Socio Economic Analysis of Organic Rice Farming System in West Sumatra, Indonesia

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(インドネシア西スマトラ州における有機稲作の社会経済的分析)

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CHAPTER 1

INTRODUCTION

1.1 Background and problem statement

In the late 1970s, Indonesia was the largest importer of rice. This condition has led Indonesian Government had decided to fulfill Indonesian demand of rice. Self sufficiency in rice is a must because the majority of Indonesian dependent on rice as staple food. At the same time, the Green Revolution movement was promoted in Asia. Under President Suharto instruction, the government invested in rice production by increased paddy yield production, improved irrigation systems, used high inputs including chemical pesticides and gave subsidies of up to 85% for fertilizer and organized quality-seed production. Most of Indonesian farmers and experts supported this program. As a result, Indonesian government efforts showed a significant result, that in 1984 Indonesia achieved self-sufficiency in rice**.**

It cannot be denied that the use of pesticides, artificial fertilizers and machinery in industrialized countries and the implementation of the Green Revolution in developing countries have increased production (Conway and Barbier, 1990). However, the Green Revolution has been implemented in a way that resulted in not to be environmentally sustainable (Kendall and Pimentel 1994).

In fact, the amazing paddy production growth in two decades (1970s-1980s) in Indonesia getting decline in the beginning of 1990s. It is also shown by a declining

growth rate of paddy production, maize and corn in the world during period from 1985 to 1991**.** The production growth decreased because the inputs used already exhausted. Farmers have high dependency on chemical pesticides in protecting their crops. Moreover, the growth of agricultural productivity also has resulted in the cost of long term degradation on biophysical environment.

Realizing the negative effect on the environment of using high inputs in agriculture, the term of sustainable agriculture is promoted all over the world. The Agenda 21 in Rio de Janeiro in 1992 stated that every nation have to sustain their agricultural development policy on sustainable agriculture principle. Organic farming is one way to achieve sustainable development of agriculture. Ecologically, the organic farming improved soil quality for future planting seasons (Pacini *et al*., 2003). Economically, farmers have less cost production because they do not have to pay for expensive chemical pesticides and fertilizers (Pimentel *et al*., 2005). Organic farming also can improve rice productivity (Irawan *et al*., 2012).

In this regard, Indonesia has a role committed to support the Agenda 21 by introducing a program entitled Go Organic 2010. This program launched in 2001 by the department of agriculture of Indonesia to enhance development of organic farming in Indonesia. The program aims to become one of the biggest organic exporters in the world. Input facilities were supported by Indonesian Government to promote this program. In terms of financial support, 300million IDR was allocated by national government in 2007. The amount of budget was increased significantly in 2009 (5200million IDR) and was decreased slightly in 2010 (Irawan *et al*., 2012).

Moreover, in terms of institutional support, a Competent Authority of Organic Agriculture (OKPO) was established. OKPO is in charge of developing organic food in Indonesia, includes a number of decrees and rules issued to regulate the organic sector. Eight national organic certification bodies have obtained OKPO accreditation and out of them, only one organic certification body is in Sumatra, which is located in West Sumatra (certificate no OKPO LS-004). According to Indonesia Organic Alliance report (2015), the proportion of organic farming area in Indonesia in 2014 is only 0.9% of total agricultural land. The total of organic land area of Indonesia is 215,176 ha. Among organic agricultural products, rice is one of the main certified products.

There are some problems with organic rice products in Indonesia, including certification, quality control and consistency. Farmers who do not have an organic certificate have difficulty in marketing their products. In the case of West Sumatra, market for organic rice is still small. This is related to the small number of farmers who have received the organic rice certificate and the small amount of rice production.

In order to achieve sustainable organic rice agriculture, therefore, it is important to investigate what are the characteristics of the organic rice farming system in West Sumatra, who are the role players in promoting organic rice farming system, what are farmers main reasons implementing organic rice farming system, how do farmers distribute their products and how do consumers views on the existing organic rice related to its distribution channels and organic certificate label. The framework of this study can be seen in Figure 1.

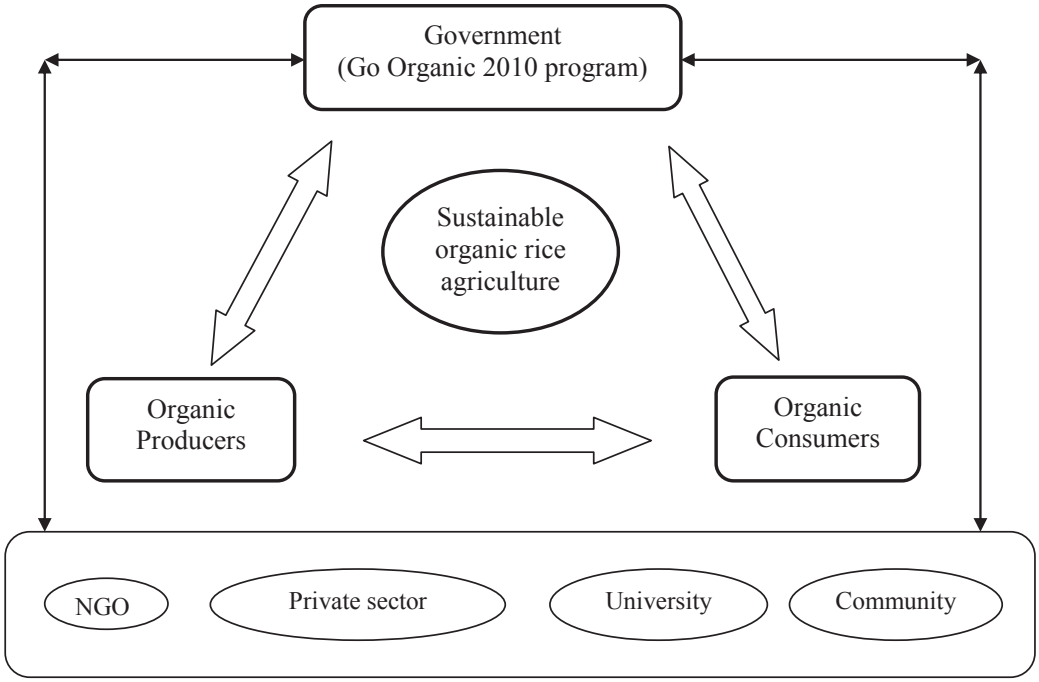


Figure 1. Study framework on socio economic analysis on organic rice farming system in West Sumatra, Indonesia

Note : The research framework was made by the author

1.2 Research objectives

There are three overall objectives of this thesis:

1. To gain increased understanding of the current development of organic rice farming system in West Sumatra, Indonesia.
2. To analyze economic aspect of organic rice farming system in West Sumatra, Indonesia.
3. To explore organic rice distribution channels in West Sumatra, Indonesia.

The specific objectives of this thesis are:

1. To examine farmers' perception on organic rice farming system, including organic certification.

2. To investigate the role players in the development of organic rice farming system.
3. To examine the total income and profit on organic rice farming system.
4. To develop a distribution channel of organic rice from farmers to consumers including farmers group and other stakeholders.
5. To identify consumers perception on organic rice in terms of their reason, perception and expectation on organic rice regarding to distribution channels.

1.3 Structure of the thesis

This thesis is concerned with the development of organic rice farming system in West Sumatra and its capacity to provide sustainable future for farm and farmers. Trilateral network is used as a framework for this inquiry and an exploratory case study approach has been employed in order to answer research objectives. The introductory chapter begins with background and problem statement and then gives objectives of the research theme. In the second chapter, the literature review related to organic farming and research theme is explained. In the methodology section, research approach and data collection methods are introduced. Subsequently, the research results are presented and discussed in three sections (chapter 4, 5 and 6) corresponding to the specific objectives. Finally, conclusions are drawn and it offers some though for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Definition and Principle of Organic Farming

FAO (1999) defines organic agriculture is *'a holistic production management system which promotes enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activities. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfill any specific function within the system'*.

One leading international federation which concern on promoting organic agriculture is IFOAM (International Federation of Organic Agriculture Movements). IFOAM was established in 1972. IFOAM defines organic agriculture is '*a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved'*. IFOAM published regulations to certify organic production, which is needed to obtain organic label. The basic standard for organic production and processing under IFOAM that have been widely adopted by many countries around the world is presented in Table 1.

Table 1. The principle aims of organic production and processing

- To produce sufficient quantities of high quality of food and other products.
- To work compatibly with natural cycles and living systems through the soil, plants and animals in the entire production system.
- To recognize the wider social and ecological impact of and within the organic production and processing system.
- To maintain and increase long term fertility and biological activity of soils using locally adapted cultural, biological and mechanical methods as opposed to reliance on inputs.
- To maintain and encourage agricultural and natural biodiversity on the farm and surround s through the use of sustainable production systems and the protection of plant and wildlife habitats.
- To maintain and conserve genetic biodiversity through attention to on farm management of genetic resources
- To promote the responsible use and conservation of water and all life therein.
- To use, as far as possible, renewable resources in production and processing systems and avoid pollution and waste.
- To foster local and regional production and distribution.
- To create a balance between crop production and animal husbandry
- To provide living conditions that allows animals to express the basic aspects of their innate behavior.
- To utilize biodegradable, recyclable and recycled packaging materials
- To provide everyone involved in organic farming and processing with a quality of life that satisfies their basic needs, within a safe, secure and healthy working environment.
- To support the establishment of an entire production, processing and distribution chain which is both socially and ecologically responsible.
- To recognize the importance of, and protect and learn from, indigenous knowledge and traditional farming systems

Source: IFOAM, 2002

IFOAM stated that there are four basic principles of organic agriculture:

1) Principle of health; Organic agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.
2) Principle of ecology; Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.
3) Principle of fairness; Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.
4) Principle of care; Organic agriculture should be managed in a precautionary and responsible manner to protect the health and well being of current and future generations and the environment.

It is important to note that IFOAM emphasizes that any system that applies organic methods and is based on principles of agriculture as organic agriculture and farmers who implement it are certified as organic farmers.

2.2 Benefit of organic agriculture

There is an increase in environmental awareness, food safety and health due to the impact of the use of external inputs in agriculture. Organic farming is seen as one solution for this. What makes organic agriculture unique is that using synthetic inputs are prevented and improving soil fertility must be maintained to reduce weeds, pest and disease problems (FAO, 1999). Rigby and Caceres (2000) suggest that organic farming is one of several approaches to achieve sustainable agriculture.

Recent years, there has been a growth in publication on analyzing the benefit of organic farming. Hole *et al*. (2005) have proposed that organic farming is seen as a right solution to solve the global problems of loss of biodiversity. Organic farming is socially and ecologically sustainable (Pacini *et al*., 2003; Pimentel *et al*., 2005; Sukristiyonubowo *et al*., 2011; Todorova and Ikova, 2014). FAO (2002) asserted that organic agriculture improves biodiversity and restores the natural ecological balance through intercropping and crop rotations, preserves soil and water resources; improve organic matter and biological processes.

Organic farming also can be used as a tool for productivity and poverty reduction in Asia (Giovannucci, 2007), as is resulting improvement in the socio economic condition of the farmers (Scialabba *et al*., 2003). Organic farming also can contribute to local food security (Scialabba and Hattam, 2002) and global food supply (Badgley *et al*., 2006). Organic farming is believed to maintain the sustainability of agriculture systems and adapt to climate change (IFOAM, 2009; FAO, 2011; Tadeo and Baladad, 2012).

Although it has been stated that organic farming is productive and sustainable, FAO (2002) suggested that it is very important to have a certain policy measures to maintain the progress of organic agriculture. Support for agriculture should be shifted from production goals to environmental and social goals in order to achieve organic agriculture. Several studies asserted that it needs for strong support in terms of agricultural extension services and research (Reddy, 2010), also support on technology and policy (Willer *et al*., 2015) and it should consider the regional differences and farmers preference (Patil *et al*., 2014).

2.3 Development of organic sector in the world

According to FiBL and IFOAM report (2015), the growth of organic agricultural land in the world has become four times compared with 1999 (Figure 2). The considerable increase on organic land area between 2011 and 2014 is due to a 53 percent growth in fully certified organic land area in Australia. 72 countries had an increased in the area of organic agricultural land, while other 31 countries were reported a decrease in the area of organic agricultural land (Willer *et al*., 2015). FAO (2002) have predicted that where many European countries have ambitious targets for expanding their agricultural land, Western Europe may have about a quarter of its total agricultural land under organic management by 2030.

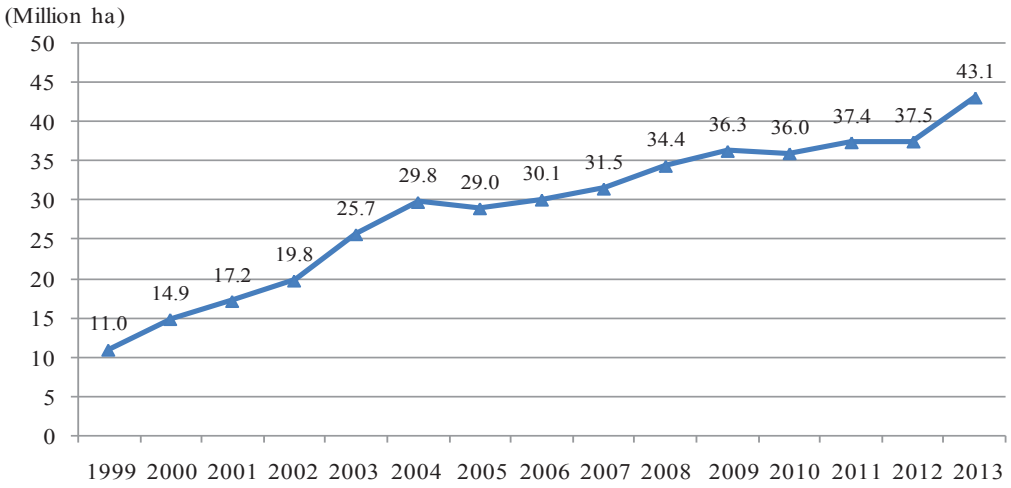


Figure 2. Growth of the organic agricultural land 1999-2013
Source : FiBL – IFOAM, 2015

In 2013, there are 43.1 million hectares of agricultural land are organic and 170 countries have data on organic agriculture (including conversion areas). Figure 3 shows the ten countries with the largest areas of organic agricultural land in 2013. Australia is the largest organic agricultural land with 17.2 million ha, continued by Argentina (3.2 million ha) and the United States (2.2 million ha).

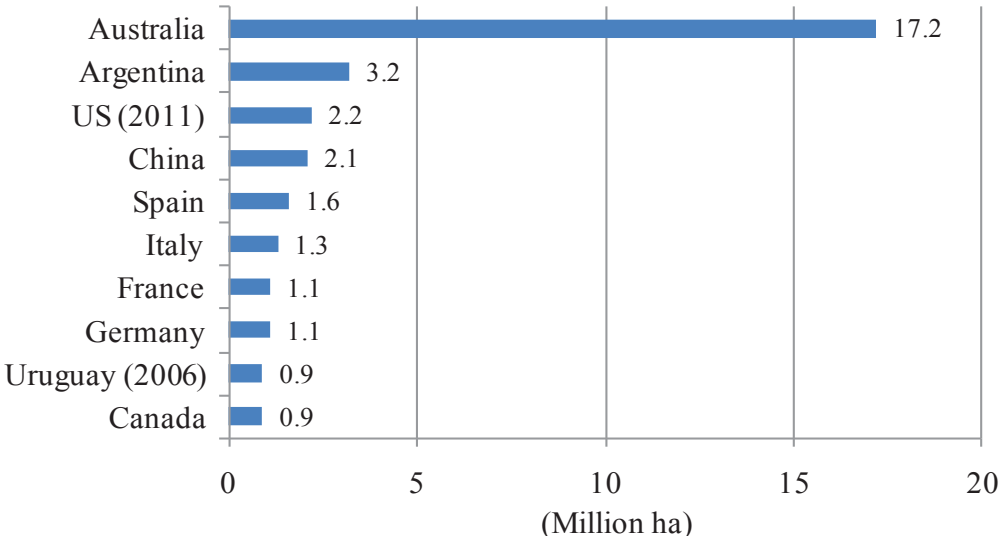


Figure 3. The ten countries with the largest areas of organic agricultural land 2013

Source : FiBL – IFOAM, 2015

Among Asian countries, China is the largest organic agricultural land (2.1 million ha) where Indonesia reached number fifth among the ten countries (65,688 ha) (Figure 4). There are 2 million organic producers in the world and more than 75 percent of them are in developing countries. In terms of organic producers, India is the country with the most organic producers (650,000 producers) (Willer *et al.*, 2015).

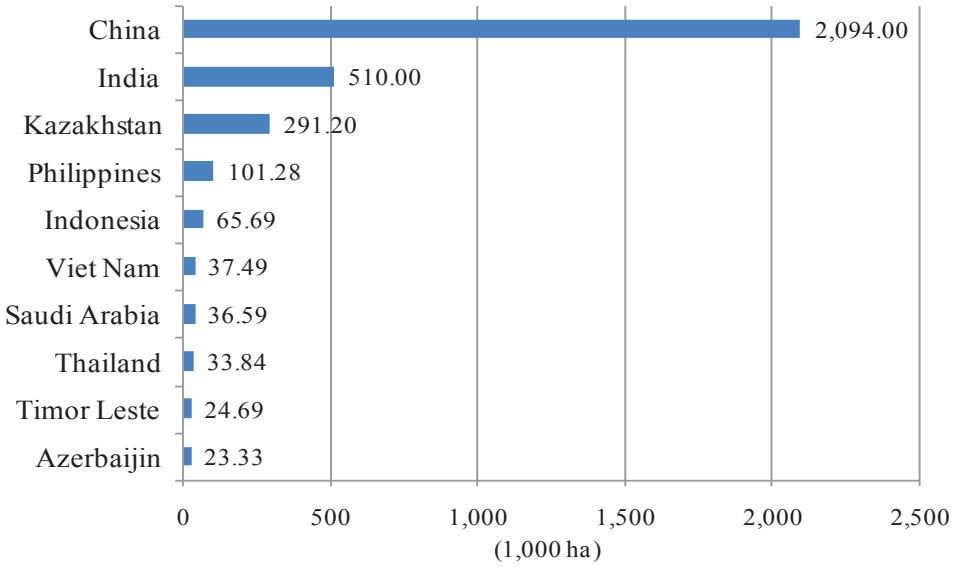


Figure 4. Asia: The ten countries with the largest organic area 2013

Source : FiBL – IFOAM, 2015

2.4 Market of agricultural organic products

The increase in global organic production leads to export opportunities for large scale farms. A demand for new organic products has been created (Soil Association, 2014). Although the market data for organic products are not available detailed for all countries, but in general the organic products market is continually growing (Lernoud *et al*, 2015). However, problems remain in marketing the organic products for organic farmers who do not have organic certification yet and have lack of access to the market. FAO (2002) asserted that in developed countries, organic agriculture is based on systematic process and methods that were monitored by inspection and certification bodies. While in the developing countries, they do not have their own organic standards and certification systems.

This is especially so for small scale farmers in developing countries, especially in South East Asia, even though they are supported by the government, community and NGO (Hong, 1992; Suh, 2015; Wai, 2014; Hsieh, 2011; Mayrowani, 2012; Takada *et al*, 2004). Most of the organic products are for local consumption and are sold at the same price as other producers. But nowadays, many developing countries are producing organic commodities for export to developed countries market (FAO, 2002).

There is a different approach in marketing agricultural products and organic agriculture products. Acharya (2001) explains marketing agriculture includes 1) performance of physical and institutional infrastructure to transfer products from farmers to consumers, 2) the different prices at different stages of marketing. However, in marketing organic agricultural products, producers should hold necessary guideline

for labeling their product as ‘organic’; then they can sell the products to the market. A difference on organic market can be seen where small scale organic farmers focus on local markets while larger farmers can aim for global organic market.

In developed countries, the large scale organic farm can hire an organic certification body to annually monitoring that their products apply organic standard. The high cost for the monitoring leads to high price. High price of organic product is one of obstacles for consumers to buy organic products (Marian *et al*, 2014; Falguera *et al* 2012). Arai and Moore (2004) found that mostly organic vegetables and organic fruits are sold in the state of Ohio, United States only because they cannot be kept fresh in long time while other products are sold to out of the state. According to Essoussi and Zahaf (2012), there are logistics and distribution cost from regional produced organic products to the market that make high price of organic products.

2.5 Organic certification

It is generally agreed that demand for organic products is concentrated in certain regions of the world, especially in developed countries. In addition, it is expected that the number of organic standard to get organic certification will be growing. The certification aims to show and guarantee to consumers that products have been produced in an organic way. IFOAM accreditation is the international verification of competence for certification bodies active in organic agriculture. They established an international organic standard in 1980 and have developed their first requirement for organic certification in 1992. It has been adopted by many countries and in many sectors.

Rigby and Caceres (2000) asserted that certification and inspection process will provide the link between organic producers and consumers. There are various regulations in different countries that apply to certify organic foods. However, labeling is becoming one of the problems for organic farmers. The certification process is complex and need inspection annually in order to keep the certificate. International certification can take much time and be very expensive. FAO (2002) emphasize that most developing countries do not have their own organic standards and certification systems. At this point, farmers in developing countries find many problems to get the certificate including the cost and applicability of certification (Barret *et al*, 2002).

One cannot deny that producers and consumers will continue to be geographically different places. For example the Asian market is seen by import of large amount of processed organic products to industrialized countries. The retail prices for organic agriculture products become expensive because of the high import cost. Organic products can be five times more expensive than conventional products in Asian markets (Cadilhon, 2009). IFOAM clarifies that there are organic farmers who think that the certification does not have any merits. This is because a small scale farmer who usually practice subsistence farming and have limited production states that the certification has no market value.

A participatory guarantee system (PGS) program, a locally focused quality assurance system, was introduced by IFOAM to certify producers based on stakeholders participation which build on trust, social networks and knowledge. The PGS program allows more appropriate mechanism of certification based on local knowledge and stakeholder's participation which is suitable to small scale farmers. This system has

been implemented successfully in Latin America, India and Japan. In Japan, this system is called "*Teikei"* or the producer-consumer co-partnership. In the *teikei* movement the idea of local self-sufficiency has been grown. The idea is that an independent local unit where organic foods consumed is grown, produced and processed within area, by building support and cooperation between farmers and consumers (JOAA, 1993). The PGS program (in varied descriptions in each country) can play a role in developing consumers' trust in local organic produce which at the same time can eliminate the verification cost (Cadilhon, 2009).

Regarding the challenges of organic products market, two strategies can be implemented, which are strengthen local demand for organic produce and respond better to local organic markets (Cadilhon, 2009). Consumers also will have a greater awareness on purchasing organic product if there is an appropriate regulation on organic product (Hsu and Chen, 2014). Although it should be noted that public and private standard and regulatory aspect on organic products may have positive and negative outcomes (Falguera *et al* , 2012). Cooperation and commitment are the keys to success rather than competition in marketing organic products (Canadian Organic Growers, 2005).

It is relevance to note that certification logo plays an important role in marketing. In developed countries, Jansen and Hamm (2012) conducted interview with organic consumers in the six European countries (Czech Republic, Denmark, Germany, Italy, Switzerland and United Kingdom) and found that consumers trusted organic logo that they knew well. Their preference are based more on subjective than objective.

2.6 Consumer preference on agricultural organic products

Consumers are becoming critical on consuming agricultural products. Millstone and Lang (2008) asserted that the increasing awareness of health and environmental issues has encouraged people to make a lifestyle choice. Consumers may pay more for food which they feel safe and less damaging for environment. Therefore, to involve in organic product market, consumer expectation on organic product is important to understand regarding food buying behavior (Schleenbecker and Hamm, 2013; Rodiger and Hamm, 2015; Shafie and Rennie, 2012). Chryssohodis and Krystallis (2005) used List of value (LOV) to examine organic consumer exploratory food buying behavior in Greece. They found that a number of positive aspect of organic product (health and environmental consciousness) become an important factor in purchasing organic products.

Another finding (Basha *et al*, 2015; Ferdi, 2008; Hjelmar, 2011; Witzel *et al*, 2013, Stolza *et al*, 2011) also show that the most commonly stated by consumer to purchase organic products are because of the quality of products, environmental concern and health. A study by Bartels and Reinders (2009) found that there is a relationship between individual and their social environment in consuming organic food consumption in the United States, The United Kingdom and Germany. In addition, ethical issues such as ‘animal welfare’ and ‘regional production’ also attract consumer concern in Europe for purchasing organic products (Zander and Hamm, 2010). Figure 5 shows that there are many factors that influence consumers’ decision on purchasing organic food products.

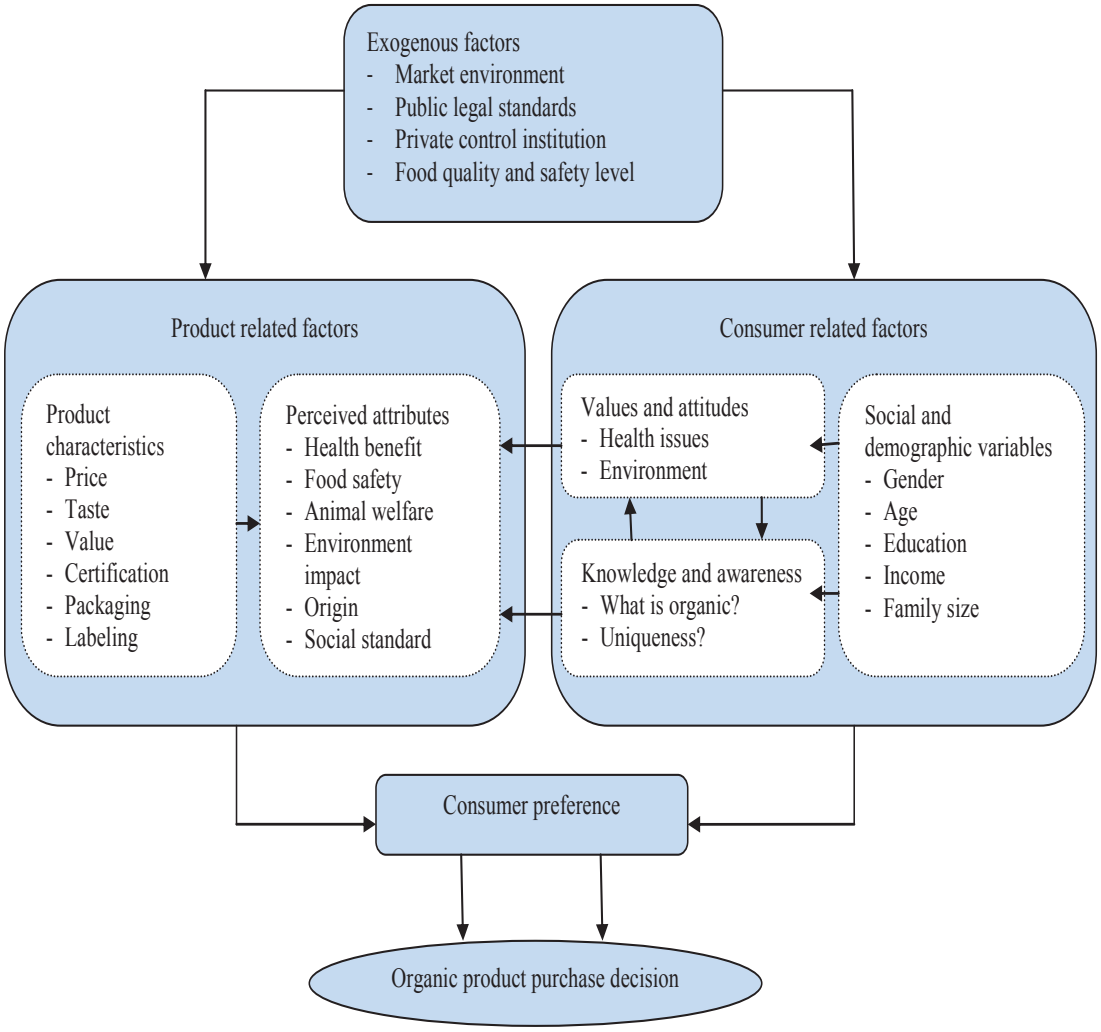


Figure 5. Framework of factors that affects consumer purchase decision on organic food products
Source : Yiridoe *et al*, 2005

Essoussi and Zahaf (2012) assert that there are three types of consumers based on usage rate, trust on purchase, and support for the local economy and the environment. The first type is true organic food consumers. The second type is sporadic organic food consumers. The third type is inexperienced organic food consumer. Environmental friendliness, food mileages and health and nutritional value are the main motivation on consuming organic food. Figure 6 shows the organic food market dynamics from the demand supply sides related to the three kinds of consumers types.

While there are a number of studies on organic consumers in the developed countries, there are few studies on consumer perception on organic food in Asia. (Schobesberger *et al* (2008) found that organic food consumers in Bangkok, Thailand believe that organic products are environmentally friendly. However, they cannot clearly differentiate between pesticide safe labels and organic labels. Moreover, Wyatt (2010) found that local consumers in Chiang Mai, Thailand were more concern about the assurance of the safety of the food they eat rather than the food has international certification. The consumers accepted local standard.

In Japan, Kim *et al* (2008) found that Japanese consumers are willing to pay 10% price premium for organic food products compared to conventional products with no specific labeling. Moreover, Japanese consumers preferred to domestic organic products than to imported organic products, while they do not show any preference for particular imported organic products country.

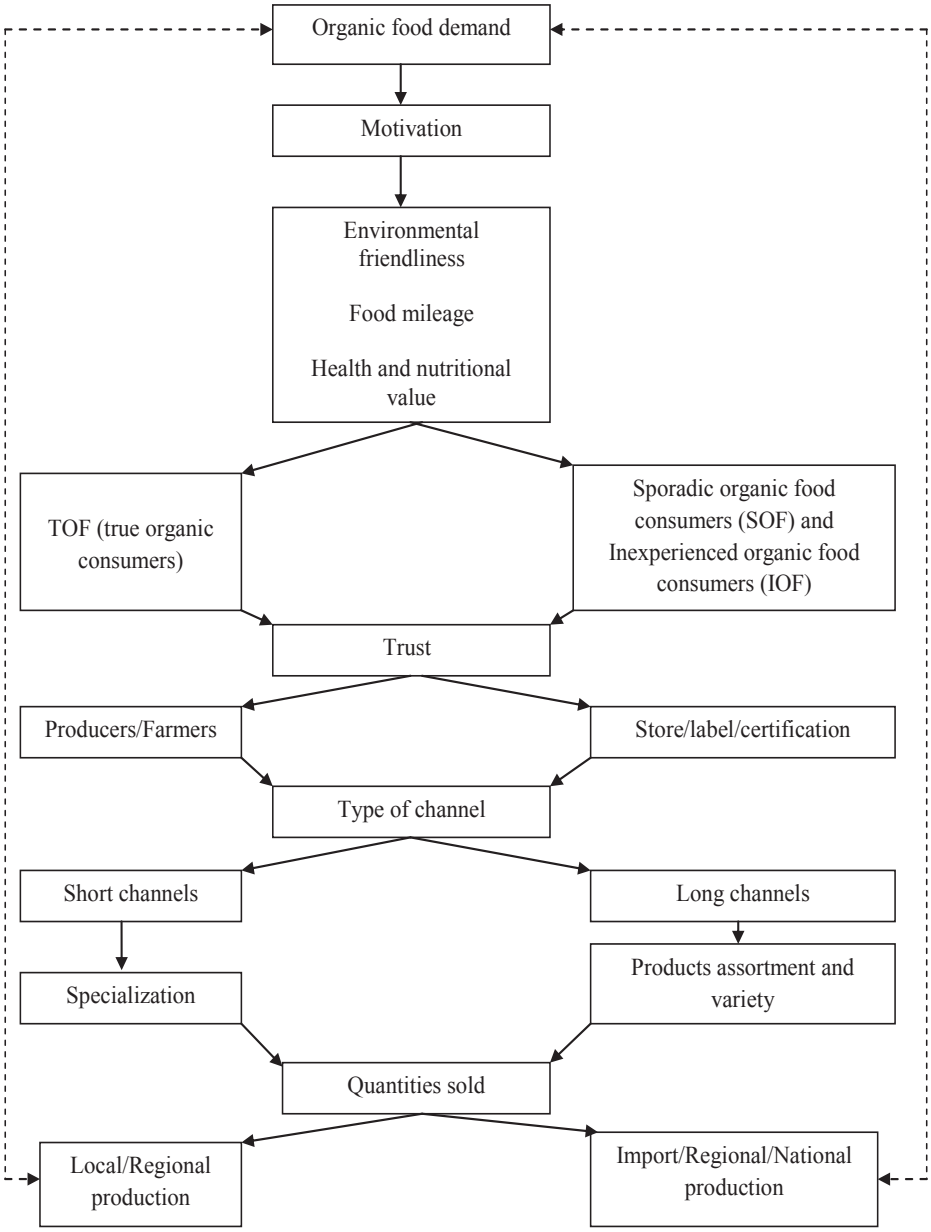


Figure 6. Organic food demand supply model

Source : Essoussi and Zahaf, 2012

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research area

The Province of West Sumatra is located in the west coast of Sumatra Island, Indonesia. It has an area of 42,130.82 km². The 2013 census recorded its population as 5,133,988 and its capital is Padang City. The geographic characteristics are plains and mountainous volcanic highlands formed by the Barisan Mountain range that runs from north-west to south-east, which make the land good for agriculture (Figure 7).

Map of Indonesia

Map of West Sumatra Island, Indonesia (in red highlighted)

Figure 7. Map of research area in West Sumatra, Indonesia

Farmers' survey was conducted in Agam District and in Lima Puluh Kota District while for consumers' survey was conducted in Agam District, Lima Puluh Kota District, Padang City and Bukittinggi City. Agam District and Lima Puluh Kota District

were chosen because, according to the Department of Agriculture of West Sumatra, Agam and Lima Puluh Kota district have a large number of farmers groups participate in organic rice farming system and both districts showed good progress in implementing an organic rice farming system compared to the other 14 districts in West Sumatra (Table 2).

Table 2 Number of farmers group participate in organic rice farming system in West Sumatra, Indonesia

No	District	Number of farmers group
1	Padang	7
2	Padang Pariaman	10
3	Padang Panjang	15
4	Tanah Datar	10
5	Lima Puluh Kota	9
6	Agam	16
7	Kab. Solok	6
8	Pasaman Barat	1
9	Sijunjung	1
10	Pesisir selatan	4
11	Pasaman	1
12	Pariaman	1
13	Payakumbuh	3
14	Solok Selatan	3
	Total	87

Source: Organic Certification Body of West Sumatra, 2010

3.2 Data collection methods

Research surveys have been conducted two times in order to obtain the research objectives. The first survey was conducted from March to April 2014 to gain information of the current development of organic rice farming system in West Sumatra and identify the farmers' point of view regarding production (supply) in two central organic rice cultivations in Agam District and Lima Puluh Kota District, West Sumatra, Indonesia.

Four farmers groups in Agam District and three farmers groups in Lima Puluh Kota District were selected. The farmers groups were divided based on three categories. First are farmers groups that have received the organic rice certificate. Second are farmers groups that are still undergoing the organic rice certification process. Third are farmers groups that have not been certified yet. Farmers' respondents are organic rice farmers who involved in a farmers group. Each group has a quota of 10 respondents based on the lowest number of farmers' group members. In total, 69 farmers who have been interviewed from a total of 117 famers of 7 farmers groups.

The second survey was conducted on March 2015 to gain information on organic rice distribution channels in West Sumatra and identify consumers' point of view on it. The survey was conducted in four districts, including Agam District and Lima Puluh Kota District (as the centre of organic rice production) and Padang City and Bukittinggi City (as the capital city of West Sumatra and the second biggest city in West Sumatra). In terms of respondent selection for consumers, consumers name and contact number was directly gain from farmers, farmers' group leaders and middlemen. In total, 46 consumers from four districts were interviewed.

Both structured and semi structured interviews and respondent observations were employed in primary research data gathering. Direct interview using a structure and a semi structure questionnaire with respondents (farmers and consumers) and key informants (farmers' group leaders, expert organic farmers and middlemen) were conducted face to face. The questionnaire was drafted in both English and Bahasa Indonesia. The interview were documented and transcribed. In addition, secondary data were collected from government reports and published papers by related organizations.

Collected data from farmers including respondent profile, farm land information, organic rice system information, organic rice farming system management, harvesting management, organic rice distribution and cost of organic paddy cultivation for the last planting season is in Annex 1. Furthermore, the collected data from consumers including consumers profile and consumers' perception on organic rice regarding to reason, distribution, price and their expectation are in Annex 2. Questionnaire for middlemen were designed to obtain about organic rice distribution system in the study area (Annex 3).

In terms of economic analysis, the data collected from farmers including:

a. Paddy production in the last harvest time (t/ha)
b. Paddy selling price at that time (IDR/kg)
c. Production cost (as seen in Figure 8)

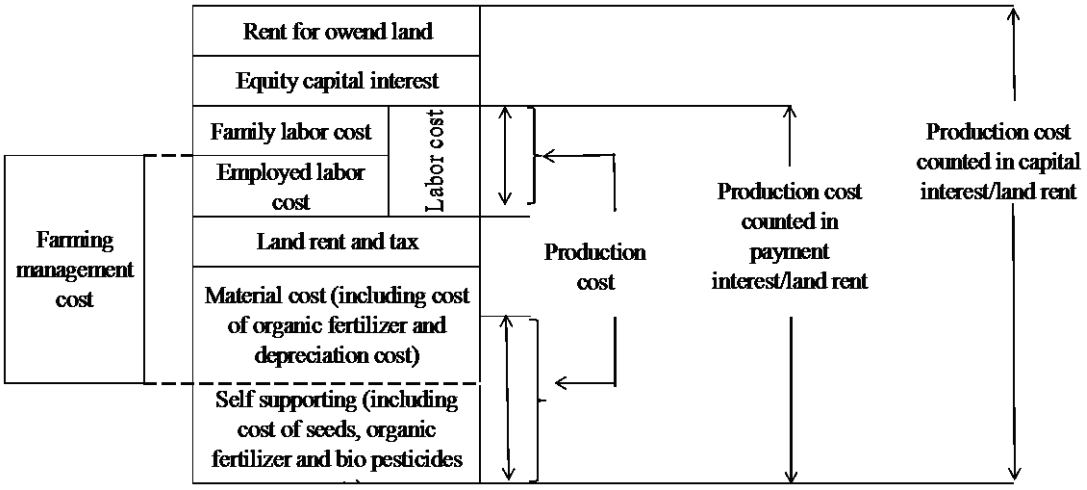


Figure 8. Production cost in organic rice farming system
Source : adapted from MAFF, 2015

3.3 Data analysis

This research used both deductive and inductive approaches in analyzing the collected data. Quantitative data are the first substance to the study, while some qualitative data are also required to answer research questions. The quantitative and qualitative data from farmers were analyzed in order to describe the characteristics, motivations, perceptions and economic benefit of organic rice farming system among organic rice farmers. The data from consumers were analyzed to describe consumer perception on organic rice. Lastly, the data were combined and analyzed to develop distribution channels of organic rice in West Sumatra.

In terms of economic analysis, total cost of production was calculated by adding all the expenditures as below:

Total management cost = ∑ of employed labor cost, land rent and tax, and material cost.

Total production cost = ∑ of labor cost, material cost and self-supporting cost.

Revenue is calculated by quantity (paddy production) x Paddy selling price.

The selling prices for every farmer were considered the same (5,500 IDR/kg).

Income is calculated by Revenue - Total management cost.

Profit is calculated by Revenue - Total production cost.

CHAPTER 4

DEVELOPMENT OF ORGANIC FARMING IN INDONESIA

4.1 Agriculture in Indonesia

Indonesia is the fifth most populated country in the world and is a major producer of agricultural products. Agriculture has played an important role in Indonesia economy during the economic crisis. Ministry of Agriculture of Indonesia (2015a) asserts that in the period of 2015 – 2019, the agricultural sector will continue to be one of the important sectors in supporting national economic development. Indonesia agricultural sector consist of two forms including large plantations (both state-owned and private) and smallholder production.

The large plantations are owned by either private or state company. They focus on export commodities such as palm oil and rubber. The smallholder farmers are mostly traditional agricultural households who plant horticulture commodities, such as rice, soybeans, corn, fruits and vegetables production. Table 3 shows the five main agriculture production (palm oil, rubber, cocoa, coffee and rice) and the growth of Indonesia's agriculture sector from 2010-2014. It was predicted that Indonesia agriculture sector is continue growing. Due to the expansion of large scale of plantation (especially palm oil), the percentage of Indonesia land area used for agriculture reach about 30% of Indonesia total land area.

Table 3. The main agricultural production and the agricultural growth in Indonesia, 2010-2014

(Unit : million tons, %)

The main agricultural products	2010	2011	2012	2013	2014
Palm oil	21.80	23.50	26.50	30.00	31.50
Rubber	2.73	3.09	3.04	3.20	3.18
Cocoa	0.57	0.43	0.50	0.57*	
Coffee	0.69	0.63	0.75	0.74	0.71
Rice	66.40	65.40	69.10	71.30	70.90
Agricultural growth (annual percent change)	2.9	3.0	4.0	3.4*	2.4*

Source : World bank cited in Indonesia Investments
*) indicated a forecast

The percentage of Indonesian land area used for agriculture stayed constant at around 21 percent of Indonesia's total land area from the mid-1960s to mid-1980s. However, this number increased to almost 25 percent from the mid-to the late 1990s. In 1998, there was a huge investment on the establishment of large scale plantations, especially palm oil. This number reached the current level of 30 percent (Indonesia investment, 2016). According to the agricultural statistic (Ministry of Agriculture of Indonesia, 2015), the land utilization in Indonesia is largely used for dry field (30%) and wet land (21%). However, there is 36% of land is still temporarily unused land (36%) (Figure 9).

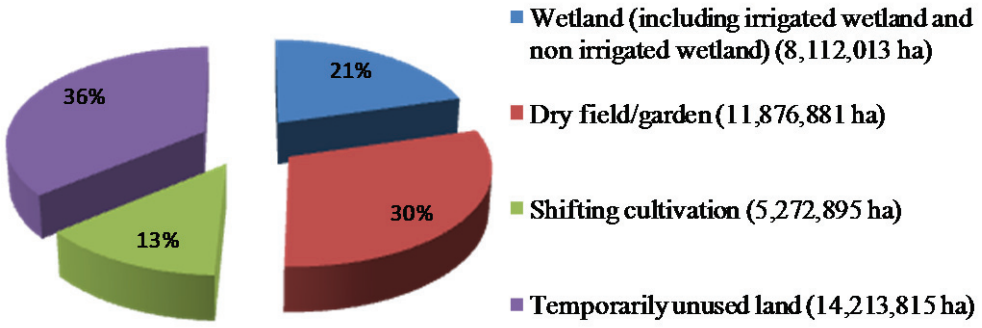


Figure 9. Percentage of agricultural land utilization in Indonesia, 2014
Source : Ministry of Agriculture of Indonesia, 2015

The Indonesian agricultural growth over the past half century can be categorized into four stages. First is from year 1961 to 1967 that is called instability period. Second is from year 1968 to 1992 that is called green revolution period. Third is from year 1993 to 2001 that is called stagnation period. Fourth is from year 2002 to 2006 that is called liberalization period. During the stagnation period, there was a decline in food and agricultural production per capita, while the crop production per hectare was almost static (FAO report cited in JICA, 2013).

Under the new government, the Ministry of Agriculture of Indonesia is preparing a strategy to move agriculture position to be a driving force of national development. The Working Cabinet agenda, called NAWACITA, is focus to trigger agricultural development to achieve food sovereignty. There are three points on the agenda. First is to fulfill the food needs from domestic production. Second is to regulate food policy independently. Third is to protect and improve the life of farmers as actors the main food agricultural businesses. In order to achieve the main targets, the Ministry of Agriculture implements strategic objectives:

1. The achievement of self-sufficiency in rice, maize and soybeans as well as increased production of sugar and meat.
2. An increase in diversification.
3. An increase in added value commodity and competitive export market and import substitution.
4. The supply of raw materials and bio energy bio industry.
5. An increase in the family income of farmers.
6. Accountability of the good performance of the government apparatus.

4.2 Rice production in Indonesia

Rice is a staple food in Indonesia diet. Rice production plays an important role in the national economy. Indonesia agriculture census 2013 showed that the number of farm households on crops is 17.73 million households (67.83% of total farm households). With the population of 252.17 million people and the population growth of 1.31% and the rate of rice consumption is 132.98 kg/capita/year, it is important to increase paddy production to overcome rice supply shortage. It is predicted (first forecast in 2015) that paddy production will increase 6.64%. Paddy average production and average growth in Indonesia from 2011 to 2015 can be seen in Table 4.

Table 4. Paddy average production and average growth in Indonesia, 2011-2015

(Unit : ton, %)

No	Province	Year					Average production	Average growth
		2011	2012	2013	2014	2015*		
1	East Java	10,576,543	12,198,707	12,049,342	12,397,049	12,778,353	11,999,999	5.02
2	West Java	11,633,891	11,271,861	12,083,162	11,644,899	12,018,743	11,730,511	0.92
3	Central Java	9,391,959	10,232,934	10,344,816	9,648,104	10,602,573	10,044,077	3.30
4	South Sulawesi	4,511,705	5,003,011	5,035,830	5,426,097	5,622,644	5,119,857	5.73
5	North Sumatra	3,607,403	3,715,514	3,727,249	3,631,039	3,816,655	3,699,572	1.46
6	South Sumatra	3,384,670	3,295,247	3,676,723	3,670,435	4,105,203	3,626,456	5.15
7	Lampung	2,940,795	3,101,455	3,207,002	3,320,064	3,861,516	3,286,166	7.18
8	West Sumatra	2,279,602	2,368,390	2,430,384	2,519,020	2,629,306	2,445,340	3.63
9	West Nusa Tenggara	2,067,137	2,114,231	2,193,698	2,116,637	2,261,871	2,150,715	2.35
10	South Kalimantan	2,038,309	2,086,221	2,031,029	2,094,590	2,268,871	2,103,804	2.79
11	Banten	1,949,714	1,865,893	2,083,608	2,045,883	2,175,273	2,024,074	2.97
12	Aceh	1,772,962	1,788,738	1,956,940	1,820,062	2,146,644	1,897,069	5.31
13	West Kalimantan	1,372,988	1,300,100	1,441,876	1,372,695	1,461,238	1,389,779	1.81
14	Central Sulawesi	1,041,789	1,024,316	1,031,364	1,022,054	1,063,382	1,036,581	0.54
15	DI Yogyakarta	842,934	946,224	921,824	919,573	909,164	907,944	2.07
16	Bali	858,316	865,553	882,092	857,944	861,321	865,045	1.10
17	Central Kalimantan	610,236	755,507	812,652	838,207	982,951	799,911	12.95
	Other provinces	4,875,951	5,122,224	5,370,118	5,502,113	5,985,187	5,371,119	
	Indonesia	65,756,904	69,056,126	71,279,709	70,846,465	75,550,895	70,498,020	3.57

Source : Central bureau of statistics and directorate general of food crops Indonesia, 2015

*) estimated number

Table 4 shows that there is a significant increase in the number of paddy production in Java, especially in East Java, West Java and Central Java as the centre of paddy production. More detailed average contribution of paddy production at 17 central Provinces in Indonesia is showed in Figure 10.

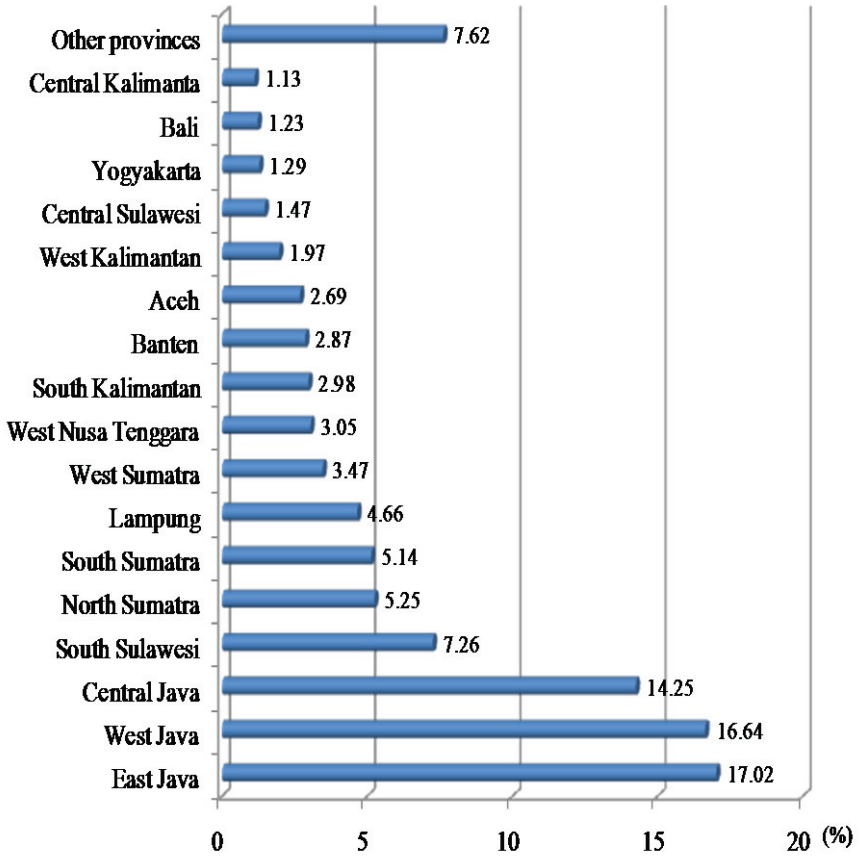
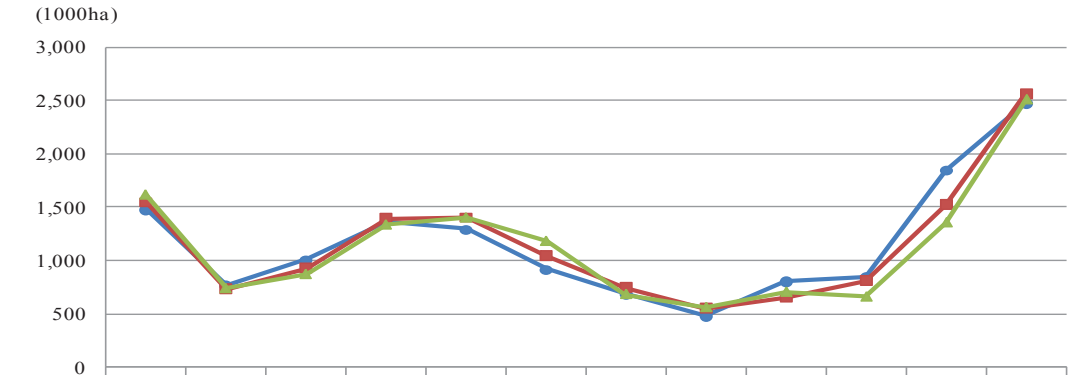


Figure 10. Average contribution of paddy production at 17 central Provinces in Indonesia, 2011-2015

Source : Central bureau of statistics and directorate general of food crops Indonesia, 2015

In general, there are two peak of paddy cropping/harvest pattern in Indonesia. The first paddy planting pattern is in rainy season from September to December. The second paddy planting pattern is from May to August. In absolute terms, the paddy planting area in the last three year (2012-2014) reach the highest planting area in Dec 2012 (2.48 million ha), while the lowest planting area is in August 2012 (Figure 11).



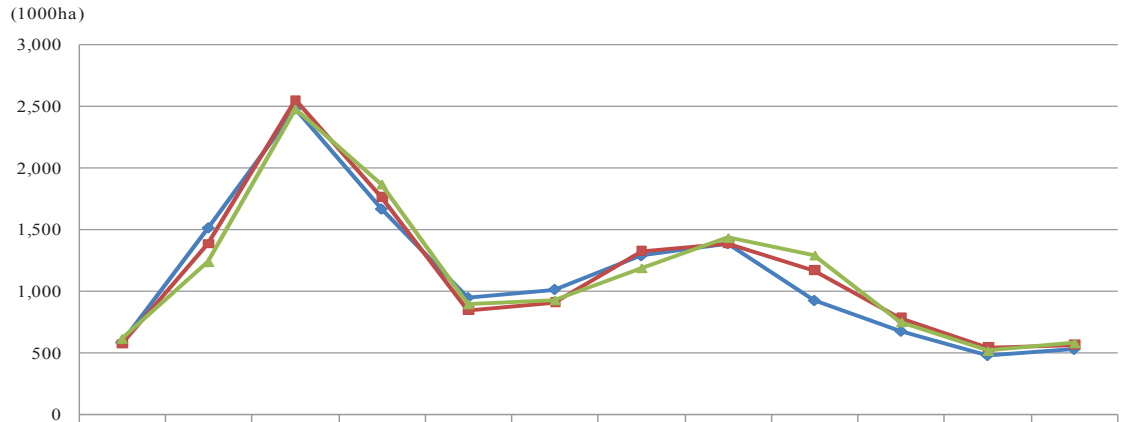
	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
2012	1,482	770	1,010	1,361	1,294	919	692	481	803	850	1,850	2,481
2013	1,546	730	929	1,394	1,400	1,044	748	548	658	810	1,524	2,567
2014	1,620	743	875	1,339	1,405	1,186	688	565	709	664	1,360	2,513

Figure 11. Development of the rice planting patterns in Indonesia, 2012 – 2014

Source : Central bureau of statistics and directorate general of food crops Indonesia, 2015

*) estimated number

Development of paddy harvested area has a contrary pattern compared to the development of paddy cropping pattern. Figure 12 shows that the first paddy harvest curve is in rainy season from January to April, with the peak paddy harvest is in March. The second paddy harvest curve is in the beginning of dry season from May to August, with the peak paddy harvest is in August.



	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
2012	579	1,511	2,478	1,664	944	1,011	1,285	1,383	921	672	475	525
2013	570	1,386	2,552	1,764	839	910	1,326	1,385	1,167	782	541	563
2014	616	1,239	2,480	1,869	897	929	1,190	1,435	1,293	751	517	580

Figure 12. Development of the rice harvest patterns in Indonesia, 2012 – 2014

Source : Central bureau of statistics and directorate general of food crops Indonesia, 2015

*) estimated number

4.3 Development of organic farming in Indonesia

The organic agriculture movement in Indonesia was begun in the early 1980s. It started with initiative from NGOs that cooperated with a small group of farmers, following by other initiatives from educational institutions, communities and self organizing farmers group. Farmers practiced organic farming under the assistance of the organizations. In 1984, the first organic training center in Cisarua, West Java was established called Bina Sarana Bakti (BSB). In 1990, a network between farmer and fisherman was formed in Jogjakarta. This network triggered other local networks and actions in organic farming. In 1998, an organic agriculture workshop which supported by IFOAM was conducted. The network focused on technical support for organic farmers and local marketing. After the workshop the first national networking scale on organic farming called The JakerPO (*Jaringan Kerja Pertanian Organik Indonesian*/Indonesian Organic Agriculture Network) was established. As a result, in 1999, The Sahani Cooperation in Jogyakarta was established as the first local direct marketing of organic products (especially rice) (Ariesusanty, 2011; Jahroh, 2010).

In 2000, Indonesian Organic Community called MAPORINA (Masyarakat Pertanian Organik Indonesia/ Organic Farming Society of Indonesia) was established. Member of MAPORINA are the staff of Department of Agriculture of Indonesia and those from academe. It aims to improve farmer welfare and conservation through organic agriculture. The community activities are including research, consultation and development of organic models. In 2001, the ministry of Agriculture launched “Go Organic 2010” as a result of an actively approach by MAPORINA. In 2002, the Indonesia Organic Alliance (IOA) was established. It was formerly named BIOCert

Organization. Then in 2006, its name changed into IOA. IOA developed BIOCert Indonesia as the first national certification body. IOA provides technical supports for its members, farmers groups or other organizations that are interested in organic agriculture.

In the same year, the Ministry of Agriculture made a basic rule to support organic farming called Indonesian National Standard for Organic Food System (SNI 01-6729-2002). The national standard is adopted from the guidelines for production, processing, labeling and marketing of organically produced foods by the Codex Alimentarius Commission (CAC/GL 32-1999). In 2003, Indonesian Organic Producers Association (APOI) was established by organic farmers which aimed to improve organic agricultural products while also to maintain sustainable agriculture. In 2005, IOA launched IOA organic standard adopted from the IFOAM basic standard and the Codex Alimentarius guidelines (Ariesusanty, 2011; Jahroh, 2010).

4.3.1 Go Organic 2010 Program

Ministry of Agriculture of Indonesia established Go Organic Program 2010 in 2001. This program is designed for three stages (Figure 13). The first step is the year 2001, where existing information about organic agriculture was affirmed. The second step is by the year 2005 a well developed infrastructure should have been established. The third stage is by the year 2010 Indonesia should have achieved its aim that is to be the one of the biggest organic agriculture producers in the world (Rochayati *et al*, 2012).

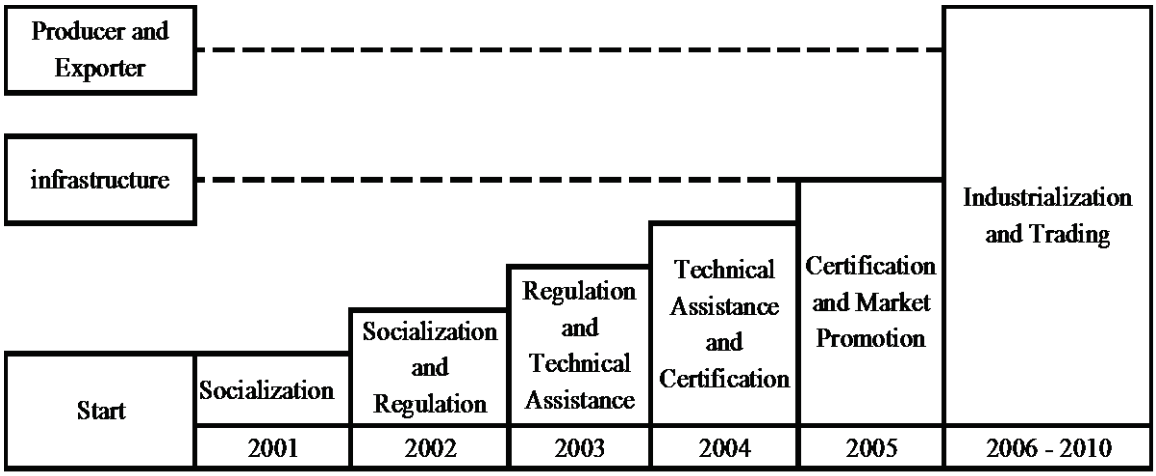


Figure 13. Organic farming development stage (2001-2010) in Indonesia

Source : Department of agriculture of Indonesia (2007) in road map of organic farming development 2008-2015

In terms of financial support, the Ministry of Agriculture allocate national budget to facilitate organic farming operator for certification process. As can be seen from Figure 14, the allocation of financial support has increased significantly from 300 million IDR in 2007 to 5,200 million IDR in 2009, while there is a slight decrease on the number of financial support in 2010 (3,527 million IDR) (Rochayati *et al*, 2012).

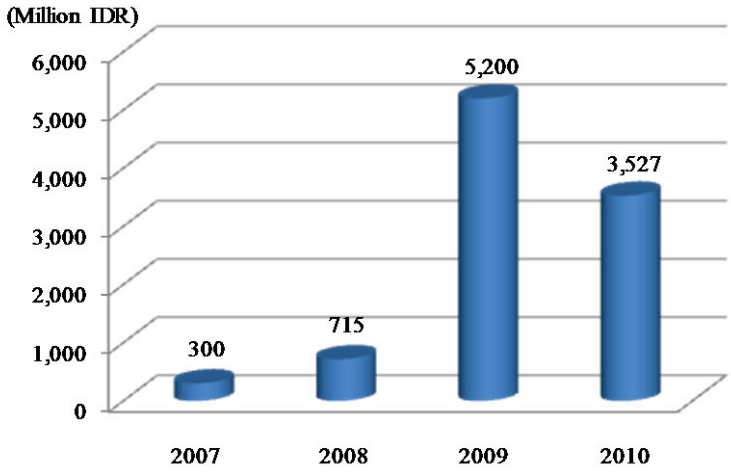


Figure 14. National budget allocation to facilitate organic farming operator in processing certification

Sources : Rochayati *et al*, 2012

Moreover, the house representative of Indonesia (period of 2004 - 2009) determined to divert some subsidized chemical fertilizer into organic fertilizer. There was also financial allocation for development and organic food certification and a decree of ministry of agriculture No.64 year 2013 about organic farming system (Indonesia Alliance Organic, 2015).

The Department of Agriculture established the Competent Authority of Organic Agriculture (OKPO) mandate in Directorate General for Processing and Marketing of Agricultural Products. The financial support also a part for organic certification to support OKPO. Although the Go Organic 2010 Program is claimed that is still far from achieving its goal, the OKPO is actively support the organic farming development in Indonesia by issued a number of decrees and rules on organic sector. The Indonesia organic logo (Figure 15) also has been established to legitimate that an organic product is already certified.

Figure 15. Indonesia organic logo

4.3.2 Post Go Organic 2010 Program

Organic farming in Indonesia has been developing supported by the government and other stakeholders can be seen in the increase of organic agricultural land year by year. The total organic agricultural land in Indonesia in 2014 is 215,176.40 ha (Table 5). This number is 2.32% decreased from the year 2013. It includes certified area

(67,426.57 ha), area in the certification process (1,142.44 ha), uncertified organic agricultural areas (146,176.40 ha) and land that is PGS certified (Indonesia Organic Alliance, 2015).

Table 5. Area of organic farming in Indonesia (2014)

(Unit : ha)

Organic farm based on certification status	Area
Certified (organic and conversion)	67,426.57
Certification in process	1,142.44
*PAMOR-certified (PGS)	36.00
Uncertified organic agricultural areas	146,571.40
Total	215,176.40

Source : Indonesia Alliance Organic, 2015

Note :

*PAMOR is a participatory guarantee system that developed by Indonesia alliance organic alliance that involved other stakeholders in assessing the compliance of organic standard.

Moreover, the growth of certified agricultural land from 2008-2014 can be seen in Figure 16. It shows that the trend of organic certified land in Indonesia has fluctuated. The organic certified land increased significantly from 2008 to 2010. Then, it decreased sharply from 2010 to 2012. The decrease in the area of certified organic farming is because there are some organic producers who the validity of their certification has expired and they did not extend it. Moreover, there are also some organic producers that still have a validity period of their certification but they did not do monitoring until it becomes invalid. This is due to local government has been trying to expand organic land area in their territory by giving subsidy and facilitating farmers to get the organic certification. However, this approach has impact on farmers are highly depending on the government support. When the subsidy and the facilitation are stopped, then farmers are found hardly to continue the certification by themselves.

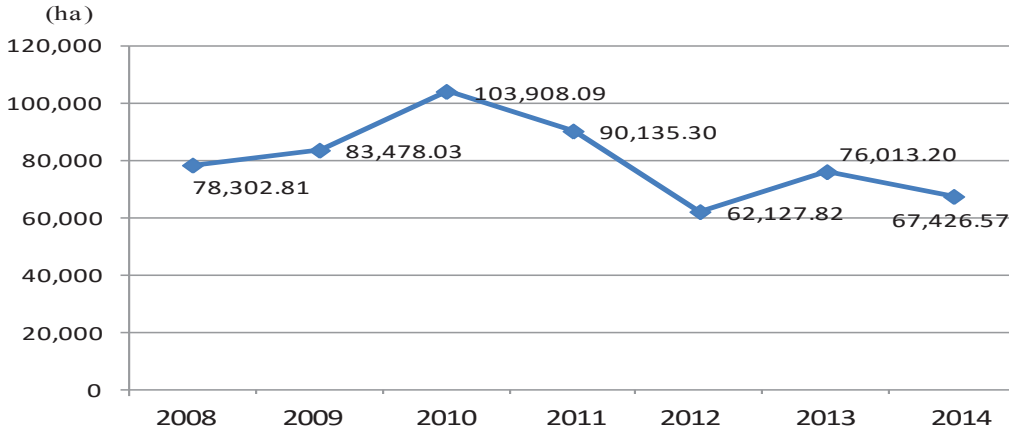


Figure 16. Growth of organic certified agricultural land in Indonesia 2008 – 2014
Source : Indonesia Organic Alliance, 2015

In 2014, there are 12,512 organic producers (including small scale organic farmers in farmers groups and firms and processor). This number is increase 19% from the previous year (it was 10,285 organic producers in 2013). This number is interesting considering the total of certified agricultural land declined in 2014. The increasing number of organic producers is due to some factors. First, data of certified organic farmers (farmers groups) is more detailed in 2014. Second, more farmers become a member of organic farmers group although their land area is in a small scale (Indonesia Organic Alliance, 2015).

In 2015, there are 57 kinds of products have been organic certified. This number is increase compared to the last year which was only 48 kinds of product certified. The most important crop is coffee which certified area of 36,022.29 ha. Most of the certified coffee is for export. Among certified organic products, rice is number nine. The organic rice land is located in Sumatra, Java, Bali and Nusa Tenggara. The highest rice production is in Sragen district and Boyolali district of Central Java with the land area of 229.57 ha and 169.28 ha respectively.

According to Indonesia Statistic of Organic farming 2014 by Indonesia Organic alliance (2015), there are 8 national organic certification bodies that are accredited by OKPO and 14 international organic certification bodies operating in Indonesia including those are cooperate with local certification bodies. Organic products for export are usually certified by international organic certification bodies. The eight national organic certification bodies can be seen in Table 6.

Table 6. List of organic farming certification body which accredited by National Standardization Body of Indonesia

No	Name of certification body	Certificate registration number	Commodity scope of certification
1	Sucofindo	OKPO-LS-001 year 2007	fresh product (food and secondary crops, horticulture and estate crops, livestocks and its products)
2	MAL	OKPO-LS-002 year 2007	fresh product (food and secondary crops, horticulture and estate crops, livestocks and its products, including honey)
3	INOFICE	OKPO-LS-003 year 2007	fresh product (food and livestocks product)
4	Lembaga Sertifikasi Organik Sumatera Barat (West Sumatra)	OKPO-LS-004 year 2007	fresh product (food and horticulture)
5	LeSOS	OKPO-LS-005 year 2007	fresh product (food and horticulture)
6	BIOCert Indonesia	OKPO-LS-006 year 2007	fresh product (food and secondary crops, horticulture and estate crops, livestocks and its products, including honey and fish)
7	PERSADA	OKPO-LS-007 year 2008	fresh product (food and secondary crops, horticulture and estate crops, livestocks and its products)
8	SDS (Sustainable Development Services)	LSPO-008 year 2012	Organic programs (EU, NOP-USDA and JAS); UTZ certified, Ethical Tea Partnership; Organic Exchange and GOTS (Global Organic Textile Standard)

Source : Indonesia Organic Alliance, 2015

CHAPTER 5

DEVELOPMENT OF ORGANIC RICE FARMING SYSTEM LEADING BY EXPERT ORGANIC FARMERS AND EXTENSION WORKERS IN WEST SUMATRA, INDONESIA

5.1 Farmers characteristic

The research result found that most of farmers groups have been implementing organic rice farming system since 2010, except a new group of farmer, Palapa, that has just begun in 2012. As seen in Table 7, in 2014, three of the farmers groups had organic rice certificates, while three other farmers groups were in the process of certification. In 2015, two farmers groups (Tigo Alua Saiyo and Sehati) finally got the certification. One farmer group (Palapa), has already implemented an organic rice farming system, but has not applied for the certificate yet because the group needs one more year to be able to apply for the certification. In addition, Serba Usaha farmers group that has been applying for the certification for one year is failed to get the certification in 2015, since some organic farming requirement are not fulfill yet.

Table 7. Organic rice certification status of farmers group in Agam and Lima Puluh Kota District, West Sumatra, Indonesia

District	Farmers Group	Organic rice certification status (April 2014)	Organic rice certification status (April 2015)
Agam	Lurah sepakat Balai Organik Amanah Agro	Certified	Certified
	Palapa	Not certified yet	Not certified yet
Lima Puluh Kota	Tigo Alua Saiyo	In the process of certification	Certified
	Sehati		Certified
	Serba Usaha		In the process of certification

Source : Field survey, March 2015

The process of certification requires more than three years. Three years for converting from a conventional to an organic farming system, and about one year for the verification process from the certification body. The most common problem during the verification is on documenting the organic farming process. Farmers found difficulties in regularly recording their activity. This is related to their educational background of which a half of respondents are low educated.

Table 8. Respondents (Farmers) Profile

Respondent Profile		Total Respondents	
		(people)	(%)
District	Agam	40	58.0
	Lima Puluh Kota	29	42.0
Age	20's	1	1.4
	30's	24	34.8
	40's	21	30.4
	50's	16	23.2
	60's and over	7	10.1
Sex	Male	12	17.4
	Female	57	82.6
Formal education	Elementary	31	44.9
	Junior High School	12	17.4
	High School	23	33.3
	Diploma	2	2.9
	Bachelor	1	1.4
Primary job	Farmer	67	97.1
	Trader	2	2.9
Marital status	Married	63	91.3
	Widow	6	8.7
Family member	1 - 3 people	16	23.2
	4 - 6 people	43	62.3
	7 - 10 people	10	14.5
Position in farmers group	Leader	6	8.7
	Vice Leader	1	1.4
	Secretary	6	8.7
	Accounting	6	8.7
	Member	50	72.5

Source : Field survey, April 2014

As can be seen from Table 8, most of respondents are at the age of thirties (35%) and at the age of forties (30%). Interestingly, 83% of respondents are female. In general, 90% of organic farmer group members are female. Five of seven farmer group leaders are women. As reported by FAO (2011), women play a significant role in the agricultural labor force in Asia. In the case of West Sumatra, where they are matrilineal society, the land was owned by women. Moreover, male are used to migrate to work to other cities. Therefore, women have more flexible time to manage their activities in the organic farmers group. 97% of respondents mainly have a primary job as farmer. Otherwise they just do housework. 91% of respondents are married. More than half of the respondents (62.3%) have family members of 4 to 6 people, while 14.5% of respondent have 7 to 10 family members. This number will be related to the household rice consumption (it will be discussed further in Chapter 6).

In terms of educational background, 45% of farmers graduated from elementary school education, 17% of farmers graduated from junior high school education and 33% of farmers graduated from high school. It was found that some respondents are hardly doing any writing and reading. Only one respondent got bachelor degree. He decided to work in agriculture in his village since it was difficult for him to find a job in the city. Moreover, 14.5% of farmers attended a non formal education called field school. Field school is facilitated by the government as a non formal process which aims to increase farmers knowledge and skills so that farmers can identify their strength, can determine and solve problems, and can make decisions and implement appropriate technologies to local resources synergistically and environmentally friendly so their farms will be more efficient, high productivity and sustainable.

Table 9 shows that 38% of respondents have been cultivating paddy for 1 – 4 years while 35% of respondents have been cultivating paddy for 5 – 9 years. The paddy fields are located in flat area (59.4%) and terracing area (40.6%).

Table 9. Respondents (farmers) land cultivation profile

Respondents land cultivation profile		Total Respondents	
		(people)	(%)
Time for have been cultivating paddy	≦4 years	26	38.0
	5 ≦9 years	24	35.0
	10 ≦14 years	4	5.8
	15 ≦19 years	3	4.3
	20 ≦24 years	2	2.9
	25 ≦29 years	7	10.1
	30 years and over	3	4.3
Organic rice cultivating area at the moment	less than 0.5 Ha	58	84.1
	0.5 ~ 1.0 Ha	8	11.6
	1.0 ~ 2.0 Ha	3	4.3
Paddy field location Organic rice cultivating area at the moment	Flat area	41	59.4
	Terracing	28	40.6
Manage the current paddy field for 3 or more years	Yes	61	88.4
	No	8	11.6
Status of land ownership of paddy land area	Owner the land	46	66.7
	Rent the land	18	26.1
	Owner and also rent land from others	5	7.2
Cultivate other commodities besides paddy in the field	Yes	0	0.0
	No	69	100.0
Land tenancy management	Rent (Money case)	1	4.3
	Sharing (Rice case)	19	82.6
	Mortgage (*Pagang Gadai*)	3	13

Source : Field survey, 2014

Moreover, almost 84% of respondents have organic rice cultivating area less than 0.5 ha. Only 4.3% of farmers have organic rice cultivating area of 1 - 2 ha. The

small scale of paddy yield has resulted in a low average of paddy production. This indicates that with limited cultivation area and a large number of family members, the paddy production is usually for their household consumption. 88.4% of farmers have been cultivating the current paddy field for more than 3 years. Their main reason to keep cultivating on the current paddy field is because 55% of them are the owner of the land and other reasons are because they are implementing organic rice farming system so that they want to maintain the quality of organic land (15%), there is labor shortage (15%) and limited land (10%).

In terms of status of land ownership, 67% of respondents own the land, 26% of respondents rent the land and 7% of the farmers are those who own and rent land as well. Many of the owners live in the same village. Respondents who do not own paddy land area (land rent) will tell the owner that they are going to cultivate paddy organically. There are two reasons why they have to tell the land owner. First is because there is a possibility of decline in paddy production. Irawan *et al* (2012) asserted that rice productivity on organic farming system will be decrease at the beginning stage, sometimes up to 3-4 planting seasons. However, subsequently the organic rice productivity will increase. In some cases, after several planting seasons the organic rice productivity will be higher than conventional rice farming. Second reason is farmers want to convince the owner that the quality of organic rice is better than the conventional one and organic rice will have higher price than conventional rice price.

There are three kind of land tenancy management in the study area. First is rent land paid by money in advance (money case). Second is sharing type. Farmers pay the land rent after harvest time which is paid by rice. The rate of sharing rice is mostly one

third for the land owner and two third is for farmers. In this case all production costs are covered by farmers. Third is mortgage type. Land owner borrow money by giving his land to other farmers. The return time is depending on the agreement between them. Farmers will return the land to the owner after the owner paid back the money. During that time, farmers utilized the land and the paddy production is all for the farmers.

5.2 Farmers main reasons in implementing organic rice farming system

It is important to identify what main reasons for farmers to convert from conventional farming to organic farming system. This is because the reasons will influence how farmers implementing organic farming. Figure 17 shows that in general there are two main reasons for farmers implementing organic rice farming system. The first primary reason is farmers emphasized organic farming is good for environment because they do not use any chemical fertilizer and pesticides in their paddy field. Farmers experienced that the soil fertility is improve as they use compost as fertilizer. While, the second primary reason is that farmers recognize that it is good for their health because since their products are not contaminated by chemical fertilizer and pesticides they believe that organic rice contains nutrients that is good for health.

Another main reason is that farmers believe that organic farming system will be benefit financially because they do not have to buy chemical fertilizer which is costly. (The economic analysis of organic rice farming system will be explained in subchapter 5.6). They can make their own compost and use it for the paddy land. It is also found that farmers want to implement organic rice farming system because of they want to try new thing, it will be benefit for long run and because of consumer demand (farmers

heard that some consumers are looking for organic rice) (The consumer perception on organic rice will be explained in chapter 6). Although there is incentive for organic farmers from the government, but it is not become their reason for implementing organic rice farming.

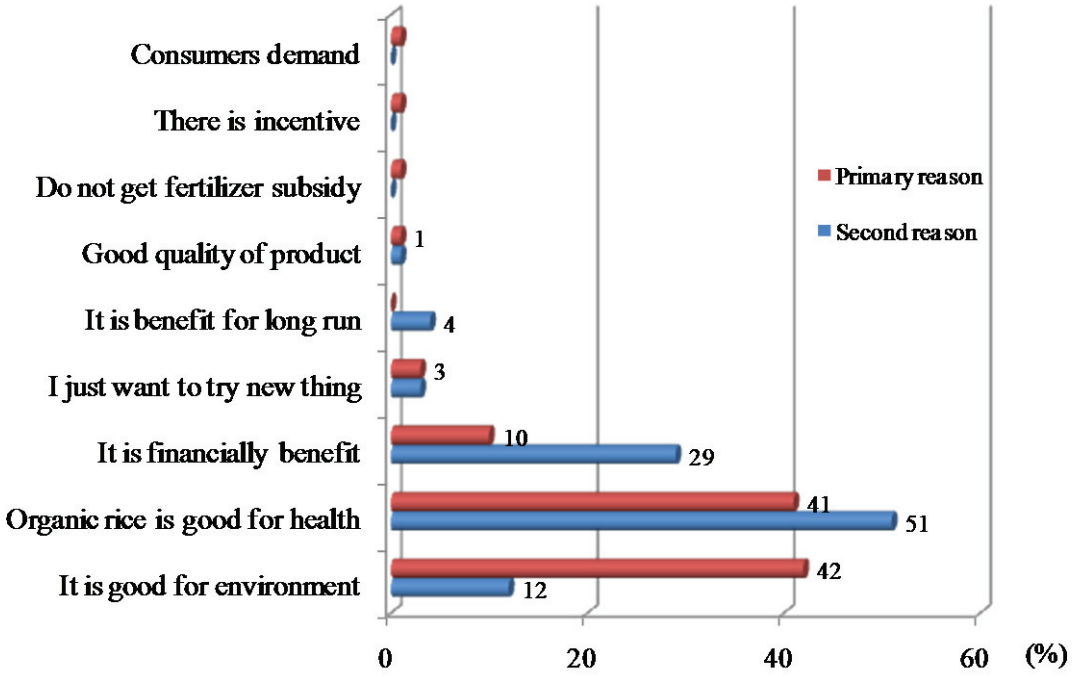


Figure 17. Two main reasons for farmers in implementing organic rice farming
Source : Field Survey, April 2014

5.3 Role of expert organic farmers and extension workers

Initially, farmers got information about organic paddy farming system from farmers group leaders, extension workers, expert organic farmers; other organic farmers and local society who concern about organic farming. The formation of farmers group is initiated by farmers themselves. Organic farming system cannot be implemented if other farmers nearby the paddy field do not cultivate organically. Farmers group is formed in order to ensure that paddy field area is not contaminated by other farmers who do not

implement organic farming system. The paddy fields of farmers' group members are located in one area. The formation process is started by a commitment from each farmer to implement organic rice farming system. Then as a group, farmers support each other in providing compost and bio-pesticides.

Extension workers are government officers with a main responsible to promote government programs to farmers. Expert organic farmers are those farmers who have been doing organic rice farming system before the organic program being promoted by government. Initially, they began implementing organic rice farming system due to the high price and scarcity of fertilizer. Then, they experienced organic rice farming system and had gain benefit of it. Therefore, their own experience is a good example to convince other farmers.

It is also found that 68% of respondents want to implement organic paddy farming system mainly because of self-participation. This is related to the farmer's reasons in implementing organic rice farming system where farmers believe that organic farming is good for the environment and good for health. 23% of farmers do it because of farmer group commitment. They think that as a member of farmers group, they have to obligate group decision. The others are on the advice of group leader and are also on the advice of extension workers and expert organic farmers. This result shows a good starting point of implementing organic paddy farming system.

In the case of West Sumatra, local government and expert organic farmers work together in changing farmer's perception from conventional to organic farming system, while other provinces, the organic farming system were facilitated by NGO, university

and the local government (Jahroh, 2010; Takada *et al*, 2004; Irawan *et al*, 2012). Figure 18 shows that there are two central sources that play an important role in teaching farmers about organic paddy farming system. 43% of farmers believe that extension workers and expert organic farmers are those who teach farmers mainly about organic paddy farming system. 9% of farmers were trained by farmer group leaders. Interestingly, one farmer learned the organic farming system was encouraged by someone from local society and he then tried to learn about organic farming by himself from magazine and other media.

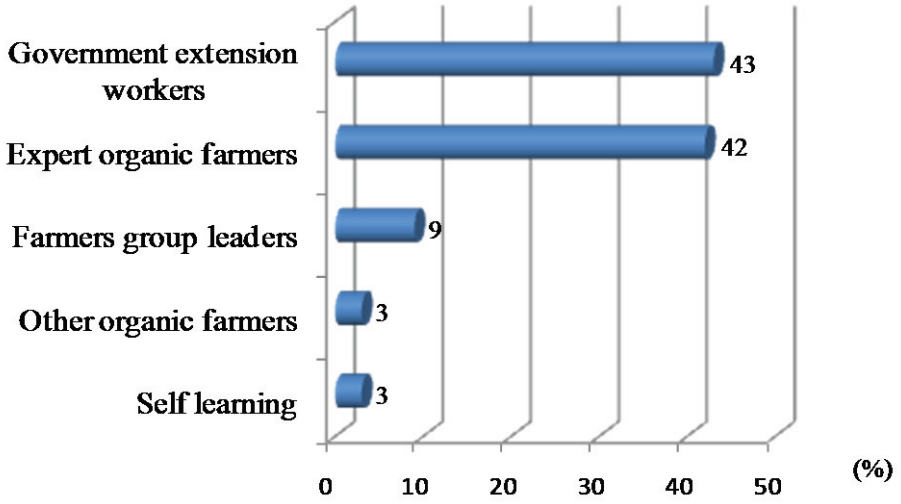


Figure 18. Person who teach mainly about organic rice farming system
Source : Field survey, April, 2014

Extension workers and expert organic farmers used a taken-lesson method in teaching the farmers. Organic standard SNI 6729-2010 as a manual is explained by extension workers and expert organic farmers with local language since the manual is written in a formal writing adopted from IFOAM basic standard for organic standard and processing. There is a new revision of organic farming system manual called SNI 6729-2013 has been established by the Ministry of Agriculture of Indonesia.

Table 10. Farmers Knowledge on Organic Standard (SNI 6729-2010)

Unit (%)

Respondents knowledge of organic standard	Yes	No
Know about current organic standard manual (SNI 6729-2010)	72.5	27.5
Have read copy of organic standard manual (SNI 6729-2010)	30.4	69.6

Source : Field survey, April 2014

Table 10 shows respondents knowledge about organic standard manual. 72.5% of farmers know about current organic standard manual. However they think that it is difficult for them to read and understand the organic standard manual by themselves. Only 30% of the respondents have read the manual. Normally, each of group farmers have organic standard manual and it is usually kept by the leader. Another method of learning organic farming facilitated by extension worker and expert organic farmers is visiting other farmers group to learn and share about organic paddy farming system. 61% of respondents have visited other farmer group sites and 57% of respondents have visited Lurah Sepakat farmers group in Agam District.

5.4 Farmers perception on government support on organic rice farming

Government supports farmers by giving incentive, extension on organic farming system, and subsidy (Figure 19). Department of Agriculture of West Sumatra Province allocated incentive of 250 IDR/kg of organic rice. Most of farmers (67% of farmers) think that incentive is the main government support on organic farming. Extension workers were provided in terms of technical assistance in order to help farmers in adopting the technology of organic farming system. 22% of farmers think that extension from government supports their organic farming. While only 10% of farmers think that subsidy is government support for their organic farming.

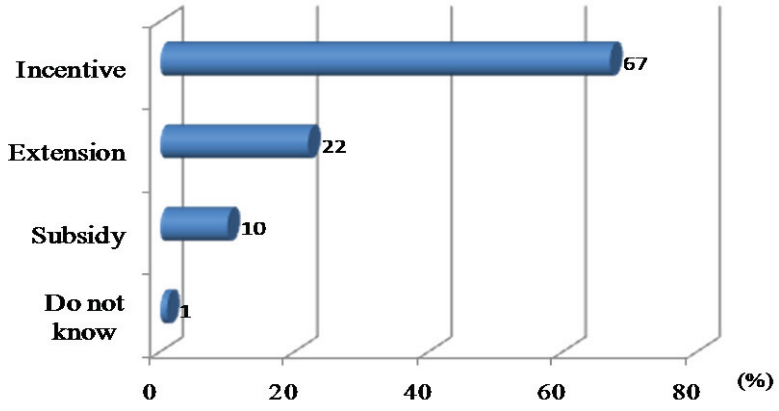


Figure 19. Farmers perception on government support for organic farming system
Source : Field survey, April 2014

However, 80% of farmers think that the amount of incentive is still inadequate to support them. Not all the farmers have got their own livestock to make own compost. Therefore, they need to spend money for buying compost. Most of farmers have utilized the incentive appropriately for buying equipment (17%), buying compost (12%), and others used it for buying seeds, making compost house and paying labor cost. However, it is also found that 24% of respondents used the incentive for daily needs. They believe that the incentive is a reward for them and they can use it as they like (Figure 20).

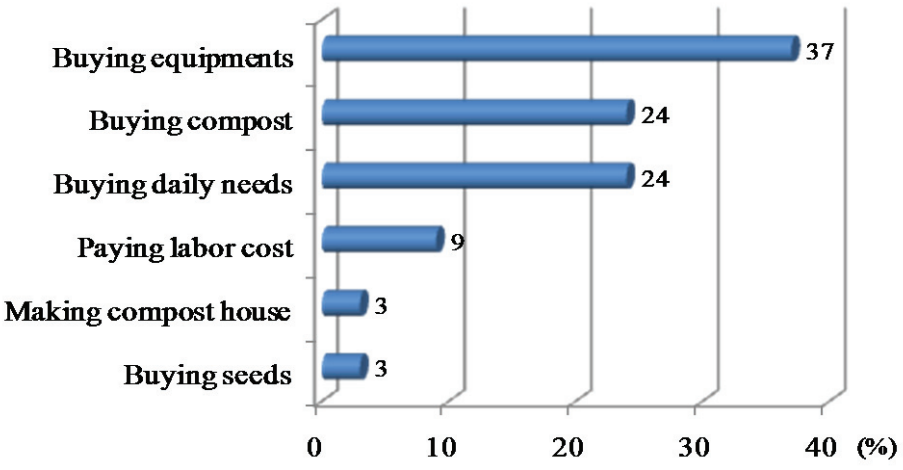


Figure 20. The use of incentives to support organic farming cultivation
Source : Field survey, April 2014

In addition, government provides financial support for expert organic farmers by giving 100.000 IDR/day as a reward for them in supporting organic program. This reward is given since the expert organic farmers, who work with extension workers in socialized organic farming system, have to leave their job for that day.

There is one main question about whether the farmers would continue implementing organic farming whenever the government organic program is over. Irawan *et al.* (2012) explained the success of one farmers group in Sragen district, Central Java which is facilitated only by local government. Therefore, I argue that this finding is important. In the case study of West Sumatra, it is found that there is a significant role of expert organic farmers in promoting organic farming system.

The expert organic farmers live at the same district with farmers. One or two expert organic farmers, who responsible for one district, were appointed by Department of Agriculture of West Sumatra Province. Even now, some leaders of farmers group have become a member of expert organic farmers group. Therefore, farmers will continue implementing organic farming system. For that, whenever farmers have problems in organic farming system, they can easily consult to the expert organic farmers. This can be a strong factor for the continuity of organic program.

5.5 Farmers activities on organic farming management

In order to apply for an organic certification, farmers have to record their farming activities, including weed control, pest and disease control, fertilizer management control and soil fertility control.

5.5.1 Weed control management

Weed growth is a major problem in all wetland rice system. There are two basic approaches to dealing with weed problems. Farmers can either try to prevent weed growth or remove weeds after they appear. In the study area, farmers took the second approach removing weed manually by hand. 88% of respondents keep record on weed control method, while others found it is difficult to record the weed control time. 67% of farmers who keep record on weed controlling doing it as needed which means they do not have regular time to control the weed. Only 4% of respondents do a weekly weed control and 3% of respondents control the weed monthly (Figure 21).

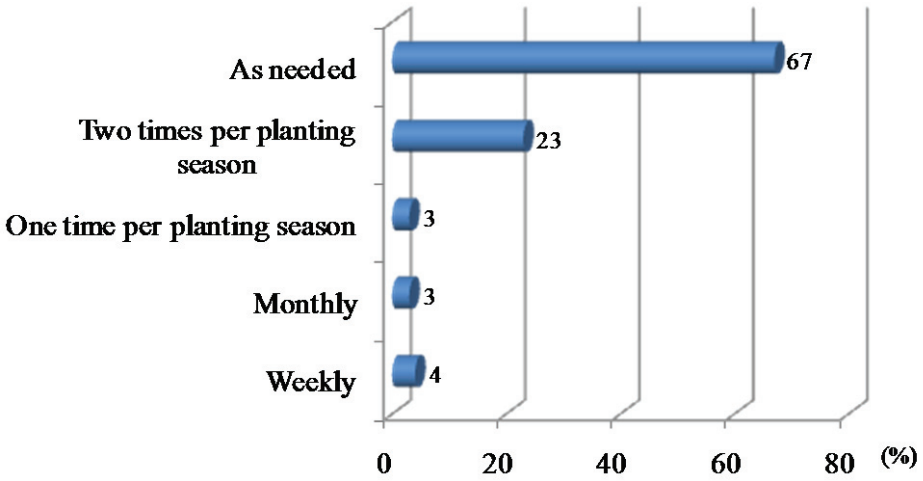


Figure 21. Farmers' activity on weed control management
Source : Field survey, April 2014

5.5.2 Pest and disease management

A study by IRRI (International Rice Research Institute) (cited in Sparks *et al* 2012) showed that farmers lose an estimated average of 37% of their rice crop to pests and diseases every year. In the case of study area, it was found that there are several

kinds of pest that attach farmers' organic rice farming. Figure 22 shows that 37% of respondents stated that snails are considered to be most pests for their organic rice farming. Rather than use pesticides in preventing the snails, 48.9% of respondents use conventional way by hand picking to prevent snail problems. Farmers handpick the snails and crush egg masses. Another way to prevent the snails is by water control. Some farmers collected the snails and cooked it for animal feed.

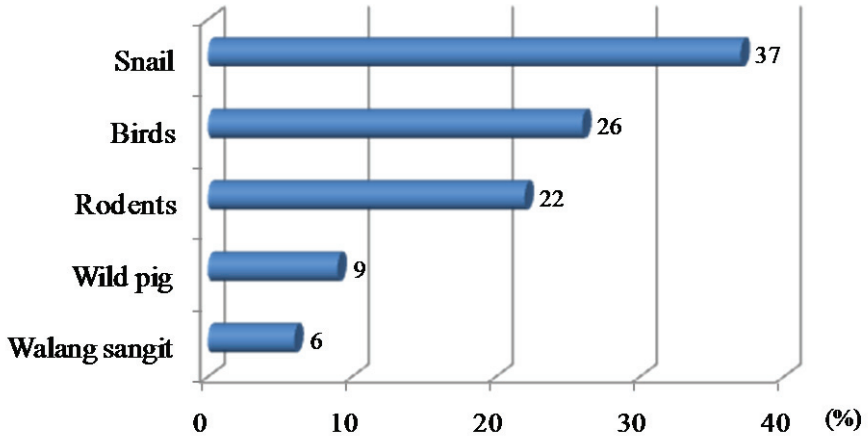


Figure 22. Pest problems that attach farmers' organic paddy field
Source : Field survey, April 2014

Farmers were asked about Integrated Pest Management (IPM). According to FAO, IPM is *'an ecosystem approach to crop production and protection that combines different management strategies and practices to grow healthy crops and minimize the use of pesticides'*. IPM was introduced in Indonesia since 1989. IPM played an important role in the promoting organic farming in Indonesia. Table 11 shows that 63.2% of respondents stated that they know about IPM program. When farmers have problems with pest, they usually contact extension workers or expert organic farmers. Most of the farmers (89.9%) affirmed that they fell satisfy with their pest and disease management so far.

Table 11. Farmers knowledge on Integrated Pest Management program

	Respondents answer	(%)
Knowledge about integrated pest management program	Yes	63.32
	No	37.68
Work with pest control advisors (extension workers and expert organic farmers)	Yes	81.50
	No	18.50
Effectiveness rate of farmers pest and disease management	Excellent	7.20
	Satisfactory	89.90
	Needs improvement	2.90

Source: Field survey, April 2014

5.5.3 Fertilizer Management

All respondents use compost as fertilizer for their paddy field. 91% of them make their own compost. 62% of respondents have livestock. For those who do not have own livestock, they work together with other member of group farmers to make compost. If the compost is not enough for all members, then they will buy compost from other farmers. Figure 23 shows farmers group compost house and their livestock.

Lurah Sepakat

Tigo Alua Saiyo

Serba Usaha

Figure 23. Compost house and livestock of farmers groups

5.4.4 Soil Management

Assessing soil fertility is an important part of 'best practice' farm management, including monitoring soil fertility. It was found that 50.72% of respondents do monitor soil fertility (Figure 24). However, most of farmers do self soil fertility monitoring without using any measurement tools. They only use manual method by observing soil surface.

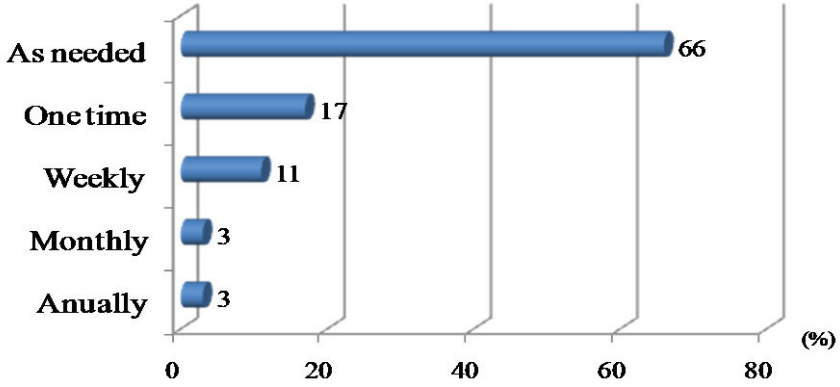


Figure 24. Farmers' activity on soil control management
Source : Field survey, April 2014

5.6 Economic analysis of organic rice farming system in study area

Several studies show that organic farming is socially, economically and ecologically sustainable (Pacini *et al*., 2003; Pimentel *et al*., 2005; Giovannucci, 2007; Sukristiyonubowo *et al*., 2011; and Todorova and Ikova, 2014), as it is resulting improvement in the socio economic condition of the farmers (Scialabba *et al*., 2003). Therefore this subchapter will examine the cost, income and profit of organic rice farming system in the study as compared with other study findings.

5.6.1 Production cost of organic rice farming

There are 49 farmers from five farmers groups of seven farmers groups have been analyzed for economic analysis due to the validity of data. There are two types of costs including management costs and production cost. The management costs consist of material costs (including purchased organic fertilizer and depreciation cost), land rent and tax, and employed labor cost. The production cost consists of self supplied costs (including seed, organic fertilizer and bio pesticides), family labor cost, capital interest, land rent, and management cost. Total management cost for each farmers group is shown in Table 12.

Tabel 12. Management cost of organic rice farming system in West Sumatra, Indonesia

(Unit : IDR/ha/planting season)

Farmers Groups	Material cost		Rent land and tax	Employed labor	Total management cost
	Organic fertilizer (purchased)	Depreciation cost			
	(1)	(2)	(3)	(4)	(5)
Lurah Sepakat	228,889	49,333	1,461,667	1,497,643	3,237,532
Balai Organik	69,879	59,333	600,000	3,671,506	4,400,719
Tigo Alua Saiyo	233,283	46,667	3,743,045	2,029,895	6,052,889
Sehati	71,161	64,815	50,000	1,666,208	1,852,183
Serba Usaha	73,855	36,667	3,404,817	1,850,927	5,366,265
Average	135,413	51,363	1,851,906	2,143,236	4,181,917

Source : Author's calculation based on survey result

Note : 1,000,000 IDR is about 9,000 Yen

The organic fertilizer cost is calculated for purchased compost and compost made by farmers (self supporting). Although most farmers make their own organic fertilizer together as a group, some farmers have to buy compost from other farmers to

fulfill their need. Lurah Sepakat and Tigo Alua Saiyo farmers groups expensed of 228,889 IDR/ha and 233,283IDR/ha respectively for buying compost. In fact both farmers groups have compost house but because of the number of member are large, it cannot provide for all members. The average cost of organic fertilizer that farmers purchased is 135,413 IDR/ha. Detailed organic fertilizer cost calculation of each farmer in farmers group is shown in Annex 4.

Depreciation cost is calculated using straight line depreciation methods, where the cost of asset is spread out equally over the expected life of the asset. Most farmers owned hoe and sickle. One farmer owned three wheeled carts (Tigo Alua Saiyo farmer group) and one farmer owned hand tractor (Sehati farmer group). The average cost of depreciation cost that farmers purchased is 51,363 IDR/ha. Detailed depreciation cost calculation of each farmer in farmers group is shown in Annex 5.

Land rent cost is calculated based on the sharing system of paddy production (as explained in Table 9 that one of the land tenancy management is by sharing rice. One of third of the total paddy production is for the owner). In terms of rent land and tax, Sehati farmer group expense was only pay land tax because all of the group members owned the land. Tigo Alua Saiyo farmers group that some members rent land paid for paid 3,743,045IDR/ha (one group member she owned land and also rent land) while Serba Usaha farmers group paid for 3,404,817 IDR/ha (two members of the group owned land and also rent land. Detailed rent land and tax calculation of each farmer in farmers group is shown in Annex 6.

The cost of employed labor is varied among farmers groups. Balai organik farmer group expense for employed labor is 3,671,506 IDR/ha, which is the highest average employed labor cost among other farmers groups. The average cost of employed labor cost is 2,143,236 IDR/ ha. Detailed employed labor cost calculation of each farmer in farmers group is shown in Annex 7.

Table 13 shows the production cost of each farmers groups consists of cost of self supporting (including seed, organic fertilizer and bio pesticides costs), family labor cost, depreciation cost, capital interest, owned land rent and management cost.

Table 13. Production cost of organic rice farming system in West Sumatra, Indonesia

(Unit : IDR/ha/planting season)

Farmers Groups	Cost of self supporting			Family labor cost	Capital interest	Owned land rent	Manage-ment cost	Total production cost
	Seed	Organic fertilizer	Bio pesticides					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lurah Sepakat	184,420	101,111	53,001	3,362,357	515,839	1,800,000	3,237,532	9,254,259
Balai Organik	161,376	230,169	44,504	1,362,473	455,152	1,800,000	4,400,719	8,454,393
Tigo Alua Saiyo	148,348	105,567	49,650	2,840,523	593,259	800,000	6,052,889	10,590,236
Sehati	165,749	247,996	43,644	3,359,422	450,451	2,000,000	1,852,183	8,119,447
Serba Usaha	151,725	226,145	65,752	3,084,506	588,762	1,200,000	5,366,265	10,683,155
Average	162,324	182,198	51,310	2,801,856	520,692	1,520,000	4,181,917	9,420,298

Source : Author's calculation based on survey result
Note : 1,000,000 IDR is about 9,000 Yen

Farmers did not purchase seeds. They usually use their made own seeds. If the seeds are not enough, then they can ask other members of the groups for free. However, the cost of seed is calculated based on how much they use the seed multiplied by the estimated seed price. The average cost of seed of five farmers groups is 162,324 IDR/ha. Detailed seed cost calculation of each farmer in farmers group is shown in Annex 8.

Farmers make their own compost and bio fertilizer. The average cost of own supplied organic fertilizer is 182,198 IDR/ha, while the average cost of bio pesticides is 51,310 IDR/ha. Farmers used any local resources for making bio pesticides. Detailed organic fertilizer and bio pesticides cost calculation of each farmer in farmers group is shown in Annex 4.

Farmers are not only employed paid labors but also employed their family members to work on the rice farm. This is usually for farmers who owned land. The average paid labor cost in the study area is 50,000 IDR/day. The family labor cost was calculated by using the average total cost of paid labor (which is 5,300,000 IDR/ha) subtracted by the amount of money that had been paid for the labor. The average cost of family labor is 2,801,856 IDR/ha. Detailed organic family labor cost calculation of each farmer in farmers group is shown in Annex 4.

The cost of owned land rent in the study area is 2,000,000 IDR/ha, while it is found that the average cost of owned land rent is 1,520,000 IDR/ha per planting season. Since Tigo Alua Saiyo farmer group mostly rent land, their expense for owned land rent only 800,000 IDR/ha, while Sehati farmer group which all members owned the land. Other groups that some members owned land and also rent land have to pay between 1,200,000 IDR/ha and 1,800,000 IDR/ha (Annex 6). The average cost for capital interest for each farmer group is between 450,451 IDR/ha and 588,762 IDR/ha. Detailed capital interest calculation of each farmer in farmers group is shown in Annex 9.

5.6.2 Income and profit of organic rice farming

Table 14 shows the revenue, income and profit for each farmers group in the study area. Revenue is calculated by the average paddy production for each group multiplied by the paddy selling price at that time (5,500 IDR/kg). The highest revenue for organic farming system is reached by Lurah Sepakat group farmers, which is 21,552,100 IDR/ha. The group produced an average paddy production of 3.9 t/ha. The other groups, Balai organic and Serba Usaha farmers groups, that have an average paddy production of 3.5 t/ha gain revenue of 19,475,779 IDR/ha and 19,359,823 IDR/ha. Sehati farmer group gain the lowest revenue which is only 15,700,799 IDR/ha. The average revenue of organic rice farming in the study area is 18,566,180 IDR/ha.

Tabel 14. Revenue, income and profit of organic rice farming system in West Sumatra, Indonesia

Unit : ton/ha, IDR/ha/planting season)

Farmers Groups	Average paddy production	Management cost (1)	Production cost (2)	Revenue (3)	Income (3) - (1) = (4)	Profit (3) - (2) = (5)
Lurah Sepakat	3.9	3,237,532	9,254,259	21,552,100	18,314,568	12,297,841
Balai Organik	3.5	4,400,719	8,454,393	19,475,779	15,075,060	11,021,385
Tigo Alua Saiyo	3.0	6,052,889	10,590,236	16,742,400	10,689,511	6,152,164
Sehati	2.9	1,852,183	8,119,447	15,700,799	13,848,616	7,581,352
Serba Usaha	3.5	5,366,265	10,683,155	19,359,823	13,993,558	8,676,668
Average		4,181,917	9,420,298	18,566,180	14,384,263	9,145,882

Source : Author's calculation based on survey result
Note : 1,000,000 IDR is about 9,000 Yen

In terms of income, Lurah Sepakat farmer group gain 18,314,568 IDR/ha as the highest income. Although Balai Organik farmer group and Serba Usaha farmer group produced the same average paddy production of 3.5 t/ha, but Balai organik gain more income of 15,075,060 IDR/ha compared to the income of Serba Usaha which is only

13,993,558 IDR/ha. This number is also not significantly higher than Sehati farmer group which can gain income of 13,848,616 IDR/ha which is only have 2.9 t/ha of average paddy production. The average income of organic rice farming in the study area is 14,384,263 IDR/ha.

The comparison of profit for each farmer group is not too much different to the comparison of their income. Lurah Sepakat gain the highest profit among other farmers groups of 12,297,841 IDR/ha. Followed by Balai Organik farmer group which gain 11,021,385 IDR/ha. Tigo Alua Saiyo farmer group gain the lowest profit which is 6,152,164 IDR/ha. The average profit of organic rice farming in the study area is 9,145,248IDR/ha.

It is important to analyze the comparison of economic analysis between organic farming and non organic farming and also to compare the profitability of organic rice farming with other studies. In Indonesia, there are several studies on profitability of organic farming have been conducted. However, very few of the studies have been published and none of them used farm budget-related data. Long-term studies are hardly found.

Since this study is only conducted to the economic analysis of organic rice farming in West Sumatra, it tries to compare with two other studies on organic rice farming and nonorganic rice farming. Table 15 shows ratio of conventional rice farming system and organic rice farming system conducted by Agus and Teddy (2011) and Sukristiyonubowo *et al* (2011). Agus and Teddy (2011) conducted the study in West Java province in 2008, while Sukristiyonubowo *et al* conducted the research on

economic analysis for three different rice farming systems in Central Java province in Oct 2008. The selling price used by Agus and Teddy (2011) is rice selling price while Sukristiyonubowo *et al* (2011) used paddy selling price.

Tabel 15. Ratio of total production cost, revenue and profit of organic rice farming system and non organic farming system in other provinces in Indonesia

(Unit : IDR/kg, IDR/ha/planting season)

Indicators	Conventional farming by Agus and Teddy (2011)	Organic farming by Agus and Teddy (2011)	Conventional farming by Sukristiyo-nubowo *et al* (2011)	Organic farming by Sukristiyo-nubowo *et al* (2011)	Research result in West Sumatra (2015)
Selling price	4,000	7000	2,500	2,800	5,500
Total cost	5,000,000	8,180,000	7,300,000	3,300,000	9,420,298
Revenue	13,440,000	22,050,000	15,000,000	16,800,000	18,566,180
Profit	8,435,000	13,870,000	7,700,000	13,500,000	9,215,467

Source : Agus and Teddy (2011), Sukristiyonubowo *et al* (2011) and own field survey (2014)

Note :

*Sukristiyonubowo *et al* (2011) did not count other costs such as owned land rent, depreciation cost and capital interest in the production cost.

First, the ratio of organic rice farming and conventional rice farming conducted by Agus and Teddy (2011) shows that there is a different on selling organic rice price, which is organic rice selling price almost double compared to conventional rice price. The total cost of organic rice farming is 8,180,000 IDR/ha, which is higher than the total cost of conventional farming (5,000,000 IDR/ha). However, in terms of revenue and profit, the organic rice farming gain more benefit than conventional farming, that is 22,050,000 IDR/ha for revenue of organic farming while it is only 13,440,000 IDR/ha for conventional farming, and 13,870,000 IDR/ha for profit of organic farming while it is only 8,435,000 IDR/ha for conventional farming.

Moreover, Sukristiyonubowo *et al* (2011) findings show that there is only 12% high difference on organic paddy selling price and conventional one. The total cost for organic farming is 7,300,000 IDR/ha, which is much higher than total cost of conventional farming (which is only 3,300,000 IDR/ha). However, same as Agus and Teddy (2011) findings, Sukristiyonubowo *et al* (2011) found that the revenue and profit for organic farming are higher than conventional farming. Interestingly, there is no so much different on the value of the profit (13,500,000 IDR/ha and 13,870,000 IDR/ha).

Second, the ratio of organic rice farming among three studies is analyzed. The total cost for organic rice farming in West Sumatra is the highest comparec to other studies (9,350,713 IDR/ha), which is less different to Agus and Teddy (2011) finding (8,180,000 IDR/ha). On the contrary, Sukristiyonubowo *et al* (2011) study in Central Java shows that the total cost is only 3,300,000 IDR/ha.

In terms of revenue of organic rice farming, Agus and Teddy (2011) finding gain the highest value, which is 22,050,000 IDR/ha with selling price of 7,000 IDR/kg, while in West Sumatra the revenue is 18,566,180 IDR/ha and Sukristiyonubowo *et al* (2011) finding is 16,800,000 IDR/ha. Moreover, in West Sumatra the profit is only 9,145,882 IDR/ha with selling price of 5,500 IDR/kg, which is lowest value compared to other studies (which is about 13,500,000 IDR/ha). However, it is important to note that there will be a complicate task when comparing the results due to different time period analyzed, different interpretations of labor cost, different selling price resulting in different outcomes.

CHAPTER 6

ORGANIC RICE DISTRIBUTION CHANNELS IN WEST SUMATRA, INDONESIA

6.1 Development of organic rice distribution channels in study area

Distribution channels, as one of the classic 4Ps (product, promotion, price and place (distribution)) are important in marketing. Therefore, this chapter will explain the characteristic of the organic rice distribution channels in West Sumatra and how are farmers and consumers views on the existing organic rice distribution system.

In the case of West Sumatra, the organic rice market is still relatively small. This is related to the small number of farmers who have received the organic rice certificate and the small amount of rice production. Product labeling with a certification logo is a tool for informing consumers as to whether the product is a certified organic product or not. However, during the verification process farmers sold organic rice to consumers with and without certification labels.

Since the farmers' education level is low, where it is only 45% of respondents graduated from elementary school, this has influenced their ability in managing their organic rice distribution. Moreover, it is found that 84% of farmers have less than 0.5 ha of paddy yield (as explained in chapter 5 about farmers characteristic). The small scale of paddy yield has resulted in a low average of paddy production.

As can be seen from Table 16, the averages of paddy production for each farmer group are different. Two of three farmers groups that have gotten organic rice certification reached 3.9 t/ha and 3.5 t/ha for average paddy production respectively. Amanah Agro farmers group only reached 2.1 t/ha for their average paddy production. The low rate of paddy production at that time was mainly due to animal attacks (rat and wild pig) to the paddy field (as explained in chapter 5 that farmers asserted rat (22%) and wild pig (9%) attacked their paddy field). The group leader said that if there were no animal attacks, they usually can produce 3.5 t/ha – 4.5 t/ha per planting season. Three other farmers groups in Lima Puluh Kota District reached 2.9 t/ha to 3.5 t/ha for their average paddy production. These number are lower compared to the average national paddy production of conventional farming which is 5.3 t/ha (Ministry of Agriculture of Indonesia, 2015).

Table 16. Description of organic rice distribution channels in West Sumatra, Indonesia

(Unit : people, IDR/kg, t/ha)

District	Farmers Group	Types of distribution channels			Seed variety	Direct selling price	Paddy production
		Direct sell to consumers	Sell to middlemen	Sell through Farmers Group			
Agam	Lurah sepakat	1	2	1	Sokan	15,000	3.9
	Balai Organik	3	4	0	Singkam	15,000	3.5
	Amanah Agro	3	3	1	Randah putih	13,000	2.1
	Palapa	5	3	0	Singkam	15,000	2.4
Lima Puluh Kota	Tigo Alua Saiyo	6	0	0	Sijunjung	12,500	3.0
	Sehati	4	0	1	Sijunjung	12,500	2.9
	Serba Usaha	1	0	0	Sijunjung	10,000	3.5
	Total	23	12	3			

Source : Field survey, April 2014

In terms of rice price, Table 16 shows that the highest selling price of organic rice for Lurag Sepakat and Balai Organic farmers groups in Agam district that have organic certified is 15,000 IDR/kg. However, it was only about 12,500 IDR/kg in Lima Puluh Kota district since they were not certified yet (still in the process of certification). Though, it was only 10,000 IDR/kg for conventional rice. In the case of the Palapa farmer group, although the group is not certified yet, because they live near other farmers groups that have already gotten their certificates, they sell the product at the same price as an organic rice although it is not certified yet. Consumers assumed that the rice sold is organic rice.

The different selling price of organic rice is related to the kind of paddy variety and certification status. There are four kinds of seed variety farmers used. All farmers groups in Lima Puluh Kota District used seed variety of Sijunjung, while farmers groups in Agam District seed variety of Sokan, Singkam and Randah Putih. Those seed varieties are local seed variety. This is related to one of main basic principles in organic agriculture that organic farming should be adapted to local conditions. Therefore, farmers used local seed variety.

The survey found that 55% of farmers sell their products while 45% of farmers use the organic rice for their own consumption. There are two types of these farmers who sell their products. First, farmers may sell organic rice based on consumer demand. These farmers usually already have regular consumers buying organic rice. Therefore, they keep organic rice for the consumers. Second, farmers may keep organic rice as stock at home. These farmers will sell their organic rice only when they need money.

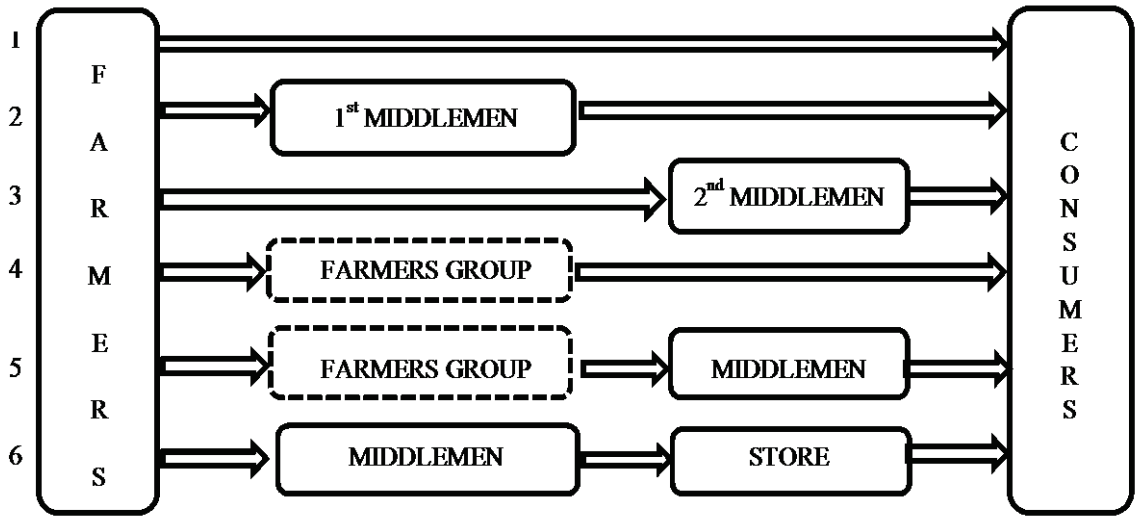


Figure 25. Organic rice distribution channels in West Sumatra, Indonesia

Source : Field survey, 2015

Note :

1st middlemen are people who distribute organic rice as a main business

2nd middlemen are people who used to be organic rice consumers and then also sell organic rice to their relatives, neighbors and colleagues

Figure 25 shows the organic rice distribution channels in West Sumatra. During the first survey in April 2014, information from farmers revealed that there are four kinds of distribution channels of organic rice (Table 16). The first is the farmer directly selling organic rice to consumers (channel 1). The second is the farmers selling to middlemen and then to the consumers (channel 2). The third is farmers selling through farmer group leaders and then to the consumers (channel 4). The fourth is farmers selling through farmer group leaders to middlemen, and then to the consumers (channel 5). In addition, through in depth interviews with consumers (the second survey in March 2015), it was found that there are two more additional distribution channels. There is a new role for people who used to be organic rice consumers, in which they then sell organic rice to their relatives, neighbors and colleagues (channel 3). Moreover, it was

found that recently (in mid 2014) middlemen sell organic rice to a store (channel 6). Basically, each member of the farmers group is free to use any distribution channel. There are no written rules for how to sell the product.

The most common distribution channel for organic rice in study area is channel 1. Over 60% of respondents (farmers) used direct sell to consumers. This is because farmers gain the most benefit by selling the organic rice directly to consumers at the optimum price. Two farmers groups that are already certified sold the product at optimum price (15,000 IDR/kg for Singkam and 14,000 IDR/kg for Sokan), while other farmers groups could only sell at 13,000 IDR/kg for Randah putih.

Compared to the other three farmers groups that are still in the process of certification which use Sijunjung seed variety, they sold for 12,500 IDR/kg. However, it was found that one respondent sold it for 10,000 IDR/kg because at the time she needed money immediately and she was not in any position to bargain selling the product for a higher price. She could not prove that her product was organic because she did not have any certificate yet, so she sold the product at the same price as conventional rice.

Although direct selling can gain higher prices, it is found that some farmers choose to sell the product to middlemen or through farmers groups. The second distribution channel, farmers sold organic rice for 13,000 - 14,000 IDR/kg to middlemen. Middlemen can sell the product to consumers for the price of 15,000 - 17.000 IDR/kg. The advantage of this system is farmers get direct cash immediately, although they gain less profit than selling directly.

The third distribution channel is an interesting one because people who used to be consumers now play a role as a middleman. They promote the organic rice to their relatives, neighbors and colleagues and then they sell it to them. The consumers who played as middlemen bought 15,000 IDR/kg from farmers. Then they sold it with the price of 17,000 IDR/kg. They gain profit by selling the organic rice.

The fourth distribution channel is farmers selling the product through farmer groups. The main reason for farmers to use this channel is because farmers trust the group leaders to help them distribute their product, whether it will be sold directly to consumers or sold to middlemen (distribution channel 5). Farmers sold the organic rice for 13,000 - 14,000 IDR/kg through farmer group leader (or famers give a fee to leader). There are no written agreements for the fee the group leader will receive. It is based on their trust on the agreement. The leader sold it directly to consumers for 15,000 IDR/kg or sold it through middlemen for 14,000 - 14,500 IDR/kg. Then middlemen sold the organic rice for 16,000 - 17,000 IDR/kg to consumers (distribution channel 5).

The role of the middlemen in distribution channel 5 is to contact farmer group leaders (in the case of Amanah Agro and Lurah Sepakat). They make an agreement on price, time and the amount of product that will be sold. Middlemen will come to the farmer group leaders' places to get the product. Then middlemen will sell the product to consumers. The sixth distribution channel is farmers selling organic rice to middlemen (for 13,000 - 14,000 IDR/kg) and then the middlemen selling it to a store (for 16,000 IDR/kg). The price of organic rice can reach 18,000 IDR/kg at a store.

The six distribution channels in West Sumatra are different to other findings by Jahroh (2010), where she found that it was two kinds of marketing channels in North Sumatra and three kinds of marketing channels in West Java (which were facilitated by university research projects). The distribution channels in North Sumatra are 1) farmers group to NGO, then to distributors and to consumers and 2) farmers group to NGO and then to consumers. The distribution channels in West Java are 1) farmers group to firm, then to supermarket and to consumers; 2) farmers group to middlemen and to consumers and 3) farmers group/farmer directly selling to consumers. Jahroh stated that support from other stakeholders (in this case is NGO and university research project) would help farmers in selling organic rice. Moreover, Irawan *et al*. (2012) described two kind of organic rice marketing channels in Central Java. They emphasized the support from local government enterprise by buying husky rice from farmers groups and selling it to government employees. In the case of West Sumatra, it was only 3 cases found which farmers sold their product through farmers group, while other studies showed that farmers mostly sell the organic rice through farmers group.

6.2 Farmers' satisfaction on organic rice distribution channels

Farmers' satisfaction on organic rice distribution channels was examined. As seen from Table 17, although 60.5% farmers used direct selling (refer to Table 10), not all of them are satisfied with the distribution channel. For farmers who use direct selling, it is found that only 9% of farmers think that the existing distribution channel is excellent, while 43% of farmers are satisfied and 48% of respondents think that it needs improvement.

Table 17. Farmers satisfaction on existing organic rice distribution channels

(Unit : %)

	Excellent	Satisfied	Need improvement
Direct sell to consumers	9	43	48
Sell to middlemen	0	50	50
Sell through farmers group	0	67	33

Source : Field survey, April 2014

The system of direct selling is that farmers receive an order from consumers by phone. Then farmers will deliver the product themselves if consumers live in the same district. However, if consumers live in another district, farmers will send the product using public minibus transportation facilities. Then consumers will pick up the product at the bus station. The delivery cost from the farmers' house to the public transportation facility is covered by farmers (included in the rice price), while the delivery cost by public transportation to consumers place is covered by consumers. Consumers transfer money to farmers bank accounts. Farmers felt that this method is not efficient when they get two orders at different times on the same day and they have to deliver the product twice in one day. For farmers who sell through the farmers group leader (67%), they are satisfied with the system because they think it is efficient as they do not have to consider additional cost for delivering the product to consumers.

6.3 Organic rice consumer profiles and their views on existing organic rice distribution channels

Organic rice consumers interviewed were spread in four districts (Table 18), including Agam district, Lima Puluh Kota districts (as the organic rice production area) and Padang city, the capital city of West Sumatra and Bukittingi City. Padang city has

50% of organic rice consumers of total respondents. Over 56% of respondents are female. Respondents are mainly graduated from university (61%), 9% of respondents graduated from college and 21% of respondents graduated from high school. This indicates that mostly organic rice consumers are people with high level of education. Moreover, respondents' primary jobs are in government sector (43.5%), including one respondent who is a member of house representative of Bukittingi city, in private sector (22%), and as a housewife (13%). 87% of respondents are married and their spouse mostly have a job (75%).

In terms of household monthly income, 28% of respondents have 3.1 million IDR to 4.6 million IDR as monthly income. Only 15% of respondents have more than 9 million IDR monthly income. This also indicates that organic rice consumers are people with high income level. This is because the organic rice price is higher than non organic rice price. 70% of respondents buy organic rice for once a month, while 13% of respondents buy organic rice in uncertain time. Only 39% of respondents consume fully organic rice, while other consumers (61%) consume both organic and non organic rice.

In regards to the organic rice distribution aspect, consumers buy organic rice from farmers (41%), middlemen (35%), neighbors (11%), stores (7%), relatives (4) and work places (2%). However, wherever they buy organic rice, 70% of respondents stated that the organic rice is not always available when they want to but it. This indicates that although demand for organic rice is high, there is a problem in supplying organic rice, due to the limitation of organic rice availability. 52% of respondents satisfy with the existing organic rice distribution while 48% of respondents not satisfy.

Table 18. Respondents (organic rice consumers) profile

(Unit : people, %)

Respondent profile		Total Respondent	
Region	Agam District	12	26.1
	Lima Puluh Kota District	6	13.0
	Padang City	23	50.0
	Bukittinggi City	5	10.9
Age	≤ 19 years	1	2.2
	20 ~ 29 years	0	0.0
	30 ~ 39 years	13	28.3
	40 ~ 49 years	20	43.5
	50 ~ 59 years	7	15.2
	≥ 60 years	5	10.9
Sex	Male	20	43.5
	Female	26	56.5
Educational background	Elementary School	1	2.2
	Junior High School	1	2.2
	High School	12	26.1
	College	4	8.7
	University graduates	28	60.9
Primary job	Government sector	20	43.5
	Private sector	10	21.7
	Trader	5	10.9
	Retiree	3	6.5
	Farmer	1	2.2
	Housewife	6	13.0
	Taylor man	1	2.2
Family member	1 - 2 people	7	15.2
	3 - 5 people	32	69.6
	6 - 8 people	6	13.0
	9 – 10 people	1	2.2
Marital status	Married	40	87.0
	Widow	4	8.7
	Single	2	4.3
If married, does the spouse has a job?	Yes	30	75.0
	No	10	25.0
Household monthly income (IDR)	≤ 1.5 million	5	10.9
	1.6 - 3 million	7	15.2
	3.1 - 4.6 million	13	28.3
	4.6 - 6 million	5	10.9
	6.1 - 7 million	7	15.2
	7.1 - 9 million	2	4.3
	> 9 million	7	15.2

Source : Field survey, March 2015

In terms of consumers' reason on consuming organic rice, Table 19 shows that the main reasons are because consumers believe that organic rice is good for health. Some consumers experienced that after consuming organic rice for several weeks they felt healthier. They believe that organic rice contains nutrition that is good for their health. The second reason is that the organic rice taste good. Consumers think that the organic rice smells better than conventional rice, the color and smell does not change in several hours and it makes the stomach full longer. The third reason is it is good for environment. Consumers are become aware of environmental issues, including the effect of using pesticides for environment. Another reason is consuming has become a new lifestyle among their community.

Table 19. Consumers main reasons in consuming organic rice

(Unit : %)

Consumers main reasons	First reason	Second reason	Third reason
It is good for health	87	11	4
It taste good	13	43	20
It is good for environment		17	30
It is a new lifestyle		15	15
To support government program on organic		2	9
Own willingness		2	0
To appreciation for organic farmers		2	0
Neighbors advise		0	2
For business		0	4
Do not know		7	15
Total	100	100	100

Source : Field survey, March 2015

It is important to examine consumers' expectation on organic rice. Figure 26 shows that almost half of respondents expect organic rice is more available when they need it. 22% of consumer hope that as organic rice it should labeled with certification number to prove that it has certified. However, 50% of consumers still will buy organic rice without certification number because they trust the farmers. 13% of consumers

wish the organic rice is sold in reasonable price. Although 59% of consumers think that the current organic rice is reasonable and 94% of them believe it is reasonable if the organic rice price is higher than non organic rice price.

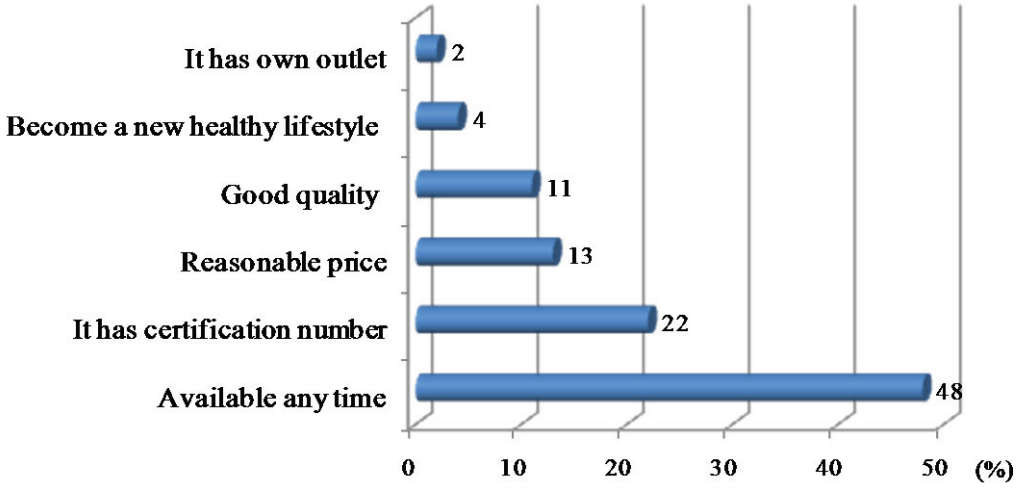


Figure 26. Consumers expectation on organic rice in West Sumatra, Indonesia
Source : Field survey, March 2015

In the future, considering there will be an increase in the number of consumer demand on organic rice and increase of the number of farmers who will get certification, there is a need to recommend a distribution channel that will be beneficial to farmers and also satisfy consumer demand. It is proposed that farmers groups' capacity should be developed not only in the technical aspect of organic farming systems, but also in marketing. Whatever the distribution channel will be developed, it would be better through farmers groups. Farmers groups would play a role to manage supply and demand of organic rice and to reduce delivery cost. If members of farmers groups can cooperate with each other, they can gain benefit in terms of profit (that they can sell directly to consumers with higher price, rather than they sell through middlemen) and time management (easily sell the product). Moreover, the management fee for farmers groups can be used for further group activities.

CHAPTER 7

CONCLUSIONS AND IMPLICATIONS

7.1 Summary of main findings

Organic rice farming system in West Sumatra Province, Indonesia has been implemented by 87 farmers groups. 7 farmers groups have been identified for the survey. The first survey in April 2014, there were only 3 of 7 farmers groups have got organic certification. Other two farmers groups got the certificate in Dec 2014. One farmers group failed to get the certificate and another farmers group still in the conversion stage of organic farming. The main motivation for farmers to work on an organic rice farming system is because of their concern for the environment and health.

National government program (called Go Organic 2010) had been implemented by each province with different approach. In the case of West Sumatra, the approach is teamwork of extension workers who deal with promoting organic rice farming system and expert organic farmers who convince other farmers the advantage of organic rice farming system based on their experience. This finding is become an original finding since other regions used the facilitation from NGO (in the case of North Sumatra), the local government (in the case of Central Java) or the university project (in the case of West Java). The team work of expert organic farmers and extension working will be a strength point for the sustainability of organic rice farming in West Sumatra.

In terms of economic analysis, it is found that the average income of organic rice farming in West Sumatra is 14,384,263 IDR/ha. The average production cost is

9,420,298 IDR/ha. The average paddy production is 3.5 t/ha. Two studies conducted by Agus and Teddy (2011) and Sukristiyonubowo *et al* (2011) had been compared to examine the profitability between organic rice farming and conventional rice farming. It revealed that organic rice farming system is profitable for farmers compared with conventional rice farming. Agus and Teddy (2011) finding gain revenue of organic rice farming is 22,050,000 IDR/ha, while in West Sumatra the revenue is 18,566,180 IDR/ha and Sukristiyonubowo *et al* (2011) finding is 16,800,000 IDR/ha. The revenue for conventional rice farming is between 13,440,000 IDR/ha and 15,000,000 IDR/ha. Moreover, in West Sumatra the profit of organic rice farming is only 9,145,882 IDR/ha, which is lowest value compared to other studies (which is about 13,500,000 IDR/ha). The profit for conventional rice farming is between 7,700,000 IDR/ha and 8,435,000 IDR/ha. However, it was found that due to external factor such as animal attack and climate change effect to low rice production. This has result in farmers are not satisfied yet with their income.

The main organic rice distribution channel in West Sumatra, Indonesia is direct sales from farmers to consumers (60.5% of farmers), while other studies found that farmers distribute organic rice through farmers groups. The results showed that there are six types of distribution channels, including selling to middlemen, selling through farmers groups and selling to stores. It was also found that some consumers are doing their own marketing by selling the product to their relatives, neighbors, and colleagues. The six distribution channels in West Sumatra are different to other studies. Jahroh (2010) found two kinds of marketing channels in North Sumatra and three kinds of marketing channels in West Java. Irawan *et al*. (2012) only found two kinds of organic rice marketing channels in Central Java. In the case of West Sumatra, it was only 3

cases found which farmers sold their product through farmers group, while other studies showed that farmers mostly sell the organic rice through farmers group.

Each distribution channel has advantages and disadvantages. However, farmers have selected the type of distribution channel depending on the situation. In fact, consumers are unable to easily get the organic rice as desired. Despite organic rice should have certification number, the main consumer expectation on organic rice is that it is available any time they need it. It was revealed that the supply side of the growing demand has not achieved a sufficient response.

7.2 Conclusions

These conclusions are aimed to answer the specific objectives of the thesis.

1. The awareness on environment and health are the two main reasons for farmers in implementing organic rice farming system.
2. There is a significant role of expert organic farmers and extension workers in the development of organic rice farming system in West Sumatra by promoting and facilitating the organic farmers groups.
3. Although organic paddy production tends to be lower than conventional system, this organic rice farming system is more profitable than conventional systems because of the input costs are lower and the selling price is higher than conventional system. The average production cost is 9,420,298 IDR/ha. The average revenue is 18,566,180 IDR/ha. The average income is 14,384,263IDR/ha and the average profit is 9,145,882 IDR/ha.

4. The organic rice distribution channels have evolve from it four kinds of distribution channel into six distribution channel. They are including selling to middlemen, selling through farmers groups and selling through stores, and create a new market by selling the product to their relatives, neighbors, and colleagues.
5. Consumer awareness on their health is the main reason to consume organic rice. The main expectation is that the availability of organic rice should be sustained.

7.3 Implication

It was revealed that organic rice farming system is profitable for farmers. Therefore, farmers should manage their farm with more effort to gain higher profit. In the future, considering there will be an increase in the number of farmers who will get certification and an increase in organic rice demand, there is a need to recommend a distribution channel that will be beneficial to farmers and also satisfy consumer demand.

I propose that farmers groups' capacity should be developed not only in the technical aspect of organic farming systems, but also in marketing aspect. Whatever the distribution channel will be developed, it would be better through farmers groups. Farmers groups would play an important role to manage supply and demand of organic rice and to reduce delivery cost. If members of farmers groups can cooperate with each other more, they can gain benefit in terms of profit (that they can sell directly to consumers with higher price, rather than they sell through middlemen) and they can manage the time for distribution. In addition, the management fee for farmers groups can be used for further group activities.

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ANNEXES

ANNEX 1. QUESTIONAIRE FOR ORGANIC RICE FARMERS

To be read by Enumerator:
This survey is conducted by …….. University Team. The aim of this survey is to collect data and information related to organic rice farming system in West Sumatra. The information will be kept secretly.

Do you agree to participate to be interviewed in this survey? 1. Yes 2. No
_____

Date of interview : ____/_____/2014 Enumerator : _____	Note: 1. Organic rice farmers: i. Certified ii. Non certified a. Willing to certified b. Not willing to certified

Section 1. General Information		
District	:	
Sub District	:	
Name of Group of Farmers	:	
Respondent Listing Number	:	
Respondent contact Number		

Section 2. Respondents Profile		
1	Name	
2	Age	a) ≤ 20 years d) ≥ 40 s/d < 50 years b) ≥ 20 s/d < 30 years e) ≥ 50 s/d < 60 years c) ≥ 30 s/d < 40 years f) ≥ 60 years
3	Sex	a) Male b) Female
4	Formal Educational Background	a) Elementary c) High School e) S1 b) Primary School d) Diploma
5	Non Formal Educational Background	
6	Primary job	a) Farmer d) Labor b) Trader e) Others …… c) Government officer
7	Marital Status	a) Married b) Widow c) Single
8	Family member	a) 1 – 3 people b) 4 - 6 people c) 7 - 10 people
9	Family member detailed information	

Name	Status	Age	Occupation

10	Position in Farmers Group a) Leader b)Secretary c) Accounting d) Manager e) Member	

Section 3. Farm Land Information

11	How long have you been cultivating paddy? a) ≤ 1 year b) ≥ 1 s/d < 5 year c) ≥ 5 s/d < 10 year d) ≥ 10 s/d < 15 year e) ≥ 15 s/d < 20 year f) ≥ 20 s/d < 25 year g) ≥ 25 s/d < 30 year h) ≥ 30 year
12	How large is your organically rice cultivating area at the moment? _____ ha a) < $\frac{1}{2}$ ha b) ≤ $\frac{1}{2}$ ha until < 1 ha c) ≥ 1 ha until < 2 ha d) ≥ 2 ha
13	Have you manage the current paddy field for 3 or more years? a) Yes b) No
14	Do you cultivate paddy in the same field all the time? a) Yes (explain……..) b) No (explain……...)
15	Do you cultivate other commodities besides paddy in your field? a)….. b)……. c)…….. d)……..
	Describe organic paddy cropping pattern in your land from 2011 - 2013
16	Paddy gross production from 2011 – 2013 for every season (kg/yield)

	Paddy Production (kg/yield)			(Converted to ton/ha)		Paddy Production (ton/ha)		
	Season 1	Season 2	Season 3			Season 1	Season 2	Season 3
2011					2011			
2012					2012			
2013					2013			

17	Cropping activities year last planting season

Respondent No :

YEAR.....	(Season_____ Crop : Paddy)																																							
	MONTH																																								
	1				2				3				4				5				6				7				8				9				10				11				12			
Activities	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Land preparation																																															
Seeding																																															
Fertilizing																																															
Weeding																																															
Pest Management																																															
Harvesting																																															

18 a	What is the status of land ownership of your paddy land area?
	a) Owner b)Other people own the land b) Owner and also rent other land from other farmers
18 b 18 c	If you own the land, how large is your own land? _____ ha If you rent the land, how large is rented land ? _____ ha
19	Does the owner live in the same village? a) Yes b) No (explain)……. c)
20	How do you manage the land tenancy? a) Rent (money case) c) Others……... b) Sharing (rice case) (please explain the system)

Section 4. Organic Paddy System Information	
21	When did you begin implementing organic system in paddy cultivation? Year.. ……
22	What encourage you to begin implementing organic system in paddy cultivation? a) Self participation b) Farmers group commitment c) NGO advise d) Farmers group leaders advice e) Government advice f) Others ……..
23	Please choose a primary reason, a secondary reason and a tertiary reason that you want to implement organic paddy farming system? a) Because it is good for environment b) Because organic rice is good for health c) Because it is benefit for long run d) Because It is financially benefit e) Because someone ask me to do so f) Because consumers demand g) I just want to try new thing h) Others …… The primary reason is …. Because …….. The secondary reason is … Because …… The tertiary reason .. Because……
24	How did you mainly get information about organic paddy cultivation system?(at least two answers) a) Farmers group leaders b) Extension workers from government c) University d) Newspapers e) Other organic farmers f) NGO g) Others……. (please explain ……..)
25	Who teach you about organic paddy cultivation system? a) Farmers group leaders b) Extension workers from government c) NGO d) University e) Other organic farmers f) Self learning g) Others……. (please explain ……..)
26	Have you ever been to other places to learn organic paddy farming system? a) Yes b) No If yes, Where …….. When …….. How long …… Who support you to go there ……..
27	If you are not the owner of the paddy land area, did you tell the owner that you are going to cultivate paddy organically? a) Yes b) No If yes, why do you think you have to tell them? Please explain…….
28	Could you explain what are the primary obstacle, secondary obstacle and tertiary obstacle in implementing organic paddy cultivation system? a) Weed control b) Fungi control c) others b) Certification cost d) Marketing
29a	What kind of supports government give to farmers? a) Subsidies b) Extension support

29b	If you get subsidies, what do you use it to support organic farming cultivation? a) Buying seeds b) Buying fertilizers c) Buying equipments d) Others ……
30	Do you think the support from the government is enough to support you to implement organic farming? a) Yes b) No (Please explain why do you think so……)
31	Do you think the support from NGO/university is useful to support you to implement organic farming? c) Yes d) No (Please explain why do you think so……)
32	Do you know the current organic standard (SNI 6729 2010) a) Yes b) No
33	Have you ever read copy of organic standard (SNI 6729 2010) manual? a) Yes b) No If yes, explain how do you get the manual?.....
34	Where is your paddy field location? a) At flat area (please attach/field number) b) At non flat area (hilly) (terracing)

Section 5. Seeds and Seeds Treatments	
35	List all seeds used from 2011 to 2013 for all crops (organically, as well as in transition, or conventional)

Year	Seeds/ variety	Organic (certified)	uncertified seed	Explanation
2011				
2012				
2013				

36	Do you purchase organic seedling? a) Yes b) No
37	If yes, Who are the suppliers ……
38	Are they certified suppliers? a) Yes b) No
39	Where did you buy the organic seedling? a) Market b) Coop c) Others…..
40	Do you purchase non organic seedling? a) Yes b) No

41	If yes, explain why did buy non organic seedling
42	Do you grow organic seedling on farm? a) Yes b) No
Section 6. Source of Water	
43	What is your source of water? a) Irrigation District c) Rainfed b) River d) Others…….
44	If your source of water is from irrigation district, please explain what kind of irrigation system a) Primary irrigation b) Secondary irrigation c) Tertiary irrigation
45	Do you have any problems with source of water a) Yes b) No
46	If yes, please explain…..
46	What water contamination problems did you experience
47	What did you do to solve the problems?
Section 7. Crop Management	
7. a. Weed Management	
48	What are your weeds problems? a) Weeds b) Pampas grass c) others
49	What weed control methods do you use a) Crop rotation b) Hand weeding c) Mowing d) Delayed seeding e) Others……
50	Do you keep record of how often you utilize the weed control methods? a) Yes b) No
51	How often do you conduct weed monitoring? a) Weekly c) Annually b) Monthly d) As needed
7. b. Pest and Disease Management	
52	What are your pest problems? a) Birds b) Rodents c) Snail d) Others
53	How do you prevent pest problems? a) Hand picking b) Using bio pesticides
54	What strategies do you use to control pest damage to crops a) Crop rotation e) Others…… b) Selection of plant varieties c) Timing of planting d) Traps

55	If using bio pesticides, what kind of bio pesticides do you use?
56	What are the material to make the bio pesticides
57	Explain the process of making the bio pesticides
58	How did you learn the use of bio pesticides
59	Do you work with a pest control advisor a) Yes b) No If yes, give name and contact information
60	How often do you conduct pest monitoring? a) Weekly c) Annually b) Monthly d) As needed
61	Have you ever heard about integrated pest management program? (please explain)
62	What are your crop disease problems? a) Bacterial disease (Bacterial blight, foot rot, grain rot, kernel spotting……) b) Fungal disease (Brown spot, Kernel spotting, leaf smut,…….) (You may choose more than one answer and give more answers)
63	What disease prevention method do you use ? a) Crop rotation b) Selection of plant varieties c) Timing of planting d) Plant spacing e) Others…….
64	How often do you conduct disease monitoring? a) Weekly c) Annually b) Monthly d) As needed
65	Rate the effectiveness of your pest and disease management program a) Excellent b) Satisfactory c) Needs improvement
	7. c. Fertilizer Management
66	What kind of fertilizer do you use? a) Organic fertilizer b) Others….
67	Do you make compost? a) Yes b) No If yes, explain how do you make compost ……
68	Do you have any livestock? a) Yes (please explain……..) b) No
69	Do you use livestock residue for your crops? c) Yes (please explain…….) a) No
70	Where is your paddy field location? a) At flat area (please attach/field number) b) At non flat area (hilly) (terracing)

71	Do you burn crop residue (paddy straw)? a) Yes b) No
72	If yes, explain why you burn the crop residue ……..…… …
	7. d. Soil Management
73	Do you monitor your soil fertility? a) Yes b) No
74	If yes, how often you monitor your soil fertility a) Weekly b) Monthly c) Annually d) As needed
75	Who conduct the soil fertility monitoring? a) My self b) Extension worker c) Others……..
76a	Do you have soil erosion problem? a) Yes b) No
76b	If yes, describe your effort to minimize soil erosion problems a) Contour Farming b) Tree lines c) Terraces d) Maintain wildlife habitat e) Others (please explain)
Section 8. Marketing of organic and organically rice	
77	How many percentage of your product for own consumption and for sell? a) own consumption _____% b) for sell _____%
78	Do you find any differences in selling organic rice, organically rice, non organic rice? a) Yes b) No (If yes, please describe in detail)
79	Please describe how do you sell your crop (paddy) ? a) Directly sell the product to consumer b) Sell to traders c) Sell to middlemen d) Sell through group of farmers e) Sell through cooperative (Please explain in detail for the answer)

80	What do you think about the marketing channel you are doing at the moment? a) Excellent because _____ b) Satisfactory because _____ c) Needs improvement because _____

Section 9. Cost of paddy cultivation for the last planting season				
	Cost item		**Unit**	
1	Seed cost			
	Amount of seed		Kg/ha	
	Cost of seed		IDR/kg	
	Total Seed cost		IDR/ha	
2	Fertilizer cost		IDR/ha	
	-			
3	Labour cost			
	Source of labour	a) Family member	b) Hired people	
	Cost of labour			
	Land preparation		IDR/day	
	Sedding		IDR/day	
	Fertilizing		IDR/day	
	Weefing		IDR/day	
	Pest Management		IDR/day	
	Harvesting		IDR/day	
4	Equipment costs			
	Sprayer		IDR	
	Tractor		IDR	
	Ani-ani (traditional tools)		IDR	
	Trasher		IDR	
5	Land lease		IDR	
	Land tax (if the land is own)		IDR	
6	Pest management cost			
	biopesticides		IDR	
7	Cost of organic sertification		IDR	
	TOTAL			

Paddy production	**: ……..kg**
Rice selling price	**: …….. IDR/kg**

ANNEX 2. QUESTIONNAIRE FOR ORGANIC RICE CONSUMERS

To be read by interviewer:
This survey is conducted by Andalas University Team. The aim of this survey is to collect data and information related to consumers perception on organic rice in West Sumatra. The information will be kept secretly.

Do you agree to participate to be interviewed in this survey? 1. Yes 2. No ____

Date of interview : ____/_____/2015
Interviewer : _____

Section I. General Information		
District	:	
Sub District	:	
Name of Respondent	:	
Respondent Listing Number	:	
Respondent contact Number	:	

Section II. Respondents Profile		
1	Name	
2	Age ( )	a) <20 years d) 40 ~ 49 years b) 20 ~ 29 years e) 50 ~ 59 years c) 30 ~ 39 years f) 60 years
3	Sex	a) Male b) Female
4	Formal Educational Background	a) Junior High School b) High School c) College d) University graduates
5	Primary job	a) Civil servant b) State owned enterprise (BUMN) c) Private sector (……..) d) Others…. (……..)
6	Marital Status	a) Married c) single b) Widow
7	If married, does the spouse has a job?	a) Yes …… (primary job……) b) No

8	Family member (…… people)	a) 1 - 2 people d) 9 – 10 people b) 3 - 5 people e) > 10 people c) 6 - 8 people
9	Household monthly income (IDR)	a) < 1.5 million d) 4.6 – 6 million g) > 9 million b) 1.6 – 3 million e) 6.1 - 7 million c) 3.1 – 4.5 million f) 7.1 – 9 million
10	Household monthly expenses (IDR)	a) < 1.5 million d) 4.6 – 6 million g) > 9 million b) 1.6 – 3 million e) 6.1 - 7 million c) 3.1 – 4.5 million f) 7.1 – 9 million

Section III. Consumers' perception on organic rice	
III.a. Distribution and price	
11	When did you start to consume organic rice? ……. (year) a) One year ago d) Four years ago b) Two years ago e) Five years ago c) Three years ago f) more than five years ago
12	Who introduce you firstly to consume organic rice? ……. a) Family member d) Office work b) Friends e) Self initiation c) Group community f) Others ….
13	How many times do you buy organic rice monthly? a) Once a month c) Three times a month e) Once for two months b) Twice a month d) Four times a month f) Others….
14	How many kilograms do you buy organic rice monthly? ……kg
15	Do you consume organic rice only or both organic rice and conventional rice? a) Only organic rice b) Both organic and conventional rice
16	If b) how many percentage of your consumption between organic and conventional rice? a) Less than 10% consuming organic rice b) Consume 25% of organic rice from total rice consumption c) Consume 50% of organic rice from total rice consumption d) Consume 75% of organic rice from total rice consumption
17	Do you find any different taste between organic and conventional rice? a) Yes b) No

18	If yes, can you describe the taste? a) Organic rice smell better than conventional rice b) Organic rice makes the stomach full longer c) Organic rice color and smell does not change in several hours? d) Other……
19	How did you buy organic rice? a) Buy from market c) Buy from farmers b) Buy from store d) Others … (explain)
20	If you buy from the market, store or farmers, does the organic rice always available? a) Yes b) No
21	If you buy from farmers, please explain how do you order the organic rice ……
22	Do you satisfy with organic rice distribution system at the moment? a) Yes ……. b) No …… (Notify the reason……....)
23	How much price of organic rice do you buy per kg? IDR……/kg
24	What do you think about the price? a) It is expensive c) It is cheap b) It is reasonable
25	Do you think is it reasonable if the price of organic rice is higher than conventional rice? a) Yes …… b) No …… (Please explain in detail)
26	Do you know what variety of organic rice you consume? a) Yes……(notify the name of variety……....) b) No…. (I just buy it as organic rice, etc…)
III.b. Reason, perception, expectation	
27	What is the main reason for you to consume organic rice? (List 3 items, like as number 1,2,3) ….) It is good for health (not contain pesticide, etc…) ….) It is taste good ….) It is a new lifestyle (trend in community, prestige, etc…) ….) To support government program on organic (Go Organic Program) ….) I do not know, my spouse asks me to buy organic rice …) It is good for environment ….) Others……. (explain)

28	If you answer a), did you find any evidence that your health is improve? a) Yes …. b) No ….. (Please explain in detail)
29	If you answer b), can you describe what the differences between the taste of organic rice and common rice? ……..
30	If you answer c), does organic rice become a common talk in your society? a) Yes …. b) No ….. (Please explain in detail)
31	If you answer d), how do you know about Go Organic Program? ……
32	What image do you have of organic rice? (you can answer more than one) a) No pesticides b) No chemical fertilizer c) Environmentally friendly agriculture d) Packaging written organic product e) Organic certificate f) Price is more expensive g) I do not know h) Others……. (please notify)
33	Do you think it is important organic rice should be labeled with certification number? a) Yes, why…. b) No, why….
34	If the organic rice is not labeled with certification number but written as organic product, do you still buy it? a) Yes, why…. b) No, why….
35	What do you expect as an “organic rice” a) It has certification number d) Others….. b) Reasonable price (……..IDR/kg -- ……..IDR/kg) c) Available any time
36	Do you think the government should promote consuming organic rice to consumers? a) Yes (explain……) b) No (explain……)
38	Do you have any comments or suggestions related to the organic rice in West Sumatra?

Thank you very much for your cooperation.

ANNEX 3. QUESTIONNAIRE FOR MIDDLEMEN / FARMERS GROUP LEADER

To be read by Interviewer:
This survey is conducted by Andalas University Team. The aim of this survey is to collect data and information related to organic rice marketing channel in Agam and Lima Puluh Kota, West Sumatra.
The information will be kept secretly.

Do you agree to participate to be interviewed in this survey? 1. Yes 2. No

Date of interview : ____/_____/2015

Interviewer : _____

Section I. Respondents Profile		
Name	:	
Address	:	
Contact Number	:	
Formal Educational Background	:	
Primary job	:	

Section II. Organic rice distribution system				
1	When did you start distributing organic rice product?			
2	Why do you interested in selling organic rice?			
3	Do you sell only organic rice or both (organic and conventional rice)?			
4	Do you sell other crops? a) Yes ……. (explain in table below) b) No			
5	If yes, how many organic rice or other crops do you sell weekly?			
	Organic rice	Non organic rice	vegetables	fruits
	..... kg	..... kg	- ..... -	- ..... - .....

<table>
<tr><td>6</td><td>Please explain the distribution process of how you get the organic rice whether it is from farmers or group of farmers.
(is there any written contract or oral contract with farmers?)</td></tr>
<tr><td>7</td><td>Please explain the process of how you sell the organic rice to consumers</td></tr>
<tr><td>8</td><td>Please explain how much price do you sell your organic rice?
<table>
<tr><th>Variety</th><th>Price</th><th>To whom</th></tr>
<tr><td></td><td>IDR……/kg</td><td></td></tr>
<tr><td></td><td>IDR……/kg</td><td></td></tr>
</table></td></tr>
<tr><td>9</td><td>How much price of organic rice do you buy (from farmers or group of farmers) per kg ?
<table>
<tr><th>Variety</th><th>Price</th><th>From whom</th></tr>
<tr><td></td><td>IDR……/kg</td><td></td></tr>
<tr><td></td><td>IDR……/kg</td><td></td></tr>
</table></td></tr>
<tr><td>10</td><td>What do you think about the selling price to consumers?
a) It is expensive
b) It is reasonable
c) It is cheap</td></tr>
<tr><td>11</td><td>Do you think is it reasonable if the price of organic rice is higher than conventional rice?
a) Yes, because ……..
b) No, because ……</td></tr>
<tr><td>12</td><td>How many percentage do you sell organic rice with the packaging labeled with certification number? …….%</td></tr>
<tr><td>13</td><td>If no packaging labeled, do consumers questioning whether the product is really organic or not?
a) Yes, because …….
b) No, because ……</td></tr>
<tr><td>14</td><td>Do you satisfy with organic rice distribution system at the moment?
a) Yes because ……
b) No because …….</td></tr>
<tr><td>15</td><td>Please give any comment or suggestion related to the organic rice distribution system</td></tr>
</table>

Thank you very much for your cooperation.

Annex 4. Organic fertilizer and bio pesticides cost of organic rice farming system of five organic farmers groups in West Sumatra, Indonesia

Farmers Group	No	Paddy yield (m2)	Paddy production (kg/yield)	Organic Fertilizer cost (purchased) (IDR/yield)	Organic Fertilizer cost (purchased) (IDR/ha)	Organic Fertilizer cost (self supplied) (IDR/ha)	Bio pesticides (IDR/yield)	Bio pesticides (IDR/ha)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lurah Sepakat	1	3,000	960	30,000	100,000	180,000	10,000	33,333
	2	2,500	1,120	30,000	120,000	150,000	10,000	40,000
	3	2,350	400	30,000	127,660	172,340	8,000	34,043
	4	1,000	480	40,000	400,000	25,000	4,000	40,000
	5	1,000	450	30,000	300,000	25,000	4,000	40,000
	6	1,500	800	35,000	233,333	66,667	15,000	100,000
	7	1,500	200	30,000	200,000	100,000	15,000	100,000
	8	1,900	900	30,000	157,895	142,105	10,000	52,632
	9	2,000	920	30,000	150,000	100,000	10,000	50,000
	10	2,500	1,125	125,000	500,000	50,000	10,000	40,000
Balai Organik	11	1,047	695	10,000	95,511	204,489	4,000	38,204
	12	2,500	450	10,000	40,000	260,000	10,000	40,000
	13	10,000	1,890	10,000	10,000	290,000	30,000	30,000
	14	2,496	750	75,000	300,481	60,000	10,000	40,064
	15	3,000	660	10,000	33,333	206,667	10,000	33,333
	16	3,904	1,440	10,000	25,615	274,385	40,000	102,459
	17	1,023	495	10,000	97,752	202,248	5,000	48,876
	18	2,497	1,125	10,000	40,048	259,952	10,000	40,048
	19	6,248	2,250	10,000	16,005	283,995	20,000	32,010
	20	2,497	810	10,000	40,048	259,952	10,000	40,048
Tigo Alua Saiyo	21	2,500	500	40,000	160,000	130,000	10,000	40,000
	22	15,000	4,500	500,000	333,333	10,000	60,000	40,000
	23	930	420	60,000	645,161	10,000	8,000	86,022
	24	2,000	860	40,000	200,000	100,000	10,000	50,000
	25	1,000	360	20,000	200,000	100,000	8,000	80,000
	26	5,000	1,200	90,000	180,000	120,000	20,000	40,000
	27	2,500	500	50,000	200,000	100,000	10,000	40,000
	28	5,000	1,500	70,000	140,000	150,000	20,000	40,000
	29	5,500	1,395	70,000	127,273	172,727	20,000	36,364
	30	3,400	1,050	50,000	147,059	152,941	15,000	44,118
Sehati	31	5,000	1,050	10,000	20,000	280,000	20,000	40,000
	32	2,500	450	40,000	160,000	140,000	10,000	40,000
	33	8,075	3,200	10,000	12,384	287,616	30,000	37,152
	34	1,797	1,070	10,000	55,648	244,352	10,000	55,648
	35	2,000	700	10,000	50,000	250,000	10,000	50,000
	36	2,500	500	10,000	40,000	260,000	10,000	40,000
	37	2,000	475	10,000	50,000	250,000	10,000	50,000
	38	2,500	500	10,000	40,000	260,000	10,000	40,000
	39	2,500	500	10,000	40,000	260,000	10,000	40,000
Serba Usaha	40	580	290	10,000	172,414	127,586	5,000	86,207
	41	4,400	1,060	10,000	22,727	277,273	20,000	45,455
	42	370	198	10,000	270,270	29,730	5,000	135,135
	43	4,400	1,291	10,000	22,727	277,273	20,000	45,455
	44	1,800	400	10,000	55,556	244,444	10,000	55,556
	45	5,200	1,600	10,000	19,231	280,769	20,000	38,462
	46	6,400	1,600	10,000	15,625	284,375	20,000	31,250
	47	2,500	700	10,000	40,000	260,000	20,000	80,000
	48	5,000	1,453	10,000	20,000	280,000	20,000	40,000
	49	1,000	600	10,000	100,000	200,000	10,000	100,000

Annex 5a. Depreciation cost of organic rice farming system of five organic farmers groups in West Sumatra, Indonesia

Farmers Group	No	hoe							sickle						
		Unit	Price/ unit	Useful life	residual value	Depreciation cost of hoe			Unit	Price/ unit	Useful life	residual value	Depreciation cost of sickle		
		unit	IDR/ unit	year	IDR	IDR/ year	IDR/ planting season	IDR/ha	unit	IDR/ unit	year	IDR	IDR/ year	IDR/ planting season	IDR/ha
Lurah Sepakat	1	3	80,000	5	5,000	15,000	15,000	50,000	3	50,000	5	5,000	9,000	9,000	30,000
	2	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	3	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	4	1	80,000	5	5,000	15,000	5,000	16,667	2	50,000	5	5,000	9,000	6,000	20,000
	5	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	6	1	80,000	5	5,000	15,000	5,000	16,667	2	50,000	5	5,000	9,000	6,000	20,000
	7	1	80,000	5	5,000	15,000	5,000	16,667	2	50,000	5	5,000	9,000	6,000	20,000
	8	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	9	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	10	2	80,000	5	5,000	15,000	10,000	33,333	3	50,000	5	5,000	9,000	9,000	30,000
Balai Organik	11	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	12	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	13	4	80,000	5	5,000	15,000	20,000	66,667	3	50,000	5	5,000	9,000	9,000	30,000
	14	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	15	3	80,000	5	5,000	15,000	15,000	50,000	2	50,000	5	5,000	9,000	6,000	20,000
	16	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	17	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	18	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	19	3	80,000	5	5,000	15,000	15,000	50,000	3	50,000	5	5,000	9,000	9,000	30,000
	20	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
Tigo Alua Saiyo	21	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	22	3	80,000	5	5,000	15,000	15,000	50,000	3	50,000	5	5,000	9,000	9,000	30,000
	23	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	24	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	25	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	26	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	27	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	28	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	29	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	30	2	80,000	5	5,000	15,000	10,000	33,333	1	50,000	5	5,000	9,000	3,000	10,000
Sehati	31	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	32	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	33	2	80,000	5	5,000	15,000	10,000	33,333	1	50,000	5	5,000	9,000	3,000	10,000
	34	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	35	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	36	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	37	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	38	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	39	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
Serba Usaha	40	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	41	1	80,000	5	5,000	15,000	5,000	16,667	2	50,000	5	5,000	9,000	6,000	20,000
	42	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	43	1	80,000	5	5,000	15,000	5,000	16,667	2	50,000	5	5,000	9,000	6,000	20,000
	44	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	45	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	46	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	47	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000
	48	2	80,000	5	5,000	15,000	10,000	33,333	2	50,000	5	5,000	9,000	6,000	20,000
	49	1	80,000	5	5,000	15,000	5,000	16,667	1	50,000	5	5,000	9,000	3,000	10,000

Annex 5b. Depreciation cost of organic rice farming system of five organic farmers groups in West Sumatra, Indonesia (continued..)

Farmers Group	No	three-wheeled carts							hand tractor			Total depreciation cost (IDR/ha)
		Unit	Price/ unit	Useful life	residual value	Depreciation cost of three-wheeled carts			Price/unit	depreciation cost		
		unit	IDR/ unit	year	IDR	IDR/ year	IDR/ planting season	IDR/ha	IDR/ unit	IDR/ planting season	IDR/ha	
Lurah Sepakat	1							0			0	80,000
	2							0			0	53,333
	3							0			0	53,333
	4							0			0	36,667
	5							0			0	26,667
	6							0			0	36,667
	7							0			0	36,667
	8							0			0	53,333
	9							0			0	53,333
	10							0			0	63,333
Balai Organik	11							0			0	53,333
	12							0			0	53,333
	13							0			0	96,667
	14							0			0	53,333
	15							0			0	70,000
	16							0			0	53,333
	17							0			0	26,667
	18							0			0	53,333
	19							0			0	80,000
	20							0			0	53,333
Tigo Alua Saiyo	21							0			0	26,667
	22							0			0	80,000
	23	1	500,000	10	50,000	45,000	15,000	50,000			0	76,667
	24							0			0	26,667
	25							0			0	26,667
	26							0			0	53,333
	27							0			0	26,667
	28							0			0	53,333
	29							0			0	53,333
	30							0			0	43,333
Sehati	31							0			0	53,333
	32							0			0	26,667
	33							0	3,000,000	90,000	300,000	343,333
	34							0			0	26,667
	35							0			0	26,667
	36							0			0	26,667
	37							0			0	26,667
	38							0			0	26,667
	39							0			0	26,667
Serba Usaha	40							0			0	26,667
	41							0			0	36,667
	42							0			0	26,667
	43							0			0	36,667
	44							0			0	26,667
	45							0			0	53,333
	46							0			0	53,333
	47							0			0	26,667
	48							0			0	53,333
	49							0			0	26,667

Annex 6. Rent land, land tax and home land rent cost of organic rice farming system of five organic farmers groups in West Sumatra, Indonesia

Farmers Group	No	Home land rent (accounted) (IDR/ha)	Land rent cost (IDR/yield)	Land rent cost (IDR/ha)	Land tax (IDR/ha)	Total rent land + Tax (IDR/ha)
		(1)	(2)	(3)	(4)	(3) + (4)
Lurah Sepakat	1	2,000,000	0	0	50,000	50,000
	2	2,000,000	0	0	50,000	50,000
	3	2,000,000	0	0	50,000	50,000
	4	2,000,000	800	4,400,000	50,000	4,450,000
	5	2,000,000	0	0	50,000	50,000
	6	0	1,767	9,716,667	50,000	9,766,667
	7	2,000,000	0	0	50,000	50,000
	8	2,000,000	0	0	50,000	50,000
	9	2,000,000	0	0	50,000	50,000
	10	2,000,000	0	0	50,000	50,000
Balai Organik	11	2,000,000	0	0	50,000	50,000
	12	2,000,000	0	0	50,000	50,000
	13	2,000,000	0	0	50,000	50,000
	14	0	1,000	5,500,000	50,000	5,550,000
	15	2,000,000	0	0	50,000	50,000
	16	2,000,000	0	0	50,000	50,000
	17	2,000,000	0	0	50,000	50,000
	18	2,000,000	0	0	50,000	50,000
	19	2,000,000	0	0	50,000	50,000
	20	2,000,000	0	0	50,000	50,000
Tigo Alua Saiyo	21	2,000,000	0	0	50,000	50,000
	22	0	1,000	5,500,000	50,000	5,550,000
	23	0	1,500	8,250,000	50,000	8,300,000
	24	2,000,000	0	0	50,000	50,000
	25	0	1,200	6,600,000	50,000	6,650,000
	26	2,000,000	0	0	50,000	50,000
	27	0	667	3,666,667	50,000	3,716,667
	28	0	1,000	5,500,000	50,000	5,550,000
	29	0	833	4,583,333	50,000	4,633,333
	30	2,000,000	606	3,330,450	50,000	3,380,450
Sehati	31	2,000,000	0	0	50,000	50,000
	32	2,000,000	0	0	50,000	50,000
	33	2,000,000	0	0	50,000	50,000
	34	2,000,000	0	0	50,000	50,000
	35	2,000,000	0	0	50,000	50,000
	36	2,000,000	0	0	50,000	50,000
	37	2,000,000	0	0	50,000	50,000
	38	2,000,000	0	0	50,000	50,000
	39	2,000,000	0	0	50,000	50,000
Serba Usaha	40	2,000,000	0	0	50,000	50,000
	41	0	800	4,400,000	50,000	4,450,000
	42	2,000,000	0	0	50,000	50,000
	43	2,000,000	467	2,566,667	50,000	2,616,667
	44	2,000,000	0	0	50,000	50,000
	45	0	1,033	5,683,333	50,000	5,733,333
	46	2,000,000	833	4,581,500	50,000	4,631,500
	47	2,000,000	0	0	50,000	50,000
	48	0	967	5,316,667	50,000	5,366,667
	49	0	2,000	11,000,000	50,000	11,050,000

Annex 7. Paid labor cost and family labor cost of organic rice farming system of five organic farmers groups in West Sumatra, Indonesia

Farmers Group	No	Paid labor (employed workers	Paid labor (employed workers	Self supplied (family labor)	Self supplied (family labor)	Total labour cost
		(IDR/yield)	(IDR/ha)	(IDR/yield)	(IDR/ha)	(IDR/ha)
		(1)	(2)	(3)	(4)	(5)
Lurah Sepakat	1	150,000	500,000	1,290,000	4,300,000	4,800,000
	2	200,000	800,000	1,000,000	4,000,000	4,800,000
	3	120,000	510,638	1,008,000	4,289,362	4,800,000
	4	140,000	1,400,000	340,000	3,400,000	4,800,000
	5	140,000	1,400,000	340,000	3,400,000	4,800,000
	6	225,000	1,500,000	495,000	3,300,000	4,800,000
	7	225,000	1,500,000	495,000	3,300,000	4,800,000
	8	250,000	1,315,789	700,000	3,684,211	5,000,000
	9	250,000	1,250,000	710,000	3,550,000	4,800,000
	10	1,200,000	4,800,000	100,000	400,000	5,200,000
Balai Organik	11	420,000	4,011,461	100,000	955,110	4,966,571
	12	1,060,000	4,240,000	100,000	400,000	4,640,000
	13	1,380,000	1,380,000	3,000,000	3,000,000	4,380,000
	14	1,440,000	5,769,231	100,000	400,641	6,169,872
	15	350,000	1,166,667	1,090,000	3,633,333	4,800,000
	16	1,670,000	4,277,664	100,000	256,148	4,533,811
	17	370,000	3,616,813	100,000	977,517	4,594,330
	18	1,320,000	5,286,344	100,000	400,481	5,686,824
	19	1,050,000	1,680,538	2,000,000	3,201,024	4,881,562
	20	1,320,000	5,286,344	100,000	400,481	5,686,824
Tigo Alua Saiyo	21	250,000	1,000,000	950,000	3,800,000	4,800,000
	22	1,000,000	666,667	6,000,000	4,000,000	4,666,667
	23	500,000	5,376,344	50,000	537,634	5,913,978
	24	760,000	3,800,000	200,000	1,000,000	4,800,000
	25	360,000	3,600,000	120,000	1,200,000	4,800,000
	26	250,000	500,000	2,000,000	4,000,000	4,500,000
	27	250,000	1,000,000	950,000	3,800,000	4,800,000
	28	640,000	1,280,000	1,760,000	3,520,000	4,800,000
	29	980,000	1,781,818	1,660,000	3,018,182	4,800,000
	30	440,000	1,294,118	1,200,000	3,529,412	4,823,529
Sehati	31	0	0	2,400,000	4,800,000	4,800,000
	32	1,120,000	4,480,000	80,000	320,000	4,800,000
	33	1,330,000	1,647,059	2,500,000	3,095,975	4,743,034
	34	830,000	4,618,809	113,000	628,826	4,691,152
	35	850,000	4,250,000	110,000	550,000	4,800,000
	36	0	0	1,320,000	5,280,000	5,280,000
	37	0	0	1,000,000	5,000,000	5,000,000
	38	0	0	1,320,000	5,280,000	5,280,000
	39	0	0	1,320,000	5,280,000	5,280,000
Serba Usaha	40	0	0	250,000	4,310,345	4,310,345
	41	450,000	1,022,727	1,660,000	3,772,727	4,795,455
	42	0	0	200,000	5,405,405	5,405,405
	43	120,000	272,727	2,000,000	4,545,455	4,818,182
	44	960,000	5,333,333	100,000	555,556	5,888,889
	45	1,440,000	2,769,231	1,000,000	1,923,077	4,692,308
	46	1,300,000	2,031,250	1,800,000	2,812,500	4,843,750
	47	720,000	2,880,000	480,000	1,920,000	4,800,000
	48	600,000	1,200,000	1,800,000	3,600,000	4,800,000
	49	300,000	3,000,000	200,000	2,000,000	5,000,000

Annex 8. Seed cost of organic rice farming system of five organic farmers groups in West Sumatra, Indonesia

Farmers Group	No	Paddy yield (m^2)	Paddy production (kg/yield)	Paddy production (t/ha)	Seed cost(IDR/yield)			Seed cost (IDR/ha)
					Quantity (unit/yield)	Seed price (IDR/unit)	Seed cost (IDR/yield)	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lurah Sepakat	1	3,000	960	3.2	10	6,000	60,000	200,000
	2	2,500	1,120	4.5	8	6,000	48,000	192,000
	3	2,350	400	1.7	7	6,000	42,000	178,723
	4	1,000	480	4.8	3	6,000	18,000	180,000
	5	1,000	450	4.5	3	6,000	18,000	180,000
	6	1,500	800	5.3	5	6,000	30,000	200,000
	7	1,500	200	1.3	5	6,000	30,000	200,000
	8	1,900	900	4.7	6	6,000	36,000	189,474
	9	2,000	920	4.6	6	6,000	36,000	180,000
	10	2,500	1,125	4.5	6	6,000	36,000	144,000
Balai Organik	11	1,047	695	6.6	3	5,000	15,000	143,266
	12	2,500	450	1.8	9	5,000	45,000	180,000
	13	10,000	1,890	1.9	30	5,000	150,000	150,000
	14	2,496	750	3.0	7	5,000	35,000	140,224
	15	3,000	660	2.2	10	5,000	50,000	166,667
	16	3,904	1,440	3.7	13	5,000	65,000	166,496
	17	1,023	495	4.8	3	5,000	15,000	146,628
	18	2,497	1,125	4.5	9	5,000	45,000	180,216
	19	6,248	2,250	3.6	20	5,000	100,000	160,051
	20	2,497	810	3.2	9	5,000	45,000	180,216
TigoAlua Saiyo	21	2,500	500	2.0	8	5,000	40,000	160,000
	22	15,000	4,500	3.0	45	5,000	225,000	150,000
	23	930	420	4.5	3	5,000	15,000	161,290
	24	2,000	860	4.3	6	5,000	30,000	150,000
	25	1,000	360	3.6	3	5,000	15,000	150,000
	26	5,000	1,200	2.4	15	5,000	75,000	150,000
	27	2,500	500	2.0	7	5,000	35,000	140,000
	28	5,000	1,500	3.0	15	5,000	75,000	150,000
	29	5,500	1,395	2.5	17	5,000	85,000	154,545
	30	3,400	1,050	3.1	8	5,000	40,000	117,647
Sehati	31	5,000	1,050	2.1	15	5,000	75,000	150,000
	32	2,500	450	1.8	9	5,000	45,000	180,000
	33	8,075	3,200	4.0	25	5,000	125,000	154,799
	34	1,797	1,070	6.0	6	5,000	30,000	166,945
	35	2,000	700	3.5	6	5,000	30,000	150,000
	36	2,500	500	2.0	9	5,000	45,000	180,000
	37	2,000	475	2.4	6	5,000	30,000	150,000
	38	2,500	500	2.0	9	5,000	45,000	180,000
	39	2,500	500	2.0	9	5,000	45,000	180,000
Serba Usaha	40	580	290	5.0	2	5,000	10,000	172,414
	41	4,400	1,060	2.4	14	5,000	70,000	159,091
	42	370	198	5.4	1	5,000	5,000	135,135
	43	4,400	1,291	2.9	14	5,000	70,000	159,091
	44	1,800	400	2.2	6	5,000	30,000	166,667
	45	5,200	1,600	3.1	15	5,000	75,000	144,231
	46	6,400	1,600	2.5	18	5,000	90,000	140,625
	47	2,500	700	2.8	7	5,000	35,000	140,000
	48	5,000	1,453	2.9	15	5,000	75,000	150,000
	49	1,000	600	6.0	3	5,000	15,000	150,000

Annex 9. Capital interest of organic rice farming system of five organic farmers groups in West Sumatra, Indonesia

Farmers Group	No	Total cost (IDR/ha)	Capital interest (IDR/ha)
		(1)	(2)
Lurah Sepakat	1	7,263,333	435,800
	2	7,255,333	435,320
	3	7,243,758	434,625
	4	11,906,667	714,400
	5	7,396,667	443,800
	6	15,136,667	908,200
	7	7,386,667	443,200
	8	7,503,333	450,200
	9	7,283,333	437,000
	10	7,597,333	455,840
Balai Organik	11	7,346,886	440,813
	12	6,603,333	396,200
	13	6,716,667	403,000
	14	11,853,333	711,200
	15	7,153,333	429,200
	16	6,701,182	402,071
	17	6,964,252	417,855
	18	7,649,989	458,999
	19	7,219,629	433,178
	20	7,649,989	458,999
Tigo Alua Saiyo	21	7,236,667	434,200
	22	10,820,000	649,200
	23	14,645,484	878,729
	24	7,276,667	436,600
	25	11,906,667	714,400
	26	6,973,333	418,400
	27	8,923,333	535,400
	28	10,733,333	644,000
	29	9,804,848	588,291
	30	10,556,136	633,368
Sehati	31	7,113,333	426,800
	32	8,776,667	526,600
	33	7,328,318	439,699
	34	7,046,060	422,764
	35	7,126,667	427,600
	36	7,616,667	457,000
	37	7,326,667	439,600
	38	7,616,667	457,000
	39	7,616,667	457,000
Serba Usaha	40	6,818,046	409,083
	41	9,509,394	570,564
	42	8,022,613	481,357
	43	9,698,788	581,927
	44	7,687,778	461,267
	45	10,680,897	640,854
	46	11,716,083	702,965
	47	7,136,667	428,200
	48	10,430,000	625,800
	49	16,426,667	985,600

Note : the capital interest used is 6% of the total production cost