Research on the Construction and Application of Agricultural Informatization under the Background of Big Data

Xiaoping Zhu
Hunan Agricultural University
Changsha, Hunan, 410128, China

Yi Xiao*
Hunan Agricultural University
Changsha, Hunan, 410128, China

Abstract: Building an agricultural informatization application system and carrying out diversified intelligent platform information construction under the background of big data caters to the basic comprehensive concept of "digital China" and "digital agriculture" development. The paper mainly interprets several technical analyses in the application system of agricultural big data informatization, and constructs a modern agricultural information management platform, hoping to help with the rapid development of agriculture in China in the future. Sort out the current situation of agricultural and rural informatization construction at home and abroad, point out the existing problems, and analyze the trend of agricultural and rural informatization construction under the background of big data, and propose suggestions for agricultural and rural informatization construction.

Keywords: Construction and Application, Agricultural Informatization, Big Data

1. INTRODUCTION

Big data is already a familiar type of modern technology, and its "3V" features provide powerful and rich data support for the development of various industries and fields. As stated in a research report released by the McKinsey Institute in June 2011, "the arrival of the big data era will inevitably promote the rapid development and innovation of future productivity, and it will also become an important indicator of consumer demand growth." In terms of agricultural and rural informatization construction, developed countries at home and abroad started earlier and developed faster. Overall, many important research achievements in these countries mainly focus on the construction of agricultural information infrastructure, basic databases, platforms, service systems, and other aspects.

The United States has always been in a leading position in the construction of agricultural and rural informatization. Firstly, the foundation of agricultural information is sound. By building the National Agricultural Information Database (AGRICOLA), National Oceanic and Atmospheric Administration (NOAA), Geological Survey Bureau (USGS), and other databases, a huge amount of data resources have been formed. For some local governments, financial funding is not strong, and the construction of rural informatization has not received sufficient investment. For enterprises, the dispersed population and resources in rural areas result in high construction and maintenance costs, low income for rural residents, and limited expected economic benefits. This directly affects the investment willingness of enterprises, and the development of rural informatization lacks market vitality.

For farmers, the investment in rural informatization construction is limited, and the information receiving terminal equipment suitable for farmers is not guaranteed. The cost of obtaining information through the network is high, and the cooperation degree of farmers who have not yet realized the opportunities of informatization is naturally greatly reduced. The "last mile" problem is becoming increasingly severe. In the process of informationization construction in modern agriculture, there are still many issues that need to be paid attention to, mainly focusing on various service aspects, including channels, modes, and subjects. The principles of resource integration and local adaptation are fully utilized, thus establishing a collaborative service model that includes a three-layer goal system to maximize the productivity of modern agriculture, promote the better development of modern agriculture towards industrialization. Intelligent perception technology for life information mainly analyzes the actual growth process of animals and plants, which can be refined into comprehensive and detailed data extraction of the physiological status, development process, and activity patterns of animals and plants. The obtained physiological data is quite delicate.

For example, the extraction of data on changes in nitrogen content in plants, animal movement trajectories, and body temperature changes. In addition, there are spectral technology, artificial olfactory technology, mechanical vision technology, and so on, which mainly focus on life information perception. They are all important life information obtained for agricultural production operations based on big data combined with intelligent perception systems for life information. They themselves are digital descriptions of agricultural production objects and can also form a comprehensive monitoring and management of individual life behavior. Firstly, we have a resource data center for agriculture, which can provide services for agricultural production in Germany. Secondly, there is a sound infrastructure for agricultural and rural informatization.

2. THE PROPOSED METHODOLOGY

2.1 Analysis of Several Technologies in the Application System of Agricultural Big Data Informatization

Computer automatic control systems are widely used in the agricultural field, improving the efficiency of agricultural machinery utilization. Finally, the Internet of Things has been extensively researched and applied in agriculture, especially in the aquaculture industry, achieving modern production using the latest technology. In the construction mode of the

information direct vehicle project, the role of the government is mainly reflected in the allocation and concentration of resources and forces from all sectors of society. The information through train project has the nature of public service, and its public welfare should precede its commercial nature. Therefore, government leadership is an important feature of this project. The provincial government has established an action bill to establish a framework for the promotion and implementation of the information through vehicle project. Allocate the backbone of relevant departments to form the project leading group and the project implementation office, forming a leadership system of departmental collaboration and connectivity. In the process of agricultural informatization development under the background of "Internet plus", we can actively change the previous regulatory model and build a sound information based regulatory mechanism, to provide an important guarantee for the safety and quality of agricultural products and effectively improve the market share of agricultural products.

At the same time, by establishing a safety traceability mechanism for agricultural products based on actual situations, actively integrating RFID technology and intelligent monitoring technology, comprehensively optimizing information query, responsibility identification, and flow tracking, to maximize the safety supervision of agricultural products. The development of agricultural informatization mainly relies on an open internet financial environment, so it is possible to actively build a modern agricultural financial system, create an internet financial platform to solve financial problems that arise during the process of agricultural informatization construction, comprehensively optimize the allocation of modern agricultural resources, and fully leverage the management and guidance roles of various regulatory departments. Only in this way can the level of agricultural informatization construction be effectively improved.

After integrating big data into agricultural network data crawling, a new web crawler technology can be formed. This technology is very precise in the dynamic monitoring process of agricultural data and can automatically crawl all information programs and school textbooks in the network according to certain technical rules. At the same time, it expands to two technologies: depth first and breadth first. From the perspective of the current big data technology at the internet level of agricultural network data, this network data capture technology can objectively reflect the scale, dynamic changes, distribution, and heterogeneity of real-time agricultural production data. At the same time, it has also established an agricultural search engine and built a big data information agriculture application system platform based on theme web crawler technology, laying a certain technical foundation for agricultural network data acquisition. The construction of agricultural information platform lacks overall planning.

Due to the lack of an overall layout for the construction of agricultural big data, the lack of development of agricultural big data construction content centered on serving the entire agricultural industry chain, and the lack of clear definition of the responsibilities and rights of agricultural big data construction subjects and participants, various departments and social entities are still in a "confused" state about how to build and participate in the construction of agricultural big data. The information officer team is an indispensable main force in providing information services for the Information Express Project, with a focus on solving the "last mile"

problem. The main task of the information officer is to enter villages and households, collect and compile information; Divided by industry into agricultural information personnel, agricultural enterprise information personnel, professional market information personnel, and industry association information personnel; The information officer is composed of members of the Communist Youth League, agricultural technology promotion personnel, professional market management personnel, scientific and technological personnel, members of agricultural associations, and agricultural enterprise management personnel.

2.2 Analysis of the Development Trend of Agricultural and Rural Informatization under the Background of Big Data

The government subsidizes information workers by supporting funds in accordance with the standards of village cadres, while encouraging them to provide paid information services. Informationists receive various forms of training to update knowledge, improve skills, and improve service levels. To better solve the problems in trans regional agricultural informatization management, it is necessary to build sound laws and policies, adhere to the measures of integrating power, responsibility and interests, increase the in-depth integration of "Internet + agriculture", and comprehensively implement the theoretical basis of collaborative governance. At the same time, we should also accurately grasp the opportunities of continuous development in today's era and effectively improve the management level of cross regional public issues. Among them, a sound system is formulated based on the actual situation to fully mobilize the participation enthusiasm of various subjects and actively participate in the development of agricultural informatization construction in the industry. These five modern agricultural functional management modules include agricultural institution management module, agricultural discipline management module, agricultural spatiotemporal management module, agricultural technology management module, and agricultural website management module.

The three modern agricultural management modules include agricultural procurement management module, agricultural sales management module, and agricultural production management module. In the era of big data, these modules can achieve precise evaluation and functional optimization of agricultural modernization based on the penetration of big data technology, while further dividing the granularity of agricultural management. Currently, with the rapid development of information technology, new technologies are constantly emerging, and their application in the agricultural field will be faster and more comprehensive, resulting in more efficient and convenient results. The need for information technology in agriculture will also become stronger, and the internet, mobile internet, Internet of Things, cloud computing, and big data will inevitably occupy a dominant position in agricultural production management. The process of agricultural production, operation, management, and service is a coexistence of material flow and information flow. From the perspective of computer science, it is a process of data generation, collection, transmission, storage, analysis, and application, which inevitably generates a large amount of data. How to manage and apply data has become an urgent problem to be solved. Improve public welfare service institutions and service teams.

Establish a unified network platform at the provincial level, establish information service centers at the city and county

levels as mainstream platforms for public welfare information services, establish information service stations at the township level, and establish rural service points at the village level, thus forming a series of top-down and comprehensive rural information service institutions. In terms of service team, cultivate rural full-time service information officers, and have them promote government subsidies and service income methods at the grassroots level. Utilize university resources to encourage college students to participate in rural information services and expand the service team. Encourage enterprises to provide a variety of market-oriented professional services, expand derivative services, and improve service quality and effectiveness. Encourage as many volunteer and socialized information services as possible.

3. CONCLUSION

Against the backdrop of big data and issues related to agriculture, rural areas, and farmers, the development of agricultural high-tech in China has gradually attracted attention. The construction of an agricultural informatization application system platform under the background of big data proposed in this article can achieve the development of precision agriculture and achieve the horizontal and vertical bidirectional sharing and exchange of information in modern agriculture. Strengthening grassroots capacity building ideas and content. Based on meeting the information needs of townships, rural areas, family farms, farmer cooperatives, farmers, and other entities, we will strengthen grassroots capacity building, open up information channels, strengthen infrastructure construction in towns and villages, and improve the operational level of grassroots service station personnel.

4. REFERENCES

[1]   Fan Jiahao. Research on the Development Status and System Design of Smart Agriculture Based on Big Data Technology [J]. Hebei Agricultural Machinery, 2022 (22): 66-68

[2]   Li Chunhui. Research on the Application of Big Data in the Agricultural Internet of Things [D]. Qiqihar University [2023-11-16]. DOI: CNKI: CDMD: 21015.622948

[3]   Cai Ying. Exploration of Accounting Information System Application Course Construction in Higher Vocational Education under the Background of Big Data [J]. China Agricultural Accounting, 2023, 33 (10): 110-112

[4]   Lin Lian. Research on the Application of Cloud Desktop in Laboratory Management in Agricultural and Forestry Universities under the Background of New Agricultural Sciences [J]. Agricultural Technology and Equipment, 2022 (9): 96-98

[5]   Deyang. Research on Ways to Accelerate the Informationization Construction of Agricultural Technology Promotion [J]. Chinese Science and Technology Journal Database (Full Text Edition), Natural Science, 2021 (6): 1

[6]   Cheng Kequn, Xu Di, Jiang Xianqian. The application of big data in the reform of accounting teaching methods in universities under the background of the epidemic: based on a questionnaire survey of the accounting major at Anhui Agricultural University [J]. China Management Information Technology, 2020, 23 (7): 7. DOI: CNKI: SUN: GLXZ.0.2020-07-091

[7]   Li Xiaojing, Li Xiaojing, Zang Yunping, et al. Overview of the Application of Big Data Technology in Agricultural Informatization [C]//Chinese Society of Agricultural Engineering; China Agricultural University; Advanced Agricultural Information Processing Group Committee of the International Federation of Information Processing. Chinese Society of Agricultural Engineering; China Agricultural University; Advanced Agricultural Information Processing Group Committee of the International Federation of Information Processing, 2013

[8]   Bai Ziwei. Research on the Evaluation Model of Agricultural Informatization in Heilongjiang Province under the Background of Big Data [D]. Jilin Agricultural University [2023-11-16]

[9]   Zeng Wei. Research on the Development Trend of Agricultural Standard Informatization in the Era of Big Data [C]//2013 National Agricultural Standardization Symposium. 2013

[10] Yang Keqi Research on rural informatization construction satisfaction under the background of "Internet plus" [D]. Hunan Agricultural University, 2015

[11] Zhu Qianqiang. Research on Agricultural Informatization Construction in Wenzhou from the Perspective of Big Data [D]. Zhejiang Ocean University, 2020

[12] Ma Huiqing. Research on the Application of Big Data Based Informatization Technology in Water Conservancy Construction Management [J]. Science and Technology and Innovation, 2021 (6): 3. DOI: 10.15913/j.cnki.kjycx.2021.06.072

[13] Jiang Minxu and Wang Yuxin. Research on the Construction and Application of Smart Agriculture Based on Big Data Technology [J]. Modern Agriculture, 2022 (4): 73-74

[14] Wang Huabing. Research on the Construction of Agricultural Informatization Application System and Platform Construction under the Background of Big Data [J]. Computer and Digital Engineering, 2017, 45 (11): 4. DOI: 10.3969/j.issn.1672-9722.2017.11.050

[15] Huang Weiqi. Research and Application of Big Data in Smart Agriculture [J]. Information Construction, 2015 (12)

[16] Luo Zhiqing, Guan Bo, Chen Pingting, et al. Research on Agricultural and Rural Informatization Construction under the Background of Big Data [J]. Northeast Agricultural Science, 2022 (004): 047