

Development of Organic Farmers' Cooperatives in East China: A Case Study of Dai Village, Jurong City

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The objective of this study is to understand the development of organic farmers' cooperatives in East China by exploring the introduction of an organic agriculture specialized farmers' cooperative in Jurong City, Jiangsu Province. This case study indicates that, with strong leadership and well-organized management, small farmers in China are able to become involved in organic farming. Deficiencies in sales capabilities and management personnel seem to be the primary difficulties currently faced by these small farmers. In addition, focus should also be placed on quality control during the expansion of organic farming in China.

Key words : organic agriculture, specialized farmers' cooperative, East China

1. Introduction

The rapid growth of organic agriculture has led to China having the fourth largest land area dedicated to organic cultivation. In 2011, China had a total organic agricultural land of 1.9 million hectares (IFOAM [1]). A report from the China Organic Food Certification Center (COFCC) paints a picture of robust growth in China's domestic market, with sales reaching 1.6 billion dollars at the end of 2009. "Company + Farm + Farmer," including contract farms and direct farms, is considered as the general business model of organic farming in China. This business model has put small farmers in an unfavorable position in terms of profit sharing in a growing market. Moreover, due to the high cost of organic certification and initial investment, it is difficult for the small peasant economy to get involved in the organic business.

However, farmers' specialized cooperatives have formed rapidly following the introduction of the Farmers' Professional Cooperative Law of the People's Republic of China in 2007. By the end of 2012, there were 57,566 farmers' specialized cooperatives in Jiangsu Province, with a total membership of 12.1 million households. This study explores how one such farmers' organization in East China developed its organic business.

The case chosen in this study is the Dai Village Organic Agriculture Specialized Farmers' Cooperative (hereafter Dai Cooperative), a farmers' cooperative in Jurong City, Jiangsu Province. The Dai Cooperative aims to promote the

cultivation of organic rice, peaches, orchards, and vegetables in Dai Village. By the end of 2012, 820 peasant households, which account for 94.7% of the population of Dai Village, had joined in the Dai Cooperative. As a result of the development of organic farming, from 2003 to 2012, the annual per capita income in Dai Village has risen from 3,400 to 13,710 Chinese yuan, higher than the average income in Jurong City. For the present study, the Dai Cooperative was selected as a case to review how a local cooperative managed to organize small farmers dealing with organic farming activities.

2. Overview of Dai Village

Dai Village is located in Tianwang Town, Jurong City, Jiangsu Province. Jurong City is a county-level city in Jiangsu Province located in Shanghai and Nanjing metropolitan economic zone. 87% of its total land is made up of low mountains and hills. There are 47,053 hectares of arable land. The population is 58.84 million, of whom 39.4 million live in rural areas. The annual per capita income of Jurong City in 2012 was 11,692 yuan. By the end of August 2012, Jurong City had 565 farmers' specialized cooperatives, with a total membership of 84,600 households.

Dai Village is a hilly village rich in natural resources, with a total of 487.5 hectares of arable land and a population of 2,879, including 213 villagers who work outside the village year-round. It includes 15 natural villages, 22 village groups, and 866 peasant households. The average land owned per household is 11 acres, corresponding to 3.7 acres of land per person, including one acre of paddy field. Most families in Dai Village depend on agriculture for their livelihoods. Of the total labor force, 73% engage in

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Figure 1. Jurong City in Jiangsu Province, China

agriculture, and 82% of households own 1–10 acres of land. Rice is grown in the paddy fields and potatoes, soybeans, and canola are grown in dry lands.

In 2003, Dai Village was one of the poorest villages in Jurong City, with a per capita net income of 3,400 yuan, less than 22% of the average for Jurong City. In 2002, this village was chosen by Zhenjiang Academy of Agricultural Science (ZAAS) for a pilot to develop organic agriculture.

Table 1. Comparative economic analysis of three modes of rice cultivation

Mode	Average production (kg/hm ²)	Material cost (yuan/hm ²)	Labor cost (yuan/hm ²)	Purchase price (yuan/kg)	Net income (yuan/hm ²)
①	3900	1350	1800	4.60	14790
②	4200	1725	2775	4.60	15945
③	6975	3150	2475	1.88	7488

Source: ZAAS [4]

Notes: ① is organic Koshihikari rice monoculture. ② is organic rice-duck-azolla cultivation. ③ is Wuyujing No.7 conventional rice cultivation. In the mode of organic rice-duck-azolla cultivation, income from ducks is 1125 yuan/hm².

The development of organic rice cultivation in Dai Village began in 2005 and was also led by ZAAS. Three plots, of 0.33 hectare each, were set up for a study comparing production, material costs, labor costs, and net income among three different modes of cultivation: organic Koshihikari rice monoculture; Wuyujing No.7 conventional rice cultivation, and organic rice-duck-azolla cultivation. Tests indicated that organic Koshihikari rice monoculture and organic rice-duck-azolla cultivation were more economically beneficial than Wuyujing No.7 conventional rice cultivation. Additionally, organic Koshihikari rice monoculture helped to reduce labor costs by 27.3%.

After observing the difference between organic and

To meet the growing demand for organic rice cultivation among villagers, ZAAS helped Dai Village to establish an organic farmers' cooperative in 2006. The Dai Cooperative has since become well known for organizing farmers doing business in organic farming.

3. Origin of Organic Farming

Organic farming in Dai Village began in 2001 with a field experiment with organic peaches led by Yafu Zhao, the director of ZAAS. Zhao chose Baisha village (now merged into Dai Village) as a demonstration area for a comparative study of organic and conventional cultivation. Results from this study suggested that organic farming had a considerable influence on raising the organic matter content of the soil, reducing soil surface runoff, as well as controlling pests and plant diseases. After obtaining these experimental results, in 2005 ZAAS transferred the supervision of this area to 3 local farmers willing to take over the planting of organic peaches. ZAAS continued to assist these farmers with the annual organic certification costs until the farmers' cooperative was established in 2006. In 2013, organic peaches were grown on 13.3 hectares in the Dai Cooperative, using the brand "Yeshanxiaocun".

conventional farming, local farmers wanted to promote organic rice cultivation in their village. According to a questionnaire survey led by ZAAS in 2005, 267 households in Dai Village, accounting for 53% of the respondents, expressed willingness to join in a farmers' organization to promote organic rice cultivation. As a result, the Dai Cooperative was established in 2006. Through seven years of continuous expansion, 189.3 hectares of land had been converted for organic rice cultivation by 2013. Like the organic peaches produced in Dai Village, the organic rice produced also uses the "Yeshanxiaocun" brand.

In addition, the Dai Cooperative developed 12.7 hectares of organic orchards and 6 hectares of organic vegetable

cultivation in 2013. To this point, rice and peaches are the only Dai Cooperative products to have organic certification from the China Organic Food Certification Center (COFCC), but other varieties are in the process of conversion.

4. Development of the Dai Cooperative

1) Establishment of the Dai Cooperative

The Dai Village Organic Agricultural Specialized Farmers' Cooperative was formally established in February 2006 with 12 million yuan as registered capital. Initially, 152 peasant households joined, and membership has grown rapidly since then (Table 2).

Table 2. Membership growth of the Dai cooperative

Year	Household members	% in Dai Village
At beginning	152	17.6
2006	296	34.2
2007	515	59.5
2008	573	66.2
2009	612	70.7
2010	700	80.8
2011	715	82.6
2012	820	94.7

Source: Field survey, 2013

The Dai Cooperative and its members came to the following agreements: 1) The cooperative would provide Koshihikari rice seeds to its members for free; 2) The cooperative would provide free technical guidance throughout the entire production process of Koshihikari rice; 3) The cooperative would pay its members a fixed amount of money for their production, as much as the market value of 600 kg of conventional rice per acre; after sales, the cooperative would draw 10% to 15% of the revenue (as common reserve fund), deduct the total cost, and then distribute the profits to its members; 4) The cooperative members must strictly follow the rules of organic rice cultivation provided by the cooperative; or else, the cooperative had the right to refuse to make payments; 5) Membership fees of 300 yuan per acre for one share in the cooperative would be collected from peasant households.

By 2012, 94.7% of households (820 households) in Dai Village had joined the Dai Cooperative. The remaining 5.3% of households had not joined because part of the paddy field in Yutangchong Natural Village, near a chemical factory, was not suitable for organic farming.

2) Management structure

Table 3. Management structure of the Dai cooperative

Level	Members
President	1 president (Li, village head), 2 vice presidents (1 village cadre, 1 ZAAS expert)
Director	6 villagers, 3 village cadres, 1 ZAAS expert, 1 college graduate village official
Supervisor	2 villagers, 1 village accountant
Technical	1 consultant (Zhao), 4 college graduate village officials, 8 paddy field operating team leaders

Source: Field survey, 2013

Notes: College graduate village official is a program introduced by Chinese government in 2005 to offer college graduates job opportunities in rural villages as a village official. Normally the term of office is three years.

The management structure of the Dai Cooperative is shown in Table 3. Jiabin Li, head of Daizhuang Village, has been elected president of the Dai Cooperative since 2006. Overall, there are 17 people involved in the daily management of the Dai Cooperative. Yafu Zhao, who participates in daily activities as a consultant, four college graduate village officials and the eight leaders of the paddy field operating teams are responsible for the cultivation of organic Koshihikari rice in the fields.

The Dai Cooperative congress is held each December during the inactive season. The main content of this congress includes a summary of the year's work, planning for the next year, as well as discussion and voting on personnel appointments.

The Dai Cooperative is a farmers' organization based on an administrative village, which signifies that the cooperative shares the leadership with Dai Village. This leadership structure may negatively influence the Dai Cooperative's independent position. However, considering the national conditions in China, this leadership structure may positively contribute to the development of the Dai Cooperative in terms of land transfer issues in rural areas.

3) Organic certification

The Dai Cooperative has maintained organic certification for both rice and peaches from the COFCC since 2008, after three years of organic conversion period, and it has promised its members that it will continue to bear all of the certification costs, including the costs associated with new

varieties such as orchards and vegetables in the future. The average cost of organic certification for each variety is 20,000 yuan. It is worth noting that, in 2012, the COFCC issued new organic certification standards to strengthen its control, making it clear that every production unit in fields would be checked. Due to this decision, the COFCC stopped certification programs which have more than 10 households involved in the production in fields. This decision created a bottleneck for the Dai Cooperative. To solve this problem, eight paddy field operating teams were set up as the basic unit to produce organic rice and provide technical guidance while maintaining independent production accounting and distribution of profits. Finally, Dai Village succeeded in maintaining its organic certification from the COFCC.

5. Production Management

1) Paddy field operating system

As a consultant for the Dai Cooperative, Yafu Zhao holds primary responsibility for the technical direction of organic cultivation. He is assisted by paddy operating team leaders and college graduate village officials. Currently, the operating system has only been developed for organic rice cultivation. The area of each operating team and their relationship with the villagers are shown in Table 4.

Table 4. Area of operating teams (in hectare)

Team	Village group	Household members	Area	Total
Baisha team	group 1	35	9.5	39.8
	group 2	43	11.0	
	group 3	28	6.4	
	group 4	23	7.6	
	group 5	18	5.3	
Erligang team	group 6	28	8.7	18.6
	group 7	24	5.0	
	group 8	18	4.9	
Xiazitang team	group 9	42	10.0	25.7
	group 10	46	7.8	
	group 11	50	7.9	
Nanzhuang team	group 12	28	7.3	28.9
	group 13	37	8.4	
	group 14	29	5.5	
	group 15	37	7.7	
Miaochong team	group 16	52	11.0	11.0
Daizhuang team 1	group 17	49	11.0	22.6
	group 18	57	11.6	

Daizhuang team 2	group 19	55	11.0	21.3
	group 20	38	10.3	
Dingchong team	group 21	42	11.0	21.4
	group 22	41	10.4	
Total		820	189.3	189.3

Source: Field survey, 2013

Generally, the paddy field operating teams are established according to the geographical location of natural villages in Dai Village, relating to the six administrative divisions of the Dai Village: Baisha, Erligang, Miaochong, Nanzhuang, Daizhuang, and Dingchong. The six village cadres from these regions are responsible for carrying out administrative matters, such as providing medical insurance and mediating neighborhood.

2) Guidance for rice production

Although rice production is led by the leaders of the operating teams, specific work in the fields is done by farmer households on their own farmland. Table 5 presents the main duties of each paddy field operating team leader.

Table 5. Techniques of organic rice cultivation

Time	Technological steps
Apr 15	Use waste vinegar residue to fertilize paddy fields at 7.5 tons per hectare
Apr 20	Remind members to plow land
May 3	Distribute seeds from cooperative's breeding base to members at 30 kg per hectare; Instruct members to soak seeds in both diluted vinegar and hot water
May 10	Remind members to grow seedling bed at the proportion of 1 hectare seedling bed for 30 hectares paddy field
Jun 15	Guide members in transplanting rice seedlings into paddy field using Japanese “^” font cultivation method; Rice seedlings should be planted at 25cm × 30cm, 3–4 seedlings per hole
Jun 15	Remind members to remove weeds
June 15– July 10	Water management, reminding members to dry soil successively
June 20– July 15	Water management, reminding members to supply water after five days of soil drying; Keep water at a certain depth until August 25
Jun 20	Fertilize field using rice bran and rapeseed cake, each at 750 kg per hectare
Aug 25	Remind members to remove weeds before water release

Sep 6	Organize local agricultural machineries to harvest rice, then sow clover in the field; Transport unhulled rice to rice processing plant for drying and processing
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Source: Field survey, 2013

3) Management for other organic cultivations

For the cultivation of other organic products (Table 6), such as organic peaches, vegetables, orchards and tea, the strategy is to contract well developed fields to those farmers who are willing to take over. This strategy is different from the paddy rice system. Specifically, the Dai Cooperative initially transfers land from farmer households to develop organic farming, construct infrastructure, and bear the costs during the organic conversion period. Thereafter, the Dai Cooperative will hand these organic fields over to the members willing to complete the contract. During growing process, the Dai Cooperative will take responsibility for the overall technical guidance and field advice.

Since 2005, three local farmers have taken over the production of organic peach fields, which were first developed by ZAAS and then handed over to the Dai Cooperative. In the same way, 12.7 hectares of orchards was contracted to 4 villagers and 1 college graduate village official and six hectares of vegetables was contracted to three villagers in 2013.

Table 6. Management for other cultivations

	Area (hectare)	Production management
Organic rice	189.3	Dai Cooperative
Organic peach	13.3	Contract farmer
Vegetables	6.0	Contract farmer
Orchard	12.7	Contract farmer
Tea	10.0	Dai Cooperative

Source: Field survey, 2013

Notes: Plans for growing organic tea began at the end of 2013 and is now ongoing infrastructure construction.

6. Marketing and Sales

In 2007, the Dai cooperative had invested five million yuan to complete a processing plant for milled rice. The main equipment was Satake pipeline rice processing equipment introduced by Japan. This equipment included nine processing steps: removing stones and clods with a destoner; pre-cleaning; gravity selecting; pelleting and flaking; separating husked rice; size separation; color sorting; polishing; weighing and packing into bags. This set

of equipment will be used only to produce organic rice produced in the Dai Cooperative. Additionally, the cooperative purchased two Kubota grain dryers in 2007 and 2011 to keep the moisture ratio of grain down to 17%.

According to the contract made with its members, the Dai Cooperative takes responsibility for all of the sales of organic rice. Weichao Yao, a college graduate village official, is primarily responsible for rice sales. The selling price of organic rice is set every year through discussions between Weichao Yao, Jiabin Li, and Yifu Zhao. The decision is based on certain standards, including previous year's sales, customer feedback, tasting rice field investigation, as well as the cost of production and organic certification. "Yeshanxiaocun" is registered as cooperative's own brand. Main areas of sales of organic Koshihikari rice from 2008 to 2010 is shown in the following table.

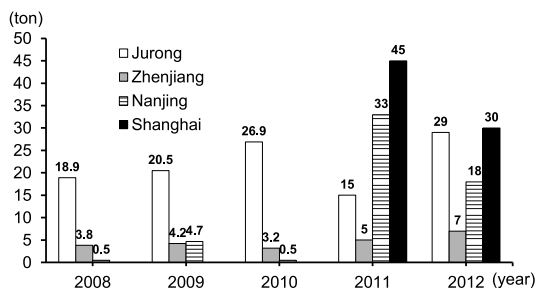


Figure 2. Sales of organic rice from 2008 to 2012

The first three years of sales was in the neighboring cities: Jurong, Zhenjiang and Nanjing City. In 2011, the Dai Cooperative entered into a contract with a Shanghai company to use the cooperative's rice to produce rice under the brand of "Guangmei" for them. This contract led to a significant increase in sales. However, this subcontracting behavior may bring potential quality risks, since once the Dai Cooperative transports their products to this company, they will not be able to track the quality of the products.

In 2012, 700 tons of unhulled rice was harvested from 189.3 hectares of paddy fields. After processing, 455 tons of milled rice was available for sale. Of this milled rice, 150 tons were "Guangmei" rice sent to Shanghai, accounting for 33% of sales. Most of the remaining organic Koshihikari rice with the Dai Cooperative's own brand "Yeshanxiaocun" was sold in local areas: 31.9% in Jurong City, 19.8% in Nanjing, and 8% in Zhenjiang.

With respect to marketing channel, 39.6% of the Dai Cooperative's Koshihikari rice was sold through local exclusive agencies, as the Dai Cooperative's main sales

channel (Table 7). The Dai Cooperative's main revenue in 2012 was 10.96 million yuan, of which 1.09 million was kept as the common fund for the Dai Cooperative's further development; the rest went to each of the member households.

Table 7. Sales channels of organic rice in 2012

Channel	Unit price (yuan/kg)	Amount (ton)	%
4 exclusive stores	20	180	39.6
Shanghai OEM	15	150	33.0
2 supermarkets	20	50	11.0
6 agricultural supply stores	24	20	4.4
2 direct selling stores	20	20	4.4
Local government; colleges	30	20	4.4
Gift		15	3.2
Total		455	100

Source: Field survey, 2013

As for sales of organic peaches, only one-third of the product was sold through the cooperative due to the lack of sales channels. The remaining two-third was left to the contract farmers to sell themselves. Vegetables produced were treated as conventional vegetables because they had not yet been certified as organic. Although the production of vegetables was contracted to three farmers in 2013, the Dai Cooperative promised to buy all their products at market price to minimize production risk for the contract farmers. Orchards and tea are still under development, not ready for the market.

7. Summary

In 2003, Dai Village was poor and undeveloped. With the support from ZAAS and the establishment of the Dai Cooperative in 2006, the village has been continuously converting its land for organic farming. The Dai Cooperative built its own rice processing plant in 2007, and the collective raised the per capita net income of Dai Village to 13,710 yuan in 2012.

Known as the "Dai Village Model," the success of the Dai Cooperative reveals that small farmers, if organized well, can carry out organic farming activities in China. The findings of this study, which examined the characteristics of the Dai Cooperative, can be summarized as follows.

First, to ensure the smooth land transfer and promotion of organic technology, powerful leadership is needed. Both ZAAS and villagers' committee have played an important

role in this case.

Secondly, the Dai Cooperative has maintained two types of organic farming: for rice cultivation, it has set up eight paddy field operating teams; for other products, the Dai Cooperative has entered into contracts with members. This strategy, while ensuring the management of paddy fields, can also be effective in the development of other organic varieties in a farmers' organization.

In addition, the Dai Cooperative does not have sales capabilities to handle all of the sales of their products, though it has promised to cover all of the certification costs. This is partly due to the lack of professional manpower. College graduate village officials may help to a certain extent, but after they leave the village at the end of their three-year term in office, problems still exist. The lack of professional personnel seems to be the "inborn weakness" of a farmers' organization.

Last but not least, it should be noticed that the introduction of high-quality Koshihikari rice helps the cooperative expand its sales channels. However, in the sales of 2012, 33% of the Dai Cooperative's organic rice was packed with the mark of "Guangmei" and then transported to the company in Shanghai. Moreover, the Dai Cooperative has been working on a contract with another large company to produce organic glutinous rice in the future. When it comes to farmland expansion and seeking cooperation with other companies, questions of maintaining its independence and ensuring quality control are important for the cooperative's future development.

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