

# Industrial-Organization-Transformation-Oriented Agricultural Modernization with Chinese Characteristics: From the Perspective of Industrial and Agricultural Interaction

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## Abstract

Agricultural modernization as an outcome of economic development cannot be achieved within the agricultural sector only. The agricultural transformation process in western countries has revealed that agricultural modernization is a process in which agricultural organizations spontaneously achieve the transformation in agricultural industrial organization and agricultural technology with the core ideology of industrialization. The existing binary system has made Chinese agriculture fail to achieve the transformation in industrial organization and technology synchronically with the industrial sector. Therefore, in the current conditions, in order to facilitate agricultural modernization, we must transform the land system at the level of relations of production, urban and rural household registration system, urban and rural social security system and other key factors, promote the transformation of agricultural industrial organization with the core concept of industrial revolution, thus promoting the spontaneous revolution in agricultural production technology.

**Keywords:** Agricultural modernization, Industrialization, Industrial organization, Transformation

Agricultural modernization is an internal decision of economic development rules as well as one of our nation's strategic measures. However, in spite of its half-a-century process, China's agricultural modernization still fails to change its traditional agriculture. The basic reasons lie in that China's agricultural modernization fails to follow the basic rules of System Theory, over-emphasizes the technological transformation of agricultural system while neglecting that in industrial organization. This paper will explore a new path of agricultural modernization with the orientation of industrial reform in the agricultural sector against the current modernization background.

## 1. Literature Review

As a concept proposed in mid 1990s, agricultural modernization hasn't got any universal recognition among Chinese scholars. Yun Kang and Xiaoming Li (2000) summarize Chinese scholars' viewpoints as the theory of industrialization, the theory of transformation and the comprehensive theory. According to Zeji Ding, a representative for the theory of industrialization, modern agriculture may be called industrialized agriculture and agricultural modernization can be called agricultural industrialization too. Agricultural modernization can be summarized as agricultural mechanization, chemicalization, irrigation and electrification. A representative for the theory of transformation, Haizhang Lei, claims that agricultural modernization refers to the process in which modern science and technology, facilities provided by modern industry and modern scientific management methods are employed to reform agriculture in an all-round way, hence transforming traditional agriculture into modern agriculture at an advanced world level. Gengsheng Xu (1993) thinks that agricultural modernization refers to the process of equipping agriculture with modern science, technology and production methods, organizing and managing agriculture with advanced scientific methods, improving agricultural laborers' cultural and technological qualities and transforming laggard traditional agriculture into modern agriculture which guarantees advanced productivity and maintenance and improvement of the sustainable development of environmental quality. According to some representatives for the comprehensive theory such as Xingyun Xuan and Chunfa Wang (1998), agricultural modernization is not only a transformation process from traditional agriculture to modern agriculture but a sum of policies and measures to facilitate it.

There is no concept of agricultural modernization in western economic theories. Instead, they study the issue of

“agricultural transformation” from traditional agriculture to modern one. American economist Theodore Schultz (1987), an authority in agricultural transformation, thinks that traditional agriculture is a special economic balance. In order to break this state and to improve agricultural production efficiency, new factors have to be invested. A pure reallocation of resources in traditional agricultural system will not bring about apparent improvement in agricultural productivity. In Schultz’s opinion, the key to agricultural modernization lies in introducing new plantation technology, better species, more effective power sources and cheaper fertilizers and so on, that is, emphasizing technological change in agriculture.

There is no contradiction in the studies of agricultural modernization and transformation made by Chinese and foreign scholars. Actually, internal universality is revealed in that technological change at the material level is emphasized. Schultz and Chinese scholars study two levels of the same issue with the former claiming that technological change is an essential condition for agricultural transformation while the latter emphasizing the concrete connotation of technological change in agricultural transformation. Comparatively, Schultz’s studies have greater significance in offering reference for China to find its proper way of agricultural modernization. The most significant inspiration Schultz has given us is to look for a path to improve agricultural efficiency through factor analysis. Once taking agriculture as a system, we may find that the improvement of agricultural productivity involves the change not only in technological factors but in structural factors or in industrial organization (Ke, 2000). Therefore, technological change is an essential condition for agricultural modernization or transformation instead of a sufficient condition. Most Chinese and foreign scholars mainly emphasize the technological change in agricultural system while neglecting its structural change. Such a deviation in research approach confines agricultural modernization to the technological field, hence leading to a lack of spontaneous drive and therefore laggard development during the process of agricultural modernization.

Currently, in such an important period with faster industrialization development, two issues need to be clarified related to agricultural modernization theories. First, the relationship between agricultural technology and agricultural industrial organization during organizational transformation of western agriculture should be studied, hence revealing that industrial organization transformation in agriculture based on market economy serves as a breakthrough point for China’s agricultural modernization while the modernization in agricultural technology is only an inevitable outcome of industrial organization transformation in agriculture. Second, against China’s specific national conditions, the self-organization rules of agricultural modernization should be respected and the characteristics of Socialist market economy should be made use of to push and facilitate modern industrial organization in agriculture, to achieve transformation in agricultural technology and eventually achieve agricultural modernization.

## **2. Interactive Relationship between Industrialization and Agricultural Modernization**

### *2.1 Industrialization and Agricultural Modernization in Developed Countries*

Human economic system is a complete system, in which sub-systems have inseparable relations with each other. For research needs, economists may start off from specific research purposes to divide this economic system into agriculture, industry and the services sector according to certain classification standards. However, it doesn’t mean that they are separate from each other. Conversely, the bounds among the three are not so clear in economic life as in concept category. In fact, in the evolution process of human beings, the three fields as a whole are also in evolution. 1500 years ago, the human society mainly relied on agriculture to make progress. 1500 years later, however, propelled by Industrial Revolution, our society has got earthshaking changes in all aspects. It is even safe to say that industry has changed all of our human society. In those previous changes, Industrial Revolution has brought about new technology for agricultural development as well as new industrial organization, which have triggered modernization in agricultural technology and industrial organization. In developed countries, in tune with their industrialization process, reforms in tools, seeds, fertilizers and management ways are spontaneously achieved in agricultural plantation and cultivation, hence fulfilling modernization in relevant agricultural technologies. Besides, industrialized production technology has been applied in agricultural produce processing, hence spontaneously achieving the modernization of this industry. In addition, with the development of international trade, international labor division in agricultural produce has been spontaneously accomplished in developed countries, accumulating domestic agricultural production to those production fields with greatest international competitiveness and forming agricultural industrial organization system based on international industrial division. At present, high-tech technologies in industry have been transferred to agriculture as well. For instance, U.S. agricultural bio-technology is mainly focused on genetic engineering, cellular engineering, enzyme engineering and ferment engineering.

It is revealed in the development process of human economic society that agricultural modernization is an

inevitable result of industrialization. In western countries, this is achieved in a self-organization way in market economy. Therefore, it is hard to find any specific policies and measures to promote and facilitate agricultural modernization there. Although some policies really propel such a transformation process, its original intention just lies in industrial needs.

### *2.2 China's Industrialization and Agricultural Modernization*

In sharp contrast with agricultural self-organization transformation in developed countries, China volunteers to construct agricultural modernization based on economic construction needs which is guaranteed by regulations and agricultural planning or plans after learning about modern agricultural production in developed countries. However, a dualistic system between urban and rural areas established in the planned economy period has formed a solid institutional barrier between the agricultural and industrial sectors, hence leading to the failure in extending industrial organization and production technology formed in industrial civilization to the agricultural sector to promote the reform in its productivity and relations of production. Besides, in the long-term planned economy period, China's strategy for industrial development of taking advantage of the scissors gap between industry and agriculture has restricted agricultural development and widened the gap between the industrial sector and the agricultural one. In the aspect of implementation measures, some representations of agricultural development in developed countries are used for reference at the level of productivity with the intention to achieve the reform in tools, seeds, fertilizers and management methods. Whereas, due to the lack of agricultural industrial organization at the level of relations of production, there is no organizational drive for technological transfer, hence laggard agricultural modernization construction. With Socialist market economy confirmed at the 14th National Congress of CCP, another wave of rapid development in the industrial sector came, bringing about profoundly improved social productivity. But since the dualistic system between the urban and rural areas hasn't been abolished from the root, the productivity accumulated in the industrial sector fails to influence the agricultural sector. As a result, the gap between them tends to be worsened instead of being improved. To sum up, the basic conditions of China's agricultural modernization include: although the society has offered sufficient productivity conditions, industrial organization in agriculture at the level of relations of production fails to keep up the pace with industrialization reform due to institutional barriers, hence restricting the application of advanced productivity to agriculture. As is revealed in developed countries' experience of agricultural transformation, technological modernization is a result of modernization in industrial organization of the agricultural sector instead of a separate variant unrelated to the reform in industrial organization. Therefore, our long-term path adopted for agricultural modernization by emphasizing technological reform while neglecting the change in industrial organization actually reverses the cause-and-effect as well as manifestation-and-nature relations between agricultural technology and agricultural industrial organization.

Overall, China's agricultural industrial organization and production technology have been long failing to go hand in hand with the industrialization process and industrial organization and technology resources in the industrial society haven't been manifested in the agricultural sector, hence changing agriculture into an economic burden for industry in spite of its previous contribution for industrial development. Now, the industrial sector has accumulated strong material and technological basis for the society, offering solid productivity conditions for agricultural modernization. Currently, the problem restricting industrial civilization achievements from entering the agricultural sector doesn't lie in productivity but in relations of production. To be more specific, the key to agricultural modernization lies in beginning with the reform in agricultural industrial organization and then introducing those advanced technologies and production methods from industrial civilization to agricultural development with the strength of market system and eventually achieving agricultural modernization. Accordingly, the key is to begin with agricultural relations of production and make scientific use of the core ideology of industrialization based on market economy in order to achieve the reform in agricultural industrial organization.

## **3. Core Ideology of Industrialization and Reform in Agricultural Industrial Organization**

### *3.1 Agricultural Participation in International Division of Labor*

Compared at the macro level, the biggest difference between Chinese agriculture and that in developed countries lies in that the former has self-sufficient production taking dominance while the latter has international-trade production. The former's industrial organization is intended to fulfill domestic demands while the latter emphasizes foreign demands. Such a huge difference has to be traced back to their different economic history. China's economic history before 1949 is actually a history of agriculture during which agricultural economy mainly relies on domestic demands. That is the reason why China's agricultural industrial organization is conducted surrounding Chinese people's living, which is manifested in natural economy characterized by

family-run production units, product-oriented production and local consumption. 1500 years later, western countries, based on the rapid development in seafaring, began to pursue the transition of their industrial organization to fulfill world demands. Especially after British Industrial Revolution in the 18<sup>th</sup> century, rapidly-developed industrialization in developed countries directly led to sharp contradiction between massive production capacity and insufficient domestic demands. Because of war, international trade got prosperous development during that period. In international competition, relatively obvious international division of labor came into being among developed countries, which brought about relevant adjustment in domestic industrial organization and hence formed market economy characterized by production units in the form of enterprises, product-oriented production and international sales of commodity.

During this process, in western countries, their agriculture was adjusted spontaneously and their agricultural industrial organization was reconstructed based on international trade and international division of labor. Specifically, a nation's choice of agricultural production is determined by international market demands and comparative advantages; agricultural production uses the experience in industrialization to transform from non-standardized to standardized production, from dispersed plantation and cultivation as well as family-run manual processing to large-scale farms and factory processing, from transaction at pedlars' market to cash market and from domestic market to international market; in addition, in order to fulfill demands of international division of labor, previous production dealing with a variety of products has been replaced by specialized production. Currently, through their efforts in standardized, specialized and large-scale agricultural production, western countries have become the strong at international agricultural produce market. Therefore, for those laggard countries, it is most important to abolish their self-sufficient natural economy in their agricultural sector, to participate in international division of labor in agricultural produce field guided by market, to find their own places in the existing labor division system and therefore to promote the reform in their domestic agricultural industrial organization system. As for Chinese agriculture, international and domestic markets as well as cash market and future market should be made use of to gain more opportunities to participate in international labor division, in which Chinese agricultural development should be oriented to adjust relevant industrial space distribution, product structure and industrial chain distribution in order to be geared to international standard in products, production methods, production standards, business patterns, quality control (quality certification) and so on.

### *3.2 Core Ideology of Industrialization and China's Agricultural Industrial Organization Transformation*

#### *3.2.1 Transformation in Basic Production Unit*

Technological revolution and change in basic production unit are important guarantee for Industrial Revolution. With the deepening development of Industrial Revolution, agricultural society has been transformed into industrial society, changing the basic production unit from families adapted to traditional agricultural society to enterprises adapted to modern industrial society. During this process, enterprises have got varied forms including private handicraft industry, master handicraftsman, manufacturing workshop, joint enterprises and companies and so on. Nowadays, corporations Ltd. and incorporated companies have constituted the main body of enterprises. During western countries' industrialization development, the basic agricultural production unit was also changed from families to enterprises; large-scale farms in the form of enterprises replaced family-scale plantation and cultivation to be the dominant role in agricultural plantation and cultivation; large-scale factories, instead of family-scale master handicraftsman, dominates agricultural processing; enterprises specialized in breeding replaced family breeding to take dominance in the breeding of new species; high-tech agricultural enterprises took the place of family technological inheritance to lead agricultural technology upgrading; professional future companies and trade companies replaced agricultural produce pedlars' market to dominate transactions in agricultural produce. Currently in China, greater efforts should be made to facilitate the transformation of agricultural basic production unit to develop plantation and cultivation enterprises, seed breeding enterprises, agricultural produce processing enterprises, agricultural produce circulation enterprises as well as enterprises providing agricultural services.

#### *3.2.2 Industrial Organization Transformation in Agricultural Plantation and Cultivation*

During their pursuit for industrialization, developed countries achieved more integrated plantation and cultivation, hence replacing family scale with large-scale farms. As a result, a variety of breeding enterprises, fertilizer production enterprises, plantation and cultivation enterprises came into being. It is safe to say that it is large-scale farms based on international labor division that evoke modern industrial organization in agricultural plantation and cultivation, which, in return, promotes the development of these farms by enlarging their scale and propelling their mechanization, chemicalization, irrigation and so on. Based on large-scale farms, more

organizational forms came into being, such as plantation and cultivation parks and cooperative organizations. Such a transformation has actually achieved the application of the core ideology of industrialization in agriculture to improve production efficiency and product quality in this field. It is revealed in developed countries' experience that while incorporated into international labor division, China should facilitate its integrated production in agricultural plantation and cultivation. With large-scale agricultural enterprises, standardized, specialized and scale plantation and cultivation can be achieved eventually.

### 3.2.3 Industrial Organization Transformation in Agricultural Processing

Industrialization in developed countries is not only confined to machinery manufacturing, metal smelting and petrochemical engineering but includes putting agricultural produce to industrialized production, providing fine and further processed commodities for international and domestic market and therefore promoting an array of food and beverages enterprises and industries. In addition to constantly-prolonged industrial chains, these industries have also created a great number of professional international brands of food and beverages. Currently, a large array of multinational companies of this kind exists in developed countries, such as Coca Cola, Mcdonald's and KFC. Based on these industries, these nations have also developed large-scale enterprises specialized in relevant facility manufacturing, technological research and development, brand operation, agency, advertising and package. In China's efforts to facilitate agricultural modernization, industrial organization construction in agricultural processing should be enhanced. Those primary agricultural produce from agricultural plantation and cultivation can be processed into agricultural products with higher added value. Along with the development of agricultural produce processing industry, the industrial chain for agricultural processing will be prolonged and perfected, even encouraging the development of high-tech enterprises specialized in biomedical, genetic engineering, cellular engineering, enzyme engineering and ferment engineering based on primary agricultural products.

### 3.2.4 Industrial Organization Transformation in Agricultural Circulation

Agricultural industrial organization in developed countries is dominated by international agricultural produce market. It is agricultural circulation system that connects directly with this international market. Smooth and efficient logistics system, a significant section in western modern agriculture, includes cash market and future market as its main body and is operated by professional cash and future companies. The market price indicator is employed to instruct agricultural plantation and cultivation companies and agricultural produce processing enterprises' production decisions, hence adjusting variety structure and output of agricultural produce. Based on these cash and future companies, western countries have also developed a variety of high-efficiency settlement enterprises, transaction enterprises, specialized financial enterprises, agencies and so on. By learning about the role of agricultural circulation system in developed countries, China is expected to enhance the construction of industrial organization in agricultural circulation, to establish professional agricultural produce market, to promote the growth of cash and future companies and to develop services system construction for market. Driven by such a circulation system, China's agriculture will be geared to the world, with its advantageous role in international competition established.

## 4. Institutional Innovation and the Implementation of China's Agricultural Modernization

### 4.1 Mechanics System of the Transformation of Agricultural Industrial Organization

Following Adam Smith's economic ideas, developed countries mainly have market economy as their dominant economic system. Even after Keynesian Revolution, the national authority's interference with economy is confined to a small area. As a result, agricultural transformation in developed countries is fulfilled along with the industrial sector's revolution with the role of market system. During this process, the transformation of agricultural production technology and industrial organization has followed the following dynamics system that agricultural market factors reach a balance at market with recombination of market self-organization strength driven by economic benefits. It is this self-organization system that has led to an internal consistency between factors, structures, the agricultural sector and other departments, hence achieving a balance in benefits. China's efforts in promoting agricultural modernization are conducted with resources allocated jointly by market system and government. That is to say, China's agricultural modernization is achieved with the joint roles of self-organization and organization system. However, these two systems are in conflict and restraint. Therefore, it is a key factor to promoting the transformation of agricultural industrial organization how to coordinate market system and government's power. Market system cannot speed up the present reform despite its success in solving internal consistency and external coupling. Meanwhile, although government can achieve faster transformation in agricultural industrial organization, they have no way to achieve internal consistency and external coupling due to decision makers' rational limitations. Therefore, all those issues solvable at market shouldn't be interfered by government. Government's role in this process should be defined in planning for agricultural development, promoting relevant institutional innovation and industrial planning in order to protect agricultural safety and

eliminate barriers during the course.

#### 4.2 Innovation in Land Transfer and Transformation in Agricultural Industrial Organization

During agricultural transformation in developed countries, since large-scale farms are not restricted by land ownership and integrated plantation and cultivation cost less in transaction, they have high efficiency in integrating agricultural resources. However, in China, the reality determines that integrated and scale agricultural plantation and cultivation will be seriously affected by land system, even involving infinite transaction cost. Therefore, with current irreversible industrialization trends, the key to China's agricultural industrial organization lies in breaking through the restrictions of rural land contract system. Despite its important role in liberating and development labor force at the end of planned economy period, such a system has to be reformed to liberate agriculture productivity at the current stage of economic development. It is an important measure to promote land transfer construction in rural areas in order to solve agricultural industrial organization reform with the current land system. Land transfer is beneficial for industrial capital flowing into agricultural development, realizing scale, specialized and standardized plantation and cultivation of agricultural produce; it is also beneficial for land flowing to those skilled laborers, hence improving land output. Conversely, without any breakthrough in land system and running mode, there will be no fundamental progress in the transformation of industrial organization, hence slowing down its pace in agricultural modernization.

#### 4.3 Innovation in Urban and Rural Household Registration System and Transformation in Agricultural Industrial Organization

Agricultural transformation in developed countries is based on equality among laborers. Therefore, excessive rural laborers caused by improved agricultural productivity can be transferred to other fields for employment, eventually achieving optimized allocation of social labor force resources through human resources market. However, due to China's urban and rural household registration system, man-made division in urban and rural laborers' labor rights leads to failure in free mobility of laborers between urban and rural areas. Despite of freer mobility after reform and opening up, reform in household registration system hasn't been completed. Therefore, those excessive rural laborers will idle away or find some inferior jobs in cities. Meanwhile, those laid-off urban laborers have no access to employment in rural areas. As a result, dual separation is caused. With reform in agricultural industrial organization conducted, a large array of rural laborers will be liberated from rural work while a large amount of industrial capital and talents pouring into rural areas. On the other hand, only with freely-flowing laborers can agricultural industrial organization run smoothly. Therefore, it is both a condition and a result for agricultural industrial organization transformation to break the current household registration system separating urban and rural areas and to achieve a unified household registration system.

#### 4.4 Innovation in Urban and Rural Social Security System and Transformation in Agricultural Industrial Organization

Since developed countries were built based on an equal employment system at the very beginning, there is no disparity between urban and rural social security system. At the same time, China's specific reality determines that its agricultural industrial organization reform will lead to a lot of peasants' loss of basic living and medical security. In addition, urban residents have also no necessary social security in rural employment. Obviously, such a social security system is an important barrier to industrial organization reform. As a result, in order to push our transformation, we are expected to facilitate a unified social security system to endow both peasants and urban residents with equal social security system. The currently-conducted rural security system construction nationwide is a necessary guarantee for China to smoothly achieve its industrial organization transformation in the agricultural sector.

### References

- Ding, Zeji. (1991). *World Agriculture: Development Pattern and Trend*. China Agriculture Press.
- Kang, Yun & Li, Xiaoming. (2000). On Connotation and Policy Selection of Agricultural Modernization. *Chinese Rural Economy*. 9.
- Ke, Bingsheng. (2000). On Promoting China's Agricultural Modernization. *Chinese Rural Economy*. 9.
- Lei, Haizhang. (1991). *Rural Economics*. China Science and Technology Press.
- Schultz. (1987). *Renovating Traditional Agriculture*. The Commercial Press.
- Xu, Gengsheng. (1993). Historical Experience in Agricultural Modernization and Its Enlightenment on China. *Research Report of China Social Science Academy*.
- Xuan, Xingyun & Wang, Chunfa. et al. (1998). *Agricultural Modernization of Western Countries in Perspective*. Shanghai Far East Publishers.