops, meteorological data, soil quality data analysis, help farmers understand the growth of crops and demand, to adjust the reasonable planting measures, such as timely fertilization, irrigation and pest control, improve the yield and quality of crops. By analyzing market data, demand trends and competition conditions, smart agriculture helps farmers to predict the changes in market prices and demand, so as to develop reasonable pricing strategies and market sales plans for agricultural products. At the same time, smart agriculture can also analyze the cost and output data in the process of planting, breeding and production, help farmers to evaluate the profit and loss of operation, formulate reasonable cost control strategies, and improve the operating efficiency.

2.2. Unblock Supply Chains and Speed Up the Circulation of Agricultural Products

Small-scale peasant economy in China has long had problems such as information asymmetry, high transaction cost, low digitalization degree, and the quality and safety of the upstream supply chain farmers and the downstream market of agricultural products, which make it difficult for small farmers to enter the market and obtain reasonable benefits [3]. Through the Internet of Things, cloud computing and big data analysis, smart agriculture monitors the production, storage,

transportation and sales of agricultural products in real time, improve the accuracy and transparency of information, reduce information asymmetry; monitor and regulate the cold chain environment in real time to ensure that the temperature, humidity and other conditions of agricultural products meet the requirements, and reduce the loss and quality problems of agricultural products. Establish the quality and safety traceability system of agricultural products, and conduct traceability management for the production, circulation and sales of agricultural products through barcode, RFID and other technologies.

2.3. Improve Financial Services and Economic Benefits

For small farmers, the capital problem has always been one of the main problems restricting their development. The financial services provided by the smart agriculture platform can help small farmers solve the capital problems and improve their economic benefits. The smart agriculture platform includes financial services and capital support, including loans, insurance, etc. Through the smart agriculture financial services, small farmers can obtain financial support and invest in production and operation, technology improvement and other aspects. The central financial institutions of the smart agriculture platform can also provide risk management and prevention services, and provide a safer and more stable loan environment for small farmers. In order to improve the financing ability and management level of small farmers, smart agricultural financial institutions and capital support institutions can also provide relevant training and guidance services, including financial management, risk control, market expansion and other aspects of knowledge. This can help small farmers to make better use of funds and resources and improve economic benefits.

3. Dilemma Faced by the Development of Smart Agriculture in China

3.1. Farmers Lack the Awareness of Smart Agriculture

China's rural labor force is generally older, and the production mode, technical level and production and management concept of farmers are relatively lagging behind. They lack of understanding and cognition of smart agriculture, and the application of smart agriculture technology is not active. These farmers, who are used to traditional farming, have relatively fixed daily management and production methods, have the problem of "relying on inertia and lack of change consciousness", and are unwilling to try new technologies and management methods. In addition, smart agriculture, as an advanced stage of modern agriculture development, has the advantages of promoting the refinement of agricultural production, efficient agricultural production management, and intelligent agricultural production process. These farmers lack both the cognition and the adaptability of smart agriculture.

3.2. It is Difficult to Apply and Popularize Smart Agricultural Technology

There are also some difficulties in the application and popularization of smart agriculture technology. On the one hand, the construction of agricultural information infrastructure in China's vast rural areas is not perfect, the penetration rate of high-end technologies such as intelligent agricultural equipment and sensors is relatively low, and the lack of unified standards and norms limits the development and application of smart agriculture [4]. On the other hand, the technology research and development and promotion of smart agriculture are also faced with problems such as high cost, complex technology and high risk, which require the cooperation of all parties to conduct technology sharing and capital investment, so as to achieve better development and promotion.

3.3. Financial Support for Smart Agriculture is Insufficient

In recent years, although the government has increased its support for agriculture, the development of smart agriculture is still insufficient and faces many challenges. On the one hand, traditional financial institutions are often difficult to meet the capital needs of small farmers, because they usually have no collateral or credit record, and small farmers have limited understanding of agricultural finance, making it difficult to assess the risks and returns of different

financial products. On the other hand, smart agriculture needs high investment to promote and apply, including agricultural mechanization, agricultural informatization, agricultural intelligence and other aspects. At present, the government's investment in the agricultural field is mainly for large agricultural enterprises and large agricultural projects. In contrast, the financial support for small farmers is relatively small, which leads to the lack of financial support for small farmers in the development of smart agriculture, which makes it difficult to give full play to the advantages of smart agriculture and limits the development of small-scale peasant economy.

3.4. Professional Talent of Smart Agriculture is Shortage

The development of agriculture in China is dominated by traditional agriculture, family as the unit, the production scale is small and scattered pattern, and the development of smart agriculture is especially immature. The level of agricultural production operators' application of emerging technologies and the understanding of intelligence are generally low, and the shortage of highly educated talents is seriously in the agricultural field. Smart agriculture is a new development mode of multi-industry and multi-technology integration. In the construction of smart agriculture, it has high requirements for talent quality, professional fields, equipment, information, etc., which requires comprehensive professionals with basic technologies of intelligent high-tech and master the knowledge of agricultural production management. In China, it takes a lot of time and capital investment to cultivate such compound talents, and the total amount of such talents is far from enough. In addition, college students with higher education, out of consideration of high treatment, high income, usually preferred employment in big cities, and rural education and medical backward, incomplete facilities, unable to attract the relevant talent home employment, leading to the lack of intelligent technology development of intelligent agricultural professional talents.

4. Countermeasures and Suggestions to Promote the Development of Smart Agriculture

4.1. Establish a Whole Industrial Chain Platform for Smart Agriculture

The whole industry chain platform is to organically combine production, processing, circulation, sales and other links through information technology means, build an integrated information platform, realize the collaborative operation and data sharing of the whole industry chain, so as to improve the efficiency, quality and efficiency of the whole agricultural production. The main goal of the whole industrial chain platform is to realize the efficient coordination of the agricultural industrial chain, promote agricultural modernization, improve agricultural production efficiency and quality, and enhance the sustainable development capacity of the agricultural economy through the application of digital technology. The whole industry chain platform collects, integrates and manages relevant agricultural data, including land, meteorology, water resources, plant growth status, etc. Through data closed loop, AI planting engines based on different categories such as field planting and intelligent greenhouse are established. Whole industry chain platform through the data driven form standardized planting system and service system, can help industry to establish a good ecological system, also can provide accurate decision-making support of agricultural production, so as to improve the efficiency and quality of agricultural production [5].

4.2. Improve the Infrastructure of Smart Agriculture

In terms of basic agricultural production equipment, governments at all levels should increase the support of preferential policies for agricultural production equipment, improve the subsidy policies for the purchase of agricultural machinery and tools, and gradually solve the problem of the relative lack of large-scale agricultural equipment. At the same time, the agricultural sector should encourage farmers to accelerate the process of agricultural mechanization, and better promote the use of new agricultural technology achievements, so as to improve the production efficiency and production quality of agricultural products, and lay a foundation for the e-commerce of agricultural products [6]. In addition, governments at all levels should strengthen the construction of irrigation and water conservancy infrastructure, gradually realize the integration of resources, reasonable

planning, responsibility implementation and supervision, build and display high-standard farmland according to local characteristics, improve the productivity of farmland, and make all kinds of agricultural machinery and tools better applied to agricultural production.

In terms of logistics and transportation, the government's transportation construction projects should be inclined to the economically backward rural areas, and optimize the rural road network structure, so as to improve the logistics and transportation environment. By optimizing the logistics system, governments at all levels can effectively reduce the cost of purchasing agricultural tools and transporting agricultural products in remote areas, make it more convenient to purchase agricultural machinery and tools in batches, and provide convenience for the timely transportation of agricultural products to consumers' locations. At the same time, governments at all levels should improve the e-commerce platforms at all levels, promote the communication between the rural self-employed and consumers, effectively reduce the imbalance between supply and demand caused by information asymmetry, and improve the efficiency of resource utilization.

4.3. Strengthen Policy and Financial Support

The development of smart agriculture depends on digital infrastructure such as the Internet, data sharing platform and artificial intelligence network. Local governments should actively build the required infrastructure, improve the talent introduction policy, and scientifically integrate local human and material resources. The infrastructure of building smart agriculture includes hardware facilities and software and technical support. Only with sufficient funds can we accelerate the development of smart agriculture. The government can guide policies and project funds to lead enterprises to smart agriculture, so as to achieve a win-win situation between enterprises and farmers [7]. In some poor areas with backward infrastructure, due to the large investment in infrastructure construction in the early stage of smart agriculture, the large scale and intensity of the project construction, and the relative shortage of funds, the government departments can improve farmers' enthusiasm for the development of smart agriculture through the concentrated purchase of agricultural machinery and other machinery.

4.4. Strengthen the Training and Introduction of High-quality Personnel

Local governments should improve the policy of talent introduction and implement the corresponding high salary treatment, so as to attract relevant experts, scholars, college graduates and other highly educated talents to return to the countryside and develop smart agriculture. At the same time, the seamless connection between agricultural colleges and industries should be strengthened, and the nature of the scientific research in universities should be used to provide basic technical training for farmers working in the front line. We should not only promote the introduction of rural talents, but also guide the existing traditional farmers to carry out scientific planting. At the same time, we should encourage them to take the initiative to innovate, change the traditional agricultural production mode, drive related enterprises to join the team of modern agricultural development, and contribute to the development of smart agriculture and rural revitalization.

6. Conclusion

Scientific and technological factors have become a key part of modern agricultural production, and the era of "relying on the weather and working hard" has gone forever. To a certain extent, the development of smart agriculture can facilitate the development of agriculture for farmers, reduce labor intensity, improve management efficiency, improve the overall income of farmers, and promote the continuous increase of farmers' income. Therefore, accelerating the intelligent development of agriculture is an inevitable trend, and it is also an important starting point to improve the development level of agricultural modernization and promote rural revitalization.

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