

CASE STUDY OF INNOVATION BUSINESS MODEL TO PROMOTE SUSTAINABLE AGRICULTURE OF PRIVATE FARM IN TAIWAN

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ABSTRACT

This study investigation modern sustainable agricultural business model of private farm in Taiwan. Enter the real field, understand the rural environment on the spot, and hope to bring substantial help to the current agricultural environment in Taiwan. Conduct Zhang-Jia farm as the case, based on local ecology, production and life to analyse the management characteristics of the farm. Combine with the theory of ideas explored in the literature to verify the relevance of its actual mode of operation and goals. Observe the local tribal ecology and industrial context to find problems, and compile various conceptual factors that affect the sustainable development of Taiwan's agriculture based on the literature. Through developing organic agriculture, promoting leisure agriculture, developing diversified agricultural products, promoting food agricultural education, and organized production and marketing groups as strategies. Through diversification activities, construct a field environmental relationship brimming with "agricultural production", "peasant life" and "rural ecology", and practice the concept of respect for nature. To maintain the survival of the farm and leave a beautiful homeland, further to increase agricultural production, increase income, maintain natural ecology, create the best areas for farming and living, attract more young people to return to the countryside, and to promote sustainable agriculture in Taiwan.

Keywords: *business model, surplus food, farm products, prosperous food*

1. INTRODUCTION

In the history of Taiwan's economic development, agriculture has played a very vital role. In addition to promoting food production and stabilizing people's livelihood needs, it also supports the rapid development of industry and commerce. However, with the changes in the socio-economic environment, the rise of environmental protection awareness, the economic internationalization and the world trade liberalization, agricultural development is confronted with a severe dilemma. The current difficult challenges include the effects of an aging population, a low young adult population, and the effects of low birth rate.

Agricultural operations must have stable economic income, otherwise the young people cannot be attracted to return, and the rural population is reduced year by year. Agricultural productivity and competitiveness depend on conditions such as land, labour, capital and technology. Taiwan's agricultural land is scarce, the average farm area is small, the wages are expensive, and capital and labour inputs cannot be increased infinitely on limited agricultural land. Therefore, to improve productivity and competitiveness, we must develop advantageous agriculture, including the adjustment of agricultural industrial structure.

In Taiwan, the average farming area of farming households is currently reduced and the scale of operation is miniaturized.

Through developing organic agriculture, promoting leisure agriculture, developing diversified agricultural products, promoting food agricultural education, and organized production and

marketing groups as strategies. Through those diversification activities, construct a field environmental relationship brimming with agricultural production, peasant life and rural ecology, and practice the concept of respect for nature.

The purpose of the present study is to summarize the various conceptual factors that affect the sustainable development of Taiwan. Based on the literature, to investigate the impact of developing organic agriculture, promoting leisure agriculture, developing diversified agricultural products, promoting food agricultural education, and organized production and marketing groups. Specifically, the research objectives of the present study are as below:

- (1) Investigated the impact of developing organic agriculture on sustainable agricultural development.
- (2) Investigated the impact of promoting leisure agriculture on sustainable agricultural development.
- (3) Investigated the impact of developing diversified agricultural products on sustainable agricultural development.
- (4) Investigated the impact of promoting food agricultural education on sustainable agricultural development.
- (5) Investigated the impact of organized production and marketing groups on sustainable agricultural development.

2. LITERATURE REVIEW

Sustainable Agriculture

Sustainable agriculture it can be divided into two parts "sustainable" and "agriculture", with the intention of developing agriculture forever. In short, sustainable agriculture is actually a kind of agricultural development goal. It is based on the concept of sustainable development, emphasizing the balance of the "productivity", "living" and "ecological" in order to promote diversified agricultural use [1]. Sustainable agriculture introduced the balance between production and the environment. It is a series of strategies that can ensure the production capacity of agricultural products without harming natural environment resources.

Hur & Kim [2] argued that sustainable agricultural has become a fashion trend pursued by all countries in the world. Singh et al. [3] indicated that the sustainable agriculture is vital in today's world as it offers the potential to meet our agricultural needs, something that conventional agriculture fails to do. Thus, the technique is environment friendly and ensures safe and healthy agricultural products. Darma [4] argued that the rural economic development as a largest part of agricultural development could be developed as an autonomous unit of government in rural area. Rural development could be done by self-supporting through the strengthening of local organization function with a set of norms and supported by available resources.

Factors Affecting Sustainable Agricultural

Various conceptual factors will affect agricultural production, peasant life and rural ecology, and then affect the sustainable development of agriculture [1]. De Souza Filho et al. [5] suggested that the probability of a farmer adopting this technology increased if the farmer was more integrated with farmers' organizations, had contacts with nongovernmental organizations, was aware of the negative effect of chemicals on health and the environment, could rely on family labour, and had a farm located in an area with better soil conditions.

Joneydi [6] proposed that in multivariable regression analysis for identifying the influencing factors to sustainability has been showed that six variables of total production, attitude to sustainable agriculture, the amount of intake facilities, social association, and relational properties indicate about 81% of dependent variable of production cooperatives. Asiry et al. [7] revealed that Hail region is an important agricultural area in Kingdom of Saudi Arabia and some agricultural practices need to be revised and directed towards sustainability through extension programmes.

Development of organic agriculture

The definition of organic agriculture is an agricultural system that strictly adheres to the principle of sustainable and sustainable use of natural resources and does not allow the use of synthetic chemicals to emphasize the effects of water and soil conservation and ecological balance on crops [8].

Hur & Kim [2] indicated that the organic agriculture focuses on biodiversity and ecological balance. The ecological benefits obtained from it should help the organic industry's industries to approach sustainable development and Ways to achieve not only meet current needs, but also do not harm the needs of future generations.

Yan et al. [9] point out that the multi-functionality of organic agriculture includes: (1) Economic function: organic agriculture can ensure stable economic income for farmers, reduce costs, increase farmers' income, and livelihood needs of rich farmers; (2) Social function: organic agriculture can produce natural and safe agricultural products, improve the quality of agricultural products, shape rural lifestyles, integrate local traditional cultural values, consolidate interpersonal relationships, and preserve and inherit cultural heritage; and (3) Environmental function: organic agriculture can eliminate pesticides and chemical fertilizers. In summary, the organic agriculture is beneficial to environmental resources, with functions such as production, subsistence, comfort, and self-purification. It helps provide a sustainable natural resource environment for future generations.

Promoting leisure agriculture

Leisure agriculture is a concept that combines production, life and ecology to maximize its benefits. Leisure agriculture incorporates multifaceted management factors. The purpose is to combine agriculture and tourism, experience rural life and understand rural culture and ecology, develop rural culture, activate the local economy, increase farmers' income and promote urban and rural development. Lin [10] proposed that the leisure agriculture has following functions: economy, education, society, environmental, recreation, medical and culture.

Developing diversified agricultural products

The development of diversified agricultural products can integrate agricultural production, processing, and sales, enhance the added value of agricultural products.

Jiang [11] proposed that developing diversified agricultural products has following benefits: (1) Solve the problem of regional overproduction of agricultural products; (2) Increase the added value of agricultural products; (3) Regulate the balance between supply and demand of agricultural products; (4) Increase farmers' income; (5) Increase the storage capacity of

agricultural products; (6) Diversify consumer consumption patterns and improve consumption levels; (7) Develop local characteristics and promote ethnic unity; and (8) It can improve technology.

Promoting food agricultural education

Yan et al. [12] indicated that the definition of food agricultural education is through the design of "food" and "agriculture" related experience and knowledge, students and consumers are trained to integrate the concepts of local sales, food nutrition and safety, food culture heritage and comprehensive learning process of agricultural experience and life education concepts. Promoting food agricultural education can maintain a good tradition of food culture and provide a field for experiencing agriculture, let busy urbanites have the opportunity to get close to rural life; and cultivate schoolchildren's knowledge of local specialty foods, the environment, ecology and local soil.

Make the impact of food agricultural education reach the three levels of production, ecology and life, to promote the activation and development of rural areas and increase the self-sufficiency rate of food, so that agriculture can achieve sustainable development.

Organized production and marketing groups

Cao [13] indicated that according to the article of agricultural development regulations, the definition of production and marketing groups is "agricultural production and marketing groups shall consist of farmers who are at least 18 years old and whose land is adjacent. The organized production and marketing groups has following benefits: (1) The joint procurement of materials can reduce the cost; (2) Through communication, observation, and study, can through labour saving, mechanization and automation to reduce cost; (3) The development of new technologies and products to increase the added value of agricultural products; (4) Improvement of production technology and increase in operating profit; and (5) Improvement of overall competitiveness and can build high-quality and competitive products.

Darma [4] indicated that for farmers engaged in sustainable agricultural development, cooperating with each other to participate in the organization and management, centralizing manpower, material resources, and agricultural resources can not only expand the economic scale, but also obtain the needs through the organization and operate agriculture in an organizational form to achieve the purpose of sustainable agriculture.

Overview of Case Farm

Introduction of case farm

The case farm is located in Tainan, with flat terrain and fertile land. Due to the good drainage of the soil, the deep soil layer, therefore, rich in organic matter balance, slightly acidic sandy loam soil and the water quality is excellent, therefore, it is suitable for planting various crops. The farm is using organic fertilizer and microbial fertilizer for cultivation and management, following natural farming methods, therefore, the quality is stable and good. The current size of the farm is about 8 hectares. The main products, hectares of cultivated area and sales time are listed in Table 1.

Table 1 The Main Products, Hectares of Cultivated Area and Sales Time of Case Farm

Products	Pomelo	Red Pomelo	Pearl Pomelo	White Pomelo	Orange	Benne	Black Bean
Hectares	1.5	1.0	1.0	1.5	0.2	1.0	2.0
Sales month	8-9	9-10	10-11	10-12	12-1	1-12	1-12

Business concept of case farm

The business concept of case farm were statements as follow:

1. In terms of production: developing organic agriculture, studied in different fields courses, observe exchanges and improve production technology.
2. In terms of sales: promoting leisure agriculture and promoting food agricultural education. Understand consumer needs, increase interaction with consumers, and build a complete database. Update information at any time in Facebook to let consumers know more about the cultivation process. And cooperate with community activities, school outdoor teaching and public welfare activities to increase farm exposure chance.
3. Improved actions: develop diversified agricultural products, cultivate new varieties, lengthen the harvest period and reduce the risk of disaster damage and slow sales.
4. In terms of regional: organized agricultural production and marketing groups, establish all well concept, control pests diseases and reduce the density of infection.

3. RESEARCH METHOD

Research Structure

The research structure of present study is shows in Figure 1. There are five strategies: development of organic agriculture, promote leisure agriculture, development of diversified agricultural products, promote food and farming education, and organized production and marketing groups. To reach three main objects: all well, shared, and coexist.

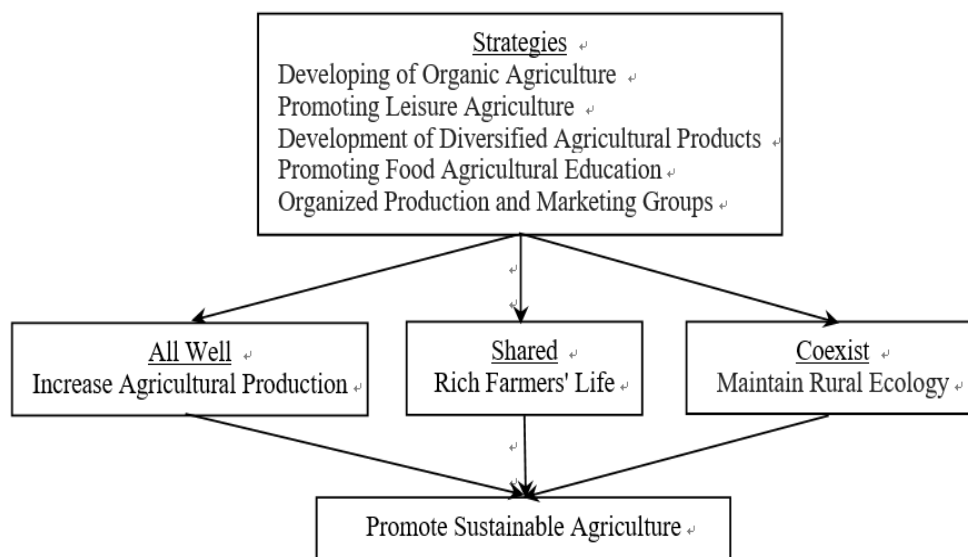


Figure 1 Research Structure of Present Study

Questionnaire Outline

Sustainable agriculture is a goal of agricultural development. It is based on the concept of sustainable development, emphasizing the balance of "productivity", "living" and "ecological" in order to promote the multiple uses of agriculture.

Agricultural production is to make money so that farmers can survive, but also to consider the ecological environment. Various conceptual strategies will affect agricultural production, farmers' lives, rural ecology, and then the sustainable development of agriculture. Therefore, the questions of questionnaire were listed below:

- Question 1: Impact of development of organic agriculture on sustainable agricultural development.
- Question 2: Impact of promoting leisure agriculture on sustainable agricultural development.
- Question 3: Impact of developing diversified agricultural products on sustainable agricultural development.
- Question 4: Impact of promoting food farmer education on sustainable agricultural development.
- Question 5: Impact of organized production and marketing groups on sustainable agricultural development.

Questionnaire

The full questionnaire is showed as Appendix Table 1. There are five questions of the questionnaire to obtain the respondents' opinions. Table 2 shows the information of question 1.

Table 2 The Example of Question 1

Q1. The impact of developing organic agriculture on sustainable agricultural development

Developing Organic Agriculture	S A	A	N	D	S D	Reason or Why?
1. Increase agricultural production						
2. Increase income and wealthy of farmers						
3. Maintain rural ecology						

Note: SA: Strongly Agree; A: Agree; N: No Comment; D: Disagree; SD: Strongly Disagree

Questionnaire Respondents

The respondents' information and coding information were showed as Table 3.

Table 3 Respondents' Coding Information

Respondents' Information	Respondents' Code
1. Agricultural administration unit of central government, are all with more than 20 years professional experience.	A8, A9, A10, A11

2. Agricultural administration unit of local government and agricultural improvement farm, are all with more than 15 years professional experience.	A13, A14, A15, A16, A17, A21, A21, A22, A23, A24, A25
3. Professor of department of agriculture, are all more than 30 years professional experience.	A1, A7, A26, A27
4. Agricultural certification, counselling, and auditing personnel, are all with more than 10 years professional experience.	A2, A3, A4, A6, A20, A28
5. Experts of agricultural associations and promotion unit, are all with more than 15 years professional experience.	A5, A12, A18, A19

4. RESULTS AND DISCUSSIONS

The Results of Questionnaire Response Statistics

After completing the design of the questionnaire and selecting the objects, the study conducted a telephone deep interview. The date of the telephone deep interview began from June 15 to July 15, 2019. After the questionnaire was collected, the verbatim text was encoded and check the questionnaire. If the basic information and the content of the questionnaire are missing or incomplete, it will be regarded as an invalid questionnaire and it will be deleted.

After organize and categorize valid questionnaires, and convert the content into verbatim text. Finalize written information and comprehensive induction for reference of discussion of research results.

30 questionnaires were sent out, 28 questionnaires were returned, 93% of questionnaires were recovered. The same answers were deducted from the questionnaires, and one questionnaire without any comments and suggestions was counted. A total of 27 valid questionnaires were received, and 90% were recovered. Table 4 shows the questionnaire response statistics.

The Results of Questionnaire Statement

Table 4 showed the results of the five strategies on targets of sustainable agriculture.

Table 4 The Results of Strategies on Targets of Sustainable Agriculture

Developing Organic Agriculture	SA	A	N	D	SD
1. Increase agricultural production.	1 (4%)	2 (7%)	6 (22%)	15 (56%)	3 (11%)
2. Increase income and wealthy of farmers.	1 (4%)	5 (19%)	17 (63%)	4 (15%)	0 (0%)
3. Maintain rural ecology.	22 (81%)	4 (15%)	0 (0%)	0 (0%)	1 (4%)
Promoting Leisure Agriculture	SA	A	N	D	SD
1. Increase agricultural production.	1 (4%)	8 (30%)	11 (41%)	6 (22%)	1 (4%)
2. Increase income and wealthy of farmers.	4 (15%)	18 (67%)	4 (15%)	1 (4%)	0 (0%)
3. Maintain rural ecology.	7 (26%)	13 (48%)	5 (19%)	2 (7%)	0 (0%)

Developing Diversified Agricultural Products	SA	A	N	D	SD
1. Increase agricultural production.	6 (22%)	11 (41%)	8 (30%)	2 (8%)	0 (0%)
2. Increase income and wealthy of farmers.	14 (52%)	8 (30%)	5 (19%)	0 (0%)	0 (0%)
3. Maintain rural ecology.	3 (11%)	5 (19%)	15 (56%)	4 (15%)	0 (0%)
Promoting Food Agricultural Education	SA	A	N	D	SD
1. Increase agricultural production.	2 (7%)	13 (48%)	7 (26%)	5 (19%)	0 (0%)
2. Increase income and wealthy of farmers.	0 (0%)	22 (81%)	4 (15%)	1 (4%)	0 (0%)
3. Maintain rural ecology.	6 (22%)	16 (59%)	4 (15%)	4 (4%)	0 (0%)
Organized Production and Marketing Groups	SA	A	N	D	SD
1. Increase agricultural production.	3 (11%)	20 (74%)	4 (15%)	0 (0%)	0 (0%)
2. Increase income and wealthy of farmers.	4 (15%)	19 (70%)	4 (15%)	0 (0%)	0 (0%)
3. Maintain rural ecology.	3 (11%)	6 (22%)	13 (48%)	4 (15%)	1 (4%)

Results of developing organic agriculture on increase agricultural production, increase income and wealthy of farmers and maintain rural ecology were showed below:

- (1) Results showed that the developing organic agriculture can increase agricultural production: 4% strongly agree, 7% agree, 22% no opinion, 56% disagree and 11% strongly disagree.
- (2) Results showed that the developing organic agriculture can increase income and wealthy of farmers: 4% strongly agree, 19% agree, 63% no opinion, 15% disagree and 0% strongly disagree.

Results of promoting leisure agriculture on increase agricultural production, increase income and wealthy of farmers and maintain rural ecology were showed below:

- (1) Results showed that the promoting leisure agriculture can increase agricultural production: 4% strongly agree, 30% agree, 41% no opinion, 22% disagree and 4% strongly disagree.
- (2) Results showed that the promoting leisure agriculture can increase income and wealthy of farmers: 15% strongly agree, 18% agree, 4% no opinion, 1% disagree and 0% strongly disagree.

Results of developing diversified agricultural products on increase agricultural production, increase income and wealthy of farmers and maintain rural ecology were showed below:

- (1) Results showed that the developing diversified agricultural products can increase agricultural production: 22% strongly agree, 41% agree, 30% no opinion, 8% disagree and 0% strongly disagree.
- (2) Results showed that the developing diversified agricultural products can increase income and wealthy of farmers: 52% strongly agree, 30% agree, 19% no opinion, 0% disagree and 0% strongly disagree.

Results of promoting food agricultural education on increase agricultural production, increase income and wealthy of farmers and maintain rural ecology were showed below:

- (1) Results showed that the promoting food agricultural education can increase agricultural production: 7% strongly agree, 13% agree, 26% no opinion, 19% disagree and 0% strongly disagree.

- (2) Results showed that the promoting food agricultural education can increase income and wealthy of farmers: 0% strongly agree, 81% agree, 15% no opinion, 4% disagree and 0% strongly disagree.

Results of organized production and marketing groups on increase agricultural production, increase income and wealthy of farmers and maintain rural ecology were showed below:

- (1) Results showed that the organized production and marketing groups can increase agricultural production: 11% strongly agree, 74% agree, 15% no opinion, 0% disagree and 0% strongly disagree.
- (2) Results showed that the organized production and marketing groups can increase income and wealthy of farmers: 15% strongly agree, 70% agree, 15% no opinion, 0% disagree and 0% strongly disagree.

5. CONCLUSIONS AND SUGGESTIONS

The present study mainly explores the strategies of sustainable agricultural development. Based on the three aspects of local agricultural production, peasant life and rural ecology, this paper uses the literature to discuss and evaluate the results of the questionnaire to analyse whether the management characteristics of the case farm are consistent with sustainable development. The agricultural management model can be accepted by the general public, which has brought substantial help to the current agricultural environment in Taiwan. The results were summarized as follow:

- (1) Increase agricultural production: Most results showed that the development of diversified agricultural products, promotion of food agricultural education, and organized production and marketing groups can improve agricultural production; the development of organic agriculture and the promoting leisure agriculture, but can't improve agricultural production.
- (2) Rich Farmers' life: Most Results showed that promoting leisure agriculture, development of diversified agricultural products, promoting food agricultural education, and organized production and marketing groups can increase income and wealthy of farmers; the development of organic agriculture can not necessarily increase income and wealthy farmers.

In conclusions, that the sustainable agriculture is actually a goal of agricultural development. It emphasizes the balance of the three life environments, which are "productive", "living" and "ecological". All factors will affect agricultural production, peasant life, rural ecology, and then the sustainable development of Taiwan's agriculture. Therefore, the effect of sustainable agricultural development cannot be achieved with a single strategy. It is hoped that the above five relevant strategies can be implemented in the future, namely, developing organic agriculture, promoting leisure agriculture, developing diversified agricultural products, promoting food agricultural education, and organized production and marketing groups to achieve sustainable agricultural development.

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