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# New Approach for China's Agricultural Modernization Practice from the Perspective of Multiplex Function

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**Abstract** This paper analyzes the multiplex composite function of agriculture comprehensively as follows. The first is political function; it can ensure the national food security; the second is economic function; it can promote agricultural competitiveness and increase farmers' income; the third is social function; it can promote the construction of new socialist village; the fourth is ecological function; it can conserve the resources environment and guarantee sustainable development of agriculture. In terms of reference of international theory and the main innovative experience of domestic agricultural modernization practice, this paper points out the new approach for agricultural modernization practice in China, and puts forward institutional guarantee based on agricultural multiplex function as follows; we should gradually promote new land system taking land transfer as major content; we should establish rational transfer system of rural labour forces; we should establish virtuous circular agricultural financial credit system; we should hew to the innovation and promotion system of agricultural technology; we should establish strict the system of resources environment and ecological protection; we should establish the agricultural risk security system.

**Key words** Agricultural modernization, Multiplex function, Approach for practice, Institutional innovation, China

Agricultural modernization, as the process of transformation from traditional agriculture to modern agriculture, is the only way to realize upgrade of agricultural production technologies, infrastructure optimization, change of production modes, and sustainable development of agriculture. This is of great significance to ensuring national food security, protecting the health of consumers, increasing farmers' income, promoting the international competitiveness of agriculture, protecting ecological environment and so on<sup>[1]</sup>. In fact, the practice road of China's agricultural modernization is long and tortuous. A fatal drawback is that the agricultural modernization is merely confined to agricultural production technology, form of production and operation, the level of agricultural technology, agricultural infrastructure construction, and other technical aspects, to seek breakthrough of agricultural development, but ignore the nature of agriculture. Therefore, we must understand the multiplex composite functions of agriculture comprehensively and scientifically.

## 1 Multiplex functions of agriculture

### 1.1 Political function: it can ensure the national food security

At all times and in all countries, "no food can occasion instability" is an axiom. Food can not only meet human needs for survival and ensure international food safety, but also make a significant contribution in breeding of animals, bio-fuel production, supply of industrial raw materials and other fields. Only by ensuring national food security to solve problem of feeding 1.3 billion people in China, can we achieve social sta-

bility and lasting stability and durable peace of the state, and promote the healthy development of other industries. According to statistics, in 2010, the planting area of grain in China was 109.87 million hm<sup>2</sup>, an increase of 0.89 million hm<sup>2</sup> compared with that in 2009; the planting area of oil crops in China was 13.97 million hm<sup>2</sup>, an increase of 0.32 million hm<sup>2</sup> compared with that in 2009; the planting area of sugar in China was 1.92 million hm<sup>2</sup>, an increase of 0.03 million hm<sup>2</sup> compared with that in 2009; the grain output in whole year was 546.41 million tons, 15.59 million tons more than that in the previous year, an increase of 2.9%<sup>[2]</sup>. In order to promote the stable development of grain production, we should not only stabilize the planting area of grain, and consolidate, improve and strengthen agricultural support policies. In addition, we should enhance technology, improve facilities, optimize the structure, change the mode, and promote overall production capacity, so as to develop modern agriculture.

### 1.2 Economic function: it can promote agricultural competitiveness and increase farmers' income

The economic function of agricultural modernization can be divided into two aspects as follows. On one hand, agricultural modernization can promote agricultural competitiveness fundamentally. Agricultural competitiveness can reflect the level of development of modern agriculture in one country. Agricultural competitiveness is also an important indicator of the level of agricultural technology, which can be manifested in five following aspects: quantity of products, quality of products, safety, benefit (including increase in value through processing of agricultural products), and ecology. In terms of quantity, China has been already the world's fifth largest exporter of agricultural products and fourth largest importer, but in terms of structure and quality of export products, China is not a power of agricultural trade, with weak competitiveness. Statistics show that in 2009, the export fig-

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ures of China's agricultural products were \$ 39.59 billion, decreasing by 2.3%; unfavorable balance of trade was \$ 12.96 billion, decreasing by 28.6%, showing a trend of deficit in six consecutive years<sup>[3]</sup>. Export of agricultural products is far below the world average. This shows that the competition of agricultural products focuses on the competition of varieties, quality, standards and price. The competitiveness of China's agriculture has not yet reached the level it should be at, and the key to promoting competitiveness is that we should rely on the development of modern agriculture. On the other hand, agricultural competitiveness is the key to increasing farmers' income. During three decades of reform and opening up (1978–2007), the annual net income per capita of farmers in China increases from 134 to 4 140 yuan, average annual growth of 7.1% after excluding the commodity price factors. In 2010, the net income per capita of rural residents in China was 5 919 yuan, increasing by 10.9% compared with income per capita of 5 153 yuan in 2009 after excluding the price factors<sup>[2]</sup>. In fact, at present, the main approaches for farmers' income increase concentrate in the non-agricultural industrial fields (working elsewhere), while using agricultural production mode to increase farmers' income gains inconspicuous effect. For the farmers engaging in agricultural production, especially the farmers in the major grain producing areas, the fundamental way to increase income is to rely on mechanization, scientific and technological progress, industrialized management, farmers' skills and other factors, to improve agricultural benefit.

**1.3 Social function: it can promote the construction of new socialist village** The principle of China's new socialist countryside construction is "development of production, affluent life, civilized rural custom, clean village appearance, democratic management", reflecting the requirements of progress of rural society, culture and politics, which is either the symbol of agricultural modernization, or an important social function. The construction of infrastructure in China's rural areas, such as transport, power, culture, sanitation and so on, develops by leaps and bounds, and the conditions of education, health care, and living get unprecedented improvement. 72.3% of the towns in China implement centralized water supply; 19.4% of the towns in China implement centralized sewage treatment; 36.7% of the towns in China have waste disposal stations; 95.5% of villages in China have highway; 95.5% of villages in China have highway; 98.7% of villages in China have electricity; 97.6% of villages in China have telephone; 97.6% of villages in China can receive TV programs; 24.5% of villages in China conduct centralized purification treatment on drinking water; 15.8% of villages in China implement centralized waste disposal; 33.5% of villages in China have biogas; 20.6% of villages in China complete lavatories transformation; 34.4% of villages in China have the chain stores or supermarkets over 50 square meters<sup>[4]</sup>. In terms of education, at the stage of primary and secondary compulsory education in rural areas, the students are exempted from all tuition and fees, and provided with textbooks for free, so that 150 million students benefit from these. In terms of health care, 19 000 township hospitals are

established and transformed, and 12 000 township hospitals are equipped with medical equipment. In terms of social security, the new rural cooperative medical care expands to 86% of the counties in China, benefiting 730 million of agricultural population; the minimum living security system is established in the rural areas of China, and 35.66 million rural residents are covered by the security system. Facts have proved that adhering to the construction of agricultural modernization is the important guarantee for the construction of new socialist countryside. Moreover, adhering to the construction of agricultural modernization not only can promote industry to nurture agriculture, promote the cities to support the rural areas, and especially promote the enterprises to push forward the villages. The modern industry and urban civilization have direct impact on the villagers' level of civilization, and it can also foster farmers' awareness of public morality, awareness of interpersonal relationship, awareness of public health and awareness of public life, promote healthy and civilized climate, promote the quality of labour forces and sense of democracy, establish and perfect the mechanism of supervision by the masses and democratic decision-making, and foster knowledge-oriented, skill-oriented, and management-oriented farmers.

**1.4 Ecological function: it can conserve the resources environment and guarantee sustainable development of agriculture** Agriculture is not only a source of human food and clothing, but also an important part of keeping human living in harmony with nature. The most distinctive feature of agriculture is that it must depend upon the support of non-renewable natural resources and environment. Many countries with developed agriculture have attached great importance to fostering the ecological function of agriculture. *Agricultural Guidance Law* (1999) issued by France stressed that agriculture is not only an industrial sector, but also is closely related to land improvement, animal and plant protection, and ecological optimization; a similar view is advanced by Japan, that is, modern agriculture not only has the function of producing agricultural products, but also have the functions of protecting the nature, stabilizing ecology and promoting man and nature to live in harmony. In the era of traditional agriculture in China, due to great pressure of the agricultural population, extensive production and management, violation of the laws of nature, one-sided pursuit of agricultural profits and other influencing factors, it has caused severe damage on the agricultural ecological environment, and some areas are mired in the vicious circle from "ecological poverty" to "economic poverty", and thus pay the heavy cost. Therefore, through the construction of agricultural modernization, we must improve the ecological environment, that is to say, we must find suitable ecological carrying point, and develop agricultural production according to local conditions, so as to make the ecology interact with agricultural construction, arrest the trend of ecological deterioration, and achieve the coordination and sustainable development of ecological environment and agricultural economy. Specific objectives are as follows: synthesis and production of organic matter; generation and maintenance of biological diversity; climate regulation; ecological building; tourism and leisure industry; the formation, accumulation and cycle of nutrients; the natural envi-

ronment and water conservation; maintenance and development of soil fertility; environment purification and degradation of hazardous and toxic substances; pollination of plants and seed dispersal; pest control; mitigation of natural disasters<sup>[5]</sup>. Eco-efficiency can be further subdivided into environmental protection, biomass energy (green energy), eco-leisure and tourism, agricultural civilization heritage and other multiple functions.

## 2 New approach for agricultural modernization practice in China

**2.1 Reference of international theory** From the world, China needs to learn from the countries with developed economy, and refer to the theory of modernization of agriculture, as the necessary practice support. There at least two classical theories which is worth thinking. One is the regional division of labor and trade theory, and the theory holds that differences of regions and factor endowments determine the division of labor and trade. Krugman, as the representative of school of new trade theory, further notes that the regional division of labour is the concentrated reflection of a certain socio-economic system in field of production; the deepening division of labor will promote innovation of production system, and promote standardization and perfection of the transaction system, resulting in progressively increasing returns, become the root cause of continuous economic growth. The other is the theory of comparative advantage. The western economist David Ricardo in his *Principles of Political Economy and Taxation* advances that the basis of international trade is the relative difference of production technology, rather than absolute difference, and the resulting difference of the relative cost. Each country and region should be based on the principle of "of two interests choose the more, while of two evils choose the less", to produce and export products with "comparative advantage", and import products with "comparative disadvantage"<sup>[6]</sup>. The above two theories have the same idea by coincidence with the policy basis of many types of practices during current China's agricultural modernization.

**2.2 The main innovative experience of domestic agricultural modernization practice** At present, under the prerequisite of fully considering agricultural multiple functions, the new ways of China's more mature practical exploration are following five aspects. The first is the characteristic agriculture. It is the superior agricultural type (emphasis on non-grain planting industry, such as local agricultural byproducts) formed by relying on superior agricultural resources in specific area, the products of which are with high-quality, high-price and strong market competitiveness. The substance of the characteristic agriculture is playing the driving role of superior agricultural products. Due to the national policy support, the characteristic agriculture is suitable for developing practice nationwide, especially in the west of China where is relatively backward in terms of economic condition. It enables the western regions to make best use of the advantages, accelerate the development and narrow the gap between the eastern areas and the central areas. The second is the urban modern agriculture. It is the agriculture form relying on development of affiliated area of central city. It completes urban supply of agricultural byproducts (vegetables, egg, dairy, fruit) by industrial structure adjustment, optimization of production distribution, widening of agricultural function

and so on. Meanwhile, it is to develop the tertiary industry, which is represented by tourism, such as agro-tourism, and agricultural popular science education; to constantly improve agricultural productivity, the peasant's income, and cultural quality of urban-rural residents; to enrich industrial connotation. The urban modern agriculture of Beijing, Shanghai, Chengdu, Hangzhou and other cities has already walked in the forefront of the country. These cities accumulated valuable experience of balancing urban and rural development. The third is efficient ecological agriculture. It is the way of modern agricultural development that combines intensive management and ecological production, on the basis of green consumption demand. It takes enhancing market competitiveness and sustainable development ability as core, with the characteristics of high input, high output, high benefit and sustainable development<sup>[7]</sup>. The efficient ecological agriculture has drawn wide attention because of the reflection of the requirement of the times, such as green, environmental protection, resource conservation and sustainable recycling. The fourth is facility agriculture. It is the way of modern agricultural production that conducts animal and plant production according to proper environment that meets the need of growth of animal and plant by comprehensive application of engineering equipment and technology, biotechnology and environmental technology. Compared with other ways of agricultural development, as the facility agriculture has the most comprehensive and maximum expected function, so it has higher requirements of construction. It not only needs the scientific formulation of development planning, but also needs the establishment of legal safeguard mechanism. The fifth is outward-oriented and export agriculture, relying on local advantage and good economic foundation, focusing on the development of high-quality seeds, special vegetables, high-quality flowers, famous fruits, high-quality poultry and special aquatic products. Taking promoting the export and processing of the high-quality agricultural products as goal, it is to vigorously develop production and processing of capital-and-technology-intensive industries, promote the level of modern agriculture, lead the development of regional economy, and increase farmers' income.

## 3 Institutional guarantee based on agricultural multiplex function

Given that agriculture has multiple functions, such as the function of politics, the function of economy, the function of society, and the function of ecology, in order to fully stimulate these potential functions and to promote agricultural modernization development, we need to implement a series of systems as guarantee.

**3.1 We should gradually promote new land system taking land transfer as major content** By allowing the the land use right to flow reasonably, it is conducive to transferring land to farming expert, promoting the appropriate scale operation of land, and reducing the cost of agricultural production, so that the agricultural resources are allocated rationally, and the way of agricultural development changes from extensive model to intensive model, achieving greater scale benefit.

**3.2 We should establish rational transfer system of rural labour forces** We should guide agricultural labour transfer scientifically, rationally, and orderly, and establish and improve rural land circulation system, household registration system,

employment system and social security system, which is the key of improving the labour production efficiency and effectively using China's abundant labour force resources in rural areas.

**3.3 We should establish virtuous circular agricultural financial credit system** As for the shortage of agricultural development financial supply, the most important reason is that the agricultural financial system reform in rural areas lags behind; the role of policy finance is not fully played; it lacks effective management of finance; there is serious outflow of agricultural capital. Thus, the target of national agricultural financial system reform is to resolve the contradiction problem reasonably between agricultural development of financial institutions themselves and promotion of modern agricultural development.

**3.4 We should hew to the innovation and promotion system of agricultural technology** The progress of agricultural technology is not only the power of agricultural growth but also the important impulsion of transformation of agricultural development mode. Since the reform and opening up, China has established the development strategy of "Agriculture by Science and Education", and written the article of "growth of scientific research investment higher than growth of financial recurrent revenue" into *Agriculture Law* and *Science and Technology Law*, which ensures the steady growth of agricultural scientific research investment. However, now agricultural technology system of China still faces many problems, which needs the supporting reform such as investment in technology, technical innovation, achievement transformation, technology transfer and so on.

**3.5 We should establish strict system of resources environment and ecological protection** In general, the phenomenon of China's agricultural ecological environment suffering damage and waste of resources has not been fundamentally controlled, and it continues to deteriorate in some areas. Thus, we must use the legislation and economic means to carry out system optimization of resources environment and then ensure the sustainable development of modern agriculture.

**3.6 We should establish the agricultural risk security system** On the one hand, we should formulate the security system of the price of agricultural products, establish the mechanism of agricultural futures interest protection and the mecha-

nism of protective purchase price of agricultural products, and arouse the enthusiasm of farmers in exploring modern agriculture; on the other hand, we should actively carry out the system of agricultural insurance, and improve the ability of agriculture to resist natural disasters, international financial crises and other unfavorable factors<sup>[8]</sup>. Once encountering emergency, we should turn crisis into opportunity quickly and minimize the loss of agriculture.

## 4 Conclusion

In brief, in order to achieve the great goal of China's agricultural modernization, we should actively pay attention to probing into the essence of agriculture. According to the local actual situation, we will actively carry out the practice and innovation of agricultural modernization. Moreover, we should enhance the implementation efficiency of supporting security system, and form the relatively self-contained development approach of the agricultural modernization with Chinese characteristics.

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will promote healthy and sustainable development of the entire leisure development. Besides, it will achieve systematic combination of the primary industry, secondary industry and tertiary industry. In addition, it is of practical significance in pushing forward social and economic development of suburbs and effectively solving issues concerning agriculture, countryside and farmers in suburban areas.

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