From Chemical Paddy Fields to Organic Paddy Fields on a Self-Sufficient Path: Lessons Learned from the Traditional Growing Area for Sangyod Rice in Phatthalung Province

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Abstract

Currently, there has been an increase of interest in organic rice farming among the Thai farmers. This article aimed to study factors affecting farmers' transformation from chemical paddy fields to organic paddy fields, and describe resource management for organic rice farming based on the fundamental principles of the sufficiency economy philosophy. Phatthalung province was selected as the research area. Primary data were collected using in-depth interviews, natural observation, field notes, tape recordings and non-participant observation. A total of eleven organic Sangyod Muang Phatthalung rice farmers were selected using purposive selection. The data were analyzed using manifest content analysis. The results showed the factors that affected farmers' transformation from chemical paddy fields to organic paddy fields were as follows: production costs, indebtedness, individual and family-related health problems, soil degradation and extension of services from related government agencies. The farmers understood the moderation in organic rice farming. They also planned to appropriately use the inputs from this research. In addition, organic rice production was mainly for household consumption. The farmers' organic rice field production was within their normal practice production capacity. The farmers applied a strong sense of understanding to organic rice farming by doing household and farm accounting in addition to no input of chemicals in sustainable organic soil management. Furthermore, the farmers exhibited self-immunity in organic rice farming, e.g., through farmer grouping and knowledge acquisition. The related government agencies can benefit from the application of these research findings to enable sustainable development planning for organic rice production focused on the sufficiency economy philosophy.

Keywords: Organic Paddy Field, Organic Rice, Resource Management, Sangyod Rice, Sufficiency Economy Philosophy

Introduction

Presently, some groups of consumers eat rice not only because of its delicious taste but also about its safety which it is one of the food security components. The consumption of contaminated rice for a long time can cause physical illness or foodborne illness which causes expenses for the medical care. Some consumers eat rice as a functional food and diet therapy; therefore, there is a high demand for organic rice in a market. Simultaneously, the related government agencies have promoted the organic agricultural products and applied the sufficiency economy philosophy more on the production processes. This concrete operational drive could be seen through the National Organic Agriculture Development Strategy Plan No. 1 (2008-2011), the Action Plan of National Organic Agriculture Development (2008-2011), and the Strategy of National Organic Agriculture Development (2017-2021) (The National Organic Agriculture Development Committee, Office of Agriculture Economics, 2017) in order to adjust the direction of agricultural production to match the world's situations and lead to the sustainable development enabling the farmers to become self-reliance, have better quality of living, and have abstemious happiness.

Phatthalung is one of the lower southern provinces in Thailand. More than 70% of its areas is for agriculture. In the production year of 2016/2017, the significant economic crops were para-rubber (958,345 rai), rice

(81,892 rai), irrigation paddy field (26,822 rai), palm oil (51,921 rai), mangosteen (15,384 rai), and longkong (14,452 rai). At present, more farmers have drastically changed from paddy field to para-rubber and palm oil productions. As a result, paddy field, the number of rice farmer household, and rice products in Phatthalung were continually declined. In the production year of 2016/2017, the number of rice farmer households was 14,500, and 3,133 households for rainfed paddy field and irrigation paddy field. They produced 38.7 million kilograms. Regarding the production year of 2011/2012, there were 173,442, and 69,372 rai of the paddy fields, 14,847 and 5,198 rice farmer households for rainfed paddy field and irrigation paddy field. The rice products were 118.0 million kilograms (Information Technology and Communication Center, Department of Agricultural Extension, 2018). In all aspects, the paddy fields, the number of rice farmer household, and the rice products were steadily decreased.

This research focused on the Sangyod rice, a strategic product for Phatthalung agricultural development. Presently, the number of Sangyod organic rice farmers are less than it was predicted although the related government agencies and the non-government organizations have encouraged local farmers to produce more organic rice as to follow sufficiency economy philosophy, and to meet the five-year (2018-2022) strategy plan of Phatthalung Sangyod organic rice development. In reality, the Sangyod organic rice market is a niche market. The consumers in this market have a good education, health-concern, and the ability to pay higher whereas the ordinary rice market is a mass market (Thailand Development Research Institute, 2010).

The two research questions were proposed: (1) what were the factors affecting the farmers' transformation from chemical paddy fields to organic paddy fields; and (2) how the farmers managed the resources for organic rice farming in accordance with sufficiency economy philosophy. The research objectives were: (1) to study factors affecting farmers' transformation from chemical paddy fields to organic paddy fields, and (2) to describe resource management for organic rice farming based on the sufficiency economy philosophy. Several government agencies such as the Khuan Kanun agricultural office and Phatthalung agricultural Office could use the findings as primary information for planning, developing, and promoting the organic rice farming based on the sufficiency economy philosophy in the research area, and other areas having similar contexts as Phatthalung province.

Research Methodology

This research focused on qualitative methods taken place at Khuan Kanun district, Phatthalung province. The research area was purposively selected due to the fact that in the production year of 2016/2017, Phatthalung province was the third largest province in southern Thailand for having the paddy fields and the number of rice farmer households. Sangyod rice is an identity of Phatthalung province, and it has long been cultivated for more than a century. Khuan Kanun was the biggest area in Phatthalung province with rainfed paddy field. It also has the biggest number of households that cultivated rainfed paddy field as well as the biggest amount of rainfed rice productions. According to the production year of 2016/2017, the total areas of all types of rainfed rice which cultivated in Khuan Kanun district were 33,755 rai (51.4%), and the total areas of rainfed Sangyod rice were 4,214 rai (33.7%). The number of households that planted all types of rainfed rice was 3,398 households (42.9%), and 1,158 households (39.2%) grew the rainfed Sangyod rice while the productions of all types of rainfed rice were 8.2 million kilograms (60.9%), and the productions of rainfed Sangyod rice were 1.2 million kilograms (60.3%). Moreover, Khuan Kanun district had seven different groups of farmers (Table 1) that they

produced organic rice and their groups certified organic Thailand and/or the International Federation of Organic Agriculture Movements (IFOAM).

This research selected Ban Khao Klang community enterprise as a sample due to its largest community enterprise consisting of 32 members. Moreover, the community enterprise had full services of Sangyod organic rice production and product transformation. In addition, the community enterprise also received the organic Thailand whereas the rice mill of the group was the first one in southern Thailand to be certified a standard of good manufacturing practice (GMP).

Table 1 Groups of organic rice farmers in Khuan Kanun district, Phatthalung province

Group	Group Location		Organic Agricultural Standard Achieved	Number of Member
	Moo	Sub-district		
1. Ban Khao Klang community enterprise	13	Pan Tae	Organic Thailand	32
2. Pang Dan farm's women group	2	Na Khayat	Organic Thailand	29
3. The Ban Wang Chorakhe rice production group	5	Tanodduan	Organic Thailand and IFOAM	20
4. The demonstration center of Tha Chang economics rehabilitation community enterprise	5	Phanangtung	Organic Thailand and IFOAM	18
5. The media of wisdom for sustainable agricultural development community	5	Phanangtung	Organic Thailand	12
6. The Sai Yao-Muan Chon farm women's group community enterprise	9	Tanodduan	Organic Thailand and IFOAM	10
7. Phanom Wang agricultural cooperative limited	6	Prakha	Organic Thailand	3

The key informants for this research were 12 farmers who produced organic Sangyod Muang Phatthalung rice (1 person represented 1 household), and they were members of Ban Khao Klang community enterprise. The respondents were purposively selected for the in-depth interview in order to get insightful information. The criteria of the respondents' selection were, to be farmers who produced organic Sangyod Muang Phatthalung rice and to apply the sufficiency economy philosophy in their rice farming. Hence, "organic rice" in this research is referred to as the "organic Sangyod Muang Phatthalung rice". The farmers who were willing to cooperate or felt convenient to be interviewed were selected as key informants. With this regard, there were only 11 respondents available for this research. According to the field data collection, in-depth interviews were carried out using the guideline of constructed questions as well as the contingency questions occurred during the non-participant observation. In addition to the natural conversation, data collecting was made via note taking, tape recording, and non-participant observation. The triangulation method was applied in this research to validate the obtained data from different people at different places and time. The data analysis was then carried out according to the manifest contents.

Results and Discussions

Factors Affecting Farmers' Transformation from Chemical Paddy Fields to Organic Paddy Fields

The farmers have worked as a rice farmer for a long time. Some of them have carried out this profession from generations to generations. In the past, farmers planted rice just for a living or only for household consumption. The over supplies were distributed to their relatives, neighbors, and acquaintances. Some of them distributed the over-supplied rice to make merit in their religion and kept some as seed stock for a coming cultivation season. Rice farming was based on nature; therefore, it could be done only once a year. Local rice such as Phatthalung,

Leb Nok, Dok Payom, Khai Mod Rin, and Sangyod was most popular among the farmers. In the past, the labor used in the paddy field were mainly from household members, relatives, neighbors both within and the nearby villages in a form of bartering labor and animals. The productions were later changed into two major purposes; namely, for a living and trade due to the fact that the farmers need money to buy goods and as well as using it for the household expenditures. As a result, the self-reliance levels were gradually declined because rice farming also relies on external factors which the farmers could not produce by themselves such as new technology, chemical fertilizer and agricultural machines to increase the rice production efficiency, and also hire the external labor force. The farmers expected that using chemical products in their paddy field could increase the productions of rice. As one farmer said "...at that time, I only thought about getting more income. Using chemicals in the paddy field I thought I would get more productions of rice then the household incomes would also be increased..." However, factors affecting farmers' transformation from chemical paddy fields to organic paddy fields found several factors as shown in figure 1 below. Four major factors for the farmers to transform from chemical paddy fields to organic paddy fields could be explained as follows:

1. The High Cost of Rice Production: According to Pongklang (2017), using chemical fertilizer in the paddy fields increased high cost of rice production both direct materials and direct labor costs. The chemical products used in the production process such as chemical fertilizer and the herbicide which were costly and the prices were varied based on the market mechanism. Similarly, the wages for spraying chemicals also have effects on the profits; hence, the farmers received lower profits than what they supposed to receive. Self-reliance capability of the farmers was also declined particularly in the aspect of production input because the farmers relied on the external factors which beyond their control. As a result, it was a risk for the farmers in receiving revenues particularly when the price of rice has changed. One of the farmers said "...I wonder that doing chemical paddy field, I can get high production but I still don't have enough money to pay a debt. When thinking carefully, it might because of the high production cost especially chemicals..." and "...in the past when parents raised us, they didn't do any chemical farming, they only did the agricultural job but they could raise their ten children. Today, doing chemical agriculture, raising one child or two children are troublesome..." According to Ketpirune (2012, 2013), it was found that doing chemical paddy fields had higher production cost than the organic paddy fields. Contrastingly, the organic paddy fields provided higher productions in return on profit. However, the rice production cost also depended on the context of the area as well as how it was calculated.

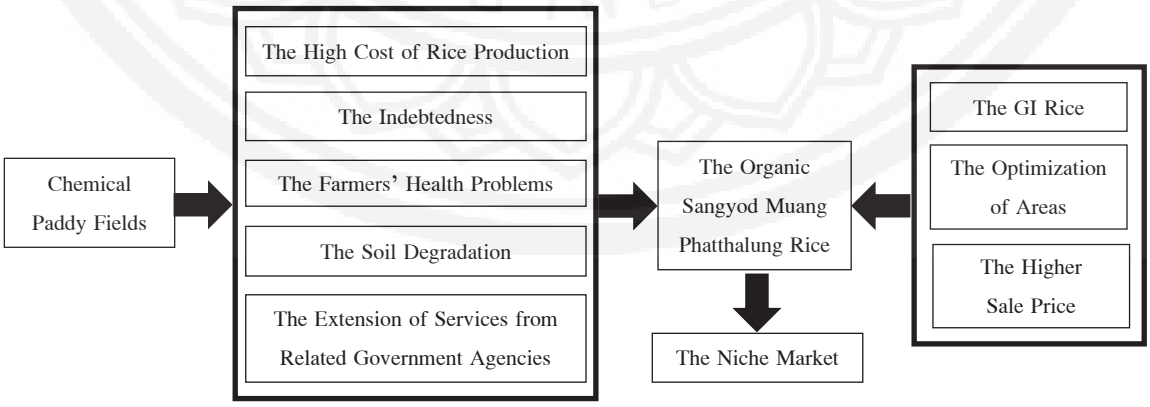

Figure 1 Factors affecting farmers' transformation from chemical paddy fields to organic paddy fields

2. The Indebtedness: According to the farmers' viewpoint, doing organic paddy field could reduce the production input particularly the chemicals. As a result, the production cost was declined. Moreover, the organic rice had higher sale price than the chemical rice. In addition, it could also reduce the household expenditures so that the farmers could pay back for their debts.

3. The Farmers' Health Problems: An average age of the farmers was 61.0 ± 15.4 years. Either illness or physical dysfunction caused by doing the chemical paddy fields in the past were considered to be health problems. Pompranee (2015) proposed that well-being was a factor for the farmers to be survival. Similarly, Sankoh, Whittle, Semple, Jones, and Sweetman (2016) reported that the farmers who used chemicals had several health problems such as nausea, acute respiratory dysfunction, blear-eyed. They could not produce rice effectively because they had to rest and to recover from their illness. Moreover, they had to spend more money on their medical care. One farmer said that "...while producing chemical rice, I didn't concern about health and carelessly protected myself when using chemicals. They were accumulated in my body and I felt such as fainting, vomiting, and became so weak..." and "...some of my friends got hypersensitivity to chemicals. They couldn't work because they felt weak, dizzy, had body ache, skin rash, angina pain, and could not breathe properly. I finally got sick and admitted to a hospital several times regarding the respiratory disease. I had to pay a lot for my medical care." The opinion was in accordance with Nantajit, Phetsawang, and Durongkaveroj's research (2015) that health concern was a crucial factor which had effects on a positive adoption of farmers for doing organic paddy fields.

4. The Soil Degradation: Doing chemical paddy fields for a long time, it deteriorated soil which was a foundation of all living things including human, animals, plants as well as the tiny livings that they support each other for survival (Sandler and Karo, 1972 as cited in Benchasri, 2010). The residual of chemicals was accumulated in the soil, causing degradation or "the soil lacks fertility." The soil became acidic and caused the outbreaks of plant disease and agricultural pests. The organic matters would be reduced and finally disappeared so that the soil became terra firma: the air could not circulate and the water could not drain properly. The farmers had to enrich the soil for the up-coming cultivation season. However, the rice productions were less than what it should be, and it really affected the security of household's financial situation. The organic paddy field could rehabilitate the soil fertility and should not disturb the process of soil nutrient collection of all livings in the ground.

5. The Extension of Services from Related Government Agencies: One farmer stated that "...it was stressful to do the organic paddy field because I did not know what to do and whether I could do it. I worried whether the local government would give training or support. Then I observed other farmers who do organic paddy field, I felt much better..." and "...I made decisions back and forth because I was not sure whether I would be successful or confronted with failure. Once the government officers distributed some knowledge, I decided to give it a try..." To do the organic paddy field, farmers were supported from different government agencies such as Phatthalung Rice Seed Center, Phatthalung Rice Research Center, Phatthalung Agricultural Office, Khuan Kanun Agricultural Office, Rice Department, Department of Community Development, Department of Agricultural Extension. Other supports were such as rice seed, agricultural equipment, organic fertilizer, budget, training about doing organic paddy field, quality of rice investigation, compensation from damaged like flooding. If farmers were members of the group, it was easier to get a certificate of guarantee comparing with an individual. According to the research of Srising (2008, p. 79), farmers received information about doing the organic paddy field in parallel with accepting of doing the organic paddy field. To Leklang (2012, p. 70), factors for supporting and servicing had effects on the decision making for doing the organic paddy field. Nantajit et al. (2015) confirmed that the number of training

and understanding had positive impacts on the adoption of doing the organic paddy field. Similarly, Kungwon (2017) confirmed that the supporting and servicing from government and private organizations had effects on the farmers to make a decision.

The farmers agreed that doing the organic paddy fields had positive effects over the chemical paddy fields. As one farmer said "...since I cultivated the organic rice, I was happier because I could share good things to others like my household members and relatives. When selling the organic rice, I didn't have to feel guilty as sinned person because my rice had no chemical. It was not dangerous for consumers..." Another farmer said "...I have better health since I did the organic paddy field. My illness was reduced because I didn't have to contact with the chemicals. My organic rice could be sold at a higher price; I could gain more profit than ever...Doing the organic paddy field reduced the production cost because I didn't have to spend money on chemicals. The organic rice products could be consumed within my family. The oversupply could be sold and used for other family's expenditure..." Another farmer pointed out that "...I was downhearted in the beginning because the rice could not abruptly absorb the nutrient from the organic fertilizer. I didn't give up and I continued to grow organic rice. Then my rice productions were steadily increased whereas the production cost was decreased. The quality of the soil was also getting improved..." Another farmer added that "...no chemicals could save the environment and there wasn't any effect on our health and customers..."

However, one farmer commented that "...We needed encouragement from those around us, patience to seek for knowledge and time to learn how to do the organic paddy field. We also needed to balance production resources and restore them from the deterioration caused by doing the chemical paddy field..." Another farmer stated that "...many farmers still produced chemical rice. Only one family cultivated organic rice for household consumption...To do organic paddy field, we must be a role model in illustrating how good it is so that others would trust and follow us..." To Rittinon and Uruyos (2017), trustworthiness among the organic farmers was a significant factor which had a great impact on their decision making and leading to organic farming adoption.

The major reasons for the farmers to do the organic Sangyod Muang Phatthalung rice farming are as follows:

1. The GI Rice

There was an acceptance for being a Geographical Indication (GI) approved on March 14, 2006 under the name "Sangyod Muang Phatthalung rice." It was considered as "intellectual property" and the marking tool which enables the value added. One of the farmers said "...GI rice was the rice here, cultivated here but could be sold anywhere in this world. It was the local rice here and a good product of this province..." Nevertheless, the European Union (EU) proclaimed that Sangyod Muang Phatthalung rice was the fourth geographical indication of Thailand, following the Thung Kula Ronghai jasmine rice, Doi Chang coffee, and Doi Tung coffee which have been effective since November 1, 2016.

2. The Optimization of Areas

The farmers had tried different methods to seek out the most suitable rice varieties, both from observation and learning from the mistake. The farmers had planted various rice and they found that Sangyod rice provided an impressive outcome. DeFleur (1970 as cited in Baran and Davis, 2011) proposed that ones with not so good education, they would do better at practice rather than theory. It could be noticed that most of the farmers received primary school education.

3. The Higher Sale Price

According to the statement "...Sangyod rice has a good price, more and more people were cultivating it. Once it was grown organically, the price was increased...". The Sangyod Muang Phatthalung rice had been approved for the agriculture organic standard of Thailand. It was more trustable for the consumers. This notion was supported by the Maslow's Hierarchy of Needs Theory in stage two which stated that person seeks for safety and security (Janyam, 2013). While Soma (2009, p. 28) added that, most consumers preferred organic rice which guaranteed the organic agricultural standard.

Farmers' Resources Management for Organic Rice Farming Based on the Fundamental Principles of the Sufficiency Economy Philosophy

One of the farmers proposed that "...heaven was at heart. If our mind felt adequate, and we learned to live moderately, we would find happiness...". The farmers managed the resources for organic agriculture. They illustrated that they applied the sufficiency economy philosophy which included moderation, prudence, self-immunity, knowledge, and morality as shown in figure 2 below:

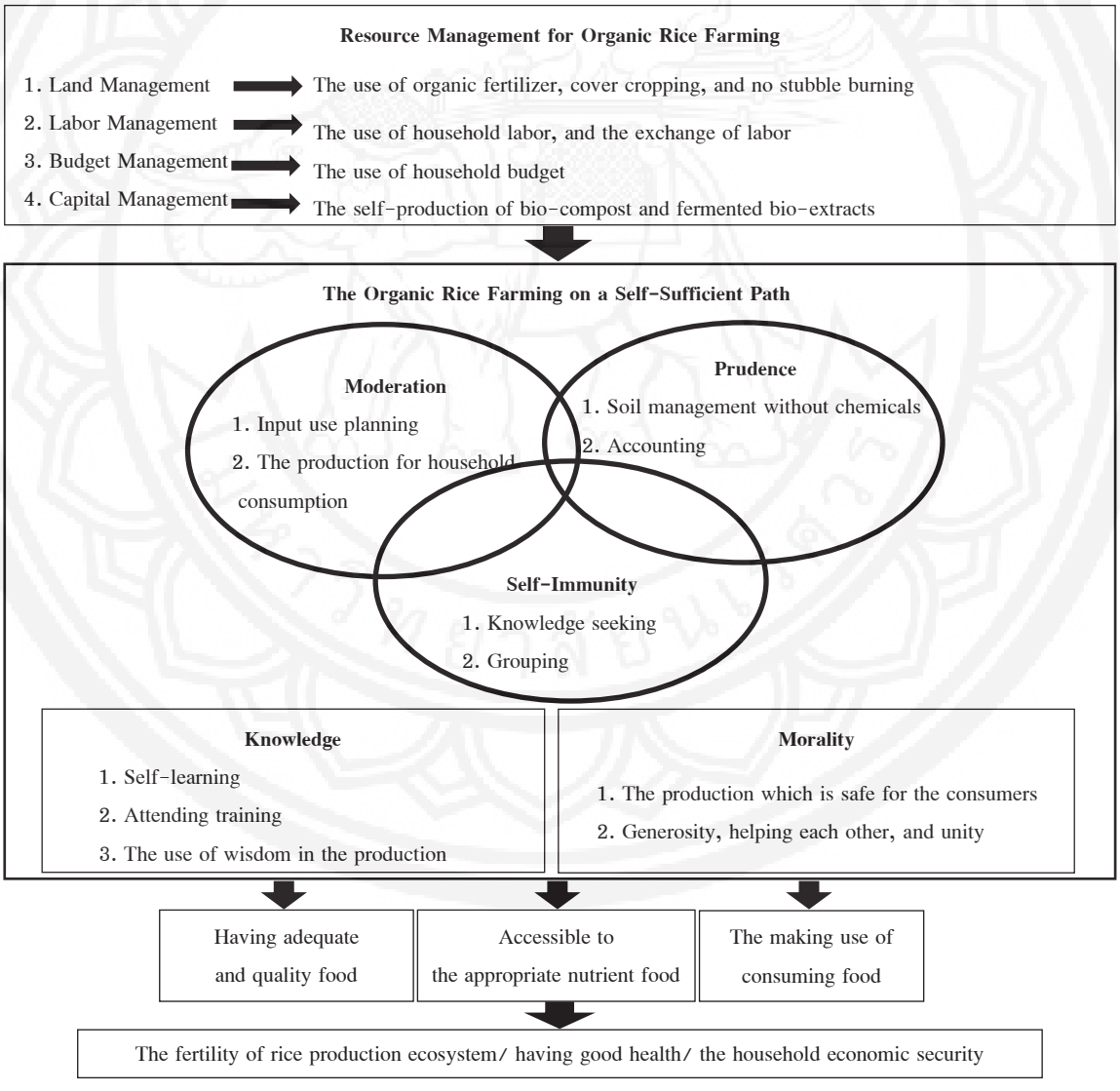

Figure 2 Farmers' resources management for organic rice farming based on the fundamental principles of the sufficiency economy philosophy

1. Input Use Planning: The farmers have planned to use the existing budget and production input appropriately such as land, labor, capital and so on to produce the organic rice. Vegetables such as Chinese kale, chili, and lettuce, were planted for household consumption. It reflected that the farmers must have knowledge and wisdom related to organic rice production and vegetable production. The farmers have used the household labor (husband-wife labor) as major labor for the organic rice production as one farmer said "...the household labor is used to construct unity and generosity..." Besides, the farmers only used the household budget to produce the organic rice because the major reason for growing organic rice was for household consumption. If the amount of the products was beyond their needs, they would be sold to generate revenue. The exceeding products might be distributed to their acquaintances. The farmers normally did not produce rice beyond their production capability or the existing production input. This showed that they could have self-reliance in terms of food since they could produce and had adequate organic rice for household consumption in line with the Thai proverb "Self is the self-reliance." Moreover, it showed that the farmers considered self-security, the household members, and the consumers because the organic rice did not have any chemicals or there was no any chemical remaining in the products. In addition, growing the organic rice could generate revenue which did not harm anyone including the environment.

2. The Soil Management: Here, the farmers restored soil fertility by planting the leguminous plants after the harvest season. The leguminous plants such as green beans and sun hemp could increase Nitrogen (Nitrate and Ammonia) in the soil. Apart from keeping soil's moisture, the leguminous plants also prevented surficial soil erosion effectively. The farmers had produced the bio-compost as well as the fermented bio-extracts for their farming from the raw materials they could find in their area with a low budget. These organic fertilizers provided rich nutrients for plants and had no negative impacts towards the soil balance and all living things in the soil.

3. Accounting: The farmers conducted a family accounting in order to calculate the household's expenditures and incomes. Besides, they also conducted a farm accounting to calculate the cost and the return on producing organic rice.

4. Knowledge Seeking: In terms of acquiring knowledge, the farmers gradually sought it and learned how to do the organic rice farming through various media such as farmer friends, role model farmers as well as attended the activities which the related government organizations provided such as training.

5. Grouping: The farmers had gathered groups of organic paddy field in order to reduce or prevent the middleman who took advantages over them especially the price. Besides, they helped each other to find the markets for their organic rice and brain-stormed to find ways to reduce the production cost of organic paddy field.

Although doing the organic rice farming provided positive impacts, some farmers confronted with some treats which they could not avoid or beyond their control to manage. For example, flooding and drought created damages to not only the organic rice but also other agricultural products. Flooding caused decayed rice which could not be harvested while the drought caused dried rice or improper growth. These problems had effects on the rice production method and the agriculturist's ways of lives and wisdom. Regarding the diversity of local rice seeds, it resulted in decreasing food security of the family in terms of food availability, food access, and food utilization, respectively.

Conclusions and Recommendations

There were five factors for the farmers to transform from chemical paddy fields to organic paddy fields: (1) the cost of rice production, (2) the indebtedness, (3) the health problems, (4) the soil degradation, and (5) the extension of services from the related government agencies. The farmers managed resources for organic rice

farming in accordance with sufficiency economy philosophy. In terms of moderation, the farmers had planned for land use, labors, capital, and household's budget. The rice production was mainly for household consumption. In terms of prudence, the farmers conducted household and farm accounting to control cost as well as to estimate the profit. They also managed the soil without using any chemicals. In terms of self-immunity, the farmers had gathered in groups and searched for knowledge. As a result, the organic rice farming led the paddy fields to have ecosystem balances. The farmers had good health, and their households had financial security. The findings from this research could be used to recommend related government agencies as follows:

1. Promote the knowledge of organic rice farming in accordance with the sufficiency economy philosophy to the new generation of farmers due to the fact that many elderly farmers are illiterate and having communication problems. In spite of the declining rate of the new generation to work in the agriculture sector, the use of information technology and the acceptance of modern technology can lead to the development of organic rice production which is challenging.

2. To reduce the cost of production in the transformation from the chemical paddy fields to organic paddy fields, the related government agencies should encourage the farmers to conduct the farm accounting. In doing so, the farmers can see the actual cost of organic rice production; hence, they can make a decision for adjusting or using appropriate input. Besides, the farm accounting can help the farmers to reduce any unnecessary cost of production.

3. The related government agencies should raise the farmers' awareness for health concern by pointing out the positive effects on the farmers from doing organic paddy field instead of chemical paddy field. Besides, it also helps to reduce the cost of production, the rice products can be sold at higher prices, and it can increase the fertility in soil et cetera.

4. The related government agencies should plan urgently regarding the water management in order to reduce the flood problem due to the fact that flood could create ample disaster to the organic rice products as well as the other agricultural products.

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