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# CURRENT STATUS AND PROSPECTS OF THE DEVELOPMENT OF THE INFORMATION COMPONENT OF FAMILY FARM MANAGEMENT IN CHINA

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## СУЧАСНИЙ СТАН ТА ПЕРСПЕКТИВИ РОЗВИТКУ ІНФОРМАЦІЙНОЇ КОМПОНЕНТИ УПРАВЛІННЯ СІМЕЙНИМИ ФЕРМАМИ В КИТАЇ

***The information component of family farm management is an important engine to promote the quality, efficiency and competitiveness of agriculture and realize the modernization of agriculture and rural areas. A perfect family farm information service system is conducive to optimizing resource allocation, improving production efficiency, optimizing supply and demand, production structure, and regional structure. The application of advanced information technologies such as Internet of things, big data and remote sensing technology in the production of family farms is conducive to improving the utilization rate of production factors and labor productivity of family farms, improving the quality of agricultural products and broadening the sales channels of agricultural products. Although China's agricultural informatization construction started late, after decades of development, it has made certain achievements in agricultural information infrastructure, agricultural information service and agricultural information technology, but there are still factors restricting further development. As an indispensable part of China's agricultural development, family farms are also groping in the informatization management. This article reveals the significance of the information component in agricultural informatization, analyzes the current situation of China's family farm informatization management, finds out and analyzes the problems and provides the basis and foundation for accelerating the development of information component of family farm management in China.***

***Through the on-the-spot investigation of some domestic farms, we understand the organizational structure of the family farm, and have a full understanding of the production and operation process of the family farm. In combination with the management work of the family farm manager in the operation of the farm, we have determined the content and practical significance of the information component of family farm management.***

*Інформаційна компонента управління сімейними фермами виступає важливим рушієм підвищення якості, ефективності, конкурентоспроможності сільського господарства та його модернізації в межах наявних сільських територій. Досконала система інформаційного обслуговування сімейних ферм сприяє оптимізації розподілу ресурсів, підвищенню рентабельності діяльності, оптимізації попиту та пропозиції, структури виробництва та його регіональної конфігурації. Застосування передових інформаційних технологій, таких як інтернет, великих баз даних, технології дистанційного зондування у виробництві сімейними фермами сприяє оптимізації рівня використання факторів виробництва та продуктивності праці, підвищенню якості сільськогосподарської продукції та розширенню каналів її збуту. Незважаючи на той факт, що формування інформаційної компоненти управління сімейними фермерськими господарствами у Китаї розпочалося пізно, після десятиліть розвитку, вона досягла певних результатів у інформаційній інфраструктурі, сільськогосподарських інформаційних службах та технологіях. Але слід визнати, що все ще існують фактори, які обмежують її подальший розвиток. Будучи невід'ємною складовою сільськогосподарського розвитку Китаю, сімейні ферми також знаходять шляхи подальшого вдосконалення власного інформаційного забезпечення.*

*На основі фактичного відвідування та анкетування, шляхом узагальнення та аналізу отриманих результатів опитування, обробки даних офіційних державних органів, врахування іноземного досвіду, в даній статті системно досліджена поточна ситуація та існуючі проблеми інформатизації а також запропоновано заходи для прискорення розвитку інформаційної компоненти управління сімейними фермами в Китаї.*

*Завдяки проведенню, в реальних умовах, спостереження за роботою фермерів, нами досліджено процес виробництва, організаційну структуру сімейних ферм та сформовано повне розуміння особливостей їх функціонування. У поєднанні з управлінською роботою керівника сімейної ферми ідентифіковано зміст і практичне значення інформаційної складової управління сімейною фермою.*

*Key word: questionnaire, informatization, information support, information component of management, management, agriculture, family farm.*

*Ключові слова: анкетування, інформатизація, інформаційне забезпечення, інформаційна складова управління, менеджмент, сільське господарство, сімейна ферма.*

## PROBLEM STATEMENT IN GENERAL FORM

Agricultural informatization mainly refers to the process of creating a more labor-saving and efficient sustainable development industry based on modern science and technology and its concepts in the process of agricultural production. With the development of the times, the Internet of things, 5g network and artificial intelligence are used. The development of agricultural informatization is very important for the development of national informatization. As an important foundation for promoting agricultural development, the role of family farm informatization management can not be ignored. Nowadays, the state attaches great importance to the work of "agriculture, rural areas and farmers", especially after the Rural Revitalization Strategy is put forward. Under the background of new rural construction, how to solve the problems in the informatization management of family farms and promote the high-quality development of informatization of family farms in China is a top priority in the whole agricultural industry.

## LITERATURE REVIEW

Through sorting, many authors have studied the family farm information management and agricultural information management, and the results are mainly concentrated in:

In the family farm information management. Fang Xiangming believes that in the field of family farm informatization, the United States has always been at the forefront of the economic and social development of family farms in the world. The United States has invested a lot of time, human, material and financial resources in the research and promotion of modern family farm information technology and family farm informatization, and has built a complete family farm information database and a modern family farm information management network system. It is provided to family farms for free, which promotes the rapid and healthy development of American family farms [1]. Ruan Rongping, Zhou Pei and Zheng Fengtian believe that in order to realize the informatization of family farms, it is necessary to improve the information acquisition ability of family farm operators, expand the information acquisition channels, pay attention to the information needs of family farm operators, and improve the matching of information supply and demand [2]. Li Jin, Feng Xian and Guo Meirong studied the application and development strategy of family farm information. The author believes that the promotion of information technology has certain regional differences. The level of productivity development and economic development in each region have a direct impact on the promotion and popularization of information

technology in family farms. Therefore, the comprehensive application of family farm information technology needs to be combined with specific reality [3]. In analyzing the relationship between agricultural informatization and agricultural economy in Henan, Ding Luman said that agricultural informatization has the attribute of public goods, and its construction can only be led by the government, which requires the government to increase the support for infrastructure construction funds, and at the same time, formulate a scientific agricultural informatization system [4]. Zhang Yi pointed out that improving farmers' information awareness and information science and technology level is the core of rapidly promoting family farm information work by analyzing the path of Hubei new rural construction [5]. When analyzing the information construction of family farms in Anhui Province, Shang Jingjing said that at present, there is still a shortage of high-tech talents, information management talents and high-quality comprehensive talents in family farms, which needs to be supplemented [6]. Fu Weidong and Wang Jixin pointed out that the main problem of China's agricultural information market is the low market allocation rate, which is mainly caused by the failure of reasonable setting of hardware, software and personnel training in the process of agricultural informatization [7]. Kong Xiangzhi believes that in the process of agricultural informatization in China, most of the energy and funds are used to build hardware and software facilities, and the importance of talent training is not recognized, which makes many farmers not interested in informatization achievements. Therefore, how to improve the efficiency of informatization achievements is an urgent problem to be solved [8]. Jack believes that family farm is an agricultural operation entity with an appropriate scale engaged in agricultural production, processing and sales based on the basic unit of peasant households, registered by the industrial and commercial administration department, market-oriented and profit maximization [9]. Aker J.C. believes that family members must live on the farm, raise funds for the family farm, and the family members of the farm work together in agriculture [10].

To sum up, the development of family farm informatization is the only way for the development of world agricultural modernization, which has been confirmed by many agricultural developed countries. For China, in order to realize the high-speed and sustainable development of China's agricultural economy, we must constantly improve the informatization level of family farms and improve the informatization system of family farms as soon as possible.

### PRESENTING THE MAIN MATERIAL

Promoting the informatization development of family farms in China can improve the comprehensive management level of family farms. With the rise of the mobile Internet of things era, more and more industries are using computers for business management. As one of the core industries of the country, family farms can establish an information transmission and feedback system that conforms to the comprehensive management, and establish a national shared Internet of things interactive closed system, which can achieve real-time information

processing and comprehensive decision-making, thus forming the comprehensive modern management of family farms.

Promote the integrated development of family farms. Family farm informatization can combine all seemingly scattered links more closely, promote the virtuous development cycle of the whole industrial chain, subvert the traditional family farm organization form and structure, and make the family farm develop in the direction of modernization, industrialization and integration.

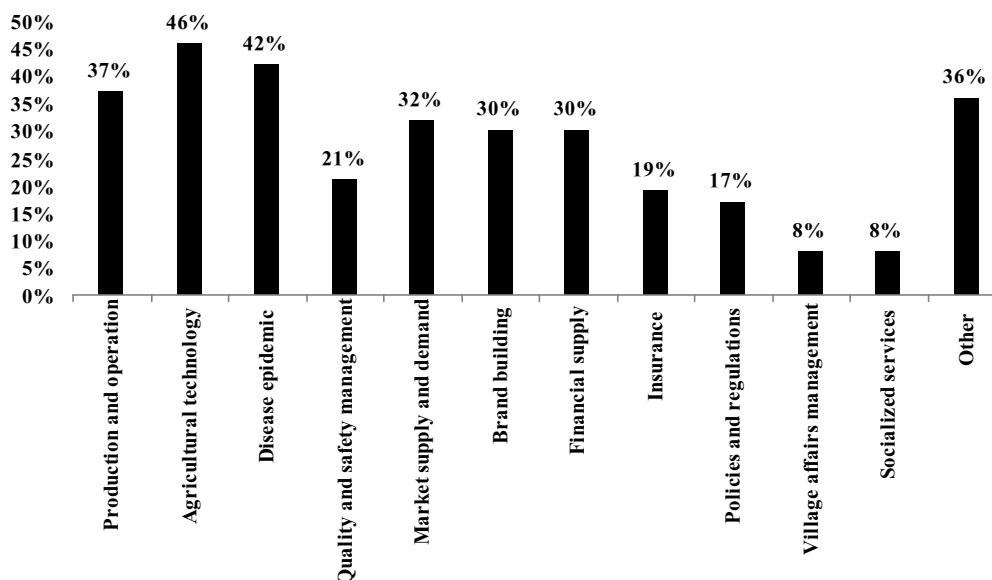
It can help the government to carry out macro-control on family farms. The informatization of family farms will produce socialized information networks, which will greatly broaden the communication channels between the government and farmers. It is more conducive for the government to manage the production, processing, circulation and other related links of family farms by going deep into the grass-roots level to understand the urgent needs of farmers, and enable the government to manage the market-oriented family farms by using modern information technology.

It can make the production factors of traditional family farms play the greatest role. Once information and knowledge are applied to the family farm as a new productivity, on the one hand, it can improve the quality of farmers, improve their labor productivity, and make the family farm production activities more accurate and orderly; On the other hand, it can effectively mix various production factors to form an optimal combination, and promote the sustainable development of family farms. Can effectively manage and control the cost of family farms.

With the long-term application of information resources, the traditional resource utilization efficiency will be greatly enhanced, and the ineffective consumption of land, labor, water resources, etc. will be greatly reduced. Therefore, the informatization of family farms can directly improve the resource utilization rate, although it requires a large amount of capital and human resources in the short term. But in the long run, the cost of family farm will be greatly reduced after the completion of informatization.

Promote the development of family farm science and technology and the promotion of information technology. Family farm informatization enables relevant scientific research personnel to share relevant scientific research achievements across time and space constraints, and discuss with each other to continuously improve family farm technology and family farm information promotion methods. For family farmers, informatization can enable them to obtain the latest agricultural scientific and technological achievements, the market situation and sales demand of relevant industries in real time to change and adjust their production plans in time, so that the market demand and supply can be effectively connected.

Promote the internationalization and globalization of agriculture. With the integrated development of the global economy, the agricultural trade between countries is becoming more and more frequent. With the development of family farm informatization, the logistics cost will be greatly reduced, and more standardized and branded agricultural products will flow to the international market, making the added value of the family farm industry chain grow rapidly, thus greatly enhancing the international competitiveness of Chinese agricultural products.



**Figure 1. Information acquisition during the production and operation of family farms**

Source: created by the authors based on the conducted research.

Promote the transformation of the agricultural economic structure. Family farm informatization can promote the framework of agricultural industry to be more standardized, so as to improve the quality of agricultural products and optimize the rural industrial structure and regional layout. The agricultural economy has been transformed from the original labor-intensive and capital intensive unitary structure into a multi-level ladder like industrial structure dominated by knowledge and information technology, and gradually from the traditional extensive development mode to the sustainable intensive development mode.

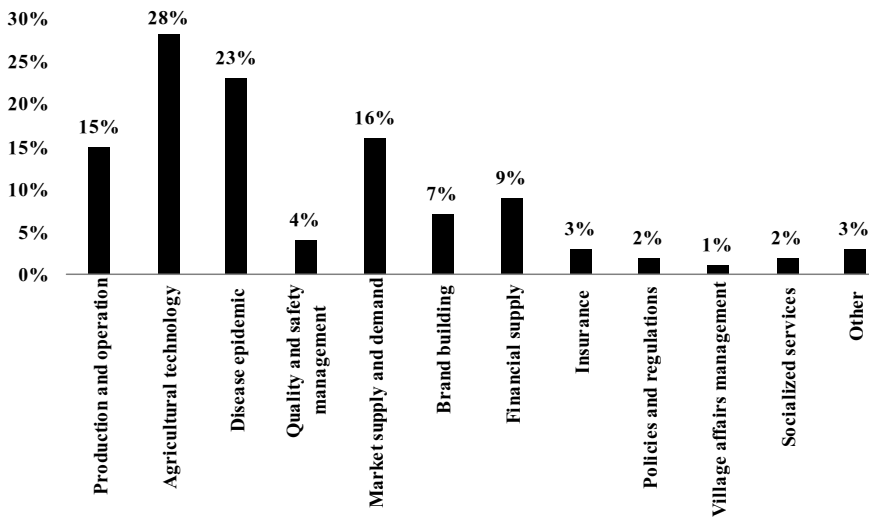
Current situation data and calculation: by the end of 2020, the overall level of agricultural and rural informatization development at the county level had reached 37.9%, an increase of 1.9 percentage points over the previous year. Remarkable achievements have been made in the development of agricultural and rural informatization, the rural network infrastructure has been significantly improved, the informatization of agricultural production has been steadily promoted, the e-commerce of agricultural products has sprung up, the digitization of rural governance has been prominent, the popularization of information services has been accelerated, the development environment has been continuously optimized, and the construction of digital villages has taken substantial steps, which has promoted the rapid development of family farms and rural informatization during the 14th Five Year Plan period And laid a solid foundation for the comprehensive revitalization of rural areas.

According to the comprehensive calculation of relevant data of 2642 counties (cities and districts) in China, in 2020, the national agricultural production informatization level will be 22.5%, the national agricultural product quality and safety traceability informatization level will be 22.1%, the county agricultural product online retail sales volume will account for 13.8% of the total agricultural product sales, the comprehensive disclosure level of administrative village Party affairs, village affairs and finance will be

72.1% by applying information technology, and the county government affairs online service rate will be 66.4%. The coverage rate of e-commerce service stations and administrative villages reached 78.9%, the county average agricultural and rural informatization financial investment was nearly 13 million yuan, the county average agricultural and rural informatization social capital investment was more than 30 million yuan, and the coverage rate of County-Level Agricultural and rural informatization management service institutions was 78.0%. Although the rural informatization development of family farms has made positive progress, it is still at a relatively low level and is facing many difficulties and challenges.

Family farms have also made some achievements in information management, but there are also some problems. According to the "national new agricultural business entity development index survey". 5166 new-type agricultural operators were investigated and studied. The author analyzed 1343 family farm samples and summarized and sorted out the data. The survey sites involved 23 provinces including Anhui, Beijing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Heilongjiang, Hubei, Hunan, Jilin, Jiangsu, Jiangxi, Liaoning, inner Mongolia, Shandong, Shanxi, Shaanxi, Sichuan, Yunnan and Zhejiang.

The type of agricultural information demand of family farm operators. The application of agricultural information technology can improve the production and operation efficiency. Family farmers usually obtain corresponding agricultural information based on their own needs, and their information acquisition ability is stronger than that of ordinary farmers. From the type of information demand, most family farms have obtained information on production and operation, agricultural technology promotion, epidemic situation, market supply and demand, brand construction, financial supply and other aspects in the process of production and operation (Figure. 1). The main agricultural information needs of family farms are obviously diversified, and the information required involves the whole process of production and operation.

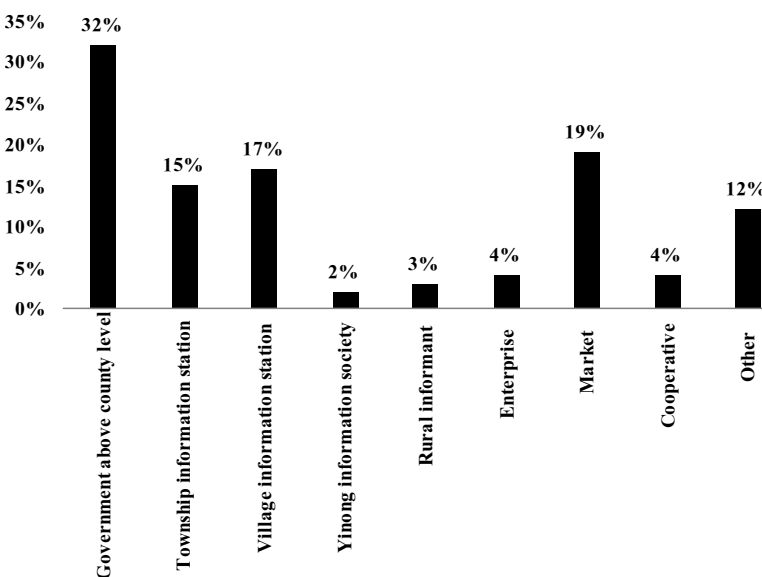


**Figure 2. Proportion of information technology to family farm production and operation**

Source: created by the authors based on the conducted research.

In general, among the information obtained by family farms in the process of production and operation (Figure. 2), the information of agricultural technology promotion, epidemic situation and market supply and demand is the most helpful to family farms. As far as family farms are concerned, 28% of the respondents think that agricultural technology promotion is the most helpful to their production and operation, followed by epidemic situation (24%), market supply and demand (17%) and production and operation (15%). Specifically, the demand of family farms for agricultural information is mainly concentrated on the production side.

The main body of information release of family farms is also an important aspect of promoting the informatization management of family farms in China. Since the implementation of the project of information entering villages and households, the main body of agricultural information supply has expanded from the high



**Figure 3. Proportion of information release subject's assistance to family farm production and operation**

Source: created by the authors based on the conducted research.

level to the low level, and various localities have made efforts to build a horizontal and vertical information supply network. For family farms, the information publishing bodies are diversified (Figure. 3). Among them, the government information service institutions at and above the county level are the most important information publishing bodies, followed by the market. These two types of information publishing bodies jointly constitute a horizontal and vertical information supply network. In addition, family farms and cooperatives also obtain a large amount of agricultural information from grassroots information providers such as Township information stations and village information stations. There are more intersections between family

farms and the locations of these types of information release subjects, with more frequent contacts, more opportunities to obtain information and higher convenience.

The abundance of access to agricultural information is a concrete expression of whether the information supply is sufficient. Family farms have multiple ways to obtain information about their production and operation (Fig. 4). Paper newspapers, government propaganda platforms, Internet and communication media are common ways to obtain required agricultural information. Among them, the Internet and mobile phone SMS / phone are the most important ways for all kinds of new agricultural business entities to obtain information that is most helpful to production and operation. TV, newspapers / books are also important ways to obtain information. At the same time, the proportion of family farms obtaining information from mobile phone app, radio, bulletin board or electronic screen, 12316 information platform and other channels is small, because various subjects are not familiar with the above-mentioned information obtaining channels, the construction of information channels is not complete, and the information obtained through these channels is limited.

As far as family farms are concerned, the main body of information release and the channels of information acquisition are diversified, indicating that China's agricultural information construction has made remarkable achievements. However, through the analysis of the proportion of information release subjects and access channels, the main release subjects and access channels of information obtained by family farms are relatively concentrated. For this phenomenon, in addition to the consistent preference of different family farms, another possible reason is that the imperfect construction of information release subjects and access channels restricts the possibility of family farms to obtain more useful information

from other channels, resulting in the concentration of information release subjects and access channels.

By analyzing the current informatization development of family farms in China, we can find that the factors restricting the informatization development of family farms are:

The comprehensive quality and ability of family farm operators are lacking. First of all, the insufficient level of family farm operators restricts the acquisition and application of agricultural information, and the subjective initiative to obtain agricultural information is weak. It is difficult to obtain the information needed from the existing information platform. At the same time, it also affects the application of existing information achievements, and the efficiency of the information platform is low. The weak ability of family farm operators hinders the application of agricultural information technology. It is difficult for the family farm operators to meet the basic conditions for the application of agricultural information technology, which makes it difficult to apply agricultural information technology to the actual production and operation. At present, there is still a big gap between the agriculture engaged in by the main operators of family farms and modern agriculture, which also leads to the inefficient application of agricultural information technology. In the construction of agricultural modernization, the informatization, standardization and scale of agricultural production process are still new to the family farm operators, and the risks brought by trying to apply new technologies under limited operating conditions are also unacceptable.

The supply and demand of agricultural information of family farm operators are disconnected to a certain extent. On the one hand, the supply and demand channels are disconnected. Most of the information obtained by family farms comes from the passive acceptance of traditional information supply channels. They tend to obtain information from other operators or grass-roots information transmission channels. The vertical government agricultural information supply mode and the imperfect horizontal information supply channel are difficult to meet their actual needs. Even though the Internet and the market can supply a large amount of information, these channels have a high threshold for traditional family farm operators. On the other hand, the content of supply and demand is disjointed. Family farms have the greatest demand for breeding information. However, in the construction of agricultural informatization, the supply of agricultural information is often based on the perspective of urbanization. In the process of connecting small farmers with modern agriculture, more emphasis is placed on the modernity of agricultural information, which deviates from the actual demand of operators for agricultural information. Moreover, the agricultural information required by operators has regional

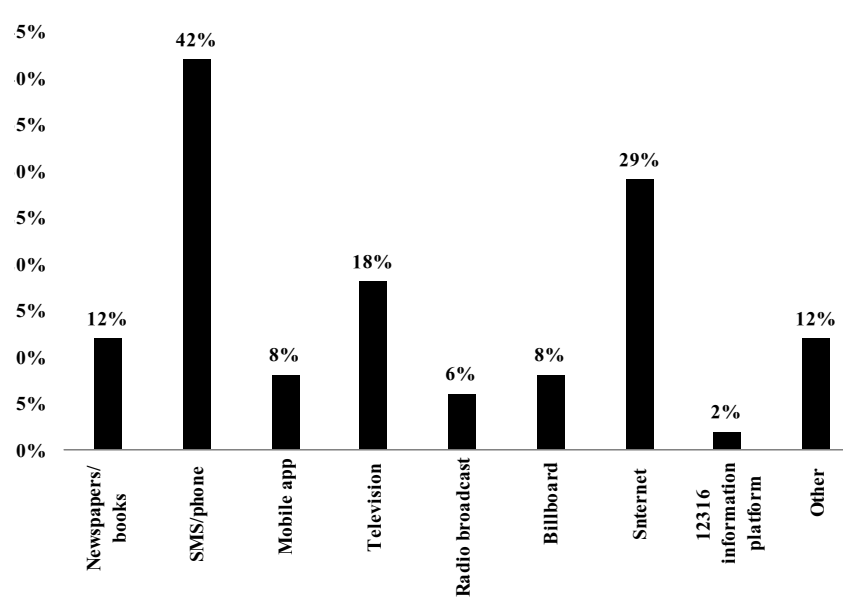


Figure 4. Proportion of information access to family farms

Source: created by the authors based on the conducted research.

differences and strong pertinence Systematic and professional information.

The construction of agricultural information infrastructure is insufficient, and the service system is not perfect. On the one hand, the serious shortage of agricultural information infrastructure construction is an important reason that restricts the informatization development of Chinese agricultural family farms. The coverage rate of the agricultural information supply platform is not high, the Internet penetration rate, especially the access capacity, is low, the agricultural information technology is not perfect and the e-commerce logistics cost is too high. The lack of infrastructure construction also affects the investment of family farm operators in the development of agricultural informatization, further restricting the application of agricultural information technology. On the other hand, the agricultural information supply network combining vertical and horizontal needs to be improved.

To sum up, the obstacles of family farms to informatization, the disconnection between supply and demand of agricultural information and the insufficient construction of agricultural informatization infrastructure are the key factors restricting the development of agricultural informatization in China. Of course, other constraints also include imperfect relevant systems and mechanisms, insufficient scientific and technological innovation, lack of professional personnel, low proportion of transformation and popularization of agricultural information technology achievements, and insufficient ideological understanding.

## CONCLUSION

On the basis of questionnaire survey and field visit on the current situation of family farms in China, this paper systematically studies the current situation and existing problems of informatization management of family farms in China by sorting and analyzing the survey data, integrating the data of relevant agricultural departments, and referring to the development experience and practices

of family farms at home and abroad. The following conclusions are reached:

The agricultural information needs of family farm operators are diversified; Different types of family farms urgently need different types of information, and their information needs are highly related to their own business characteristics.

The main body of information supply of family farms presents diversified characteristics. The main body of family farm operation can obtain the required information through multiple channels, but the main body of information release and access are concentrated, and the information service capacity is weak.

There is a disconnect between the supply and demand of agricultural information of the family farm operators. The existing agricultural information supply channels are difficult to fully meet the actual information needs of the family farm operators. The weak information acquisition ability and imperfect information supply of the family farm operators are the reasons for the disconnect between the supply and demand of agricultural information.

The crowding out effect of new agricultural operators, the disconnection of agricultural information supply and demand and the lack of infrastructure construction are the key factors restricting the development of agricultural informatization. The application efficiency of family farm operators to the agricultural information platform is low..

Family farm informatization is the inevitable direction of agricultural modernization. In recent years, China's overall agricultural informatization construction has been accelerated and achieved results, which has laid a solid foundation for agricultural development. However, the construction of family farm information management and the application of agricultural information in family farms are a long-term development process.

Through the on-the-spot investigation of some domestic farms, we understand the organizational structure of the family farm, and have a full understanding of the production and operation process of the family farm. In combination with the management work of the family farm manager in the operation of the farm, we have determined the content and practical significance of the family farm information management system.

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