

# Specialization: the Economic Nature of Farmer's Professional Cooperative in China

–An Evidence from Tea-Cooperative in Fujian

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## Abstract:

Through literature review and investigation to Fujian Province (China), we concluded that the economic nature of Farmer's Professional Cooperative (FPC) in China is specialization (a kind of specialized organization). We found that inside of FPC, the production was divided into several processes, and then members specialize and cooperate to finish the production chain from planting to marketing. Using a simple model, we also explained the economical effectiveness of specialization in FPC that it can accelerate technology progress through learning by doing, thus productivity of FPC increases, i.e. farmers' revenue increases.

**Key Words:** Specialization; Production Function; FPC

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## I : Introduction

Although GDP in China increased exponentially these years, the problems in rural areas appear continually, for example, the contradiction between powerful consumer market and weak supplier market (Yan Tingwu and Wang Yuanxue, 2013), land transfer problems (Huang Yanxin *et al.*, 2011), agricultural institution innovation (Deng Dacai, 2010; Yang Liyuan and Luo Hanxue *et al.*, 2011).

Facing these issues, the government from center to local has been paying great attention on them. In consecutive more than 10 years, agriculture was viewed as the most important issue in the national conference. Moreover, active actions have been taken to explore ways to solve these problems. For instance, Agricultural Tax has been exempted since 2004; Farmer Cooperatives Act was published in 2007. All of these methods are aiming at solving the present issues facing and developing the economy in agricultural areas.

Some outstanding scholars also devote themselves into exploring ways of solution. Some researches take modern agriculture and agricultural industrialization as a way possible (Zhang Shuguang, 2010), while FPC was also put forward as an effective prescription. However, what is the economic nature of FPC, which is a fundamental issue, hasn't drawn an agreement on it, though they have done plenty of researches on them. As a result, we mean to concentrate on it in this paper.

Fu Chen and Lv Bing (2005) explored the nature of FPC; he claimed the nature of FPC includes voluntary, autonomy, democracy and so on. Huang Zuhui and Shao Ke (2009) held that the essential of FPC is self-service and democratic control. Evidently, the nature is based on sociology rather than economics, which cannot reflect the basic motivation and the ultimate goal of

forming FPC. Yuan Peng (2006) wrote that the nature of FPC is the unification of owner and user; definitely, we have no reason deny this point, but this so called nature is only the characteristics of FPC, which other economic organizations rarely hold, not the real nature of FPC. Some scholars even declared that the nature of FPC is the weak farmer's joint (Zhao Yanglin, 2005). Apparently, it contradicts with the fact that the farmers in FPC are always stronger than ordinary farmers who did not participate in FPC, so the idea of "weak farmer's joint" is invincible.

All of these studies about the nature are different, because they put forward these "natures" in different approaches like sociology; some researchers even failed to get it. What's the real nature of FPC, especially its economic nature?

A better research was conducted by Liang Yi (2009), and she declared economy of scale and saving transaction cost is an explanation to the nature of FPC. Phillips (1953) formalized the view of cooperative as joint action by farmers to gain the benefits of vertical integration. Nilsson.Jerker (1996) and Ling (2012) also referred transaction cost economizing.

Truly, they are reasonable. In approach of economy of scales, FPC can enlarge the scale of production by intensive exploitation of resources say land, the most important resource of agriculture. With the same invariable cost, more production means less average costs, thus economy of scale, more precisely, internal economy of scales occurred. While in approach of transaction costs, almost studies have drawn an agreement that PFC can save transaction cost in some extent, because joint purchase and joint sales are really effective in saving transaction cost, like negotiation and price searching. These ideas are almost touched the economic nature of FPC, through which can explain why the cost in FPC is lower than ordinary farmers. However, neither economics of scales nor transaction costs can provide an essential answer to the fact we investigated why the output in FPC

is higher than individual farmers. Apparently, something still keeps unknown because they rarely pay attention to specialization, although it is obvious.

Aiming at exploring economic nature of FPC, we planned to structure this paper in following orders. Section II focuses on evidence of specialization through scanning literatures about FPC. Cases of Tea FPCs in Fujian will be presented to demonstrate how they specialize inside FPC in Section III. We will try to explain the economic effectiveness of specialization using a simple model in Section IV. The final section is V, we will draw some conclusions and put forward some issues we neglected.

## **II : Evidence from Literature**

Song Xiaokai and Kanda K. (2010) studied the present condition and problems of FPC in China. They listed 5 FPCs, and analyzed their organizational structures and businesses in detail. In his paper, he listed an example of a FPC who majors in duck breeding. In this FPC, farmer members specialized in breeding, while the managers and directors specialized in marketing, purchasing and epidemic prevention. In other FPCs he referred in his paper, we can also find the feature of specialization, like Grape FPC.

Yuan Peng (2008), taking an example of Pear FPC, explored the leading company-drove FPC. She introduced Shengzelin Pear FPC in detail. Although she hasn't planned to focus on specialization, from his introduction, we can clearly see that the leading company specialized in marketing, management and technical conduction, while farmers engaged in planting.

Wang Yong (2010) investigated industry expansion and institutional innovation in FPC. In his paper, he listed 5 FPC cases located in Shandong Province. Fortunately, we can still find some strong evidence of specialization in the cases he referred. The way of specialization is almost the

same with examples stated above, so we planned to skip from analyzing.

In these papers, intentionally or unintentionally, they presented us specific cases and we can clearly see the organizational structures of these FPCs they surveyed: focusing on one or two main product (s), they divide the process of production into several parts, and then specialize in these parts; finally, all of these parts "cooperate" to complete the whole production chain. This is the core and feature of specialization.

### **III : Evidence from Cases Study in Fujian Province**

In August 2013, we did an inquiry to FPCs in Fujian Province: a place that plenty of FPCs located. We focused on two FPCs, a leading company-drove FPC and a farmer-drove FPC. Here we will list and contrast the similarities and differences of FPC we surveyed.

Although these two FPCs are different in the eyes of some scholars who believe that farmer-drove FPC is superior to company-drove FPC (Zhang Xingwu, 2003; Yuan Peng, 2013), without any exceptions the members of FPCs are focused on specialization: centered on tea industry, they divide the process of tea-making into planting, making, marketing and management and then, aiming at the centre goal: profit maximizing, they specialized in each field and cooperate to finish the tea production chain from planting to marketing.

Both of them are specialized economic organization, but they have their own characteristics in specialization in detail.

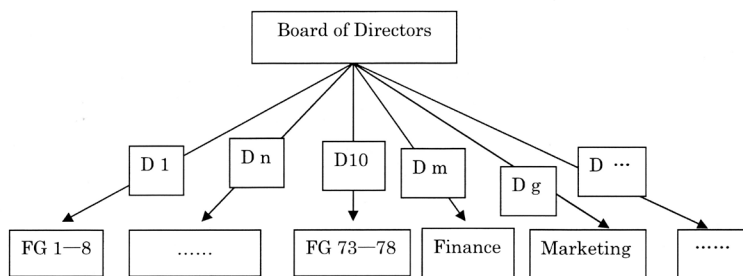
#### **3.1 X Tea FPC**

X Tea Farmer's Professional Cooperative composes of three tea companies who focused on tea processing and marketing before 2009. However, they

responded to the calling of government and merged to be a leading company-drove FPC with over 800 famer members in 2009. Its business remains at tea, but planting was involved.

Actually, X FPC is a half-specialized FPC: the FPC famer members still work on planting and tea making. But in order obtain the exclusive right to sell their raw tea to FPC-company in 15% to 20% higher price, farmer members must receive the technique conduct and unified management from headquarter, like fertilizer and pesticide.

The organizational structure is roughly based on specialization. 19 directors engaged in different fields and under their conduction, farmers specialized in tea planting and making, while the centre companies major in tea marketing. They cooperate to run the FPC and finally, headquarter distributes its revenues to farmers. Its organization structure is described below<sup>3)</sup>:



When we interview leaders of this FPC, they revealed that the farmer members' revenue is 20% to 30% higher than farmers who did not participate in any PFC. What's more, talking about their strategy in the future, the directors told us that they will make full use of their accumulated technical

<sup>3</sup> D and FG denote "Director" and "Farmer Group" respectively. Headquarter divided their farmer members into 78 groups based on geographical relationship and appointed 10 directors manage these groups, while other directors work on Finance, marketing or quality supervising.

advantages to develop high quality and various kinds of tea, which individual farmers can hardly do.

Finally, we also did independent questionnaire survey to the FPC member and ordinary farmers; the result matches the directors' words. In addition, more than 90% farmers are satisfied with this production model.

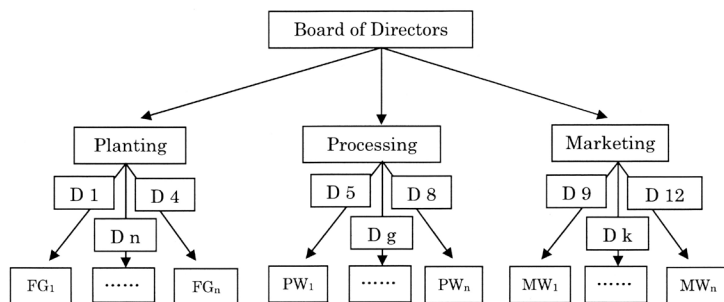
### 3.2 Y Tea FPC

Y Tea FPC, which is established in 2008, is a pure leading farmer-drove and closed FPC<sup>4)</sup> with 158 household members. It differs from X Tea FPC in organizational structure, although they are both specialized economic organizations. Basically, the feature of Y FPC is standard corporate operation: farmer members pour their land into FPC as "Registered Capital" and they manage it as a corporate. They conduct unified and standard management by appointing 13 directors specializing in three divided fields: planting, processing and marketing. The farmer members are almost like long-time employers in FPC who earn their wage according their time working for FPC, but they are also "stock holders" who obtain revenue by sharing FPC's income. Generally speaking, this structure was considered as highly specialized organization, and the organizational structure of Y FPC can be depicted as the following figure<sup>5)</sup>:

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<sup>4</sup> The leading farmers, who started the FPC, own massive land. In addition, the FPC is a closed FPC: no new members will be enrolled, which is different with general idea, open FPC, new members can be accepted as long as they can meet the strict requirements of entrance.

<sup>5</sup> Just like X FPC, the farmers were also divided into several groups that almost engage in planting. They are managed by responding directors. In this figure, "Dn" denotes director n. Some of them are good at planting management, while someone have marketing advantages over others. Hence, the board of direct appoints them to specialize in some certain area according to their merits. "FG<sub>i</sub>" denotes "farmer group", who are all members of Y FPC. "PW<sub>i</sub>" denotes "processing worker" who major in tea making. Some of them are farmers who belong to Y FPC, while some are enrolled externally. "MW<sub>i</sub>" denotes "marketing workers", and the origin of them is the same with processing workers.



Roughly viewing, this kind of organizational structure is a real company and the farmers are stock holders. As a result, we can regard FPC as a mutation of company: they are different in name, but share the same core.

We visited their plantation and factory, and they really perform very well. In planting, we found that they used advanced automatic irrigation technology, while ordinary farmers who haven't participated in FPC use pump operated by hands. And their infrastructure is much better than ordinary farmers'. For instance, concreted roads lead to every region of their plantation, while it's dirt track for ordinary farmers. In the factory, sophisticated machines, like automatic tea baking machine, are used. However, for ordinary farmers, traditional yet simple tools were used year by year. In addition, there are specialized technicians who mastered more skilled and advanced technology for tea making in the factory, which is a vital advantages over ordinary farmers.

We also did interview to some directors of Y Tea FPC. Revenue increase effect for farmers was also regarded as 30% and production-cost-down phenomenon is significant contrasting to ordinary farmers. In addition, output promoting was also confirmed. More important, they can develop high-end and higher value added tea, like red tea, making use of their technique advantages, the director revealed. Finally, we also did independent questionnaire



survey to the FPC member and ordinary farmers; the result matches the directors' words.

By the way, the result of field study is also in accordance with the research of Yang Dan and Liu Zimin (2012) to 2445 Chinese villages: raising the level of agricultural specialization can improve rural income significantly.

Through reviewing cases in literature, we can see that specialization in FPC is significant. While we also paid attention to the organizational structure and business of FPCs we investigated, and we found that they reflect the idea of specialization everywhere. What's more, specialization is not only the feature of FPCs, but also the origin of revenue increase for farmers by economizing transaction cost and accelerating technological change which I will present in next section. Thus, we can conclude that economic nature of FPC is specialization (or a kind of specialized organization).

#### **IV: Effectiveness of Specialization**

It's evident that FPC is a kind of specialized organization both from literature and practical investigation. But why they specialize? Is there any economic effectiveness in specialization? There are two existing approaches to explain this "effectiveness" that are Neo-institutional Economics and New Classical Economics.

In approach of Neo-institutional Economics, "Transaction Cost" is the keyword. We can regard FPC as horizontal integration and vertical specialization: lots of individual farmers integrate into an organization and they specialize vertically. During this process, specialization can economize transaction cost. Supposing that if they don't specialize, each farmers needs to negotiate with production factor suppliers and product demanders. However, it's completely different when they specialize vertically. They can

setup a department that responses for purchasing and sales by which less negotiations cost need, hence fees caused by negotiation can be saved. In the end, the production cost decreases and thus the revenue of farmers increase.

In approach of New Classical Economics, Yang X. and Ng Y. K. (1993) proposed and proved that specialization can increase output. But in their models, this specialization and output increase occurs only when increased return satisfies; otherwise, the economy will reduces to self-sufficient condition. Thus, this approach can be regarded as approach of Economy of Scales.

Yang X. and Ng Y. K. (1993) also added that coordination cost (a kind of transaction cost) occurs and increases with specialization, so specialization process stops when the coordination cost offsets the benefit of specialization. This is the so called boundary of an economic organization, as well as FPC. In addition, it can also explain why FPC cannot be formed in some areas? This is because the coordination cost is larger than the benefit coming from specialization, which is also the reason why some established FPCs collapse after years.

These approaches: Transaction Cost and Economy of Scales are reasonable. Here, we intended to give another and more general explanation from production approach with constant return, which analyze production before and after specialization.

Assuming there are two identical farmers  $F_A$  and  $F_B$  live in a village making tea. They have no absolute advantage or comparative advantage in between them. Every one allocates his time on tea planting and tea manufacturing called P and M. If their production of tea planting satisfies Cobb-Douglas production function characterized with  $Y_1 = A_1 K_1^\alpha L_1^{1-\alpha}$  with  $0 < \alpha < 1$ , where A means technology level, K and L respectively denote capital and labor. Similarly, for tea manufacturing, the function is

$$Y_2 = A_2 K_2^\beta L_2^{1-\beta} \text{ with } 0 < \alpha < 1.$$

#### 4.1 Output of Self-sufficiency System

Firstly, two farmers work separately and haven't any specialization and cooperation between them. The total output for  $F_A$  household is :

$$Y_A = A_1 K_1^\alpha \left(\frac{L_1}{2}\right)^{1-\alpha} + A_2 K_2^\beta \left(\frac{L_2}{2}\right)^{1-\beta} \quad (4.1)$$

The total output for  $F_B$  household is :

$$Y_B = A_1 K_1^\alpha \left(\frac{L_1}{2}\right)^{1-\alpha} + A_2 K_2^\beta \left(\frac{L_2}{2}\right)^{1-\beta} \quad (4.2)$$

The total output for the self-sufficient economy composes of  $F_A$  and  $F_B$  is:

$$Y_{\text{self}} = Y_A + Y_B = 2^\alpha A_1 K_1^\alpha L_1^{1-\alpha} + 2^\beta A_2 K_2^\beta L_2^{1-\beta} \quad (4.3)$$

#### 4.2 Output of Specialization

In a coincident occasion,  $F_A$  and  $F_B$  drew an agreement on specializing in one process and then cooperate with each other to complete the production chain. For simplicity, we assume that  $F_A$  specializes in P, while  $F_B$  specializes in M<sup>6)</sup>.

The output for  $F_A$  household is:

$$Y_A = A_1 (2K_1)^\alpha (L_1)^{1-\alpha} \quad (4.4)$$

The output for  $F_B$  household is:

$$Y_B = A_2 (2K_2)^\beta (L_2)^{1-\beta} \quad (4.5)$$

The total output for this specialized economy:

$$Y_{\text{spec}} = Y_A + Y_B = 2^\alpha A_1 K_1^\alpha (L_1)^{1-\alpha} + 2^\beta A_2 K_2^\beta (L_2)^{1-\beta} \quad (4.5)$$

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<sup>6</sup> In this situation, we assume that the machines for P belonging to  $F_B$  were "transferred" to  $F_A$ , and vice versa, because  $F_A / F_B$  cannot use M/P machines any more.

and

$$Y_{\text{self}} = Y_{\text{spec}} \quad (4.6)$$

Obviously, the total output for  $F_A$  and  $F_B$  before and after specialization is the same, which demonstrates specialization cannot increase total output with constant return if technology progress keeps the same. But we should consider is there still any justification to assume that the technological change keeps the same before and after specialization.

### 4.3 Taking Endogenous Technological Change into Consideration

This disappointing result:  $Y_{\text{self}}=Y_{\text{spec}}$  is caused by exogenous technological change that specialization has nothing to do with technical change. As we all know, this logic isn't reasonable because a common sense is: one obtain more knowledge if he just engages in one field known as learning effect, thus technological changes more quickly under specialization. More knowledge means a higher productivity, thus the total output of specialized economy should higher than the self-sufficient economy. A better way to overcome this defect is endogenous technology progress, which is known as endogenous technological change.

Basically, there are two ways for us to get knowledge in economic theory: education or R&D department (Uzawa, 1965; Romer, 1990) and learning by doing (Arrow, 1962). In agricultural sector, especially for FPC, education or R&D department is unrealistic, while Learning by Doing is much more significant and reasonable, so we consider this learning effect in our model.

We just compare the total output before and after specialization, so it's unnecessary to use the whole and sophisticated "Learning by Doing" model, a simple one can meet our needs:

$$Y = AK^\alpha L^{1-\alpha} \quad (0 < \alpha < 1) \quad (4.7)$$

$$A = BK^\delta \quad (0 < \delta < 1) \quad (4.8)$$

In Equation (4.7),  $A, K$  and  $L$  denote knowledge, capital and labor respectively. And letter  $B$  represents the effective of knowledge production in Equation (4.8). Thus, the production function can be expressed as:

$$Y = BK^{\alpha+\delta} L^{1-\alpha} \quad (4.9)$$

With the same assumption, the total output for the self-sufficient economy that composes of  $F_A$  and  $F_B$  is:

$$Y_{\text{self}}^{\text{new}} = Y_A + Y_B = 2^\alpha B_1 K_1^{\alpha+\delta} L_1^{1-\alpha} + 2^\beta B_2 K_2^{\beta+\delta} L_2^{1-\beta} \quad (4.10)$$

The total output for the specialized economy that composes of  $F_A$  and  $F_B$  is:

$$Y_{\text{spec}}^{\text{new}} = Y_A + Y_B = 2^{\alpha+\delta} B_1 K_1^{\alpha+\delta} L_1^{1-\alpha} + 2^{\beta+\delta} B_2 K_2^{\beta+\delta} L_2^{1-\beta} \quad (4.11)$$

As we assumed,  $0 < \delta < 1$ , it yields  $2^{\alpha+\delta} > 2^\alpha$  and  $2^{\beta+\delta} > 2^\beta$ , thus we can compare the total output before and after specialization:

$$Y_{\text{spec}}^{\text{new}} > Y_{\text{self}}^{\text{new}} \quad (4.12)$$

It's is clear that the total output in specialized economy is greater that the self-sufficient economy under circumstances of endogenous technological change. So far, we have demonstrated that specialization can increase the total output by accelerating technological change without taking transaction cost and economy of scales into consideration. This is the effectiveness of specialization and the origin of income increase for farmers.

## V: Conclusion

Through literature review and investigation to Fujian Province (China), we concluded that the economic nature of Farmer's Professional Cooperative (FPC) in China is specialization (a kind of specialized organization). We found that inside of FPC, the production was divided into several processes, and then members specialize and cooperate to finish the production chain

from planting to marketing.

Using a simple model, we also explained the economical effectiveness of specialization in FPC that it can accelerate technology progress by learning effect, thus productivity of FPC increases, i.e. farmers' revenue increases.

However, we just focused on intra-organizational specialization. In reality, according to our survey, inter-organizational is also significant. For instance, with the high-speed development of tea industry, the tea-set industry, like cup and pot, also prospered. In addition, logistic and packing industries also developed, which helps the taking off of tea industry. And this is a meaningful issue that needs further research.

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