

Study on Regional Management System of Agriculture Park Focusing on Agribusiness Development in Advanced Rural Area of China

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To improve the income level of rural area has become one of the main objectives of the 11th “5-Year Plan” of China. Agribusiness has been proved to effective in encouraging the economic development in rural area by many successful cases in Japan. The purpose of this study is to discuss the regional management system of agriculture park in advanced rural area of China, where is proposed to be the model region of new agriculture industry. Agriculture park, as one kind of typical agribusiness, is expected to realize the comprehensive development of first, second and third industry. Regarding to the current condition, the agriculture park may focus on the points of the safe food production, organic vegetables and resorts, which will be integrated into the management system in the study.

Keywords: Regional Management system, Agribusiness, Agriculture Park

1. Introduction

China has realized the continuous economic growing for the last 30 years, including agriculture after family contract responsibility system was established in 1983. However, the urbanization and the faster development on second and third industry result in the unbalance of income level between rural area and urban area. Tens of millions farmers are still effectively excluded from the country's recent decades of rapid growth and the new wealth it has brought. So how to accelerate the first industry, to improve the income of farmers, that's to say, to build “a new socialist countryside”, has become one of the main tasks in the next stage for the country.

Since the break-up of massive communal farms three decades ago, individual families have been permitted to farm their land under 30-year government contracts. However, the farms are small, averaging about 1.66 acres (0.67 hectare) in size, making it hard to run the farms profitably. To maximize production, many farmers swap chunks of land to be held in common by the village. People

leaving the village to work in richer coastal areas often lease farming rights to the others in informal arrangements. Recently, such changing has produced some successful cases, such as Xiaogang village in Anhui province, where farms are leasing their land to other farms or companies to run, for example, a pork farm and vineyard. China's Communist Party top leaders have agreed a package of rural reforms that could shape the country's economic policy over the coming years, which is thought that farmers will now have more power to transfer or rent out their land.

The reform could possibly make the China's countryside the similar social environment as Japan's countryside. So this paper starts from the introduction of Japan's experience on agribusiness development in Chapter 2, and discusses the possible agriculture park in China and its regional management system in Chapter 3. Formulation and model consideration is explained in Chapter 4, followed by the conclusions in Chapter 5.

2. Review of Japan's Countryside Development

In Japan, after the World War II, especially in the Highly Advanced Economic Era from 1965 to 1975, placing factories and places for factory had been proceeded in order to advance the industrialization of the society. They lead to

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the birth of the Technopolis and then the activation of the rural areas. The beginning of the term, it was seen that the surplus man power of villages was gathered to the city. As the result many people have moved from the villages in the rural area and have concentrated to the specific city. Therefore, the activity of the rural areas based upon the farming village has extremely reduced. The family management of the small farming causes that the framing in Japan becomes weak. Those background stated above is similar to China's current situation.

As the urbanization proceeds, the farming and the farms are evaluated on the side of the value on the cultural exchange to the urban and the ecological way of suing resources. The preservation of farming can be consistent with the urbanization, as the environmental merits from farming are considered to be effective and necessary to the urban life. There is the necessity of the support system for the self-support of farming from the view point of the industry. The new agribusiness with the corporation was established and successful, which is more efficient on the investment than by the personal management. In the corporation, second and third industries are integrated and made into the multiple enterprise of agribusiness.

As the systematic approach, the problem of agribusiness

could be regarded as followings:

- 1) By the proposition that there is a Chairman who can understand the benefit of whole and the local government in the whole zone cooperates with each other, thereby, they can get same benefit with lesser investment than by alone.
- 2) The negotiation among the local governments is regarded to be based on the strategy that aims to choose the minimum investment pattern which maximizes the total income of farmers in their town.
- 3) The local government decides the pattern of the zoning and the employment giving the maximization of the total income of farmers in their town.

The farming management by the corporation can make the high investment efficiency. For launching the new industry and giving more kinds of jobs, it is thought that the business of manufacture and commerce (merchandising) are included into the agribusiness as the multiple enterprise of agribusiness: the management system which can provide farmers bywork (part time work) in the corporation is discussed. The enterprise is organized under the cooperation in the integrated municipal zone for increasing the total employment of agribusiness, and acquisition of the financial support from government. Such kind of farming

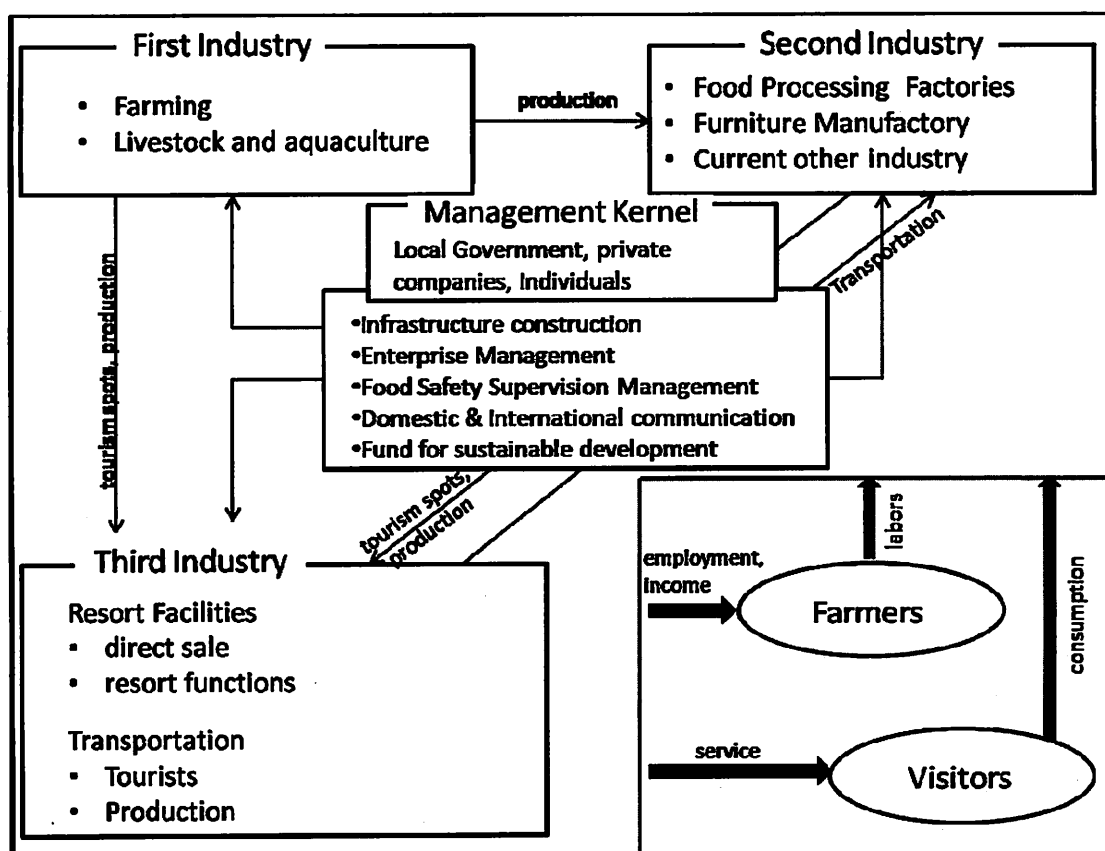


Figure 1: Framework of Agriculture Park

corporation in the integrated municipal zone is called Agri-Network System in Japan. The aim of Agri-Network System is “Administrating the total flow of agribusiness – product (farming), processing, and distribution. Make the farms bywork in the network, then stabilize their income and maintain the farms. By adding the feature of tourism to the farming like an agri-tourism, make a culture exchange between rural and urbanized area. For increasing the efficiency, the management function of network is concentrated, and distinguishes each institution according to the features of the place.”

3. Proposed Agriculture Park and Regional Management System

Refer to the cases in Japan and considering situation in China, we propose the agriculture park concerning to safe production and organic production, the framework of which is shown in Figure 1.

First industry, including farming, livestock and aquaculture is the base of the enterprise. The production could be treated in the proceeding factories and then transported. Third industry discussed here mainly includes resort and transportation functions.

For resort, besides the basic requirements such as the fresh food, comfortable accommodation, visiting to the farming facilities and enjoying the natural environment could be designed as the sales points of the agriculture park. Commercial function such as direct retail sale to visitors should not be neglected, which could be push of the farmers' income increasing.

Transportation is the precondition of the establishment of the agriculture park. Firstly, it serves the visitors, with road connection with main interchange of the highways, enough parking area, and shuttle bus system as the linkage of each facility. Secondly, the productions from second industry need to be transported to the outside.

Those function or facilities can be operated by private companies, individuals or communal sectors. To establish the enterprise, general management system is required. As shown in the figure, management kernel stands for the console position. The management kernel can be made up with local government, private companies and individuals. In the initial stage, some subsidy or loan could be assigned to the kernel to support the infrastructure construction like transportation and waste treatment. During the operation, it

sets up rules and coordinates the cooperation of each unit with the agriculture park.

Besides those two general functions of the kernel, there is another important function or system to be established by the kernel, which is the safety supervision management. Since the unsafe problem may happen in each step of producing, proceeding, and transporting and so on. The effective way to ensure the safe production is to implement the supervising in the standard and systematical way along each step.

Moreover, domestic and international communication can bring many chances to the region. The management kernel is a platform for commercial and technical cooperation. The maintenance, which is usually neglected in Chinese-style management, is also desired for the sustainable development. To support the infrastructure maintenance, fund could be prepared by the management kernel by collecting money from each unit. Also the fund is expected to take care of the welfare of the inhabitants in the agriculture region.

The visitors' consumption is regarded one of the main incomes. So the agriculture park also needs consistent advertisement by the management kernel. The integrated second and third industries can provide more employment to the farms as bywork, by which they can attain more income.

4. Formulation and Models

To consider the feasibility of realizing such an agribusiness, financial analysis is necessary. So the formulation of the agriculture park management system and basic models are discussed as the following.

Z_1 is the profit of the agriculture park, which is expected to be maximized.

$$Z_1 = P(s^{pk})p^{ag} + \sum_{k=1}^n P_k^{agn}(s_k^{agn})p_k^{agn} - F^{ag}(s^{ag}) - \sum_{k=1}^n F_k^{agn}(s_k^{agn}) - C^{ag}(s^{ag}) - \sum_{k=1}^n C_k^{agn}(s_k^{agn}) - T(s^{ag}, s_k^{agn}) \rightarrow \max \quad (1)$$

Sub. to

$$C_{con}^{ag}(s^{ag}) + \sum_{k=1}^n C_{con}^{agnk}(s_k^{agn}) \leq BUD \quad (2)$$

$$\begin{aligned} s^{ag} \geq 0, \quad 0 \leq s_1^{agn} \leq A_1, \quad 0 \leq s_2^{agn} \leq A_2, \\ 0 \leq s_3^{agn} + s_4^{agn} \leq A_3 \end{aligned} \quad (3)$$

Where, $s^{pk}, s^{ag}, s_k^{agn}$ is the scale of agriculture park, commercial facilities, and tourism spots. p^{ag}, p_k^{agn} is the average consumption in commercial and tourism facility k. F^{ag}, F_k^{agn} is the management fee for commercial and tourism facilities. $C_{con}^{ag}, C_{con}^{agnk}$ and C^{ag}, C_k^{agn} are the construction and operation costs of commercial and tourism facilities respectively. T is the tax. BUD is the total budget for the agriculture park. A_1, A_2 is the scale of current farms. A_3 is the scale of the unused available land.

P is the amount of the visitors to the agriculture park.

$$P = rQ \exp(U(s^{pk})) \quad (4)$$

$$U = \log\left(\sum_{k=1}^n q_k(s_k)\right) \quad (5)$$

r is the choice ration of visiors to this region. Q is the total amount of the visitors. U is the utility function of the agriculture park based on survey. Logit model is used for the prediction of the possible visitors P_k^{agn} to each facility.

U_k is the utility function for the facility k .

$$P_k^{agn} = P \frac{\exp(U_k(s_k^{agn}))}{\sum_{k=1}^n \exp(U_k(s_k^{agn}))} \quad (6)$$

Besides the consideration of the whole agriculture park, the profit for each facility or spot Z_2 is to be ensured for each management unit: private company, indivedules or communal sector.

$$\begin{aligned} Z_2 &= P(s^{pk}) - F^{pe}(s^{pe}) - C^{pe} - T(s^{pe}) \\ &\rightarrow \max \end{aligned} \quad (7)$$

Sub. to

$$P(s^{pk})p^{3s} + T(s^{pk}) - C^{3s}(s^{3s}) \geq R \quad (8)$$

$$\begin{aligned} C_{con}^{3s}(s^{3s}) + C_{con}^{pe}(s^{pe}) + C_{con}^{ag}(s^{ag}) \\ \leq (BUD - BUD^{ag}) \end{aligned} \quad (9)$$

Where, s^{3s}, s^{pe}, s^{ag} is the scale of facility management unit, facility and the direct sale commercial facility. R is the constraints for operation cost. BUD^{ag} is the budget for facilities directly related to farming industry.

The models list above will be used for the calculation and evaluation of the establishment and operation of the agriculture park, which was applied to Japan's cases.

5. Conclusions

This study is based on the ongoing project of model region of sustainable development in Changxing City and Longquan city of Zhejian province, China. Those two cities are main agriculture regions for a long time and have a lot of well-protected natural resources. In earlier years, second industry has been built up in moderate scale, especially furniture manufactories. In recent years, tourism industry has widely introduced into the regions. While the private, family-style management has caused many problems and been the serious obstacle to the improvement. The proposed management system of Agriculture Park is expected to utilize all the available resources, integrate first, second and third industries to promote the agribusiness in the regions, which could improve the farmers' income and realize the development in the rural area. In the further study, empirical data will be inputted into the models; spatial design of the agriculture park will be taken into account; and the effect of Agriculture Park to regional development will also be evaluated from the practical case.

Reference

- 1) Mikio Takebayashi and Mamoru Haruna: Regional Management System for Development in the Rural Area, *Proc. of The 5th. World Conference of RSAI*, CS2-12-2(1)- CS2-12-2(8), 1996.
- 2) Hongdong Guo and Robert W. Jolly: Contractual arrangements and enforcement in transition agriculture: Theory and evidence from China, *Food Policy*, ScienceDirect, 2008