

Agricultural organizations and the role of farmer cooperatives in China since 1978: past and future

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Abstract

Purpose – During the past four decades, agriculture and rural development in China has scored a great progress. Organization institution in agriculture is one of the domains with drastic innovations. The purpose of this paper is to map the emergence and evolution of various agricultural organizations in China since 1978. Development status and the trend of agricultural organization system are analyzed. Further, the role of farmer cooperatives is discussed.

Design/methodology/approach – Data used in the paper are mainly from statistical yearbooks and documents published by the government including Ministry of Agriculture and Bureau of Industry and Commercial. Both descriptive and deductive analyses are adopted to achieve different analytical purposes.

Findings – The vast small-farm sector, co-existence of various types of organizations, and innovation of other organizations will continue and sustain for a long-time period in China. Despite the fast development of modern farmers and various organizations, it is important that traditional farmers participate effectively in modern agriculture. Farmers act collectively via a cooperative in a desirable way, which determines the central position of farmer cooperatives in the agricultural organization system.

Research limitations/implications – This paper is a qualitative analysis on agricultural organizations in China, yet no quantitative estimation regarding the comparison of various organizations is conducted due to insufficient data.

Originality/value – This paper fills the gap of a comprehensive review of the emergence, development status, and trend of agricultural organizations in China.

Keywords China, Agricultural organization, Farmer cooperative

Paper type General review

1. Background

China started its “reform and opening up” policy which was implemented in rural area 40 years ago. During the four decades, agriculture and rural development in China has scored a great progress. Organization institution in agriculture is one of the domains with drastic innovations. As North and Thomas (1976) put it, efficient economic organization is the key of economic growth. The adoption of household responsibility system (HRS) in agricultural production in the late 1970s pushed farmers to shoulder both the production and market risks. Farmers can only survive by seeking better technology, services, and market access. In addition, the agricultural sector of developing countries is increasingly influenced by developments in global markets, such as the development of global trade liberalization (Singbo and Lansink, 2010) and China is not an exception. With the evolution of specialization and labor division, farmers are facing diversified and higher quality demand with a smaller profit margin. Thus, agricultural industrialization and institutional innovation are essential ways to help farmers out.



Agricultural industrialization in China started in 1990s with the emergence of industries and commerce capital in the rural area. It is defined as a mode of operation based on the HRS, modern production technology and management with a market-oriented approach, relying on organizations such as agricultural leading companies and farmer cooperatives aiming at specialization and scale economy. The process of agricultural industrialization is indeed the systematization or institutional innovation of farmers which is dependent on the development of industrial organizations.

For the first time, industrial organization was defined by the famous economist Marshall in his work "Principles of Economics." The cores of an organization include the willingness to cooperate, a common goal, and information exchange. An agricultural organization specifies the vertical coordination and integration of agricultural production and marketing, i.e. the establishment of links between alternative stages of the supply chain (Eswaran and Kotwal, 1985; Huang, 2008). China has diverse types of agricultural organizations such as agricultural companies, alternative modes of farmer cooperatives, and family farms that vary in terms of governance structure which is the arrangement regarding ownership, decision, and income rights. To be specific, an agricultural company is owned and controlled by a few shareholders, a farmer cooperative is owned and controlled by all the member farmers who are also the users of the cooperative, and a family farm is owned and operated mainly by the family members. These organizations differ in the extent and mode of integration such as contracting, horizontal integration, and vertical integration.

This paper maps the emergence and evolution of various agricultural organizations in China during the past four decades and analyzes the development status and trend of the agricultural organization system. The role of farmer cooperatives in the organization system is further discussed in response to the international debates on the legitimacy of Chinese cooperatives. The development trend of organization institution in agriculture under various environmental changes in both supply and demand sides is also explored.

2. Evolution of various agricultural organizations since China's "reform and opening up" policy in 1978

The development of various agricultural organizations in each decade since the "reform and opening up" policy of China is summarized. They are the period of 1978-1987 in which HRS was adopted and farmer professional technology associations emerged, the period of 1988-1997 which was mainly characterized by the emergence of agricultural leading companies and farmer professional cooperatives, the period of 1998-2007 which is dedicated to the flourishing of agricultural leading companies and farmer professional cooperatives, and the period of 2008-2017 featured by the rapid development of farmer cooperatives and the emergence of family farms and cooperative unions.

2.1 1978-1987: the adoption of HRS and emergence of farmer professional technology associations

Agricultural management system and institutions in China had experienced a meandering and profound transition since the "reform and opening up" policy in the late 1970s. Completely different property right structures and organization systems were introduced and established. The most important change is the shift from the collective ownership system to the HRS. The operation rights over agricultural land were distributed to farmer households, while the ownership rights stayed with the collective. Farmers thereafter had the ownership rights over the products, after a hand over of a fixed amount of output to the government. This reform in the rural area laid foundation for a number of institutional innovations.

Farmers pursued for better technologies to maximize the output and value of products. Some capable farmers, together with local Associations for Science and Technology, initiated

farmer professional technology association (*Nongmin zhuan ye jishu xiehui*) (farmer association thereafter) in the early 1980s. An association aims to promote the development of a specific product sector, and provide farmers with technical instruction, market information, intermediary services between farmers and buyers, and so on. In addition, it is an effective communication bridge between the government and farmers. Nevertheless, associations are unincorporated organization and cannot take part in economic activities directly in the market.

2.2 1988-1997: the development of agricultural leading companies and farmer professional cooperatives

The adoption of HRS enables farmers with ownership rights over land output, yet farmers are incapable of negotiating effectively with other market participants due to the small scale of production scale and the scarcity of market information. In this context, agricultural leading companies (*nongye longtou qiye*) (agricultural company thereafter) emerged in response to the farmers' demand for technology and market access. An agricultural company refers to a company engaged in agricultural input supply, agro-product processing and circulation. With the agricultural industrialization in China in 1980s, the demand for labor division, effective links between production and circulation, extended supply chain, high product quality, etc. became prominent. A large number of big agricultural companies were founded by rural entrepreneurs and reported rapid growth in 1990s. Agricultural companies provide technology instructions and/or contract with farmers to purchase products from them. There are two-way benefits for both farmers and companies, as farmers get access to the market by delivering the output to companies, while companies get a stable supply of inputs with reduced transaction cost.

In spite of the presence of farmer associations and agricultural companies, farmers are faced with multiple challenges such as they hardly benefit from the value added to the products and the contracts between agricultural companies and farmers are not stable. Furthermore, a series of new challenges grew with the implementation of industrialization, for example, a smaller marginal profit, specialization, informatization, and globalization of other supply chain participants. Small farmers lack the power to negotiate effectively with other supply chain participants. Eventually, farmer professional cooperatives (*nongmin zhuan ye hezuoshe*) (farmer cooperative thereafter) emerged to help farmers to cope with these problems. These cooperatives were established initially under the promotion of the government and were developing at a moderate pace. A farmer cooperative is a farmer-owned unit and beneficial to farmers, which helps in avoiding the disadvantages of unstable contracts between farmers and companies.

2.3 1998-2007: the flourishing of agricultural leading companies and farmer professional cooperatives

The growth of agricultural companies has accelerated since the formation of 15th Party Congress and the 3rd Plenary Session in 1998, in which the national government called upon the development of leading companies in agriculture. In 2000, formal policy measures and administration regulations for supporting agricultural companies were enacted. In the same year, 151 companies were ranked as National Key Agricultural Leading Companies, followed by the launch of programs of Key Agricultural Leading Companies at provincial and city levels.

Farmer cooperatives began to grow rapidly and spread all over China in the 2000s. The government also put a lot of emphasis on the development of farmer cooperatives. Since 2004, farmer cooperatives are mentioned for many times in each of the No. 1 Document published by the national government at the beginning of the every year. Meanwhile, many farmer associations transformed to farmer cooperatives by restructure and re-registration, in order to enter into the market and negotiate on behalf of farmer members.

2.4 2008-2017: the rapid development of farmer cooperatives and the emergence of family farms and cooperative unions

The increase of cooperatives was even faster after the promulgation of the National Farmer Professional Cooperative Law in 2007 (Xu, 2005). Meanwhile, other types of cooperatives such as land shareholder cooperatives and cooperative unions also began to emerge. The official name of cooperatives in No. 1 Documents changed from “farmer specialized cooperative” to “farmer cooperative” in 2013 in order to fit with the diversification of cooperative forms. After ten years of development, the government is working on the revision of National Farmer Professional Cooperative Law and a revised Law is expected to be forthcoming.

The small size due to fragmentation of farm land limits the economic scale and causes low production efficiency, low value addition, high transaction cost, and farmers’ small voice *vis-à-vis* government officials (Huang, 2001; Ji and Qian, 2010; Zhang, 2010; Ma, 2012). The average cultivated land per capita is 1.4 mu and that of nearly a half of provinces is less than 1 mu[1]. As Wan and Cheng (2001) reported, food output in China would increase by 71.40 million tons, if land fragmentation is eliminated. Many farmers immigrate from rural areas to urban areas and transfer from farming to non-agricultural jobs, because of the rapid development of urbanization and industrialization in China. This trend results in the demand for farm land circulation, agricultural entrepreneurs, and technical progress (Gao *et al.*, 2013). This is the reason why family farms and land shareholder cooperatives emerged.

Family farms were officially proposed as one of the most important operation organizations by the government in 2008 and were for the first time mentioned in the No. 1 Document in 2013. They are defined as “market and profit-oriented economic enterprises operated mainly by family members and engaged in agricultural production, processing, and marketing” (Gao *et al.*, 2013)[2]. According to the emphasis by Ministry of Agriculture, labors needed in the production of a family farm mainly comes from family members rather than hired long-term workers. Also, most of the income of the family is generated from farming which is a main feature of a family farm. A family farm is developed to enhance production efficiency and increase farmer income by enlarging the farming scale. A family farm can join a farmer cooperative to obtain services in technology and to gain market access.

The development of land shareholder cooperatives was officially proposed by the government in 2013, and has been promoted via various practices since then. A land shareholder cooperative is established based on the circulation and operation of lands. Theoretically, the ownership of the cooperative is allocated among the membership according to the size of land that individual members use to join the cooperative. Collected lands are consolidated and reorganized either by the cooperative or by a third-party company to enhance production efficiency and product value addition.

Although farmer cooperatives have better access to the markets than individual farmers do, they lack the countervailing power to compete with other market peers. Hence, farmer professional cooperatives in the same sector or in the same geographical area establish cooperative unions to upgrade the competitiveness of farmer cooperatives. Members of a cooperative union share technology, market information, brands, and/or conduct financing cooperation. Some upstream input supplier or downstream processors also join the union in order to increase vertical integration and save transaction costs. The development of cooperative union was the first time officially raised in the No. 1 Document in 2013.

2.5 Summary

Figure 1 shows the evolution of various agricultural organizations during the past four decades. Farmer professional technology associations and agricultural leading companies emerged in response to the demand for production technology and market access in the context

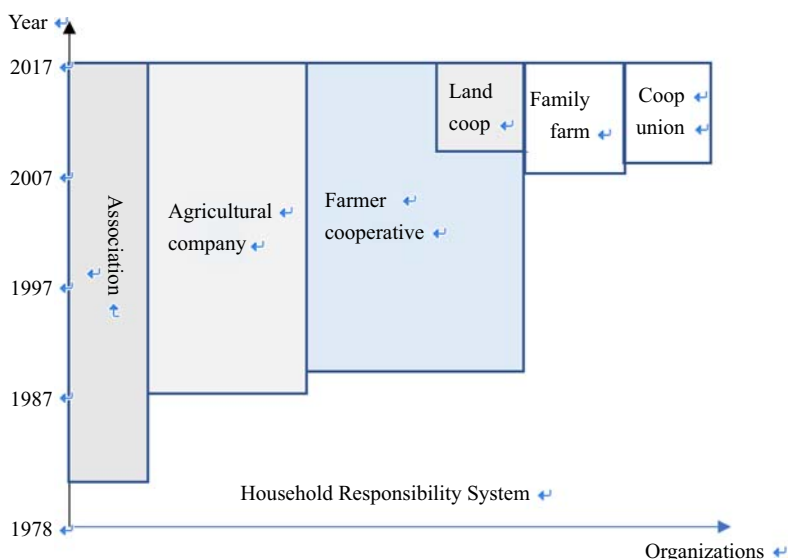


Figure 1.
Evolution of various
agricultural
organizations
after 1978

of household responsibility and agricultural industrialization. Farmer cooperatives were founded to help small households to increase bargaining power and obtain more value addition to the product. Being aware of the limits of small scale and fragmentation, family farms were developing fast in the last decade under the promotion of the government. Subsequently, various cooperatives such as land shareholder cooperative and cooperative union were established to address different challenges faced by individual farmers and cooperatives.

3. Development status of various organizational organizations

The three dominant types of agricultural organizations nowadays in China are agricultural companies, farmer cooperatives, and family farms. We map the development status and challenges faced by each type of organizations in this section.

3.1 Agricultural companies

At the end of 2015, there are 129,000 agricultural companies in China. More than 40 percent of farmers deliver products to agricultural companies and more than 1/3 of agro-products are circulated via agricultural companies. Since the rapid development of farmer cooperatives and family farms, the increasing speed of agricultural companies has slowed down, yet they still are one of the dominant organizations in China. There are three levels of agricultural leading companies, national, provincial, and city levels, depending on total asset, fixed asset, sale revenue, and the extensiveness of links with farmers.

Different business relationships between agricultural companies and farmers are identified. First, farmers deliver products to an agricultural company by spot and random transactions. This type of company is usually located in production areas and makes the purchase from local farmers. The company does not provide technology guidance or requirement to farmers. Second, a company and farmers transact via goods contracting farming, which is developed mainly for grains, livestock, and some special industrial crops. The contract between farmers and an agricultural company is either a formal written contract or informal oral contracts (Sun, 2009). The company provides inputs to farmers and requires farmers to produce according to the company's own standards and farmers deliver

products to the company based on either flexible or fixed prices, according to the contract. Third, a company and farmers establish factor contracting farming in which the company rents lands from farmers and conducts scaled production, processing, and marketing uniformly. Farmers work for the company as workers and receive a fixed rental and a salary. This type of contracting is broadly applied in sectors of high value and capital-intensive products.

However, the relationships between farmers and companies have various weaknesses such as vulnerability in coordination and farmers' difficulty in obtaining added value (Zhou and Cao, 2001). Farmers and/or companies sometimes violate contracts opportunistically when there are alternative choices of higher profits (Hong, 2002). In more cases, farmers are price takers and are easily threatened, held up, and controlled by the downstream companies due to the great disparity of strength between the two parties. In addition, agricultural companies prefer to contract with large farmers because of their better technology and capabilities in standardized production.

3.2 Farmer cooperatives

Farmer cooperatives in China have experienced a rapid development during the past decade. Table I shows the number of farmer cooperatives, registered capital, total number of members, and average membership size during January 2007 and July 2017. The number of farmer cooperatives increased from 26,000 in 2007 to around 1.93 million in July 2017. At the end of July 2017, there were more than 100 million farmers joining farmer cooperatives, accounting for 46.8 percent of the total farmers. The average membership size was a little bit larger than 13 in 2007 and reached around 60 in 2017.

The number of farmer cooperatives varied in different sectors. Farmer cooperatives engaged in crop, husbandry, service, forestry, fishery sectors, and others, accounting for 53.2, 24.3, 8.1, 5.9, 3.4, and 5.1 percent, respectively. Among all the crop cooperatives, 38.9 percent were grain cooperatives and 18.0 percent were vegetable cooperatives.

Although the membership size was still small, the proportion of cooperatives with more than 100 members increased from 1.8 percent in 2008 to 3.8 percent in 2016 and that with a membership size of 100 in 2008 increased to 500 in 2016, i.e. 1.7 to 3.0 percent.

A land shareholder cooperative is a special type of farmer cooperative. Farmers obtain the membership by circulating their farm land to the cooperative. At the end of 2015, there were 85,222 land shareholder cooperatives, accounting for 6.4 percent of the total farmer cooperatives. A land shareholder cooperative either operates pooled land uniformly itself or

	No. of Coop (10,000)	Registered capital (10 billion)	Total membership size (10,000)	Average membership size (household)
2007	2.6	30	35	13
2008	11.09	90	142	13
2009	24.64	250	392	16
2010	37.91	450	716	19
2011	52.17	720	1,196	23
2012	68.89	1,100	2,373	34
2013	98.24	1,890	2,951	30
2014	128.88	2,730	9,227	72
2015	153.11	3,230	10,090	66
2016	179.4	–	10,667	59
July 2017	193.3	–	11,243	58

Source: Authors' summary based on the statistical data published by the State Administration of Industry and Commerce

Table I.
Development of
farmer cooperatives in
China (July 2007-2017)

entrusts the operation rights of lands to a third-party company. In China, land shareholder cooperatives in the grain sector tend to integrate the lands and operate by themselves, while many land shareholder cooperatives engaged in high-value products entrust lands to third-party companies. The advantage of the former is that value added from farming is obtained by members and the weakness may lie in limited access to capital and market. Members of the latter type of cooperatives are excluded from products' value addition and get fixed rentals. Cooperatives of the latter type, representing all the members, negotiate with third parties, which reduces transaction costs.

The government provides various supports to promote the development of farmer cooperatives. The government offers broad trainings regarding both production technology and management talent to cooperatives. Large amounts of subsidies are provided to help farmer cooperatives. For instance, the total governmental subsidies obtained by farmer cooperatives were around 25 billion RMB during the years 2010-2015. However, the coverage of cooperatives obtaining subsidies is limited, with a proportion of 2.5 percent of the total farmer cooperatives. Pilot cooperatives are ranked and rewarded by the government in accordance to their good performance in terms of operation size, product quality, brand construction, access to broad market, and so on. There were 135,000 pilot farmer cooperatives up to the end of 2015, accounting for 9.5 percent of the total farmer cooperatives. Three levels of pilot cooperatives are distinguished, i.e. national, provincial, and city levels.

Farmer cooperatives are faced with various challenges. First, the ownership and control rights distribution of farmer cooperatives in China are skewed to a few core members or the initiators. Common members mostly focus on farming and are seldom involved in management or decision making. Second, the membership size of farmer cooperatives is small, compared with that of cooperatives in the western world. The average membership size in 2017 is 58. The low threshold of the registration and the promotion from the government result in the fast growth of farmer cooperatives in terms of quantity. However, the increase in organization size lags behind relatively to the quantity of farmer cooperatives. Third, the competitiveness of farmer cooperatives is weak compared with their peers. There is a great demand for talents and financial capital to enhance the countervailing power by cooperatives. Talent training and intra-organizational credit cooperation are therefore desirable. Fourth, the value addition of most farmer cooperatives is low. The services provided by farmer cooperatives mostly include input purchasing, product marketing and/or primary processing which is limited to only grading and packing. Fifth, it is costly for the government to distinguish between member-beneficial cooperatives and entrepreneur-beneficial cooperatives, which results in the displacement of various governmental supports and sequentially the dissimulation of cooperatives.

3.3 Family farms

Family farms have been developing fast since the first proposal by national government in 2008. According to the census for family farms conducted at the end of 2016 by the Ministry of Agriculture, there were 877,000 family farms in China. Family farms enlarge the production scale by circulation and integration of land. The average production size of family farms was 107 mu[3]. More than a half (55.2 percent) of family farms were smaller than 50 mu, while a small proportion (3.7 percent) of family farms were larger than 500 mu. The government provides subsidies to family farms for registration, land circulation, machinery, and other fixed assets. In addition, loans are offered to family farms by banks with lower interest rates. These favorable policy factors have promoted the fast growth of the quantity of family farms.

According to a report published by the government, family farms have the highest profitability and efficiencies, compared with agricultural companies and farmer cooperatives[4].

The sales net profit rates of family farms, agricultural companies, and farmer cooperatives in 2015 were 52, 42, and 40 percent, while the returns on assets were 27, 23, and 21 percent, respectively. This is due to the private ownership of a family farm, which indicates self-supervision, low labor cost, and hardly any transaction cost within a family farm.

However, family farms have disadvantages in scale economy of machinery, information availability, and broad market access, which results in their inferior position in the market. In addition, family farms have difficulties in enhancing product quality and value addition. Some family farms join cooperatives to obtain benefits of collective action in input purchasing, technology, and marketing. The alienation of family farms needs to be paid attention to. Some family farms are “fake” because they mainly use hired labors rather than family labor, yet it is not easy or too costly for the government to distinguish those “fake” family farms from real ones. This malposition of governmental support hurts the interests of real family farms.

3.4 Agricultural organization system

To sum up, the current agricultural organization system in China is mainly composed of agricultural companies, farmer cooperatives, and family farms. Besides that, associations play an important role in providing a series of services such as technology extension and training, production exhibition and promotion, and formulating quality standards. Agricultural organization system in China is delineated in Figure 2. Agricultural organizations are a four-in-one system including family farms, farmer cooperatives (including farmer professional cooperative, land shareholder cooperative and cooperative union), agricultural companies, and industrial associations, under the promotion of the government.

From the evolution of various agricultural organizations in China, it is not difficult to find that organizations are developed after industrialization. This is not common in international context. Agricultural organizations develop following agricultural industrialization in most of the other countries. Agricultural organization systems in different countries currently are basically the same but with different features. For example, agricultural organization

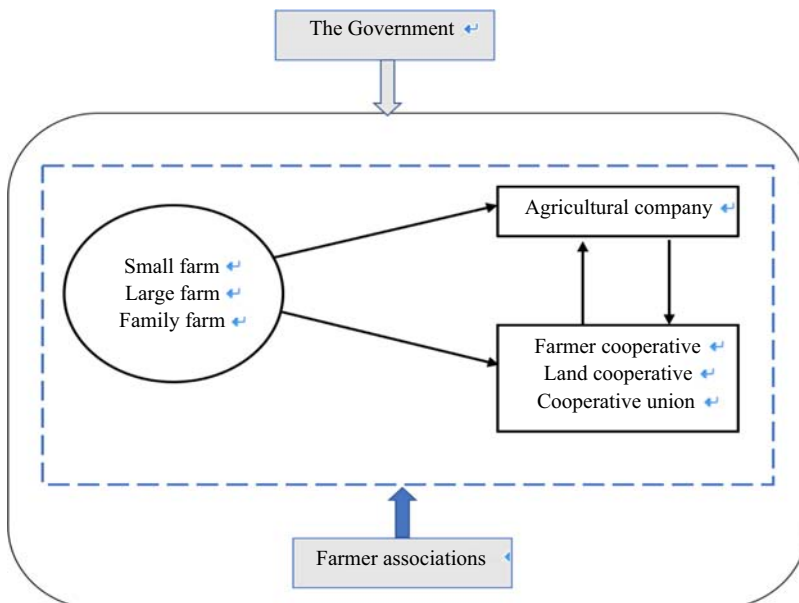


Figure 2.
The four-in-one agricultural organization system in China

system in the USA is characterized by family farms as the basic organizations under the support of public service from the government, social service from industry associations, market service by agricultural companies, and self-service via farmer cooperatives (Wang, 2017). Agricultural organization system in Japan is featured by the comprehensive network of associations, while farmer cooperatives have dominant position among other agricultural organizations in Israel (Yuan, 2015; Liu, 2017).

4. Role of farmer cooperatives

From the international lens, agricultural organizations are developing from diversification toward unified, normative, and comprehensive track. Changes in agricultural technology and markets have created a demand for organization innovation and a more vertically coordinated agribusinesses system (Höhler and Kühn, 2014) and China is not an exception. Some scholars assert that farmer cooperatives have a dominant position in the agricultural organization system in China, while others hold alternative opinions (Cao and Lei, 2005; Zhang and Liu, 2005; Luo and Wang, 2008).

4.1 *Debates on the role of farmer cooperatives*

The facts from part of developed countries indicate the central role of farmer cooperatives. In Europe, over 50 percent of agricultural products are produced and marketed by cooperatives (Bijman *et al.*, 2012). For example, dairy cooperatives in various European countries have more than 50 percent of market shares on average (Bijman *et al.*, 2012). In the USA, more than 80 percent of farm milk is marketed by cooperatives (Cakir and Balagtas, 2012). Cooperatives account for 99 percent of market share in dairy in New Zealand (Iliopoulos *et al.*, 2012).

However, cooperatives in China have some distinctive features compared to those in Western countries, which causes the debates on the legitimacy for cooperatives (Liang *et al.*, 2015). First, both domestic and overseas scholars have been discussing the issue regarding “true” or “fake” cooperatives since the emergence of cooperatives in China. The control rights and income rights are held by a few core members rather than the whole membership (Liang *et al.*, 2015). Most common members focus on farming but are hardly engaged in financial capital contribution or decision making. This feature of cooperatives in China contradicts with the user-controlled and user-benefited principle of traditional cooperatives, which therefore causes a debate.

Second, cooperatives in China are characterized by small size and locality (Deng *et al.*, 2010; Xu *et al.*, 2013). The average membership size of cooperatives in China is 58 in 2017, which is extremely small compared to regional or global cooperatives in Western countries. Members of a cooperative are mostly from local and neighborhood villages. This evokes a doubt about the market competitiveness of farmer cooperatives in China.

Third, cooperatives in China generally have diverse functions other than economic targets (Song *et al.*, 2014). In addition to obtaining higher market surplus through joint procurement of inputs and collective marketing, many cooperatives in China provide various services such as technology training and market information, talking with the governments as representatives of farmers, reducing the problems of feminization and ageing of the agricultural workforce (Song and Vernooy, 2010; Liang and Hendrikse, 2013). The diversity of roles causes debates on the market effect of cooperatives. Because of these distinctive features of farmer cooperatives in China, their position in the agricultural organization system needs further discussion.

4.2 *Relations between farmer cooperatives and other organizations*

To identify the central role of the agricultural organization system, it is necessary to map the relations between various organizations, which are presented in Figure 3. Agricultural

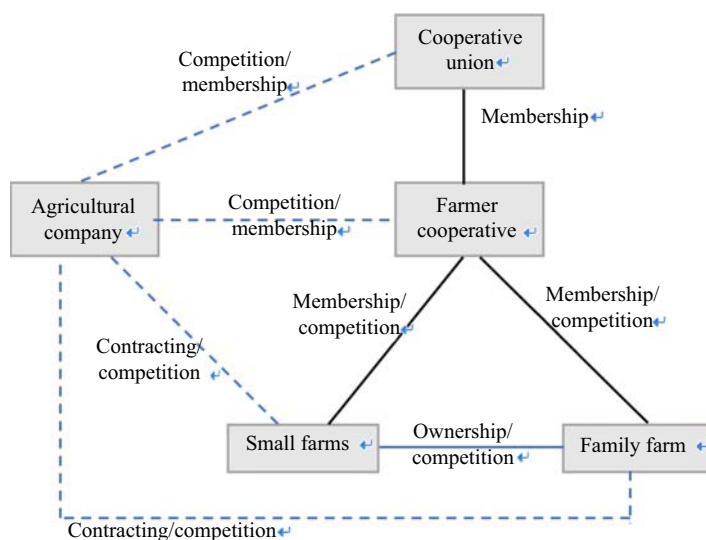


Figure 3.
Relationships between various organizations

companies generally have competition and/or transaction relationships with other organizations, which are specified by the dotted line. Farmers either deliver on spot or contract with agricultural companies. In either case, farmers are in a passive position and pure price takers because of their weak bargaining power.

The establishment of farmer cooperatives transfers the relationship from spot market and contracting to membership, which is specified by the black and solid lines originating from farmer cooperatives. As the extent of social division of labors and specialization grows, small and family farms seek for external services to enhance product quality and obtain better outlets. The membership relationship between cooperatives and farmers is more stable and close because farmers have the ownership rights and income rights theoretically. Agricultural companies also can join a farmer cooperative to stabilize the product delivery and implement quality standards. According to the National Farmer Professional Cooperative Law of China, the ceiling shares of a cooperative that a company holds is 20 percent.

From these relations specified above, farmer cooperatives have a special and most important position in the agricultural organization system in China. In spite of the dominant position of agricultural companies and the fast development of family farms, farmer cooperatives are an important part of various agricultural organizations. This is due to a following reasons. First, the contract between agricultural companies and small farmers is not stable and will be better off if small farmers form cooperatives and act collectively. Agricultural companies have sufficient capital and are professional in marketing, while cooperatives can better organize farmers via technology training and standard production. Second, family farms still have a weak market position and it is beneficial to join cooperatives to obtain various services. The characteristics of agro-products such as high production risk and perishability result in the weak position of farmers in the market. Third, a farmer cooperative is an organization owned by farmers, who are dominating and will dominate in agricultural production in the long future in China. Cooperatives provide both economic and non-economic services to farmers such as technology training, market information, processing, marketing, credit assistance, construction of infrastructure, talking to the government representative of farmers, and various recreation activities.

The presence of farmer cooperatives organically integrates household operation, cooperation operation, company operation, and association coordination. We therefore regard farmer cooperatives as the central of agricultural organization system in China. However, there is a long way to go before the establishment of a modern agricultural organization system that comprises industrial organizations featured by intensification, large-scale production, and specialization, and service providers characterized by industrialization, systematization, and socialization.

4.3 Positioning farmer cooperatives

To position farmer cooperatives and ensure the well-rounded development of the agricultural organization system, three relationships should be focused on. The first is the mutual promotion and joint development of cultivating modern agricultural operation subjects and constructing the agricultural service system. Farmer cooperatives need various services from other stakeholders such as the government and downstream processors, and meanwhile provide services to members as the demander and meanwhile supplier of services. Hence, normative development and competitiveness upgrade of farmer cooperatives are pre-requisite for the equilibrium of service demand and supply.

The second relationship is the choice between outsourcing and internalization. The trade-off of service marketization and non-marketization is determined by relative costs. Farmer cooperatives should for one thing extend internal service provisions and for another thing seek for external services for members to minimize costs.

Third, the government need to take into consideration the fairness and efficiency regarding the distribution of public service and policy support among different areas, sectors, and agricultural organizations. It is important to establish a performance evaluation system for public service and policy support. Farmers' benefits should certainly be included in the evaluation system.

5. New challenges of agricultural organization development

Besides the general environmental changes faced broadly by agricultural organizations such as globalization and specialization, China has some distinctive and time-associated tendencies and challenges. For example, the decrease in the number of labors engaged in the agricultural production, consumers' preferences for diversified and high-quality products, and the booming of agricultural e-commerce. This section describes these environmental changes and analyzes governmental and farmers' responses observed.

5.1 Some new challenges

5.1.1 The decrease in the number of labors engaged in the supply side. The number of labors engaged in the agriculture production is declining dramatically in China due to urbanization and ageing. The rate of urbanization at the end of 2015 was 56.1 percent. Rural people moving to work in non-agriculture industries in urban areas are mostly "elite" labors with relatively higher education level and capabilities, while the rest of them in rural areas are mainly female and old who are incapable of applying new technologies or enhancing value addition of products. According to the sixth population census in 2010, the proportion of aged people (close or older than 60 years) is around 55 percent and this proportion is growing[5]. The reduction in the number of agriculture labor presents serious challenges for the sustainable development of agriculture in China.

5.1.2 Consumers' preferences for diversified and high-quality products in the demand side. Consumption demand is developing toward diversity and differentiation of products. Consumers are not only concerned for the quality of products and the process of production but also for personalized services and convenience of availability. With a series of food

safety incidents, consumers' awareness and knowledge of food safety are increasing. Farmers need to produce safe and high-quality products based on branding and certificates such as green and organic products. The demand for diversified food is growing with the increase in the economic level. A positive and significant association between the income level and the diversity of consumption is found by many scholars (Theil and Finke, 1983; Thiele and Weiss, 2003).

5.1.3 The booming of informatization and e-commerce. E-commerce in agriculture has witnessed a fast growth in year of 2010 in China, because of its advantages in reducing transaction costs, enhancing economic efficiency, enlarging targeting market, and promoting the service industry (Gui, 2013). The development of e-commerce makes it possible to sell the products nationwide and overseas beyond geographical limits. Some monopolistic e-commerce and traditional companies such as Alibaba, Jingdong, and Suning began to target rural markets and exerted a large amount of investments in exploiting the market. For example, Alibaba planned to invest 10 billion RMB to construct 1,000 county-level e-commerce operation centrals and 100,000 village service stations in rural area within the next three to five years. Jingdong is looking for e-commerce agencies in rural area with a broad coverage of villages. Suning would establish more than 10,000 buying service stations in rural area in the next five years (Zhang *et al.*, 2015). According to the statistics by the Ministry of Agricultural, the total turnover of agro-product through e-commerce was more than 150 billion RMB in 2015 and the predicted turnover will reach 800 billion RMB in 2020[6]. After continuous effort by the government and companies, infrastructure such as roads in rural area have been largely improved and the popularity of world wide web is growing at a dramatic speed. For the demand side, online shopping has become more and more popular, indicating that the capacity of market for agricultural e-commerce is expanding continuously (Yuan *et al.*, 2014).

5.2 Responses of the government and farmers

5.2.1 The government's response. Supply-side structural reform. The need for the reform of agricultural supply-side structure was the first time raised in the national Conference on Rural Work at the end of 2015 and was formally put forward in the No. 1 Document of 2016. The main objectives of the reform are to reduce storage, save cost, and improve weakness. The key points of the reform lie in the production structure and institution upgrade of supply side. Not only the production structure but also the institution in production and marketing are seeking for adjustments to optimize the agricultural production and marketing in the supply side.

This call for a reform of the supply-side structure by the government is based on a couple of background factors. On one hand, China put a lot of emphasis on the growth of agricultural output, import, and storage in the past. Grain output increased from 430.7 billion kg in 2003 to 621.5 billion kg in 2015 (Luo, 2017). According to the estimation by the government, the total demand for grains in China is around 640-645 billion kg per year (Chen, 2016). Hence, there is a vacancy of around 25 billion kg grains. However, China imported nearly 125 billion grains in 2015, which results in a high level of storage (Chen, 2016). On the other hand, the growing costs of materials, labor, and land reduce profit margin and hold back farmers from production. The government motivates farmers by price subsidies, which causes price inversion, i.e. a higher domestic price than the international price, and the China's low competitiveness of grains in international market, which results in import and storage increase. These challenges can be handled by making changes in the agricultural production structure.

In the No. 1 Document of 2017, "three activations" are emphasized to promote the reform of agricultural supply-side structural reform, i.e. to activate the market, to activate subjects (organizations), and to activate factors. Among the three activations, the core is to activate

the market and reduce governmental intervention, otherwise no organization or factor would be able to get activated.

The amalgamation of the first, second, and third industries. The competition in the agriculture supply chain is getting fiercer due to globalization and narrow profit margins, which generates the demand for the combination of scale production and vertical integration. The government puts forward the amalgamation of the first, second, and third industries to enhance the value addition of agricultural production and processing and meanwhile maintain the surplus within the farm gate. In essence, amalgamation of industries is the horizontal and/or vertical integration of different sectors and/or stages. To put it in another way, it is the coordination and institutional arrangement of alternative organizations as well as their benefits. There are several modes of amalgamation. The primary mode is to integrate horizontal sectors such as the integration of crop growing and animal raising. A more advanced mode is the vertical integration between production, processing, and marketing. The most comprehensive mode is the integration of agricultural production and alternative industries such as leisure, tourism, culture, and so on, which is based on the multiple functions of agriculture.

5.2.2 Farmers' response. Faced with these environmental changes and challenges, farmers respond with multiple measures under the government's support and guidance. First, modern farmers (*xin nongren*) in China have been growing fast. Modern farmers are those who are engaged in agro-products production and marketing and have a high education level, modern agricultural technology, and management capability. The main income of modern farmers is from the production and marketing of agro-products. There are now more than 1,000,000 modern farmers in China (Chen, 2015). Information asymmetry and limited access to the market are two of the most prominent problems faced by traditional farmers (Markelova *et al.*, 2009; Poulton *et al.*, 2010). However, modern farmers can transact directly with consumers. They adopt advance technologies and scientific management in production, and rely on online networks to exploit potential market niches that traditional farmers have no access to. Modern farmers attach importance and emphasis to brand establishment and value addition, as well as to consumers' feelings and feedbacks. In addition, they are updated with latest innovation in production and marketing and have knowledge regarding various processes. There are quite a lot of modern farmers who have online shops such as WeChat or Taobao shops and sell agro-products broadly beyond the limit of geography. Modern farmers either operate individually or establish cooperatives or companies to pool resources.

Second, agricultural industrial combos (*nongye chanyehua lianheti*) are established besides the fast development of family farms, farmer cooperatives, cooperative unions, and agricultural companies. Though various organizations play important roles in enhancing the extent of specialization division and enlarging scale in production, processing, and/or marketing, effective connections between alternative organizations, between upstream and downstream stages, and between different sectors are insufficient. In addition, the lack of financial capital limits the circulation of land and investments in value addition of products. An agricultural combo is defined as a union generally initiated by an agricultural leading company, linking at least one farmer cooperative and five family farms. It is not a legal entity and does not need a formal registration. It is in essentially contracting transactions between an agricultural company and upstream organizations including cooperatives and family farms. A constitution is formulated and contracts are signed among various organizations engaged in the combo to set responsibilities and obligations. Contracts regarding production plans and product quality standards are signed between the agricultural company and family farms. The agricultural company sells inputs to family farms with preferential prices and purchases products from family farms with conservation

prices, while family farms deliver high-quality products sustainably to the company. Cooperatives provide farms services such as production technology, land circulation, and mutual capital assistance, and meanwhile supervise product quality for the company. To sum up, an agricultural combo is a refined form of contract farming between agricultural companies and individual farmers by the establishment of better coordination mechanisms for supervision and distribution of benefits.

Third, traditional farmers try to increase the extent of participation in modern agriculture practices in China through collective actions. It is not a successful or effective mode of modern agriculture without the presence of traditional farmers in the supply chain, given the long-time dominant position of small holders. One of effective ways for traditional farmers to obtain the value addition of products is via the establishment of land shareholder cooperatives. Farmers do not have much capital but they have land. It is important to utilize the land as the capital and gain from the bonus generated by the land.

6. Conclusion and policy implications

6.1 Conclusion

Organization institution in agriculture has witnessed vast innovations in the past four decades in China. Agricultural production is featured by flexibility and hard supervision, which determines the sustainability of the HRS. Besides that, agricultural organizations are developing toward integration to reduce transaction costs and ensure value addition. Agricultural companies began to emerge since 1980s as the development of agriculture industrialization. However, contracts between companies and farmers are not stable and farmers are pure price takers without having the bargaining power. Thus, farmer professional cooperatives are established to organize farmers to act collectively in the market. Being aware of the disadvantages of land fragmentation, family farms have been growing fast in the past decade to increase production scale via land circulation. However, family farms are not yet properly integrated to different types of organizations such as farmer cooperatives to obtain services.

Despite the dramatic innovations in the past four decades, agricultural organizations are now facing rapid negative environmental changes. For example, the decrease in the number of labors engaged in the agricultural production, the growing demand for diversity and high-quality of products, and the booming of agricultural e-commerce. Both the government and farmers respond to these changes via various measures such as the supply-side reform, industry amalgamation, the emergence of new farmers, the establishment of agricultural industrial combos, and collective actions.

To sum up, vast small-farm sector, the co-existence of various types of industrial organizations and the innovation of other organizations will continue and sustain for a long-time period in China.

6.2 Policy implications

Some policy implications are derived from the analyses on the agricultural organization system in China.

First, diversification of agricultural organizations needs to be carried out such as alternative modes of cooperatives, industrial combos, and so on. The large population and heterogeneity of farmers in China result in a demand for diversified types of agricultural organizations. Laws and bylaws, as well as governmental supports, should allow for the diversification of organizations in agriculture.

Second, there is a requirement of more social capital investments in agriculture and the need to enter into agriculture via organizations such as agricultural companies and cooperatives. The growing demand for product quality requires more investments in

production. Due to the diminishing margin of profit, the efficiency in production needs to be enhanced, which sequentially needs capital investments in facilities and equipment.

Third, it is already the right time to transfer the development of agricultural organizations from quantity growing to quality upgrade. For example, the number of cooperatives has scored a rocket-like growth since 2000. However, competitiveness of cooperatives is relatively weak compared with that of agricultural companies or cooperatives in Western countries. More efforts are needed to improve the market competitiveness of cooperatives and family farm.

Fourth, despite the fast development of modern farmers and various organizations, it is important that traditional farmers participate effectively in modern agriculture. Farmers act collectively via a cooperative in a desirable way, which to a large extent determines the central position of farmer cooperatives in agricultural organizations in China.

Fifth, the guidance and support from both national and local governments have a great impact on the orientation and the proper allocation of resources. It is therefore important that the government intervention is required in a proper manner to promote the well-rounded development of the agricultural organization system as too much governmental support for modern farmers may exert negative influences on the interests of traditional farmers.

Notes

1. 15 mu = 1hectare.
2. There are no standards of size for family farms yet. Some provinces require that family farms of fruits, vegetables, and other cash crops must have production areas of larger than 30 mu, while those of cereal crops larger than 50 mu. Some areas require a minimum planting area of 100 mu. Each hectare equal to 15 mu.
3. Data source: three problems need to be solved to develop family farms. *Financial Times*, March 31, 2014.
4. Data source: "The Survey Report on the Development of New Agricultural Operation Subjects (fifth edition)" 2017.
5. Data source: "China Population & Employment Statistics Yearbook 2016".
6. "The Developing Plan for National Agro-product Processing and Amalgamation of Rural Industries (2016-2020)".

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Further reading

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