



## **Influencing Factors and Improving Countermeasures of Family Farm Management Efficiency in China**

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**Abstract:** As an important new rural agricultural business entity in China, family farms can not only solve the rural "hollowing out", give farmers a new identity, but also fully enhance the motivation of agricultural operators. At the same time, it can also alleviate the barren condition of rural land in China, increase the effective supply of agricultural products, and promote the development of agricultural economy and the process of agricultural modernization. How to solve the production and management problems of family farms is the top priority for the survival and development of rural family farms. This paper studies the current situation and difficulties of family farms in China, and empirically analyzes the factors affecting the operating efficiency of family farms in China, and finally puts forward relevant suggestions.

**Keywords:** Family farm; New agricultural business entities; Management efficiency.

### **1. Introduction**

In recent years, with the rapid development of new agricultural business entities in China, the problems and obstacles have also attracted the attention of all sectors of society. In 2013, the No. 1 central document proposed to encourage and support the transfer of land to large agricultural households, family farms and farmers' cooperatives, which is also the first time that the concept of "family farms" has appeared in the top-level decision-making. In 2017, the No. 1 central document once again proposed to study and formulate appropriate scale evaluation indicators. Family farms can promote farmers to enter the market in an orderly manner, enhance their organization, solve the problem of no farming of cultivated land caused by rural labor

mobility and aging population, and promote the harmonious development of our society [1]. In 2022, the Ministry of agriculture and rural areas, the Ministry of Finance and the national development and Reform Commission issued a document once again emphasizing that in order to comprehensively promote rural revitalization, based on the development of the new era, and accelerate the pace of agricultural and rural modernization, we should actively explore the development of professional family farms [2]. "Family farm", an agricultural management concept borrowed from Europe and the United States, has obviously been incorporated into the relevant solutions to the "three rural" problems in China. Family farm is a new type of agricultural management organization, which is an effective carrier to explore the appropriate scale of rural land. At the same time, it can also alleviate the barren situation of rural land in China, increase the effective supply of agricultural products, promote the development of rural agricultural economy, and promote the modernization of agriculture in China. In the new historical period, family farms have become an important production and operation subject of rural development, and also a new starting point. However, with the continuous expansion of the market scale of agricultural products and the improvement of agricultural production efficiency, great changes have taken place in the supply and demand structure of agricultural products in China [3]. Therefore, how to solve the production and management problems of farmers' family farms is the top priority for the development of rural family farms. This paper describes and quantitatively discusses the operation status of family farms from the aspects of family farmers, land circulation, management and policies, and on this basis, makes a more comprehensive discussion on the impact of various elements in the operation process of family farms. This study is of great significance to explore a path suitable for the scale management mode of family farms in China and to guide the production and management of rural agriculture in China.

## **2. Relevant Concepts and Theoretical Basis**

### 2.1 Related concepts

(1) Family farm. Family farm is an enterprise with family as the main production mode. Compared with large professional households, its upstream and downstream links are longer and the degree of intensification is higher. It is not simply based on agriculture. From the perspective of intensification, this model covers agricultural mechanized production, product processing, product market circulation and product sales, and can be involved in three major industries. For example, a family can not only contract a large amount of land for agricultural production, but also set up agricultural product processing plants according to its own economic strength, and even operate farmhouse entertainment or develop rural characteristic tourism projects.

(2) Land circulation. Land circulation means that farmers transfer the land use right of family farms to other subjects in legal form through legal channels. Its main contents include: encouraging farmers to transfer land to professional cooperatives, professional cooperatives, so that the scope of contracted land for family farms in China can be expanded to expand the scale of agricultural management. Obviously, the relevant situation of land circulation has also fundamentally affected the business scale of family farms in China.

## 2.2 Theoretical basis

(1) Scale economy theory. The theory of economies of scale is one of the main contents of studying various economic systems in China. The theory of economies of scale shows that with the increase of the number of products in a certain period, the unit cost will be reduced, that is, by expanding the production scale to reduce the average cost, and then improve profits. This theory in this paper reflects that a family farm should reasonably choose the scale suitable for its own farm if it wants to maximize its benefits. If the scale is too small, the average cost is high and the return to scale is small, and the scale is expanded indefinitely in pursuit of a lower average cost, the production efficiency will also be greatly reduced.

(2) Land property rights theory. Property right is a social tool, which is very important in business activities, because it can help people have a rational expectation, affect and determine their interests and losses when they are doing business with others. The core of land is land ownership. Rural land in China belongs to the collective. Farmers can contract the land for operation and use. Land use right is the main content of China's land property right system. At present, China's land circulation is developing rapidly, and the circulation of land use rights has become an important way to promote the development of moderate scale management in our country.

(3) Division of labor economic theory. At present, in the research on the formation and evolution of agricultural production organizations, most scholars believe that the theory of division of labor economy can better explain agricultural production organizations, and that with the development of division of labor, agricultural production organizations will be diversified [4].

## 3. Current Situation of Family Farms Development

According to the data of the Ministry of agriculture and rural areas, the number of family farms in China showed an overall upward trend from 2015 to 2019. By the end of 2019, the number of family farms nationwide had increased from 343000 to 853000, an increase of about 1.5 times compared with 2015. The number of demonstration family farms at and above the county level increased from 39000 to 117000, a twofold increase. In 2020, there were more than 1million family farms in China. By the end of

November 2021, there were more than 3.9 million family farms with 470million mu of land under management.

In terms of the business scope of family farms in China, in 2019, there were 533000 planting family farms, accounting for 63%, 148000 animal husbandry family farms, accounting for 17%, 38000 fishery family farms, accounting for 4%, 100000 planting and breeding family farms, accounting for 12%, and 34000 other family farms, accounting for 4%. Among them, the proportion of family farms combining planting and breeding increased by 2.7 percentage points compared with 2015.

#### **4. Influencing Factors of Family Farm Management**

The production and management of family farms in China are mainly affected by internal and external factors. Internal factors mainly include the operator's own situation, cultivated land resources, etc. external factors mainly include natural factors, policy support level and social service system.

##### 4.1 Operator's own factors

The situation of the farm operator will also affect the operation of the farm, including the operator's age, production management experience, educational background, identity and so on. In terms of the age of the operators, young farmers are generally more likely to accept the scientific production and management methods of the new era, while older farmers have more experience in production and management. From the perspective of the educational background of the operators, the operators with higher educational background are easier to grasp the market demand and the interpretation of relevant policies, so as to better carry out production and operation. From the perspective of the identity of the operator, the higher the status of the general operator in the local area, the greater the impact on the local area, and it can also promote the production of family farms [5].

##### 4.2 Land resource factors

Generally, land resources are considered from two aspects: one is its own rent, and the other is the relevant resources contained in itself. In the process of circulation, the high rent will reduce the efficiency of land circulation, thus affecting the business scale of family farms. Then, according to the different regional environment and the relevant factors of climate latitude, the crops suitable for sowing in the land of each region are different. Agricultural operators need to make reasonable planning according to the advantages of land resources [6].

##### 4.3 Natural disaster factors

One of the major problems we need to face in the process of family farm management in China is natural disasters. The less disasters each family farm belongs to, the more extensive agricultural production can be carried out. According to the statistics in the

veterinary Bulletin of the Ministry of agriculture and rural areas, from January 2008 to December 2020, a total of 2216 outbreaks of classical swine fever occurred in China, with a total of 125719 pigs. Among them, the number of outbreaks occurred in 2008 was the most, and then decreased year by year. After 2012, the annual transmission frequency was no more than 30 times / year, and after 2019, it was no more than 10 times / year, sporadically distributed. The number of cases also decreased with the decrease of the number of cases, with small upward fluctuations in 2015 and 2018. According to the relevant information of the National Bureau of statistics, the total affected area of agriculture in China has been declining in the past two decades, which provides a guarantee for the development of China's agricultural economy, from 54150 thousand hectares in 2003 to 19960 thousand hectares in 2020. See Figure 3.4 for details. The flood disaster has been a major obstacle to China's agricultural development since ancient times. The area of China's agriculture suffering from floods has gradually decreased from an average of more than 10000 hectares 20 years ago to an average of about 5000 hectares, but it is still fluctuating.

#### 4.4 External policy factors

With the continuous increase of policy support in China, the economic development situation of family farms in China is generally good, and the number of family farms in China is also rising, which shows that the development of family farms in China is closely related to the relevant support means of the government and society. This is reflected in the preferential agricultural policies of family farm management in China, which affects whether farm operators enjoy corresponding preferences and subsidies. Generally speaking, the development of family farms cannot be separated from the support of a large number of funds, and the rent of land circulation is 400-1000 yuan per mu, and the rent of 300 mu of land circulation is about 120000-300000 yuan per year. A small harvester is between 120000 and 140000 yuan, and a large harvester is between 180000 and 200000 yuan. Coupled with the production and operation costs, this has a lot of pressure on a family farm operator, which will also directly affect its business scale. The government will provide more support for operators in this process, which will help to promote their business enthusiasm.

### **5. Difficulties Faced by Family Farms Management**

Compared with family farms in foreign developed countries, family farms in China started late and developed poorly. They are still in the primary stage, which is specifically reflected in the following aspects.

#### 5.1 Unbalanced development among regions

Due to the different actual conditions in various parts of China, especially the non-standard land circulation, the market structure is incomplete, as well as the land

circulation cycle and other problems. Therefore, there are great differences in the quality and speed of the development of family farms across the country, especially in the eastern region of the Yangtze River Delta, which is significantly higher than the central and western regions. According to the data from the website of the Ministry of agriculture and Anhui agricultural information network, the total number of family farms registered with the market supervision department in Guangxi reached 52000 in 2020, while that in Anhui reached 143000, ranking first in the country.

### 5.2 Low efficiency of land circulation

In the land circulation, farmers hope to obtain more benefits, so they are more inclined to short rent, hoping to get more rent in the future. The rent of land circulation is 400-1000 yuan per mu, and the rent of 300 mu of land circulation is about 120000-300000 yuan per year, which brings worries to the farmers who have contracted the land. They cannot invest too much money and equipment in their own farms, affecting their development. From the perspective of circulation, large-scale land circulation needs to cross villages, and most of it depends on the coordination of the two committees of the village, lacking the support of the superior, which increases the burden on farmers, which is very detrimental to the expansion of the scale of family farms. Although China has formulated corresponding policies to solve this problem, the actual implementation effect is poor, and it is difficult to improve the efficiency of land circulation. Under the condition of low efficiency of rural land circulation, it is difficult for farmers to effectively promote their business scale. If we can't solve the current situation of scattered rural land resources and lack of sustainable development, it will inevitably bring serious problems to rural development.

### 5.3 Low industrial and commercial registration rate

According to the official website of the Ministry of agriculture, at present, most family farms in China have not been registered for Industry and commerce. China is a vast country with different national conditions and regional characteristics, and there are also great differences in recognition standards. China has not made unified regulations on whether family farms should be registered for Industry and commerce, and the managers of family farms in various regions are not familiar with the relevant government policies and procedures, resulting in a low rate of industrial and commercial registration of family farms. In fact, industrial and commercial registration is conducive to clarifying the dominant position of family farms in the market operation, facilitating the formation of agricultural product brands and being well-known by consumers. At the same time, it is also conducive to obtaining loans required for business development, enjoying national and local financial support and tax reduction and exemption policies.

#### 5.4 Farmers' comprehensive quality is low

Compared with other agricultural developed countries in the world, the actual cultural level of personnel engaged in agricultural production in China is worrying. According to relevant surveys, among agricultural practitioners in China, 92.5% are below the high school education level, 6.6% are high school educated, and only 0.9% are college educated or above. The low cultural level of farmers reflects that farmers' overall quality is not high, lack modern advanced management and education, and rely on traditional agricultural production experience. Family farmers must have professional knowledge reserves. They must not only have certain work experience, but also have certain technical support. According to the relevant investigation, most farmers have fixed work experience, but their business level and cultural quality are very poor, which affects the expansion of the business scale of family farms and is not conducive to the standardized and professional implementation of business management. In the future family farm operation, family farmers should not only cultivate their own technical awareness and management skills, but also learn basic knowledge, so as to truly understand the market and provide a basis for the expansion of the scale of family farm operation.

#### 5.5 The financial support mechanism is not perfect

At present, family farms in China are still in their infancy, and they are in urgent need of financial support because of financing difficulties. Farmers lack sufficient funds, so it is difficult to realize the circulation of land and cannot contract all of it, which leads to the dispersion of farmers' fields. Moreover, after the transfer of land, it is also a big expense to level the farmland. At the same time, the relevant departments have not established a sound agricultural insurance system, and the government subsidies for it are also minimal. Under the long-term decentralized operation conditions, farmers' management level is low. Because insurance companies and financial institutions are unwilling to provide effective financial support for farmers, it is difficult for farmers to get sufficient financial support. Without enough assets as collateral, family farmers are difficult to borrow more money from formal banks and can only borrow through higher interest rates. Farmers are often unwilling to bear too much risk and can only choose to reduce the size of family farms to reduce operating costs.

## **6. Empirical Analysis of Factors Affecting the Operating Efficiency of Family Farms**

### 6.1 Variable selection and definition

Based on the data acquisition, this paper selects the relevant influencing factors of China's agricultural management according to the five aspects of quantification, comparability, universality, representativeness and systematicness. After screening,

the following five variables are selected as explanatory variables for the empirical study on the influencing factors of family farm management in China: total power of agricultural machinery ( $X_1$ ), cultivated land irrigation area ( $X_2$ ), total price index of agricultural means of production ( $X_3$ ), rural employment ( $X_4$ ), and government financial subsidies ( $X_5$ ).

### 6.2 Construction of measurement model

After selecting the relevant factors, we will build a linear regression model to analyze the correlation of these five factors, so as to find out their impact on agricultural management, find out the key factors, and finally put forward relevant suggestions. Multiple regression analysis model is a regression model based on multiple regression analysis. It has many different functions and needs to be selected according to the actual situation. We will take the five variables mentioned above as explanatory variables and China's total agricultural output value as explanatory variables to build a multivariate regression model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu \quad (1)$$

Where,  $Y$  is the total agricultural output value (100 million yuan),  $\alpha$  is a constant,  $\beta_i$  is the coefficient of the  $i$ th explanatory variable,  $\mu$  is the error term.

Due to the large data related to agricultural output value, the direct introduction of the equation will bring about problems such as large heteroscedasticity and small data. At the same time, the agricultural machinery, power generation equipment and relevant irrigation area in the independent variables are also relatively large compared with other variables, so it is necessary to modify formula (1) to get formula (2):

$$\ln Y = \alpha + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \mu \quad (2)$$

Formula (2) is a double logarithm model. Through analysis, we can get the impact of agricultural machinery scale, contracted land factors, agricultural personnel employment factors, policy service factors and other factors on China's agricultural management.

### 6.3. Results and analysis of empirical analysis

Using Eviews software and the least square method, the multiple linear regression of China's agricultural output value on the five explanatory variables  $X_1$ ,  $X_2$ ,  $X_3$ ,  $X_4$  and  $X_5$  is obtained, and the following multiple linear regression equation is obtained:

$$Y = 42 + 0.2143 \ln X_1 + 0.1607 \ln X_2 + 0.0538 \ln X_3 - 0.4005 \ln X_4 + 0.4688 \ln X_5 \quad (3)$$

It can be seen from the data that the coefficients of the four explanatory variables  $X_1$ ,  $X_2$ ,  $X_3$  and  $X_5$  are all greater than 0, which indicates that the total power of agricultural machinery, cultivated land irrigation area, pesticide and agricultural machinery price index, government financial subsidies, when rising, will bring a positive increase in China's agricultural output value, which will have a positive impact on the production and management of China's new agricultural business entities. The coefficient of the explanatory variable  $X_4$  (rural employment) is less than zero. According to the data of

rural employment in China, from 400million person times in 2007 to more than 200million person times in 2020, which shows that the decline of rural employment in China will reduce China's agricultural output value, which is in line with the actual situation.

Secondly, except that the P value of  $X_1$  is close to 0,05, the P value of other explanatory variables is greater than 0.05, which is not significant within the significance level of 5%. Therefore, the author preliminarily judges that the model has serious multicollinearity.

Moreover, under the joint action of these five explanatory variables,  $R^2=0.9911$ ,  $\bar{R} = 0.9821$ , so the goodness of fit of this model has reached a high degree, and the p value of the F test value is 0, less than 0.05, so it passed the F test. Therefore, next, we use evIEWS9.0 software to establish a double logarithmic model and use stepwise regression method to solve the multicollinearity problem of the prediction model. The regression result after correcting the severe multicollinearity effect is:

$$\ln Y = 11 + 0.5117 \ln X_1 + 0.3014 \ln X_2 + 0.1521 \ln X_3 \quad (4)$$

It can be seen from this that in the new regression equation composed of three variables after removing the two variables  $X_4$  and  $X_5$ , the P value of each variable is less than 0.05, indicating that it is significant within the significance level of 5%, and the R of this model  $R^2=0.9942$ ,  $\bar{R} = 0.9801$  is very close to 1, indicating that the fitting degree of the model is good, and the p value of F test is 0, which is also less than 0.05, passing the test. Therefore, it can be judged that  $X_1$ ,  $X_2$  and  $X_3$  have an important impact on China's agricultural management.

## 7. Countermeasures

### 7.1 Operator level

(1) Relying on regional advantages, make rational use of local resources and create brand advantages. The agricultural climatic conditions, land properties and soil conditions in various regions are different. Agricultural operators should combine the local natural conditions, give play to the advantages of regional characteristic agriculture, and rely on mountains and rivers. At the same time, we should fully consider whether the products produced and operated can fill the gap in a certain field, and create our own brand advantages from the perspective of product scarcity.

(2) Increase the use of the Internet, expand sales channels, and enhance brand awareness. The survey results show that most family farms in China have little publicity, only a few billboards are placed near the villages, and a complete product certification has not been formed. This leads to narrow sales of products and few profit opportunities. Nowadays, it is the Internet era, and all kinds of products can be known faster only on the Internet. Therefore, family farms should increase the use of the

Internet. In the mode of Internet + family farms, they should put advertisements on the Internet, design their own family farm web pages, and cooperate with other enterprises to expand the sales of their own family farms.

(3) Grasp the production strategy of agricultural products, carry out standardized and branded production, and produce out of season. Product standardization is the guarantee of product quality. To enhance the competitive advantage of agricultural products, we must establish standardized agricultural product standards. In addition, farmers should also establish the brand of agricultural and sideline products in a timely manner. In addition, from the perspective of the supply of agricultural products, off-season sales can bring huge profits to operators. They can produce agricultural products according to market demand, master storage technology, sell with quality and quantity guaranteed, pay attention to surrounding development trends, and actively develop new markets to obtain greater economic benefits.

(4) Cultivate talents engaged in agriculture, attract talents in agriculture and develop agricultural technology. The survey also found that farmers and practitioners have rich practical experience, but their theoretical knowledge is not high enough, their vision is not long-term enough, and the relevant technical level can only reach the average level. Although this can make the family farm operate smoothly, it cannot develop efficiently, so the family farm mainly takes the initiative to learn science and culture, and carries out certain knowledge education for the farmers in the family farm, so that they can have some advanced agricultural knowledge, as well as legal knowledge and policy knowledge, so that when they face natural disasters and the corresponding policies, they can use this knowledge to solve problems, Reduce certain economic losses. At the same time, cooperation between different agricultural business entities and relevant agricultural colleges and universities can be strengthened. These colleges and research institutions have many excellent college students who have good theoretical knowledge. Farms should attract them, so as to improve the technical level of planting personnel, and effectively carry out agricultural activities such as pest control, precision fertilization, seedling raising, and breeding.

#### 7.2 Government level

(1) The government should improve the policy of benefiting farmers and increase support. The development of family farms cannot be separated from the support of the government. The survey results show that there are many breeding and cultivation projects in family farms, and some fields cannot be shared, so the development of family farms requires a large number of fields. At present, the contradiction between people and land is tense, the land circulation price is rising, and the long-term circulation is difficult. This requires the government to provide some fields with slightly lower prices to family farms, and reduce the tax on family farms. For some agricultural

projects, priority can be given to family farms.

(2) Establish a natural disaster prevention and response mechanism to stop losses in time. A major problem that family farms need to face in the process of management is natural disasters. The nationwide swine fever situation will cause the breeding industry of family farms to fall into a trough, and the flood disaster has an immeasurable impact on the planting industry, so the government should timely estimate the occurrence of the disaster, remind and urge family farms to build good systematic drainage facilities and breeding environment. When a disaster occurs, stop the loss in time according to the corresponding response mechanism established.

(3) Standardize the land circulation system, supervise the circulation links, and increase punishment. In order to develop new agricultural business entities, the government should deal with the problem of land circulation, guide and support farmers to actively participate in land circulation, support the paid transfer of rural collective land, and use idle land to meet the needs of family farm management. In addition, we should strictly implement the land circulation policies, establish relevant management systems, and reduce the circulation costs. At the same time, we should strengthen the effective supervision of the whole process of land circulation, and take corresponding punishment measures for illegal circulation.

(4) We will improve the family farm directory management system, create a model family farm, and optimize the family farm management system. We should strengthen the market management of farmers, clarify their dominant position, play an exemplary role, and establish family farm associations and demonstration family farms. We should strictly implement the relevant recognition standards, standardize the conditions and procedures for "inclusion", establish a perfect directory of "family farms", and timely include the relevant family farms that meet the conditions into the system, so as to achieve "dynamic update" and "data sharing".

### References

- [1] Zhang Yongqi, Zhuang Tianhui. Family farm and care poverty of rural elderly population - Empirical Evidence from China's family tracking survey and family farm monitoring [J] World agriculture, 2022(05):70-82.
- [2] Kong Lingcheng. Study on the appropriate scale of family farm land from the perspective of comprehensive benefits -- Taking Songjiang grain family farm as an example [D]. Northwest University of agriculture and forestry science and technology, 2016.
- [3] Lai Xiaodong, Du Zhixiong, Gao Liangliang. A comparative study on the management mode and path selection of family farms -- an investigation based on typical cases [J]. Journal of Henan University of science and Technology (Social science edition) 2021, 39(02):41-49.
- [4] Xiao Efang. Family farm development: formation mechanism, influencing factors and path

- trend [D]. Central China Agricultural University, 2017.
- [5] Wu Jingru, Han Dan, Ruan Rongping. Agricultural informatization and agricultural product quality -- Analysis Based on the quality and safety certification behavior of agricultural products in family farms [J]. Journal of Nanjing Agricultural University (Social science edition) 2022, 22(01):172-184.
- [6] Liu Shouying, Yan Jianan, Ji Xianqing. The choice of agricultural land contract and the change of management system under the collective land ownership system -- a case study of Songjiang collective village community family farm [J]. China's rural economy 2021(02):19-41.