

Research on The Construction Strategy of Heilongjiang Digital Agriculture Pilot Area

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Abstract. Digital agriculture is the organic integration of digital information technology and agricultural products. Using big data technology and artificial intelligence technology, it can effectively improve the output, efficiency and economic development of agricultural products. At present, there have been some important progress in the observation of digital agriculture and remote sensing research of agricultural problems. However, the framework and technical system of digital agriculture have not yet been formed, and digital agricultural products in most regions have not been widely used. This paper will focus on the current development situation and development strategy of Heilongjiang province are analyzed in detail, and according to the actual situation of Heilongjiang province, its development direction is discussed, and finally gives the construction of the province's digital agriculture first demonstration area.

1. INTRODUCTION

The conflict between population growth and resource scarcity is intensifying, especially in agriculture, which is in the middle of population and resources and has the closest relationship with the two. With the rapid development of modern digital technology, 'digital agriculture' has emerged in China's rapidly developing digital economy. Applying digital technology to agriculture is one of the driving forces for making decisive progress in rural revitalization and basically realizing agricultural and rural modernization. Digital agriculture is the organic integration of digital information technology and agricultural products[1]. Using big data technology and artificial intelligence technology, it can effectively improve the output, efficiency and economic development of agricultural products. In the 1950s, there was a concept of digital farm abroad, and computer technology was also used in it. In addition, by using the new standard networking technology, a new stage of three digital agricultural informatization is realized[2]. The development of digital agriculture in China is lagging behind. In the early stage, it mainly relied on government policy and financial support. By 2017, the development of digital agriculture has entered the digital stage[3,4,5]. Although there have been some important progress in China's agricultural problems, China's digital technology and framework have not yet been formed, and most regions have not yet been fully realized. Therefore, this article will focus on the advantages and disadvantages of Heilongjiang Province, and its development strategy is prospected. According to the reality of Heilongjiang province, this paper mainly

discusses four problems : what to develop, what to develop leading industry, how to develop, expand and develop market. Finally, this paper makes a preliminary discussion on the construction of the first demonstration area of digital agriculture in the whole province, so as to improve the economic benefits and output level of agriculture in the whole province, the effectiveness of work and the consumption of labor force[6].

2. DEVELOPMENT STATUS OF DIGITAL AGRICULTURE IN HEILONGJIANG PROVINCE

2.1 The hardware configuration status of agricultural resources in Heilongjiang Province

Heilongjiang Province is located in the eastern part of Eurasia, the west coast of the Pacific Ocean, and northeast China[7,8]. Northeast China is one of the four black soil areas, which plays an important role in protecting regional ecological environment, food security, promoting food security and promoting sustainable development of China. However, with the high level of use in China for many years, the black soil production in China is decreasing year by year[9,10]. The content of soil organic matter decreased year by year. The soil surface becomes shallow and hard. The coordination of soil moisture, fertilizer, air and heat is obviously weakened. Continuous plough layer soil showed acidic tendency. At present, based on the urgent need of black soil degradation, restoration, utilization and protection in China, the protection and management of black soil must be accelerated.

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2.2 The current situation of digital technology platform construction in Heilongjiang

The agricultural information platform of Heilongjiang Province has been initially used in all aspects of agricultural production, and has explored high-level agricultural Internet of Things platform, agricultural production trusteeship service platform, and agricultural machinery dispatching command platform in agricultural production services. China has built the first set of agricultural machinery production scheduling command system, using GPS and GPRS dual mode, to meet the monitoring requirements of various field operations. BeidahuangSanjiangQixing Company has built the first demonstration project of farmland Internet of Things in China, which adopts three modes of automatic collection, artificial intelligence input and continuous upgrading of management software in production. Under the support of digital technology, the agricultural scientific research institutions with Heilongjiang Academy of Agricultural Sciences as the core have 11 national field observation experimental stations, 12 Internet of Things monitoring platforms, 8 professional data management platforms, and 1 comprehensive meteorological station. It has accumulated 42 years of soil fertility, 50 years of soil sample data, 21 years of image data of staple crop area, growth and disaster in the province, and 6 years of monitoring and verification data of cultivated land fallow rotation and high standard farmland construction pilot in the province. These accumulations provide technical and data support for digital agriculture.

2.3. The current situation of digital technology infrastructure construction in Heilongjiang province

On the basis of digital technology, the existing agricultural production base and agricultural production base in Heilongjiang Province have been basically completed. During the 'Tenth Five-Year Plan' period of the agricultural reclamation area, 230 million yuan was invested in informatization, and the farms of Baoquanling, Hongxinglong, Suihua, Jiusan, Beian and Qiqihar were built. The expansion and expansion of the optical fiber and switching system of the production team were completed. A total of 12,000 fiber optic cables and more than 460,000 switches were built. And it has built 13 wide area networks and 21 local area networks, opened the 'Beidahuang Information Port Station', with tens of thousands of computers and more than 20,000 broadband users. At present, the power of agricultural machinery in this area reaches 433,000 kilowatts, and the mechanical power of per capita arable land is 2 kilowatts. At present, there are 26,775 large, medium and small tractors, 4,166 100 tractors, 31 agricultural machinery 31 tractors, and the comprehensive mechanization rate is 92 %. A variety of field operations have realized

aircraft operations, which is the leading level in the country.

3.ANALYSIS OF THE PROBLEMS EXISTING IN THE DEVELOPMENT OF DIGITAL AGRICULTURE IN HEILONGJIANG PROVINCE

At present, the basic conditions of digital agriculture in Heilongjiang Province have been significantly improved, and the application of digital technologies such as remote sensing, big data and Internet of Things in agriculture has gradually deepened. With the increasing abundance of data resources in agricultural production, operation and management, the gradual deepening of digital industrialization, new industries and new formats are emerging. However, the construction of agricultural demonstration areas in Heilongjiang Province is still lagging behind on the whole, and there are many problems.

3.1 Lack of sufficient digital technology platform

At present, although there is a considerable scale of agricultural big data in Heilongjiang Province, due to the high data barriers among government departments, scientific research units, enterprises and the three parties, and the lagging development of relevant laws and regulations, the lack of public platforms and sharing channels and other factors, agricultural data are mostly scattered in different departments and fields, resulting in the information island formed by the division of data departments, which makes the agricultural big data resources in the era of big data unable to be shared.

3.2 Lack of high-level talents and high technology

In the digital farms developed in Heilongjiang Province, there are a large number of 'small data' and 'limited samples', which cannot be accurately managed. Although China's use of big data is not inferior to the international, but in the basic technology can not be in line with international standards[11]. A large number of data storage, data cleaning, data analysis and mining technologies, due to the lack of research on its process combining, index monitoring, problem diagnosis and evaluation, have led to inefficient data-driven decision-making.

3.3 Insufficient infrastructure construction

At present, the digital technology infrastructure in Heilongjiang Province is still in its infancy, such as efficient and accurate agricultural machinery, Beidou foundation enhanced base station, high-precision operation of agricultural machinery and precise navigation system. And the lack of agricultural

production process management system, including paddy field precision finishing and operation system, sowing monitoring system, pest control system. Data processing, the operating system has problems such as inefficiency.

4. FEASIBILITY ANALYSIS OF DIGITAL AGRICULTURE PILOT ZONE CONSTRUCTION IN HEILONGJIANG PROVINCE

4.1 The site selection level of digital agriculture pilot area test base

Digital agriculture is a comprehensive utilization of modern science and technology, with huge investment, huge risk, but also requires a better experimental and development environment[12,13]. Select areas with good scientific research environment, good farmland construction, and certain agricultural information construction to carry out national rural digital demonstration pilot work. Carry out scientific research on digital agriculture at all levels, apply existing scientific and technological achievements and theoretical results to production practice in time, and improve and accelerate research and development. Heilongjiang has a vast territory and can be used as a typical pilot unit to promote the digital development of Heilongjiang Province through pilot projects and build the requirements of 'digital first demonstration area.

4.2 economic aspects

The connection function of the Internet and the effective configuration of the big data platform can improve the efficiency of agricultural production, bring about the effect of increasing marginal returns, and lead to the exponential growth of output[14]. The construction of digital agriculture pilot area is conducive to giving full play to the economic effect of digital technology in agricultural production, accelerating the construction of modern agricultural industrial system, production system and management system, making up for the shortcomings of rural development, and empowering rural revitalization and development. The establishment of digital agriculture pilot demonstration area has low economic requirements and less economic burden on Heilongjiang Province.

4.3 Technology aspects

Digital technology has expanded the business scope of traditional industries, promoted the interconnection, intelligent control, precise operation and scientific development of various production factors, and promoted the steady growth of agricultural products in China. Digital technology provides enterprises with information, intelligent and intelligent management means, which makes the traditional means of

production more intensive, from extensive to digital, intelligent and intensive[15]. The ecological transformation of Heilongjiang can reduce the uncertainty of agriculture, reduce the consumption of resources and reduce the burden on the environment. For remote sensing technology, GIS, satellite positioning system and other high-end technology has not yet reached effective integration, can not achieve the intelligent control of information systems, precise operation and scientific comprehensive needs.

5. HEILONGJIANG PROVINCE DIGITAL AGRICULTURE PILOT AREA CONSTRUCTION STRATEGY FORMULATION

5.1 Development Planning Idea of Digital Agriculture Pilot Area in Heilongjiang Province

The establishment of 'digital agriculture first demonstration area', in order to develop modern agriculture and cultivate intelligent agriculture as the goal, vigorously support the training and introduction of scientific and technological personnel, promote the deep combination of 'agriculture' and 'digitization', in order to improve agricultural labor productivity, resource utilization and cultivated land output as the main purpose, to build a precise input, personalized service as the characteristics of agricultural production technology system, service system and market system, to achieve agricultural intelligent perception, intelligent control, independent operation, smooth digital agriculture development new model.

The construction of digital agriculture demonstration area is a comprehensive project. First of all, under the guidance of the development of digital agriculture in Heilongjiang Province, on the basis of the digital agricultural technology system, the key technology of great significance is selected as the breakthrough point[16]. On the basis of unified technical specifications, we should concentrate our efforts and work together to jointly develop the core technology of digital agriculture, establish the digital agricultural technology system of Heilongjiang Province, and provide support for the development of national economy. Secondly, to build a digital pilot zone of "increasing the income of workers and increasing the efficiency of enterprises," we should highlight the characteristics and advantages of "digital agriculture first zone," and emphasize the policy of "based on reality, highlighting key points, overall coordination, standardization, improving institutions, sharing, training, promotion, demonstration and stability." Third, we should base on high-level development, attach importance to the introduction and absorption of foreign advanced technology, selectively absorb foreign scientific and technological achievements, and achieve 'information leap'.

5.2 Heilongjiang province digital agriculture pilot area policy support strategy

In August 2019, Heilongjiang Provincial Department of Agriculture, Heilongjiang Provincial Agricultural Investment Group and Heilongjiang Branch of China Construction Bank signed the " Strategic Cooperation Agreement for Heilongjiang Digital Agricultural Comprehensive Service System " in Harbin. The purpose of the agreement is to further promote the deep integration of Internet, big data, artificial intelligence and other technologies with the agricultural field, promote the digital, networked and intelligent transformation of Heilongjiang agriculture, and lay a solid foundation for the new format of digital agriculture in Heilongjiang Province, the establishment of a national digital agriculture demonstration area and the northern portal of the digital Silk Road.

At present, Heilongjiang Province has fully implemented the service system of digital rural integration, but in the support of digital technology and the construction of infrastructure, it is necessary to strengthen the popularization of data network, strengthen the training of infrastructure and talents, strengthen financial investment, strengthen the management of agricultural technology and finance, and make full use of the support function of policy to agricultural scientific research. Support commercial banks to carry out agricultural science and technology projects, promote the transformation of technology and scientific and technological achievements, and actively explore new financing channels.

5.3 Infrastructure and digital technology platform planning

Consolidate and improve rural broadband projects, continue to deepen the reduction of fees and popularize telecommunications services, continue to expand the coverage of 5 G and optical fiber networks in rural areas, radiate network services to households, and greatly increase rural Internet penetration ; By grasping the application terminal, the focus of rural informatization was shifted to the field, the agricultural Internet was developed, and the promotion of 5 G in agriculture was actively promoted, which laid a material foundation for the development of digital agriculture in China.

Based on the agricultural data resource directory and data sharing and exchange system, the data model, algorithm model and scheme model are refined to provide meaningful data assets, services, model services and knowledge experience for agricultural data[17]. The data processing of the agricultural industry is carried out by means of API, and it is integrated with the actual situation of the agricultural industry. Big data and artificial intelligence technology are used for data processing, and intelligent planning and design are carried out for agricultural production, management, management, service and other links, so as to establish a unified, reliable, practical,

technologically advanced and safe digital technology platform.

6. CONCLUSION

Digital agriculture is the frontier field of agricultural development in the 21 st century. Heilongjiang Province has the basis for the development of digital agriculture, but it is still in its infancy in terms of technology and personnel training. This is far from the needs of digital agriculture development. Heilongjiang Province must formulate a development strategy in line with the development of digital agriculture according to the actual situation of Heilongjiang. In the specific implementation, it should be carried out as a whole, step by step, from point to surface, step by step ; avoid repeated waste and mistakes. In the early stage, technical specifications should be unified, with digital platforms, infrastructure, etc.as the main content. On this basis, the relevant application mode of digital agriculture is established, the key technologies of pilot digital agriculture are discussed in depth, and the integration and promotion are carried out, so as to form the first demonstration area of Heilongjiang digital agriculture.

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