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Barriers of Supply Chain in Supporting Certified Organic Rice (SC-COR) Development in Tasikmalaya Regency, West Java, Indonesia

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ABSTRACT

Improving Soil and environment damage and taking advantage of the economic opportunities from the value increase can be the motivation for Indonesia to develop certified organic rice. However, there were 10 barriers impeding the development of certified organic farming in Tasimalaya Regency which needs solution. The 10 barriers in the supply chain in supporting certified organic rice (SC-COR) are as follows: [1] Complexity of certification requirements, [2] Expensive certification costs, [3] Lack of government support, [4] Lack of commitment, [5] Lack of institutional support, [6] Market uncertainty, [7] Lack of capital adequacy, [8] Less economic scale of farming, [9] Lack of consumer awareness, and [10] Insignificant product price. The objective of the paper is to get the appropriate sequential steps of resolving the barriers in the SC-COR, and Interpretive Structural Modeling (ISM) is employed to achieve the objective. The results shows indicate that "market uncertainty" of certified organic rice and "lack of government support" are the initial determinant keys in overcoming the barriers that occur in overall the SC-COR. The next barriers are "lack of commitment" and "complexity of certification requirement" which are the deciding barriers to be solved at the end of the SC-COR. Nevertheless, based on the *Matrice d'Impacts Croisés Multiplication Appliquée á un Classeement* (MICMAC) diagram there are several barriers that should get special attention, because it is considered the drivers for all barriers, namely "lack of government support", "lack of institutional support", "lack of consumer awareness", and "complexity of certification requirement".

Keywords: *Barriers, Certified Organic Rice, ISM, MICMAC, Supply chain.*

INTRODUCTION

There has been a strong urgency for Indonesia to develop organic farming, both for soil and environment improvement that have been increasingly damaged as well as to take advantage of the economic opportunities from the value increase. Currently, the development of the world's organic farming is showing prospective portrait. According to Willer and Lernoud (2016), until 2014 organic market size has reached 80 billion US dollars, making a huge leap from 1999 which was 15,2 billion US dollars. The countries with the largest organic markets were the United States (35.9 billion US dollars), Germany (10.5 billion US dollars), and France (6.8 billion US dollars). In response to market growing, the countries that were interested to develop such a farming were increasing. It was noted that until 2014, some 172 countries in the world have adapted it. Indonesia is among the

countries which is trying to exploit the opportunities of taking benefit from the activities, besides reducing chemical contamination of conventional agriculture that made extensive negative impacts so far, by declaring the mission of " Go Organic 2010" in 2003.

According to the data collected by Indonesian Organic Alliance (IOA), the development of organic agricultural land in Indonesia in the period of 2012-2013 increased by 3.5 percent, from 212,590 to 220,300 ha, of which only 97,352 ha had been certified, and the rest was considered wild plants that did not receive any treatment (IOA 2013). Meanwhile, Tasikmalaya is one of regencies that enterprisingly develop organic farming, rice in particular. Development of organic rice in Tasikmalaya regency began in 2003 and continued to grow rapidly, which made it an icon of organic rice development area in West Java province, even Indonesia. Some organic rice fields had found it certified by international certification body and its product was successfully exported to USA, Germany, Malaysia, Singapore, United Arab Emirates (UAE) and the Netherlands (IOA 2014). The opportunity of supplying the market of organic food came not only from international market, but also appeared from domestic demand. In 2008, consumers of organic rice were around 1.07% of Indonesia's population (Hidayat and Lesmana 2011). Number of the consumers tended to increase as potential market for organic products in Indonesia was around 37% of the population, coming from middle and upper-middle class of people (Novianty and Andoyo 2006. Unpublished paper).

Unfortunately, Indonesia has not procured the opportunity coming from national as well as international demand, considerably. Indonesia could not fulfil the growing demand from international consumers towards Indonesian rice, that made the consumers seek other suppliers of other countries. Accordingly, the production system in Indonesia is incapable of providing domestic demand, for which is fulfilled by importation. It is astonishing that volume of import of premium rice including organic rice reached more than 194 thousand tons in 2015 (CBS 2015), without any great effort to substitute with local produce. The description of national organic rice supply is addressed to the barriers of organic rice supply chain, including the production system and other chains in the supply chain, it may include the activities of post-harvest handling, delivery system, processing, packaging, and so forth. If such the barriers can be removed, then advantage taking of the world's organic rice demand can proceed.

The objective of the article is to construct a design of developing certified organic farming through structuring the barriers in the supply chain of the commodity in order to facilitate the appropriate sequential steps of resolving the barriers. The following discussion starts with employing a suitable methodology, which is followed by depicting the barriers embeded in the supply chain of certified organic farming (SC-COR).

METHOD

In order to construct appropriate sequential steps of resolving the barriers in the SC-COR, Interpretive Structural Modeling (ISM) is employed. The method firstly proposed by J. Warfield in 1973 to analyze the complex socioeconomic systems is a computer-assisted learning process that enables individuals or groups to develop a map of the complex relationships between the many elements involved in a complex situation. Principally steps of using ISM method is as the following (Eriyatno 1998; Sohani and Sohani 2012).

Step 1. Identify and Define Elements. Identify and define the barriers of the SC-COR. The elements were identified from consultation with various experts and is supported by literature review.

Step 2. Define Contextual Relationship. State the contextual relationship among the barriers of the SC-COR elements. Expert inputs were solicited to capture the contextual relationship among the elements.

Step 3. Develop Structural Self Interaction Matrix (SSIM). Develop Single Structured Interaction Matrix (SSIM) representing elements of respondents' perceptions of elements intended relationship using symbols as follows:

V : the relationship of elements Ei to Ej, not vice versa
A : the relationship of elements Ej to Ei, not vice versa
X : interrelation relationship between Ei and Ej (may otherwise)
O : shows that Ei and Ej unrelated

Step 4. Develop Reachability Matrix (RM). Change the SSIM symbol into a binary matrix with the following rules:

- If the relationship Ei to Ej = V in SSIM, the elements Eij = 1 and Eji = 0 in RM
- If the relationship Ei to Ej = A in SSIM, the elements Eij = 0 and Eji = 1 in the RM
- If the relationship Ei to Ej = X in the SSIM, the elements Eij = 1 and Eji = 1 in the RM
- If the relationship Ei to Ej = O in the SSIM, the elements Eij = 0 and Eji = 0 in RM

Initial RM is modified to show the entire direct and indirect Reachability, i.e. if Eij = 1 and Ejk = 1 then Eik = 1 .

Step 5. Classify elements in the different levels of the structure of the ISM. For this purpose, the two following sets are associated with each element Ei of the system: Reachability Set (Ri) is a set of all elements that can be reached from the element Ei, and Antecedent Set (Ai) is a set of all elements where elements of Ei can be achieved. In the first iteration of all elements, Ri = Ri∩Ai is the elements of level 1. On the next iterations, elements identified in previous iteration are removed, and the rest elements are selected for the next levels using the same rules. All elements of the system will finally be grouped into different levels.

Step 6. Develop Canonical Matrix. Canonical matrix is developed by clustering factors in the same level across the rows and columns of the final reachibility matrix.

Step 7. Develop Diagraph. Develop diagraph which is a chart of elements that interact directly, and levels of hierarchy. Initial diagraph prepared on the basis of canonical matrix which is then cut by moving all the components to form the transitive final diagraph.

Step 8. Emerging ISM by moving all sum of elements with actual elements description. Methodologies and technique of ISM are divided into two parts, namely preparation of the hierarchy and classification of sub-elements. Classification of sub-elements refers to the processed results of Reachability Matrix (RM) that have met the transitivity rules to obtain value of Driver Power (DP) and the value of Dependence (D). Classification of sub- elements are classified into 4 sectors:

Sector 1: Weak Driver - Weak Dependent variable (AUTONOMOUS) is a sub-element with the value of DP < 0.5 X and the value of D < 0.5 X where X is the number of sub-elements. Sub-element in this sector is generally not associated with the system, and may have little relationship although it could have such a strong relationship.

Sector 2: Weak Driver - Strongly Dependent variable (DEPENDENT) is a sub-element with the value of DP < 0.5 X and the value of D > 0.5 X. Sub-element in this sector is not free.

Sector 3: Strong Driver- Strongly Dependent variable (LINKAGE) is a sub-element with the value of DP > 0.5 X and the value of D > 0.5 X. Sub-element in this sector should be examined carefully because the relationships among sub-elements are unstable. Every action on a sub-element will have an impact on other sub-elements and the influence of the feedback can magnify the impact.

Sector 4: Strong Driver - Weak Dependent variable (INDEPENDENT) is a sub-element with the values of DP > 0.5 X and the value of D < 0.5 X. Sub-element in this sector is the remaining part of the system and so-called independent variables.

Consultation with various experts was carried out in all four districts of certified organic rice development. There were 14 experts involved in determining the relations of the elements of the barriers in the SC-COR, namely four chiefs of farmer's groups, four appointed traders, two of FGA chief and his assistant, one district extension office head, one Tasikmalaya agriculture office head, two university researchers, both come from Agricultural University of Bogor, and one freelance observer as well as socio-economic researcher.

RESULTS AND DISCUSSION

Performance and the Barriers of SC-COR

Performance of Certified Organic Rice

Organic rice in Tasikmalaya regency evolved in line with the development of the System of Rice Intensification (SRI), which was promoted by local as well as central government. SRI development in accordance with its historical origins was to increase production through soil improvement, use of locally natural materials, returning the appropriate way of cultivation of plants corresponding with the original habitat, as well as optimizing the absorption of nutrients, sunlight and the elements that are necessary. If the SRI rice cultivation was fully implemented, then the concept of organic rice cultivation will inevitably be applied. In its development for years, the term of SRI faded gradually and was replaced by the term 'organic rice farming', which showed the conversion from the use of chemical pesticides and fertilizers into organic materials application.

The development of organic rice planting area was also associated with the level of rice productivity that can be achieved through SRI planting method. As evidence in other countries, the method could increase productivity significantly. At the beginning of its development in the period of 2003 - 2005, the SRI method of planting was able to increase the productivity of 5.4 tonnes per ha to 7.5 tonnes per ha, an increase of 39 percent. An increasing trend continued despite until 2008 still fluctuated, where productivity decreased to 7.4 tonnes per ha. Since 2009 productivity consistently increased, where in 2012 reached 7.9 tonnes per ha. Nevertheless, productivity of SRI method as compared to conventional cultivation was getting smaller. According to the chief of Agricultural Extension Office of Manonjaya, this happened because farmers did not strictly apply SRI method, and at the same time conventional farmers tended to use organic fertilizers as the additional component, which then improved their land and increased its productivity.

As compared to conventional rice, organic rice planting area was still very small, or only about 17.5 percent of total rice area. Local government was willing to convert 30 percent of the conventional rice into organic, but it found it difficult to make such a target. There were several important issues that were not able to be overcome related to the provision of organic material. One of which was the animal waste supply to support the program, since it was difficult to obtain. Livestock as the provider of animal waste was hard to develop in the area since most feed source relied mostly on rice straw, byproduct of rice cultivation. In fact, rice straw in the organic rice development went to be organic materials (compost) to mix with animal waste.

In addition to certification from IMO, BIOCert and Inofice, in May 2010, most farmers members of Gapoktan/FGA Simpatik (six additional groups) were successfully certified by the certification body of Sucofindo. Only the rice from the farmers who got IMO certification as the international certification body was able to be exported, while the farmers who received certification from the certification body of BIOCert and Sucofindo could sell their product for only the domestic market. At the

beginning of the development of organic rice, there were seven districts which were home to certified organic rice development, namely Cisayong, Cigalontang, Manonjaya, Salawu, Sukahening, Cineam and Sukaresik. Many farmers and land areas that were certified located in 17 villages and 25 farmers' groups.

The Barriers of SC-COR

The barriers in this meaning are related to low performance condition of the SC-COR, which can be triggered by the condition of the members themselves or by external matters. The barriers that occurred in some supply chain members will be unfavourable to all the members in the chain. Supply Chain Management (SCM) that aims to provide mutual benefits to all members involved needs to address their barriers, in order to create conducive situation for development. The barriers encountered by one member in the chain can be different from the others. The discussion of the SC-COR is limited to the chain members of farmers, appointed collector traders, and the farmers' group alliance (FGA). Exporter company is as outside party since it was difficult to reach. Even though the exporter was not included in the SC-COR, the FGA could represent most functions of the exporter's role. The exporter entrusted all the processing activities to the FGA, including the drying, hulling, grain selection, rice color mixing, packaging, and quality control. The exporter would only control the the FGA work to ensure the activities of the FGA was running well.

The work of SC-COR is shown at Figure 2 below. Figure 2 shows that the flow of rice produced by the farmers went through four lane, out of their own consumption. As the legal lane, only to appointed traders and the FGA should the rice go through. In fact, the rice also flowed to other destinations such as consumers in the village and traders of conventional rice. Such a leak also occurred at the appointed traders, who did not sell all the rice that was bought from the farmers to the FGA as they should be. The appointed traders sold some of which to the traders of conventional rice or milling operator and mini market at government office. Leakage at farmers and collector trader level made the FGA unable to buy at expected amount. In addition, the FGA would not also sell all the rice they bought to the exporter as some of which were out of standard quality. Such lower quality of small quantity was sold to the consumers who came to the FGA office.

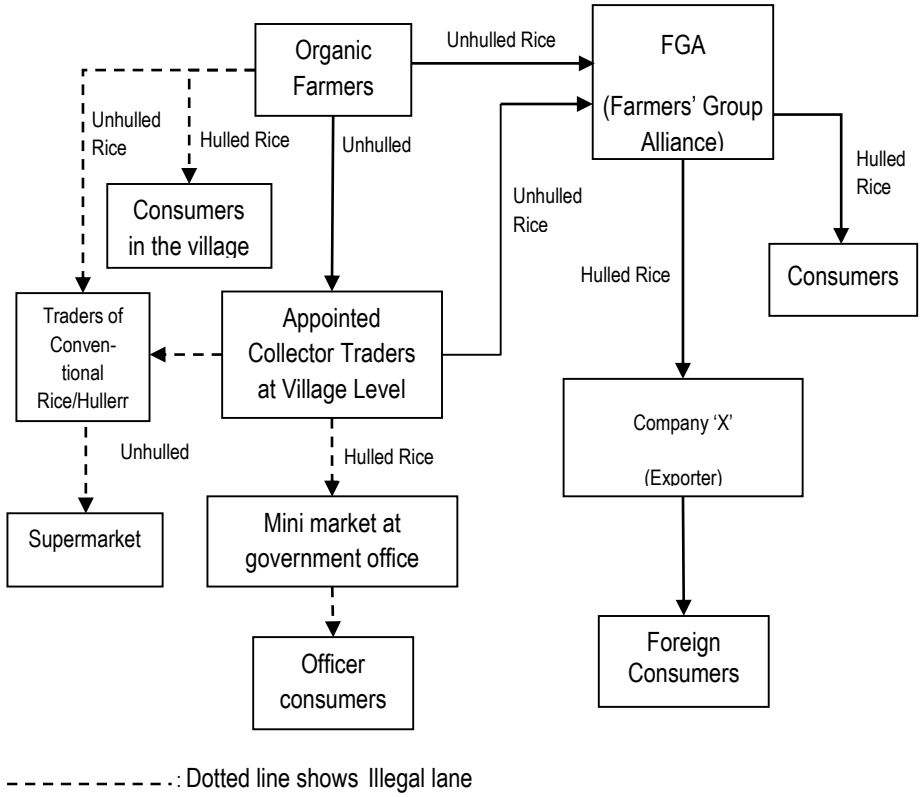

Figure 2. Diagram of the Supply Chain of Certified Organic Unhulled/Hulled Rice for the Varieties of Ciherang and Sintanur in Tasikmalaya Regency

Based on the identification of the problems in the field, interviews with some experts of various background as mentioned above such as business players, government agencies officers, university and observer, there were 10 barriers in the SC-COR.

They consisted of [1] Complexity of certification requirements, [2] Expensive certification costs, [3] Lack of government support, [4] Lack of commitment, [5] Lack of institutional support, [6] Market uncertainty, [7] Lack of capital adequacy, [8] Less economic scale of farming, [9] Lack of consumer awareness, and [10] Insignificant product price. In fact, the afore-mentioned barriers impeded the development of certified organic farming in Tasimalaya Regency. There is necessary to resolve the barriers to create conducive situation for development.

[1] Complexity of certification requirements

Certification requirements was considered complex by farmers (Edwardson and Santacolama 2013; Saragih 2011; Mayrowani 2012; Mendez *et al*. 2010; and Sahm *et al*. 2012). Certification body set strict requirements to farmers in carrying out their farming, particularly related to set aside artificial chemicals application in farming, including prevention of using all materials which are potentially contaminated by the substance, such as irrigation water, equipment, container and storage spaces. It was not easy to internalize such concepts among farmers as they had used artificial chemicals since 1960s, when green revolution was introduced. Such technology that had been internalized in their life and made use of artificial chemicals were part of their farming culture. Before converting to organic, farmers always had an argument that the greener the leaf of the plants the healthier they were; and only chemical fertilizers that could make it. For that reason, farmers found themselves doubt when they did not use the fertilizers to their plants. This argument sometimes appeared again after being an organic farmers for years, although they were not courageous to do so.

To meet the above requirements, various types of exhausting activity had to do, namely collecting animal waste and green manure (leguminous plants) to be used as compost. The activities included the search process, transport, collection, cutting, brooding, flipping, carrying into the fields, and fertilizing. All the activities performed should be recorded in detail including the timing and duration of activities, quantities used, and the number and origin of workers employed. All the activities would be examined by a team of internal control system (ICS) as well as a team of IMO. At harvesting time, the ICS would supervise the collection activity and separation of the rice to ensure the rice harvested were not mixed with conventional rice.

[2] Expensive certification cost

Besides making farmers work harder, organic certification is also very expensive (Trimarchi 2016; Saragih 2011; Mendez *et al*. 2010; and Sahm *et al*. 2012). The cost of certification of organic rice reached IDR 2 millions/ha. As the average productivity of the rice amounted to 8,000 kg for twice harvest a year and the farmers sell all the production, then the certification fee would be IDR 250/kg. However, if the amount of rice sold is 40 percent of the total production and the rest (60%) for consumption, then the fee of certification that was really felt by farmers would be IDR 625/kg. In this case the farmers would perceive that certification cost was very expensive. In fact, if the farmers sold all the product and bought cheaper conventional rice for their own consumption, then the payment of certification was relatively inexpensive.

Different from international certification bodies, the national certification bodies offered lower cost. According to Saragih (2011), certification by BIOCert and Sucofindo, for example, was IDR 25-80 millions for the area of 50 ha, or IDR 0.5 to IDR 1.6 million per ha, depended on the field condition. There are seven national certification bodies in Indonesia that have been accredited by KAN (national accreditation committee), spread in some cities namely BIOcert (Bogor), INOFICE (Bogor), Sucofindo (Jakarta), LeSOS, Mutu Agung (Depok), PT Persada (Yogyakarta) and LSO (Padang).

[3] Lack of government support

Government support for organic development is rare (Ruenglertpanyakul 2015; Edwardson and Santacolama 2013) for supply chain members. However, in the case of Tasikmalaya, government support could be felt by farmers and the FGA in particular. It cannot be denied that at initial development of organic rice through SRI, government support was plenty, including the provision of organic fertilizers, seeds, and assistance. The government also supported the FGA a set of modern rice milling, which has been used up to now. Nevertheless, governments tended not continue to further support the development of organic rice. It could be observed from the reduction of the assistance both to farmers and the the FGA. Surprisingly, in the same time, credit of input to conventional farmers continue to proceed, causing jealousy among organic farmers. Because of contrasting condition, some of organic farmers were simply switching back to conventional farming with the intentiong of getting credit.
Prior to certification, farmers and other chain members got trainings of organic farming, particularly on the producing organic fertilizers and pesticide, development of local micro organism, utilizing local material and kitchen waste, transfering new cultivation technology associated with seeds, planting space, method of seedling preparation, transplanting, fertilizing, weeding, pest control. Farmers and all chain members also got training on all requirements for certification. Unfortunately, no additional training or internsive assistance so far, although the participants might had forgotten most knowledge from the training. Lack of assistance of farmers can be identified from the their expression that they needed field extension officer to accompany them in facing difficulties, but the field extension officers usually did not come as expected. In the case of other members of other supply chains, assistance of field extension is still not popular up to now. Indeed, they should get the knowledge especially for free traders who trade organic rice.

[4] Lack of commitment

Commitment is essential to strengthen relationship among the members of an association or a bond of various fields and sectors, because through which the objectives of each member can be achieved. In Missioura definition, commitment is linked to togetherness and connectedness through an emotional bond or obligations. As communities undertook the community partnerships work, the need for a wide range of "commitments" emerged — including from different organizations and individuals in different roles — to support and meet a variety of partnership needs (OMG Center 2014). Otherwise, lack of commitment may disturb the relationship through uncontrollable mechanism, because lack commitment of one stakeholder will be responded by the same way by others. This will continue to an end of unfortunate consequence.

Lack of commitment is one of the barriers that happened in organic rice development (Daniel *et. al*. 2014). There were some farmers who were not committed to sell their product to the FGA because of unknown reasons. It was supposed that they would sell their product to free traders for higher price. Likewise, lack of commitment was also able to be found among appointed traders because of the same purpose with the farmers. They would not sell all the rice to the FGA as they would sell it to other traders who were not the member of SC-COR, for better price. However, the lack of commitment also happened to the FGA itself, which broke the agreement of buying the farmers' rice at good price. In reality, the FGA could not put at the promised price nor always buy the farmers' rice. Frequently, the FGA cannot buy the farmers' rice because of no enough money.

[5] Lack of institution support

Organic farming has not been supported by strong organization (Mayrowani 2012). The smallest institution of farmers was a group of farmers which consisted of the farmers who managed land field in one compact land coverage. This institution need strengthening to support the work farmers in their farming activities, which had to involve all the members to get efficiency. Group of farmers did not have a legal entity, too small and lack of capability to make transactions with other parties. For better representation, some farmers' groups formed a farmers groups alliance (FGA). Although the alliance was in fact a bigger institution, it also had no legal entity. Therefore, in order to make transaction with other parties, such as exporter companies, the institution had to join with a company to represent it in business transaction. This made the farmers' institution could not work independently and had to share the profit with the company.

The FGA is expecting to be independent and empowered by taking legal entity through cooperative establishment. Establishment of cooperative is expected to boost economic advantage to all stakeholders, especially the certified organic farmers who will be the members of the cooperative. Establishment of cooperative will employ government facilities such as cheap credits. The next challenge for the institution is to run professional work.

[6] Market Uncertainty

Market Uncertainty was a fairly serious barrier faced by organic supply chain members (Mayrowani 2012). Exports as the main market was faced with an uncertain demand, where volume of demand was very volatile from year to year. Notes of certified organic rice exports to several countries by the exporter showed that most of the importing country did not have a stable demand. One country only imported once, then stop for the following years. Meanwhile, other countries imported in large amount at the beginning before badly fluctuated in the following years. However, there was a country that consistently bought in ever greater amounts. Such situation was actually following the general trend of consumers of organic food and production (Tondel and Woods 2006; Edwardson and Santacolama 2013; and Mayrowani 2012). Therefore, market development in domestic become the logical alternative to cope with the market of erratic conditions. Market certainty enables the farmers to make planting plan corresponding with market demand.

[7] Lack of capital adequacy

Adequate financial capability is essential in supply chain process (Edwardson and Santacolama 2013) to be independence. In fact, lack of capital capability happened to all supply chain members. Farmers encountered lack of capital capability because no income left for capitalizing their business, whether in farming, trading as well as in export. Traders and the FGA often met capital problems, where traders could not afford to buy farmers' grain in large quantities because of no enough money, despite they had a chance of capturing higher benefits. Meanwhile the FGA as the agency and representative of farmers did not have strong capital capability to harness the opportunities to meet foreign consumer demand.

The FGA was also not able to purchase all the grain from farmers, although the FGA got an advance of 50 to 60 percent from company 'X' when the contract was performed. Currently there are a total of certified organic rice planting area of 110 hectares, with a potential yield of 450 tons. If the farmers sell 40% of the rice harvested, then the total purchase should be 180 tonnes. However, purchase of FGA cannot exceed 100 tons. According to the information obtained from the management of the FGA, demand from importing countries actually reached twice as much of that could be exported at this time. Therefore there was a contradiction between the fact that on the one hand the FGA encouraged the farmers to sell grain as much as possible, but on the other hand the institution did not have enough cash to buy it.

Lack of capital adequacy also made farmers not afford to buy enough input for their farming, which would spoil the plant performance. Therefore, at some cases organic farming was reported to have a lower productivity than conventional farming (Ponisio *et al*. 2014; Tuck *et al*. 2014), though many also claim that organic farming can increase productivity through soil improvement. Increasing productivity was actually experienced by farmers during the initial development of organic farming. Data provided by the local Agricultural Office showed that the productivity was increasing. However, current interview with 70 farmers showed that the productivity of the farming was much lower than expected.

To some extent, lack of capital adequacy cannot support the needs of good quality control to premium product. One of problems envisioned offending the quality was during post harvest handling. Organic products encounters difficullty and costly of post-harvest handling (Edwardson and Santacolama 2013; Mishra and Shukla 2013). The difficulties perceived by organic rice farmers was particularly in drying. Farmers dried rice harvested in the fields because of no enough space at their homeyard. Such a custom could go well so far without any problem. However, in the future the risks are very likely to occur, such as the climate that is often erratic. In the event of rain, although the farmers could simply cover the rice with plastic sheet to avoid from getting wet, but when the humidity rises the water content of rice may increase again, so drying process may takes longer and degrade the quality of rice.

[8] Less economic scale of farming

Most of rice farming in Tasikmalaya Regency were of small farming, which was not of economics of scale (Sukayat, 2013. Unpublished paper). With the land avarege managed by certified organic farmers only 0,2 ha, the farming was considered inefficient. From the producer side, such a farming did not give profit optimally since cost tended to be higher relatively to profit. The problem of the economic scale of land obstructed the development of organic rice.

The land requirement for certified organic rice farming was a land with large contiguous, which get water directly from tertiary canal, instead of disposal water of other fields. Water coming from tertiary canal was expected free from contamination of artificial chemicals. However, the water sources from tertiary canal could not simply comply with the requiments. The water had to firstly enter water tank planted by water hyacinth plants to absorb chemicals. Such a land was relatively limited, because the owner of the land might not be willing to convert their farming to organic. Moreover, most of the cultivating farmers were not the land owner, who could not make decision immediately. The land owner also usually lived faraway from their land.

Meanwhile, the difficulty of post-harvest handling experienced by traders was at the time of purchase from farmers for collection, because traders have to pick up door to door. Since sales of rice by farmers were usually done more than one time, the purchase of collection activity was very exhausting. The farmers would sell their rice when they needed cash money. In addition, the water content of rice bought from farmers was still high, so the traders had to dry it out for higher degree of dryness.

[9] Lack of consumer awareness

Lack of consumers awareness was found in many organic supply chain (Mayrowani 2012) and affected the performance of SC-COR. Otherwise, increasing consumers consciousness of environmental and agricultural issues escalated the demand for organic products (Suharjo *et al.* 2016), They may desired to consume organic rice, but were not ready to pay for premium price. It is necessary that awareness of healthy food and better environment condition grew among societies. Less conscious consumers on healthy food and environment could be observed from the sales of organic rice in the supermarket that was still small, compared with the conventional ones. In fact, the sales happens in the place where most of the buyers coming from medium to high economic status.

Such lack consumer awareness may appear from information of the product. Naturally, the people tend to consume the good taste rice than the heathier ones. Awareness of consuming healthy food may appear when they find themselves sick. Unfortunately, changing into organic food is not the only choice to improve their health. This may be caused by absence of the benefit of organic food and the untrusted purity of the product. The information of the purity issue may affect the people poorly, which make they are not easy to trust to the product offered.

[10] Insignificant product price

Price is one of the determining factors affecting the development of farming, since it reflects the fulfilment of income of the farmers as the producers to continue their producion. However, the effort to comply with the requirements as organic farming did not automatically get the price as desired (Mendez *et al*. 2010), which is not sufficient to compensate for rising production costs (Sahm 2010).

The certification would lift the purchasing price by the FGA of about IDR 500 to IDR 700 per kg, depended on the bargaining with the appointed traders. This means that the addition of certification cost did not get good appreciation in terms of the price product. The profit of being organic farming would be taken if the productivity is higher. According to farmers' group chief, the productivity of organic and conventional was not significatly different. Therefore farmers complained with the price given for the rice they produced, as the price did not meet their expectation. The farmers hoped that they deserved to get higher price as promised previously. Fortunately, the farmers found themselves relief from the risk of the cost paid for certification,

since the certification fee would only be effective when the exporter bought their rice. It was the phenomenon among the farmers and traders of certified organic rice and in green supply chain management (Farm Economics Brief 2013; Scott and Pexton 2014).

The farmers have to fully work for the certified organic rice farming or they will found themselves failed to get income because of non standard quality, lesser yield and lower price. In fact, the reasons of the farmers to continue their farming did not for profit purpose, but rather on others. They continued to implement organic farming in order to reduce cash expense, got healthy food and established better environment. They admitted that organic rice they consumed could relieve and cure sickness from various diseases. The rice also had good taste and gave higher satisfaction to them. Meanwhile, as the healthier environment they could raise fish in their rice field, during the rice growth, for sale and consumption.

Discussion of ISM Results

Figure 3 describing the ISM result shows that "lack of government support" and "market uncertainty" of certified organic rice were the primary determinant keys in overcoming the barriers which occurred in overall SC-COR. It has been stated previously that the terms of "lack of government support" refers to inconsistent and limited endorsement. Lack of goverment support was felt at the uncontinous aid of organic fertilizer for farmers and the absence of capitalization of the FGA. The partial support also was experienced at the aid of livestock with its corral and organic ferlitizer processing house with its equipment. Such lack support had made the activities could work only partially. Small land farmers found themselves difficult without continuous government support, mainly in providing cheap organic fertilizer. Therefore, better performance will come up if the government can support the work of organic farming considerably. Resolution of lack of government support is expected to encourage institution to be powerful and ready to support in resolving other barriers in the SC-COR.

Resolving the barriers of "lack of government support" can affect to the resolution of the "market uncertainty." The government will give solution to the "market uncertainty" if the government is ready to give full support to those who require it. This means the expansion of domestic and foreign market is possible if the government support it, through its policies. The lack of support from the government was triggered by a hesitation that organic rice development will support rice self sufficiency program, since the productivity of organic farming cannot be boosted. The development of the use of organic fertilizer which is currently widely distributed is to improve wetland damaged by excessive use of chemical fertilizers for decades. However, those who supported the development of organic agriculture had a reason to continue the development, as it can increase the income of farmers, primarily through domestic market expansion.

If both of these obstacles can be overcome, then the problem of "lack of institutional support" can be conquered. More defined market or government support can encourage institutions to play a role in creating conducive situation on SC-COR performance. Market certainty will assemble firmness with the planning and organization of production at the farm level. This is in line with the results of research of Aminah *et al*. (2014) which showed that the market certainty can assist completion the barriers of lack of institutional support. Making contract of supplying certified organic rice with an institution is a kind of market certainty, through which the desired varieties and qualities can be booked and controlled by the consumers. Meanwhile, government support separately or integratedly with a definite market presence will motivate institutions to make preparations in the improvement of the SC-COR.

The existence of a solution to the "lack of government support" and "market uncertainty" can encourage farmers and traders involved in the SC-COR to strengthen the institutions of their shelter, and are used to support their business. Strengthening institutions can be in terms of revitalizing farmer group and the FGA or establish cooperative as the legal entity, which is encouraged by the government. Establishment of cooperatives is a learning tool for farmers and traders to understand each other in sharing the benefits of the SC-COR. Through this legal entity, professionalism culture is established, remuneration is based on performance, so that the efficiency and profitability can be achieved through an actual business process.

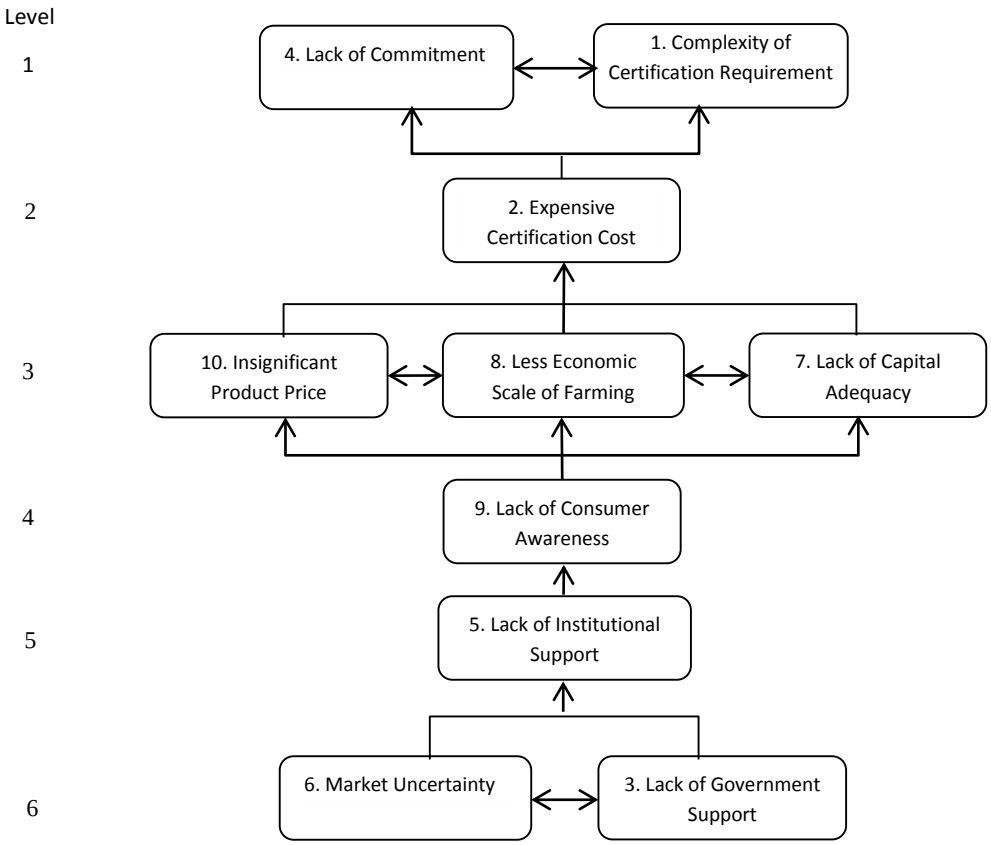

Figure 3. The Structure of ISM of SC-COR in Tasikmalaya Regency

There is a need to make some studies to increase the volume of domestic market, in terms of taste, trust, and captive market creation. This is to ensure that organic rice produced by farmers has persisted buyer. Government support is absolutely necessary, such as in setting premium prices, at least to compensate for conventional agriculture that have received much assistance (Guthman 2004). Some continual efforts should be directed to long term manageable program related to the continuation of production including provision of input, processing and trading, besides creating the captive market.

Resolution of "lack of institutional support", can psychologically solve the "lack of consumer awareness". Consumers were given the conviction that the commodity in the SC-COR has strong credibility, ensuring the sustainability, readily available in many places, and other better impression, such as stable quality, good handling and others. Although the consumers have realized the importance of consuming organic rice, but confidence in the credibility of the quality and the difficulty to obtain such products may discourage consumers to decide as a loyal consumers of the product. This is due to lack of availability or lack information of the product presence in the market will increase consumers' searching costs (IOA 2014).

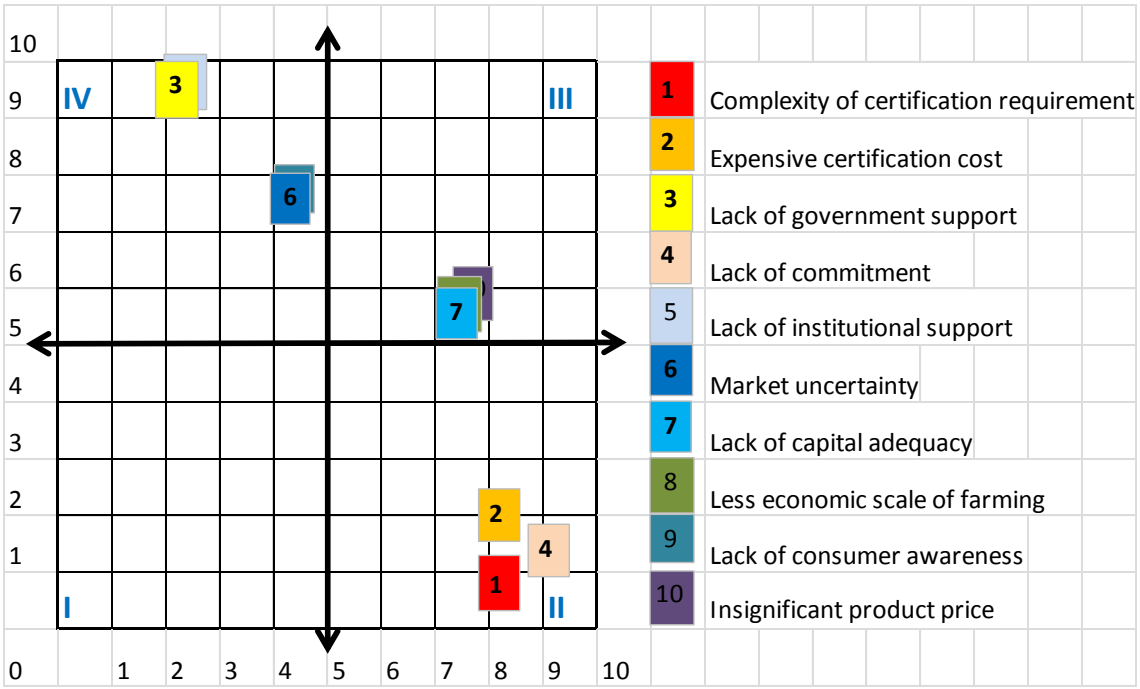

Figure 4. MICMAC Analysis of SC-COR

Solutions to "lack of consumer awareness "can straightly solve the problem of "insignificant product price", "less economic scale of farming" and "lack of capital adequacy". Consumer awareness can increase the demand for certified organic rice, thereby potentially increasing the purchase price, which in certain circumstances would be perceived as a satisfactory price for farmers. At the same time, the participants of the SC-COR also have the opportunity to have a better capital to finance farming, processing and trade. Likewise, increasing the ability of capital will increase the scale of farming, and create efficiency.

The existence of a solution to the above three barriers makes it possible to solve the problem of "expensive certification cost", which is actually a relative condition of the overall SC-COR. In this sense, expensive is due to the capital condition of farmers is still weak, so they are incapable of paying certification, which may be believed to have an impact on price increases and further income of farmers. Therefore, the presence of significant product prices, availability of capital, and more efficient farming, certification issues previously considered expensive cost will be increasingly perceived as relatively cheap.

Psychologically "expensive certification cost" appeared to be a problem because it has not been felt of having important role in the SC-COR. Nevertheless, when the demand of certified organic rice is growing and the farmers can envisage to get profit from production expansion to fulfil the demand, they will be more availabe to pay the certification. This means the barrier of "expensive certification cost" will be resolved. Meanwhile, from the participants of the SC-COR point of view, solving the problem of "expensive certification cost" will have an impact on solving the barrier of "lack of commitment" and "complexity of certification requirement." Participants who are not committed will find themselves lossed, because it will be left behind by someone who is committed. Similarly, certification requirements will be no problem, since it will be replaced by better income.

It is shown in the MICMAC diagram (figure 4) that "lack of government support", "lack of institutional support," lack of consumer awareness," and "market uncertainty" are lying in cluster IV. These barriers are classified as driving power barriers as they are the most powerful barriers to revive other barriers in the diagram. They are independent in making action without waining other to do so. Based on the position in the diagram, it is also possible to choose the most priority barriers by ordering them. The diagram shows that the most priority of the four barriers the "lack of government support" and "lack of institutional support". The two barriers can be chosen to get first resolved if resolving all four driving barriers is costly. The other barriers of "lack of consumer awareness," and "complexity of certification requirement" are the next turn.

The barriers of "lack of capital adequacy", "less economic scale of farming" and "insignificant product price" in cluster III have high driving power and high dependency. This shows that there is a need to make cooperation with other programs in its implementation, particularly with the handling of "lack of consumer awareness" as the barrier that influence the sustainability of these three barriers, and "expensive certification cost" that can lead to these three barriers to achieve success. Meanwhile, there are three barriers in cluster II, which have low driving power with high degree of dependence, namely the "complexity of certification requirement", "expensive certification cost" and "lack of commitment". These three barriers are likely difficult to move if there is no stimulant from other programs. Therefore, the barriers will solve themselves as other barrier are solved.

CONCLUSION AND RECOMMENDATION

Indonesia has strong urgency to develop organic farming to improve both the damaging soil and to take advantage of the economic opportunities from the value increase. There were 10 barriers impeding the development of certified organic farming in Tasimalaya Regency. The barriers are as the following: [1] Complexity of certification requirements, [2] Expensive certification costs, [3] Lack of government support, [4] Lack of commitment, [5] Lack of institutional support, [6] Market uncertainty, [7] Lack of capital adequacy, [8] Less economic scale of farming, [9] Lack of consumer awareness, and [10] Insignificant product price. In fact, the above-mentioned barriers impeded the development of certified organic farming in Tasimalaya Regency. There is essential to resolve the barriers to create conducive situation for development.

The results of ISM indicate that "market uncertainty" of certified organic rice and "lack of government support" are the initial determinant knot in overcoming the obstacles that occur in overall SC-COR. The next barriers of "lack of commitment" and "complexity of certification requirement" are the deciding barriers to be solved at the end of the chain. Nevertheless, based on the MICMAC diagram there are several barriers that can get attention, because it is considered as the drivers for all barriers, namely "lack of government support", "lack of institutional support", "lack of consumer awareness", and "complexity of certification requirement", two of these four barriers, "lack of government support" and "lack of institutional support" should receive top priority, because it is specifically characterized as the main driver.

Based on the conclusion above, it is suggested that in an effort to overcome the barriers in the SC - COR, government support and the creation of the market are the two most urgent barriers to do. Government support should be mainly directed to widen the market, domestic and international. In creating the market, at the same time the government should make regulations and conduct law enforcement to prevent the emergence of a 'free-rider', especially the parties who compete with counterfeit product.

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