



# Application Analysis of Modern Computer Technology in Agricultural Economic Management

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**Abstract.** The organic integration of computer technology and agricultural economic management system can establish an efficient information management platform, rely on the analysis of internal multi-information data, accurately locate the information related to various economic behaviors in agriculture, and promote the development of agricultural information. This paper discusses the problems existing in traditional agricultural economic management, analyzes the application value of computer technology in modern agricultural economic management, and introduces the application of modern computer technology in agricultural economic management: First, the standardized establishment of agricultural information database. The system data coding method and classification management method are introduced in detail. Second, the design of agricultural big data sharing service platform is introduced in detail, including the application of Hadoop framework, and the applications of Hbase, Redis and FastDFS in big data sharing service platform are also introduced. With the introduction of the above-mentioned computer technology, China's agricultural economic management has gradually realized the modernization development, and the management quality and efficiency have been significantly improved.

**Keywords:** computer technology · agricultural management · application mode

## 1 Introduction

Under the new economic normal environment, the development of agricultural industry began to change to intensive direction. By integrating different information data in the agricultural industry, collecting the changing trend of agricultural environment and the basic orientation of current development, the standardized and orderly management methods are defined [1]. The organic combination of computer technology and agricultural economic management system is the inevitable direction of today's agricultural industrial economic informatization development. Through the orderly and real-time information transmission system supplied by computer technology, we can build a standard agricultural industrial economic management system, and supply decision-making

information data for the development of agriculture, which makes China's agricultural industry regulation and macro-layout efficiency significantly improved.

The structure of this paper is as follows: The first part gives the problems of traditional agricultural economic management, the second part expounds the application value of computer technology in modern agricultural economic management, and the third part concretely presents the application mode of modern computer technology in agricultural economic management combined with practice.

## **2 Problems of Traditional Agricultural Economic Management**

### **2.1 Agricultural Industry Itself Has Great Limitations**

The economic base of agriculture is very weak, and now China's agricultural industry still has a strong dependence on the environment. For a long time, China's agricultural development has always been highly dependent on nature, and its ability to resist risks is insufficient. The above-mentioned problems have seriously limited the rapid development of economic benefits and scale of agricultural industry [2]. Therefore, the development of agricultural modernization has obvious demand and dependence on computer technology. In particular, many farmers don't have the awareness of intelligent industrial development, which leads to different degrees of influence on agricultural planting, management and development effects, thus causing serious instability in agricultural production.

### **2.2 Insufficient Utilization Rate of Agricultural Resources**

Nowadays, China's rural economy is relatively weak, industrial technology and computer network facilities and technologies have not been popularized, which leads to unsatisfactory industrialization level of China's agricultural economic development and agricultural economic management effect [3]. Affected by the factors of the agricultural industry itself, coupled with the shortage of talents in the agricultural field and wisdom and technology, China's agricultural economy as a whole shows different problems such as insufficient leading industries, low scientific and technological content and poor total economic benefits, which seriously affect the rapid development of agricultural economy [4]. On the whole, the development level of China's current agricultural industrialization needs to be improved, and the poor level of agricultural economic management seriously limits the rapid development of China's agricultural economy.

### **2.3 Agricultural Value is Difficult to Transform**

The development scale of China's agricultural industry needs to be expanded, and its operation is relatively scattered, so its ability to resist market operation risks is poor, and its advantages in agricultural market competition are not significant [5]. Not only that, China's agriculture has not yet formed a sound and systematic economic chain, but also limited the efficient transformation of China's agricultural economic benefits. For a long time, China's agricultural economy has been faced with the problems of insufficient

scale and lack of market awareness. No matter the procurement of agricultural means of production or the processing and marketing of agricultural products, it has failed to build a sound industrial chain, which leads to the reduction of the bargaining power of the agricultural industry in the market, and it is impossible to turn the existing agricultural superior resources into the advantages of the agricultural industrial economy. Therefore, China needs to introduce information technology as the driving force and main platform to build a more ideal platform for the development of agriculture.

### **3 Application Value of Computer Technology in Modern Agricultural Economic Management**

#### **3.1 Promote the Industrial Chain Construction of Modern Agricultural Economy**

With the maturity of computer technology, the production technology of agricultural industry is constantly upgrading, and both the service concept and the industrial supply chain are developing towards scale and systematization [6]. By giving full play to the application advantages of different links and fields, and constantly improving the road of modern agricultural economic development, we can effectively strengthen the cooperation ability between different links of the agricultural industry. If agricultural practitioners in China can scientifically apply computer technology, reasonably control the actual needs of the market for agricultural products, and ensure that the business data of the agricultural industry can be shared and communicated efficiently at the first time, it can provide convenience for relevant business entities to adjust and improve agricultural management schemes, and effectively improve the efficiency of agricultural economic management. In this way, China's agricultural industry can give full play to the advantages of computer technology to promote the intelligent upgrading of industrial management. For example, various regions in China have begun to introduce command and control systems. The ventilation equipment, temperature, nutrient supply and so on are all controlled by computers. Agricultural managers can use fertilizer pumps to provide nutrient supply for multiple hydroponics tanks. In this way, the data of water and fertilizer ratio can be adjusted, making the agricultural economic development more scientific and providing good productivity for rural economic development.

#### **3.2 Lay the Foundation for the Intelligent Development of Agricultural Industry**

The rational application of computer technology can provide an important driving force for the modern management of agricultural economy. By giving full play to the advantages of computer technology, designing feasible modern economic management schemes, constructing modern agricultural economic management mode, and scientifically applying agricultural development resources to speed up the integration of agricultural industries, we can realize the sharing of agricultural industrial resources, maximize the industrial agglomeration effect, construct the development mode of "Internet + agriculture", and fully explore the existing agricultural resources, so as to increase farmers' economic income and ensure the development environment of rural areas.

### **3.3 Provide Wisdom Kinetic Energy for the Development of Modern Agricultural Economy**

Nowadays, computer technology has been applied to various agricultural fields such as agricultural production and management, agricultural product marketing, which is beneficial to the continuous promotion of agricultural industrial technology, and at the same time, it is beneficial to popularize new technologies and facilities, improve the distribution of agricultural production resources [7]. Nowadays, the modernization of China's agricultural industrial counties is gradually improving, and the agricultural production mode, management system and marketing system continue to introduce management system to realize intelligent upgrading. By giving full play to the advantages of computer technology, we can significantly improve the level of agricultural industrialization and lay the foundation for China's rural economic management. Computer technology accelerates the integration and development of rural industries in China, and at the same time endows agricultural industries with certain economic added value. Therefore, during the construction of modern agriculture, local governments need to combine the development status of local agricultural industry, such as computer infrastructure construction, farmers' scientific and technological level, farmers' education level and industrial development scale, so as to improve the application system of computing technology and continuously strengthen the economic development ability of rural areas.

### **3.4 New Channel to Increase Farmers' Economic Income**

"Internet + agriculture" is the inevitable trend of agricultural industry development in the future. All-round and systematic application of computer technology is beneficial to the establishment of a market-led and technology-driven modern agricultural industrial economic system, and increases the channels for farmers to obtain economic income [8]. With the development of agricultural economy beginning to form a new normal state, the transformation of agricultural scientific and technological achievements has also achieved initial results, and the resources necessary for the development of agricultural industry have been initially improved. By giving full play to the value of computing technology, local farmers can effectively improve the efficiency of agricultural management, promote the organic combination between computer technology and green agriculture construction, improve the development of agricultural industry in all directions, effectively help farmers to increase their economic income and promote the development of farmers' economy.

## **4 Application Mode of Modern Computer Technology in Agricultural Economic Management**

### **4.1 Standardized Establishment of Agricultural Resource Information Database**

Agricultural resource information data involves a lot of information data, and the data scale is huge, with the characteristics of high data structure and sharing. All kinds of data are not only related to each other, but also a framework system that supports each other, which is convenient for modular and standardized management and control

of agricultural resource information database, mainly aiming at spatial elements and agricultural resource ledger information data to be standardized organization and control [7]. The details are as follows:

First, classification and coding of spatial elements and thematic information types: first, spatial elements. According to the two-level classification, the element code adopts four-digit code, the first two digits adopt spatial element code, and the last two digits adopt spatial elements subcategory code. The codes of administrative areas in the spatial elements are all arranged by the unified 12 administrative division codes of China. The codes of two-area plots, permanent basic farmland plots and agricultural economic rights plots are coded by the relevant achievement data, and the raster data are coded according to the sub-frame map number formulated by China.

The second is thematic information. Based on the classification of spatial elements, several diverse thematic information are set up under all spatial elements subcategories. Set up stimulating thematic information again for each thematic information. The thematic information uses 8 as the digital code, the first 4 digits are the spatial element codes to which the thematic information belongs, the 5–6 digits are the thematic information codes, and the last two digits are the extended information codes. Now, the last two extended information codes are “00”, which can be extended to secondary thematic information in combination with actual work requirements. For example, 01053300, in which “01” represents the administrative region, “02” represents the township level, “33” represents the township collective economic organization, and “00” represents the special information of the follow-up stimulus.

Second, spatial data and thematic information data organization and control. The first is spatial data. It contains vector data and raster data, and the structural attributes of both adopt type names, geometric features, structural table names and constraints. Among them, the types of vector information include administrative areas, spatial entities, water system irrigation, road traffic and so on. Its codes are represented by 01, 02, 03 and 04 respectively. There are corresponding subtypes under different types, namely layers, and subtypes have corresponding codes at the same time. Appropriate data are expressed in different levels according to the types of elements (as shown in Table 1). The types of raster data include DOM, DEM and others, and the codes are represented by 0501, 0502 and 0503. Raster data is managed according to different types of contents, and the names and collection characteristics of raster information data are classified and described (as shown in Table 2). The second is thematic information data. Account information is organized and managed by relational table method, and all thematic information names, codes, structural table names and restrictions are described according to the corresponding relationship one by one.

## 4.2 Establishment of Big Data Sharing Service Platform

Big data is an information asset with high value, which is characterized by mass, rapidity, diversity and authenticity. It must be collected, screened, stored and analyzed by using advanced processing technology to provide data support for agricultural economic management. Big data sharing service platform can be established in rural areas to improve the overall efficiency of agricultural economic management. Agricultural economic management contains abundant contents, including information data related to agricultural

**Table 1.** Agricultural resources ledger spatial information data vector data hierarchical control

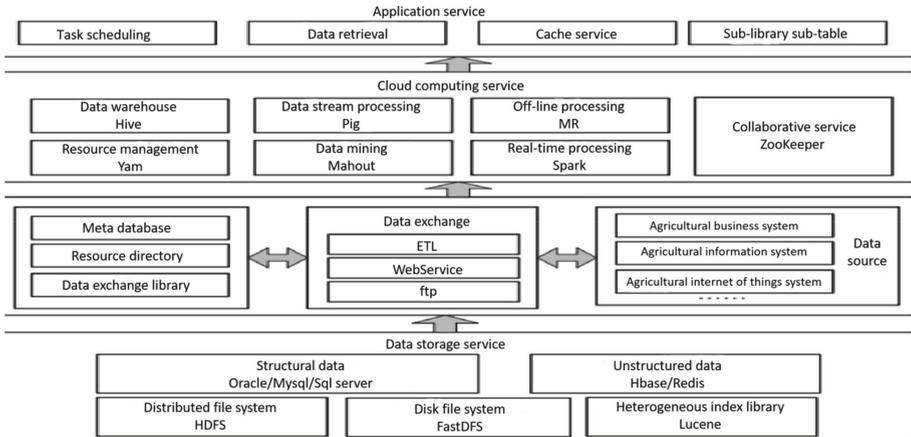
Type	Code	Layer name	Code	Geometric features	Structure table name	Constraint condition
Region	01	Village administrative region	0101	Surface	CUNJXZQ	O
		Township administrative region	0102	Surface	XIANGJXZQ	M
		County administrative region	0103	Surface	XIANJXZQ	M
		Municipal administrative region	0104	Surface	SHIJXZQ	M
		Provincial administrative region	0105	Surface	SHENGJXZQ	M
Spatial entity	02	Agricultural land plot	0201	Surface	NYSCYDDK	M
		New agricultural management subject	0202	Point	XXNYJYZT	M
		Scale farm	0203	Surface	GMHYZC	M
		.....	.....	.....	.....	.....
Road transport	03	Road above grade	0209	Line	DJYSDL	O
		The road of agricultural production	0301	Line	NYSCDL	O
Water irrigation	04	River	0401	Line	HL	O
		Reservoir lake	0402	Surface	SKHB	O

Note: “M” represents “required” and “O” represents “optional”, the same below. The structure table name is a “layer name” initials.

basic conditions, such as water area, grassland, cultivated land, soil, agrometeorology. Information data of agricultural resources elements, including planting, animal husbandry, agricultural parks, etc. All kinds of transaction information data generated by agricultural management, including management and sales of crops and confirmation of rural land rights. Manage agricultural related information data, such as pest control and farmers’ popularization of science and technology. In the data type scheme, agricultural

**Table 2.** Classification management of agricultural resources ledger spatial data raster data

Type	Code	Geometric features	Structure table name	Constraint condition
DOM	0501	Image	SGSJ	M
DEM	0502	Image	SGSJ	O
Other	0503	Image	SGSJ	O



**Fig. 1.** Design of agricultural big data sharing service platform (Photo credit: Original)

information data includes different types of ways such as text, video and audio. Through the platform, the above information data can be summarized, stored and shared, which provides convenience for agricultural economic management. The specific structure is shown in Fig. 1. The platform is designed with Hadoop framework, and the bottom layer is data storage service. In order to meet the actual needs of different types of structures, relational databases such as Oracle are used to manage structured information data. It is also necessary to use Hbase and Redis to manage unstructured data; HDFS is used to manage the distributed file system; Apply FastDFS to manage the disk file system; Lucene is responsible for the management of heterogeneous index database. After the above-mentioned work, the data sharing and data exchange layer processing can be started, and various technologies such as ETL, Webservice and FTP can be used to summarize the information data of each business department, compile the resource directory and build the meta-database. Based on this, cloud computing services are adopted for summary data, including database establishment, data content mining and analysis and other services. At the same time, based on this, application services are provided to carry out task scheduling, data checking and caching services. Big data resource management system can open and share the summarized agricultural information data with different sectors and subjects, and provide more convenient data services for various departments.

## 5 Conclusions

The application of computer technology in agricultural economic management in China is of positive significance for improving the efficiency of agricultural economic management, and also has high practical value. With the help of modern computer technology, the development of agricultural industry began to develop in the direction of informationization and multi-level. Local governments in China should make clear the application value of modern computer technology, give full play to the value of computer technology, increase farmers' economic income and promote the continuous development and progress of China's agricultural industry by establishing agricultural resources information database and big data sharing service platform.

**Acknowledgements.** This project is supported by the 2020 First-class Basic Economics Course Project of Ningxia Hui Autonomous Region.

## References

1. Chen X (2020) Application mechanism of computer technology in agricultural economic management. *Guangdong Sericult* 54(7):61–62
2. Lu H, Dai N (2017) Application and effect analysis of computer technology in enterprise management. *Value Eng* 12:31–32
3. Zhu S, Liu A, Ao X (2020) Discussion on the influence of agricultural information management on jiangxi agricultural economy under big data environment. *Friends Farmers Gett Rich* 34:248
4. Zhou T (2020) Strengthening ecological agriculture construction guided by digital economy—promoting sustainable development of agriculture. *Res Agric Modern* 26(11):1–2
5. Wang G (2021) Application and prospect of big data in chinese agriculture—taking Heze peony industry as an example. *Bus Econ* 4:102–104
6. Cao Z (2021) APP application of network marketing in precision poverty alleviation in agricultural industry—comment on “introduction to precision poverty alleviation in agriculture.” *Chin J Agrometeorol* 42(9):805
7. Yin K (2020) Application of computer technology in animal husbandry system construction—comment on “animal husbandry system engineering.” *Chin Feed* 4:118–119
8. Li L, Lin Z, Huang Q (2019) Explore the application of computer information technology in modern agricultural scientific research. *Rural Econ Sci Technol* 30(8):274
9. Xu C, Bao P (2019) Research on the construction of digital humanities research infrastructure for the field of agricultural history—based on the construction of local records product knowledge base. *Agric Hist China* 38(6):40–51

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