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Original Research Article

## Economic explanation of the three agricultural systems and its enlightenment to China

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**Abstract:** This paper systematically elaborates the core of the three major systems of agriculture and the implications for China's construction. Firstly, the research status of the three major agricultural systems is discussed. On the basis of this, the production function is used to analyze the agricultural production system, and it is concluded that the core of the production system lies in the efficiency of input and output, which depends on many factors; The analysis of the agricultural industrial system through compound function shows that the core of the industrial system lies in the integration and development of the rural one, two and three industries; the implicit function is used to analyze the agricultural management system, it is concluded that the core of the management system is to complete the conversion from product to commodity, and to control the price of the element, agricultural product prices and fluctuations in prices. According to the above research conclusions, it summarizes the enlightenment to China to provide theoretical and decision-making basis for the construction and optimization of China's three major agricultural systems.

**Keywords:** Agricultural Industrial System; Agricultural Production System; Agricultural Management System.

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### 1. Introduction

In recent years, China's agriculture has developed rapidly and achieved fruitful results. In 2015, the progress of agricultural science and technology contributed more than 56%, improved varieties of major crops were basically covered, the mechanization level of crop planting and harvesting reached 63%, effective irrigation area accounted for more than 52%, and the technical level of agricultural material and equipment was significantly increased<sup>[1]</sup>. However, on the whole, China's agriculture is large but not strong, production efficiency is low, agricultural science and technology support is insufficient, the utilization rate of machinery and equipment is low, agricultural market competitiveness is insufficient; land social security is difficult to stand, and it is impossible to solve the problem of prosperity and social welfare problems such as children's education, medical care and pension by relying on farming. The current "package of production to households", the agricultural operation scale of which is small, is a "super-small peasant household economy", by which we can achieve enough food and clothing, barely achieve "well-off", and never achieve "Chinese dream". In the future, to realize a moderately prosperous society in an all-round way in China and to realize the Chinese dream, we have a long way to go in agriculture.

Under these backgrounds, during the two sessions in 2015, General Secretary Jinping Xi pointed out in the deliberation of the Jilin delegation that to speed up the construction of the modern agricultural industry system, modern agricultural production system, modern agricultural management system and the promotion of agricultural modernization; in 2016, General Secretary Jinping Xi rural reform symposium of Anhui Xiaogang Village further stressed to build a modern agricultural industry system, production system, management system as the starting point to accelerate the promotion of agricultural modernization<sup>[2]</sup>; during the two sessions in 2017, General Secretary Xi Jinping further pointed out in the deliberation of the Sichuan delegation that the agricultural industrial system, production system and management system should be optimized to form the comprehensive effect of agricultural and rural reform and to promote the integration of urban and rural development. At the

same time, the No.1 document of the CPC Central Committee in 2016 also proposed that to vigorously promote agricultural modernization, we must strengthen material equipment and technical support, and build a modern agricultural industrial system, production system and operation system. Changfu Han, minister of Agriculture, believed that to solve these problems in rural China, we must follow the important instructions of General Secretary Jinping Xi, and take the construction of a modern agricultural industrial system, production system, management system as the starting point, to accelerate agricultural modernization. Since then, the upsurge of the construction of three agricultural systems is set off all over the country.

## 2. Literature Review

According to CNKI, as of May 2017, there were only 36 related articles under the name of “Three Agricultural Systems”<sup>1</sup>, and most of them were newspaper articles, and the number of journal and magazine articles was small. The contents of the major literature studies are reviewed below.

As for the research of local governments on the construction of the three agricultural systems, Changfu Han, minister of Agriculture, said that to build the modern agricultural industry system, it was necessary to improve the economic, ecological and social benefits of agriculture and promote the transformation and upgrading of the agricultural industry; to build a modern agricultural production system, we should improve the utilization rate of agricultural resources, land output rate and labor productivity, and enhance the comprehensive agricultural production capacity and the ability to resist risks; to build a modern agricultural management system, we should develop various forms of appropriate scale management, and improve the level of intensive, organizational, scale, socialized and industrialization of agricultural management<sup>[3]</sup>. Ningxia, from the situation of the local resources, gives full play to the advantages of natural environment and etc. suitable for Chinese wolfberry growth and cow production, and innovates the agricultural economy and strengthens characteristic agriculture, and strive to build and improve the three agricultural systems<sup>[4]</sup>. Guangxi focuses on optimizing the industrial structure, strengthening infrastructure construction and scientific and technological force support, and constantly training the main body of new agricultural operation, to build the three major systems of modern agriculture, and promote the development of local agriculture<sup>[5]</sup>; since 2017, Ezhou, Hubei Province has allocated 98.2 million yuan to increase financial support, and strive to build the “three systems” of modern agriculture in Ezhou<sup>[6,7]</sup>. From adapting to the new changes in market demand, Jiansanjiang has raised the integration of order planting and planting to quality and characteristics around the market, and takes the construction of modern ecological agriculture as the starting point to drive the development of facilities agriculture, tourism agriculture, and other agricultural industries to accelerate the construction of the three major systems of modern agriculture<sup>[8]</sup>. Jilin Provincial Department of Finance increased capital investment to further clarify the direction and key of the three financial systems of agricultural support<sup>[9]</sup>. Moreover, Jilin Provincial Agricultural Commission and Agricultural Bank of China also issued policies supporting agricultural development] from their respective perspectives<sup>[10-14]</sup>.

About the significance of the construction of three agricultural system, Guo Yongtian believes, speeding up the construction of modern agricultural system is the urgent need to promote agricultural transformation and upgrading, is the inevitable requirement to guarantee the effective supply of main agricultural products, is the basic guarantee to promote farmers’ income, is the only way to improve agricultural international competitiveness, realizes the leapfrog development of traditional agriculture to modern agriculture, makes new contributions to build a well-off society in an all-round way<sup>[15]</sup>. According to the problems existing in the process of agricultural development, Anhui Daily commentators pointed out that the traditional agricultural production organization based on small family farmers has bound the development of agricultural productivity, and we must

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<sup>1</sup> The “three agricultural systems” referred to in this article is the construction of modern agricultural industry system, production system and management system proposed by General Secretary Xi Jinping in 2015. Therefore, the article inquired is the relevant theme articles from 2015 to 2017.

focus on the internal requirements of modern agriculture development, and vigorously promote the construction of industrial system, production system and management system<sup>[16]</sup>.

On the experience of agricultural development in developed countries, Jiangsu Smart Agriculture Intelligent Equipment Technology Delegation went to Germany and the UK from 15 to 13, 2016 to summarize the development characteristics of modern agriculture in the two countries and draw lessons from the development experience, so as to accelerate the construction of the three major systems of modern agriculture in Jiangsu: Scientific and technological innovation, accelerate the improvement of agricultural material equipment and technical level, strive to make new breakthroughs in building modern agricultural production system, take “Internet +” as the starting point, speed up industrial form upgrading and transformation, strive to build modern agricultural industrial system; cultivate multiple forms of business entities, accelerate agricultural socialization services, and strive to make new breakthroughs in building modern agricultural management system<sup>[17]</sup>.

According to the above analysis, it can be found that the existing research mainly focuses on the construction plans and measures of the three major agricultural systems, introducing the measures, the significance, necessity of the construction and the experience and lessons of agricultural development in other countries, but there is still a lack of systematic research from the theoretical level. This paper is based on the theory of economics, studies the construction of production function, compound function and implicit function, and expounds the core and its enlightenment to China from the perspective of economic theory.

### 3. Agricultural Production System

What is a market economy? All efficient modes of production, and eliminate all inefficient modes of production. China’s agricultural production input and output rate is low, and there is a big gap with developed countries. Take agricultural labor input as an example, Germany, the United States and other developed countries have less agricultural labor input and high efficiency. For example, German farmers are less than 600,000 households, practitioners only account for 4% of the labor force, and each agricultural labor should support about 124 people; the United States has more than 300 million people, of which only about 2% are living in rural areas, less than 1% are engaged in agricultural production, only half of whom use agriculture as its main business<sup>[18]</sup>; according to the 2016 National Economic and Social Development Statistical Bulletin of the People’s Republic of China, Chinese rural permanent population is about 600 million (589.73 million), rural registered population is about 800 million (813.03 million), and Chinese farmers is “6+2” 800 million farmers (600 million permanent population, 200 million floating population in urban areas). From the above comparison, we can find that China’s agricultural input-output rate is far lower than that of developed countries, resulting in too high grain production costs and weak market competitiveness. Further, agricultural products lack of competitiveness, the downstream agricultural products processing, the corresponding basic industries have also lost the market competitive advantage. Explain in the form of production function (joint factor, linked product), the core of the production system is the efficiency of input and output, which depends on many factors.

The general expression for the production function is:  $G(y_1, y_2, \dots, y_m) = F(x_1, x_2, \dots, x_n)$

The formula can be described as the follows. First,  $y_1, y_2, \dots, y_m$  indicate the simultaneous production of various joint products, such as soybean, corn, wheat, rice, etc. In particular, joint products like “apples and bees” or “steel mills and fish farms” respectively in the upstream and lower reaches of the same river. From the perspective of marketing, it is the problem of product portfolio. The agricultural production system needs to consider which agricultural products to plant and operate and what relationship should be between these products. Due to the continuous change of market demand and competitive environment, in order to maximize the profit, it is necessary to constantly adjust the planting structure of agricultural products, optimize the combination of agricultural products, and realize the dynamic balance of agricultural products portfolio. At present, China is on agricultural supply side reform, constantly optimizing the agricultural product structure, but under the background of Chinese household contract responsibility system, that a single family adjusts agricultural

products planting structure cannot play a substantial impact, the government must play the role of macro-control. Through the government guidance, we can realize the dynamic balance of agricultural products combination and constantly improve China's agricultural economic efficiency and market competitiveness.

Second,  $x_1, x_2, \dots, x_n$  indicate the various input factors of agricultural production. For example,  $x_1$  means seeds;  $x_2$  means pesticides or pesticides making crops not be ill;  $x_3$  means fertilizer and corresponding nutrition for crops;  $x_4$  indicates natural resources such as land and good water quality;  $x_5$  means mechanization, automation equipment;  $x_6$  for appropriate scale, artificial simulation environment (greenhouse, automated drip irrigation), comfortable sunlight, temperature, humidity, etc. Various input factors are affecting agricultural production efficiency and production cost, and the influence of different factors will need to be taken into account comprehensively. Taking appropriate large-scale operation and agricultural mechanization investment as an example, we will analyze the reasons for China's low agricultural production efficiency and weak competitiveness. Appropriate scale operation will bring economy of scale and reduce production costs. For example, Germany, Britain and other countries develop appropriate scale operation according to their own situation to improve production efficiency. Germany mainly develops small and medium-sized family farms of less than 50 hectares, and the UK focuses on the develops large farms of 200 hectares (accounting for 45.2% of British moderate scale operation); However, the agricultural production under the Chinese household joint production contract responsibility system is mainly led by scattered families, so it is difficult to obtain the scale remuneration brought by large-scale operation. Chinese Academy of Engineering Luo Xiwen also pointed out that China's agricultural mechanization level is low, the technology is backward, fruit and vegetable tea planting harvest mechanization level is less than 10%, Chinese agricultural machinery products is only half of that of foreign countries (China has more than 3500 kinds, and foreign countries have more than 7000), and only 10% of Chinese agricultural machinery products in technology can reach the technical level of developed countries in the 1990s<sup>[19]</sup>.

Third, the specific expression forms of joint elements and joint product production functions represent the specific technical management level and the corresponding institutional environment, which means "technological innovation" in terms of production factors and "institutional innovation" in production functions.

In terms of technological innovation, when a certain production technology method is adopted (such as the "embroidery agriculture" of fine farming in Japan, South Korea and Taiwan, or thousands or thousands of mu of mechanized farms), the relationship between input and output determines the efficiency of the agricultural production system, for example, when the input is established, the output is maximized:

$$\sum_{i=1}^m y_i \uparrow / \sum_{j=1}^n x_j \rightarrow$$

or when the output is established, the input is minimized:

$$\sum_{i=1}^m y_i \rightarrow / \sum_{j=1}^n x_j \downarrow$$

Take agricultural technology as an example. Although the investment and level of Chinese Agricultural industry are constantly improving, there is still a phenomenon of little research and development investment and unreasonable investment structure on the whole.

Data show that China's agricultural research investment accounts for agricultural GDP (agricultural research and development strength) is 0.77% (the national proportion is 1.7% in the same period), the appropriate standard of research and development strength determined by the FAO is 1%, and developed countries are 3%–5%, from which we can see that China has insufficient investment in agricultural research and development; on the other hand, unreasonable research and development, less supporting research and imperfect agricultural research system. Taking rice research and development as an example, there are more than 600 research groups on breeding, but less than 100 research groups on cultivation and planting and less other crops<sup>[20]</sup>.

In terms of land system, at the beginning of the reform and opening up, China implemented the household contract responsibility system in rural areas, which fully aroused the enthusiasm of farmers to engage in agricultural production, and the achievements of rural reform achieved fruitful results; after more than 30 years of rapid development, China has once again entered a period of economic and social transformation and development, and has put forward new requirements for the rural land system. According to the relationship of production to adapt to the objective law of productivity development, this stage should continue to deepen the reform of rural land system, the central file 1 has been 14 consecutive years focus on “agriculture” problem, the “three separation” system innovation, under the background of the new era of agricultural production system, develop moderate scale management, constantly explore the effective form of rural land collective ownership. Obviously, the transfer of land management right is only a basic variable of the agricultural production system, and involves two aspects of production factors (large-scale land planting) and the form of production function (the mutual relationship between land elements and other elements).

Fourth, financial support for the construction of the agricultural production system is needed. The construction of the agricultural production system needs the support of financial, legal, science and technology, information, circulation and other services, especially financial support. From the current production function of China’s joint production contract and the production mode of a small workshop into the production function of thousands or even tens of thousands of mu of large farm scale, it requires one-time and large-scale investment injection, capital investment and infrastructure construction like the purchase and investment of modern agricultural equipment and the dropper technology needing one-time investment to build a pipe network and the corresponding sunshine, rain, pest warning and other automatic facilities. Obviously, leaving the corresponding capital market, the modernization of this agricultural production system is not possible. However, capital requires a return on investment, which is a stable profit return, but agricultural investment and infrastructure construction is large investment and has a long payback period. According to the Law of Rural Land Contracting Law of the People’s Republic of China, the contract period of cultivated land is 30 years. How should we deal with the management right of cultivated land in 30 years? In addition, attracted by the high return on investment, a large number of China’s surplus funds were attracted by the “siphon funnel” to big cities such as “Beijing, Shanghai, Guangzhou and Shenzhen”, while China’s agricultural profit margin is far lower than that of real estate and other industries, which is not attractive to capital, which discouraged many investors. This is the top priority for China’s agricultural development, which is how to guide the flow of funds into the “agricultural modernization construction”.

#### 4. Agricultural Industrial System

Agricultural industry system, can be expressed with the concept of compound function, as shown in the following formula.  $Y = F(U_1, U_2, \dots, U_n)$ , and in which  $U_i = G(V_1, V_2, \dots, V_m)$ .

In the above formula,  $U_1, U_2, \dots, U_n$  represent the integration of various industries and the series of products in each industry. In this way, China’s 600 million farmers have been locally “transformed” into industrial workers, truly realizing the “unity” of the identity of cities and farmers. First, it is said to develop a variety of agricultural industries according to local conditions. If we think that agriculture is to product of commissariat (which is probably the thinking legacy of designated crop production left by the era of planned economy, as if industrial and commerce is urban and rural areas can only be farming), the problem of farmers’ problems cannot be completely solved. On the whole, local governments must adhere to the principle of adapting measures to local conditions, give full play to their comparative advantages, and develop distinctive industries in light of their resource endowments. We will develop a variety of operations of meat, eggs, milk, grain, fruits and vegetables in areas suitable for planting and breeding, such as planting vegetables in areas around the city.

Second, the integration of forward and backward integration of agricultural products is developing. For example, the forward integrated deep processing of soybean corn, further deep processing of meat products and

dairy products, organic fertilizer, biogas and other energy supply, and so on; For example, the integration of pesticides, fertilizers, and even machinery and equipment in backward elements integrates group companies, including financial enterprises. Only in this way can we fundamentally avoid the risk of rigid food demand and completely solve the thorny problem of “cheap grain hurting farmers”. For example, Ningxia gives full play to the advantages of traditional industry, extending the wolfberry industry chain and building the wolfberry industry system, so that wolfberry is sold from jin to grain. The traditional planting industry is developed into organic and leisure modern agriculture.

Third, it is the development of agricultural related industries. For example, the high-speed railway involves dozens of scientific research and industrial departments, hundreds of manufacturing categories, tens of thousands of product categories, including steel, metallurgy, composite materials, locomotives, new power, chassis, braking, power supply, pressure stabilization, sensing, communication, telecommunications, braking control, signal integration, signal transmission and safety control, which involve the overall improvement of industrial and engineering quality and the improvement of the supervision system and production management and is a sign of the overall level of “Made in China”. The development of agriculture needs the support of seeds, machinery, chemical fertilizers, pesticides, research and development and other related industries, and the development of these industries cannot be separated from the support of agriculture.

The construction of agricultural industry system is comprehensively managed through large-scale grain, corn soybean chemical raw material processing, scale dairy and chicken duck farming, dairy products processing, organic fertilizer, biogas energy so in, as well as providing various services including modern financial derivatives, which really realized the integration of rural industry and the compatible and positive association between two industries, and it has a positive impact. For example, when Tangshan constructs the agricultural industrial system, Tangshan actively develops the planting and breeding industry, but also actively expands and strengthens the food processing industry, and develops characteristic leisure agriculture and modern agricultural service industry. Through the linkage of the primary, secondary and tertiary industries, it will achieve coordinated development and jointly promote the rapid development of agriculture.

## 5. Agricultural Management System

Agricultural production is not to satisfy “themselves” or to barter “you” (such as the planting of characteristic cash crops); but to “them” in the general market. Therefore, the core of the agricultural management system is to complete the transformation from product to commodity, to control the price of factors, agricultural products price, and the price fluctuation trend.

$$\sum_{i=1}^n c_i(i)S_i(i) = \sum_{j=1}^m p_j(j)X_j(j)$$

In the above formula, the left indicates the number  $S_i(i)$  of the various elements invested at the t moment and its price level  $c_i(i)$ , which is also the cumulative cost function. The right indicates the number  $X_j(j)$  of various produce produced at time t and its price level  $p_j(j)$ , which is a function of cumulative sales revenue. Revenue minus costs is the profit gain.

The relationship between cost and income determines the efficiency of the agricultural operating system. For example: when the cost is established, the mode of profit maximization is

$$\sum_{j=1}^m p_j(j)X_j(j) \rightarrow \uparrow / \sum_{i=1}^n c_i(i)S_i(i) \downarrow$$

or when the gain is established, the mode of minimized cost is

$$\sum_{j=1}^m p_j(j)X_j(j) \uparrow / \sum_{i=1}^n c_i(i)S_i(i) \rightarrow$$

First, it is obvious that the core of the agricultural management system is to complete the transformation from product to commodity. It is to complete the transformation from agricultural product production function, to cost, profit function. Purchasing production factors, completing production and processing, and transferring it to consumers through circulation channels need Purchase production factors, complete production and processing, and transfer to consumers through circulation channels. Commodity is the unity of use value and value, use value is the natural property of commodity, value is the social attribute of commodity. The most basic attribute of agricultural products is to meet people's survival needs, which makes people focus on the use value of goods, but to complete the transformation of product to goods, the value of goods must be realized in the process of exchange. The value is determined by the necessary labor time of the society, and the value determines the price. The lower the labor productivity is, the greater the necessary labor time in the commodity society is, the greater the value is, and the higher the price is, which is reflected in agricultural products. On the one hand, compared with the agricultural production level of foreign developed countries, China's agriculture is still mainly scattered household management, labor productivity is not high, the social necessary labor time is large, the product price is high, and under the same market conditions, China's agricultural market competitiveness is insufficient; on the other hand, while catching up with the agricultural production efficiency of other countries, increasing the necessary social labor time of agricultural products in other aspects is the only way to increase the added value of agricultural products, such as the production of organic agricultural products and the deep processing of agricultural products.

Second, with the help of mutual alliance with agricultural enterprises, the market power is obtained. According to the theory of supply and demand, the market equilibrium price is the price when the supply and the demand curve intersect, that is, the supply and demand determines the product price, and in the long term, the price will also affect the supply and demand. Agricultural products are daily necessities, which belong to the products that lack the demand price elasticity, that is, the price of agricultural products is largely determined jointly by the supply and supply quantity. From the perspective of supply quantity, if the supply is large, the price drops, and the cheap grain hurt farmers; on the contrary, the price increases. To obtain the price dominance by controlling the supply quantity, we need to use the road of large-scale operation and alliance with enterprises; From the perspective of supply (in addition to the supply factors are supply factors), agricultural products origin, varieties, quality and so on will also affect the price of agricultural products, such as in the large use of fertilizers, pesticides for agricultural planting today, agricultural pollution phenomenon is everywhere, the ecological agricultural products in product sales have a certain price dominance. Therefore, in order to obtain price dominance from the perspective of supply, it is necessary to take the road of characteristic agriculture scale with the help of brand effect.

Third, establish an agricultural product futures market to realize the separation of risk factors. The agricultural futures market under the leadership of the government comes from the relevant income of the futures market used to support the development of agricultural related industries and factors. Farmers use hedging to hedge their risks. Otherwise, it still falls into a cycle of coax, kind of obtaining nothing. At the same time, make full use of the two markets and resource, and give full play to the role of foreign futures markets to hedge. The United States give full play to the role of futures agriculture in risk avoidance, price discovery and resource allocation, use the corn futures market to maintain the corn market prices, encourage and support farmers hedging, with this, the United States has become the center of global corn pricing, also make the United States become a model of agricultural futures, worth summarizing for reference in China.

## **6. Principles of the Construction of the Three Major Systems**

China should take the road of agricultural modernization in line with its national conditions. China is a major agricultural country with special national conditions. It has large land types, less flat land, more mountainous areas, large population base, rapid growth rate and large agricultural population. We can draw lessons from the agricultural development experience of developed countries, but we must explore a road of agricultural modernization with Chinese characteristics. Take the problem of farmers as an example, referring to

the United Nations in 2011, per capita arable land (ha / person) of the United States, France, Germany and the UK are: 31.66 (243.5), 14.54 (111.85), 9.99 (76.85) and 6.91 (53.15), respectively; that of Japan, South Korea, Taiwan (region), and China are: 1.50 (11.54), 0.70 (5.38), 0.27 (2.08), and 0.13 (1.00), respectively. With this as the goal, China follows the urban employment of 20 million farmers every year (urbanization is the appearance, employment and housing is the essence), after 20 years, there are 400 million farmers, and each farmer is of 20 mu of land; after 30 years, there were 200 million farmers, each farmer is of 40 mu of land. Not to mention that it takes 20 or 30 years for China to catch up with the level of developed countries, it is a historic problem to solve 20 million farmers in cities every year, because solving the jobs of 6 or 7 million college graduates alone is a social pressure (there are 7.95 million college students in 2017).

Emerging technologies such as the Internet, big data and cloud computing have been deeply integrated with agriculture, profoundly changing agricultural production, agricultural industry and agricultural operation. Therefore, we must give full play to the role of the Internet in the construction of the three agricultural systems.

“Internet + Production System”: provide agricultural production efficiency through the Internet. The combination of the Internet and agricultural production management (real-time monitoring, farmers’ management), agricultural machinery, land testing, agricultural seeds and other work and links can significantly improve the production efficiency of each link. “Internet + Industry System”: to realize the rapid extension of the agricultural industry chain through the Internet, and to promote the rapid integration of primary, secondary and tertiary industries. The Internet will crack the phenomenon of information asymmetry among enterprises and other subjects in the agricultural industrial chain, such as the supply of mechanical equipment and agricultural production demand information sharing can significantly drive the development of agricultural machinery and equipment industry, and then build and improve the agricultural industrial system. “Internet + Business System”: improve the agricultural management level through the Internet. The Internet has brought great changes for agricultural management system, understand the Internet “new farmers” is gradually building a new agricultural management system, such as with the help of the Internet electricity platform support, farmers produce agricultural products through logistics (express) function and directly to the consumer table, real-time monitoring of the Internet did not solve the problem of agricultural products traceability.

At the same time, the correctness of the strategies of the three agricultural systems can only be tested by domestic and international factors and commodity markets, give full play to the role of the two markets and two resources, and test and improve the strategy in practice.

## 7. Conclusion

This paper systematically interprets the core of the construction of three agricultural systems and summarizes the enlightenment to our country. By combing through the relevant literature, the existing research on the three major agricultural systems mainly focuses on three aspects: on the research of local governments on the construction of the three agricultural systems, the significance of the construction of the three agricultural systems, and the reference of the experience of agricultural development in developed countries, but there is still a lack of research from the theoretical level. Based on this, the agricultural production system is analyzed with the production function: the core of the production system lies in the efficiency of input and output, seed, pesticides, fertilizers (energy), production mode (machinery, robots), technology, system (large-scale operation, etc.) comprehensively determine the efficiency of the production function, and also point out the direction of China to improve agricultural production efficiency. Analyze agricultural industry system with composite function and we can obtain that the core of the industrial system lies in the integrated development of the primary, secondary and tertiary industries in rural areas, and four development suggestions are put forward: one is to develop a variety of agricultural industries according to local conditions; the integration of agricultural products forward and backward development; the development of agricultural related industries; the fourth is the agricultural scale and intensive development. With the function analysis to analyze the agricultural management system, we can obtain: the core of the management system is to complete the transformation from product to commodity, and to control the price of factors, agricultural prices, and price fluctuation trend. Two development suggestions are put forward: first, it is to cooperate with agricultural enterprises to dominate market prices;

second, establish agricultural futures market to realize the separation of risk factors. At the same time, the principle of building the three major agricultural systems is put forward. The research provides a theoretical and decision-making basis for the construction and optimization of the three major agricultural systems in China.

## Conflict of Interest

The authors declare that they have no conflict of interest.

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