

Article

Norms in Community-Based Organic Farming

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Abstract: In integrated organic farming, smallholder farmers tend to work collectively in a group with the norms that bind their behaviours. This study aims to explore norms among the farmers with the case of organic rice farming in Ketapang Village, Susukan Sub district, Semarang, Indonesia. The study employed the qualitative case study method and applied Ostrom's Institutional Analysis and Development framework. The norms among these farmers included only planting local varieties, using natural pest repellent, jointly cultivating the land, fairness in water distribution and prioritising rice consumption for farming families rather than profiting from the sale of rice products.

Keywords: organic farming; farmers' group; IAD framework; action situations; norms

1. Introduction

Organic farming can be adopted as an agricultural concept focusing on the integration of farming and livestock activities in a village or agricultural field. As a low-external input approach, organic farming emphasises the sustainability of the agricultural system by utilising biological pesticide, crop rotation and organic fertiliser [1] as renewable and locally available materials/production inputs [2]. Further, the existing livestock are significant to the provision of both solid and liquid fertilisers, and vice versa the output of agriculture can be used as the input in the production of livestock. Moreover, organic farming can reduce the production cost of these activities [3] and negative impacts of conventional/inorganic agricultural activity, particularly in reducing soil erosion and climate change [4–6]. Scholars also have emphasised the impact of organic farming in increasing employment opportunities [7] and contributing to sustainable livelihoods [8], particularly in rural areas.

However, the application of organic farming in Asian countries, such as Indonesia, is challenging, as most of the farmers are smallholders who lack adequate quantities of fertiliser due to having too little livestock [9]. To overcome this issue, the application of organic farming can be integrated with a community-based agriculture approach [10,11]. Through this approach, the farmers work collectively to resolve issues not only related to fertilisers but also seeds and pesticide provision.

The concept of community-based agriculture in organic farming has been discussed in the literature with reference to the collective action of smallholder farmers in dealing with issues that directly impact their farming activities [12–16], such as pest control, water management and collective marketing effort. For these reasons, farmers in geographical proximity work in a small group, as illustrated in Tamil Nadu, where 5–30 women work collectively regarding seeds, crop cultivation and harvesting [17], and in Bangladesh, where the farmers co-operate by exchanging seed stocks and skills, building a community seed bank, and creating a monitoring and surveillance group for the application of organic farming principles [16]. Furthermore, the application of community-based agriculture in organic farming can foster rural development, as this approach plays a role in enhancing social capital among the farmers, particularly in terms of trust and reciprocity [16].

However, the research has not discussed the main challenge in the application of community-based agriculture in organic agriculture: the behaviour of farmers working together to achieve their common welfare goals. This challenge is related to how farmers with different interests and abilities collaborate in governing their actions to maintain the quality of the organic products. Ostrom [18–20] emphasised the role of norms as institutions that govern the behaviour of the actors. In the context of organic farming, the farmers' behaviours can discourage the achievement of their goals. Therefore, norms are required as an informal institution to regulate the daily life of the farmers. Referring to the characteristics of community-based agriculture, which emphasise self-reliance in managing agricultural activities (self-government), these norms are the result of the agreement of all communities/farmers.

Hence, this study aims to explore norms in organic farming based on a community by taking, as a case study, organic rice farming in Ketapang Village, Susukan Sub-district, Semarang Regency. The paper applies Ostrom's Institutional Analysis and Development (IAD) framework [21,22], at the core of which is the action situation, defined as social space where/when two or more actors interact and exchange resources [21,22]. The IAD framework was developed both to understand how institutions within a community operate [23,24] and in response to existing institutional studies founded on individual disciplines dominated by market-focused economics and politics focused on hierarchies [25]. Hence, the IAD framework is appropriate for a comprehensive examination of the community based organic farming, particularly by exploring the norms as rules in use (informal institution) among these organic rice farmers. This study also explores the application of the IAD framework with multi-shared resources among the actors rather than a single resource, as explored in previous research [24,26].

2. Materials and Methods

2.1. Research Design and Data Collection

The approach for this research is qualitative, employing interviews, observation and one round of focus group discussion (FGD) for the data collection. These tools were applied simultaneously to reduce researcher bias and subjectivity in interpreting the data [27–29]. The data were collected from March 2016 to November 2017. The semi-structured interview questions were based on information from the participants, observation and the FGD that were conducted simultaneously. In this way, verbal information emerging from semi-structured interviews and FGD could be clarified by observing the farmers' activities. The participants of the interviews were selected based on the snowball process with saturation of information as the main consideration to finish the process. The snowball process was started from the leader of the farmers group. In total 7 farmers participated in the interviews that generally ranged from 45 to 60 minutes. Two rounds of FGD were conducted in order to cross-check the information from the interviews and observations from the farmers. Hence, the FGD participants were the leaders of small groups of farmers as well as the persons in charge of the union's activity, such as the representatives of the women's group, fertiliser development and public communication. In total, 20 persons attended the FGD. In terms of observation, this research applied naturalistic observation as the strategy to collect data of daily activities of the farmers in an authentic setting [30–32]. In order to record information during the observation process, observation notes, photographs and short videos were used.

Following the data collection, the data were analysed using thematic analysis. A synthesis of the data transcription codes gathered from the interviews, FGD and written observation notes resulted in the data themes. These themes were then analysed to answer the research question. The data analysis in this research began by exploring the activities of farmers in producing organic rice in this village. The framework of step by step rice farming developed by IRRI (International Rice Research Institute) [33] was applied in this analysis. Further, this research explored the common or shared resources among the farmers in those activities. The concept of types of goods [22] was applied as the guidance in this exploration. In addition, this research explored the norms applied in those

activities. In this case, the norms are the agreements among the farmers that are applied and governed the behaviours of farmers in their daily activity [18–20]. In this exploration, this research constantly linked the themes found from the interviews with relevant theories, particularly the theories of social exchange that discuss dyadic and group interdependencies [34,35].

2.2. The Case Study

This research is based on a case study of an Organic Rice Cluster in Ketapang Village, Susukan Sub-district, Semarang Regency. Almost all the people in Ketapang are farmers with rice as their main product. In the late 1990s, the farmers started organic farming based on the consideration of protecting nature and improving the welfare of the community. This organic farming is organised by a farmer group called Al-Barokah. Nowadays, this group organises more than 109 Ha of organic paddy fields in Ketapang Village, and includes 13 small farmer groups each consisting of 20–30 farmers in geographical proximity. The mission of this farmer group is to create resilient farmers who can manage and conserve their natural resources in achieving their well-being. The Al-Barokah also has a business unit called Koperasi Gardu Tani that markets organic rice (white, brown and black), rice crackers and other rice products. These products are marketed in more than 20 cities in Java, as well as Singapore, the United States and Hong Kong. To guarantee their products, this farmer group is certified by the INOFICE/Indonesian Organic Farming Certification (SNI 6729:2013) for rice with the certification number 062/LSPO-003-IDN/10/15. Since 2002, this community has received several awards related to organic farming such as the first winner of agribusiness competition in Central Java Province in 2004, as well as appreciation awards from the President of Indonesia and Ministry of Agriculture for its participation in the national food security program in 2004 and as one of national organic farming pioneer in 2011.

3. Results

3.1. The Activities (Action Situations) of Organic Rice Farming in Ketapang Village

The exploration of activities in the organic rice farming in this case study is based on a framework called step-by-step production of rice, as developed by IRRI [33]. This framework includes pre-planting (seed provision and land preparation), growth (planting, water management, soil fertility and pest control) and post-production (harvesting, drying, storage and milling). Each stage is described below. The exploration of action situations is also based on the involvement of individual farmers, small groups of farmers and Al-Barokah (the union of farmers in this village).

3.1.1. Seed Provision

Seed provision is organised in small farmer groups with one or two farmers who play a role in the cultivation process. The results of the cultivation are distributed based on the needs of each farmer. If the stock in the small group is insufficient, the farmers can borrow from Al-Barokah. The borrowing system is called the seed bank, and there are rules. For example, once a farmer borrows a quantity of seed, he must return twice as much seed as was borrowed.

3.1.2. Land Preparation

Land preparation for the paddy field in this village is conducted individually or with the help of the other farmers who are in the same small group as the farmer. Furthermore, each field needs to undergo a conversion process to ensure the quality of organic rice. At least two rounds of organic rice planting are needed to purge the field of synthetic or chemical products.

3.1.3. Planting

The planting process in this village is not dissimilar to the conventional rice planting process. Each farmer will prepare seedbeds before planting in the paddy field. This process is conducted individually or with the help of other farmers in the small group.

3.1.4. Water Management

The quality and quantity of water is important in organic farming. The best source of water is a spring in close proximity to the field, but it is quite challenging because the paddy fields use water from irrigation and the water may be polluted from the activities in the headwaters. Hence, the farmers in Ketapang Village have modified their paddy field by adding a pond to neutralise the water before it enters the field. The pond contains parts of a bamboo tree and some vegetables, particularly water hyacinth and Azolla, and these plants absorb the chemicals in the water. Azolla will also indicate pollution in the water, as the leaf of Azolla turns yellow. In addition, the farmers raise fish with scales that cannot grow well in polluted water. This water management in each paddy field is conducted individually, but the quality and quantity of water is monitored collectively by farmers within the small group.

3.1.5. Soil Fertility

Organic fertiliser is made from natural resources, such as plants (including Azolla and rice straw) and faeces and urine from livestock. Each farmer needs 2–3 goats to provide the input for the fertiliser, but more livestock per farmer is preferable. Further, a number of farmers also raise rabbits and/or cows to support the fertiliser supply. The organic fertiliser in this village is made individually by the farmer. However, the small group of farmers is tasked with creating the best composition of fertiliser based on the characteristics of the soil in their area.

3.1.6. Pests and Diseases

In line with the concept of organic farming, pest and disease control is conducted using biological pest control. In this village, the biological pest control is developed within the small group of farmers using plants grown in their village. They create the pest control based on the characteristics of their field and the diseases found in paddies in their area. This strategy makes the pest control more effective and enhances the innovation of the farmers.

3.1.7. Harvesting

Paddy harvesting in this village is conducted individually. However, if needed, other farmers in the same small group can lend a hand to ensure that harvesting finishes as soon as possible. The farmers harvest their paddy manually by hand to avoid gasoline residue from machines being left in the field.

3.1.8. Drying

The individual farmer (sometimes with the help of the other farmers) conducts the drying process manually (sun drying). After drying the unhulled rice, the farmers store it individually in their house/storage. The farmers tend to store the unhulled rice to maintain the quality of the rice.

3.1.9. Milling and Processing

Rice milling is conducted individually by using the two communal rice mills owned by the farmers' group, and they can choose a rice mill based on its proximity to their house/storage. The farmers need to pay a certain amount of money for the maintenance of the machinery, fuel and workers. Farmers who have surplus rice can sell it to the Koperasi Gardu Tani (the farmers cooperation), who repack it into small packages (5 kg and 1 kg) and sell it to customers. In addition, the women's group within the cooperation makes other products from the rice, such as ground bran and rice crackers.

3.2. Common/Shared Resources between the Farmers

This research found that the farmers share resources for their organic farming activities, including water from both the spring and the irrigation system, stored seeds and rice mills. First, the water from the spring or well is the best water resource for organic farming because it is less polluted and relatively more stable in quantity than that from irrigation. However, only a few paddy fields in this village are covered with this kind of water, which means that irrigated water is the main water resource in this village and the farmers must share it, including with those from other villages. The main problems related to this resource are the quality (pollution) and quantity of water, particularly during the dry season. The farmers had overcome the quality issue by providing a pond to neutralise the water. However, in terms of quantity, they must deal with the water provider in managing the irrigation system and sometimes also with other villages, as the following excerpts illustrate:

We have three springs and five wells to water our field. But . . . it is not enough. For example, the wells provide water only for about 15 Ha of paddy field. (Mr Soni)

Most of us use water from irrigation. But . . . during the dry season, we need to stand by in front of the irrigation gate. The provider has arranged the schedule for each village. But . . . sometimes the farmers from the other villages cheat and steal our allocation. So, we need to secure it. (Mr Mahmudi)

Second, the farmers in this village share the seeds stored in the koperasi. This might occur when the demand for seed stock among the farmers or small group of farmers is higher than the supply. All the farmers have the right to use these seeds but also have an obligation to return double the quantity to maintain the seed stock in the koperasi, particularly during the dry season when the probability of crop failure is high.

Third, the farmers share rice mills to remove the hulls from the rice. In total, this village has two rice mills that are used only for organic rice to maintain its quality. These mills are managed by the koperasi, and each farmer who wants to use them only needs to pay the operational cost, including the maintenance, fuel and labour costs.

3.3. The Norms in Organic Rice Farming in Ketapang Village

The organic rice farmers in Ketapang Village have a shared vision to be independent, particularly from government support related to seed, fertilisers and pesticide provisions. It is expected that, with this vision, the farmers will be more eager to innovate their agricultural system. This research found four main norms that organise the behaviours of the organic rice farmers in Ketapang Village, which they employ to achieve their vision. These norms are the result of an agreement between the farmers in the Al-Barokah and are described as follows.

3.3.1. Obligation to Cultivate Local Varieties

The farmers in the Ketapang Village have decided to develop and use only local varieties as their flagship for agricultural rice products. The use of local varieties is conducted with the consideration of: 1) reducing the dependency of farmers on seeds provided by the government; 2) maintaining the preservation of locally endangered varieties; and 3) reducing the negative impact of non-local seeds that are largely genetically engineered.

We supply the seed and fertiliser by ourselves. We want to be the subject not the object of agriculture activities. We want to be independent farmers; independent from government's projects and subsidies. (Mr Mustofa)

Here, the farmers have reintroduced local varieties with which they were familiar before the Indonesian government introduced the modified varieties. However, not all local varieties have been planted in this area, as the farmers select the varieties in high market demand and which grow well in their field, such as *menthik wangi* and *menthik susu* for white rice, *cemani* and *arang* for black rice, and *anom* and *mandel* for brown rice.

3.3.2. Obligation to Utilise Locally Organic Fertiliser and Biological Pesticide

Because each field has its own physical characteristics, the farmers in this village decided to allow each farmer to modify the composition of the organic fertiliser and biological pesticide. This norm ensures the accuracy of the use of fertiliser to suit need, and it encourages each group or farmer to innovate in the management of their farmland. The norm is also implemented in the creation and use of natural pest repellent. In addition, the discussion mechanism every three months in the farmers group (the Al-Barokah) opens opportunities for farmers to gain knowledge from other farmer groups or share experiences related to pest eradication efforts and fertiliser development.

Furthermore, to avoid the application of synthetic fertilisers and non-biological pest control in the organic rice field, the farmers in this village have a monitoring mechanism. A farmer is appointed to monitor five other farmers. If he finds that the other farmer applies synthetic fertiliser and/or non-biological pest control, he will report it to the Al-Barokah and this farmers' group will impose a sanction on the offending farmer, such as being unable to sell rice in the koperasi and having to start the conversion of the paddy field again. This sanction is conducted to maintain the quality of the organic rice sold by the koperasi:

A farmer acts as a supervisor for five farmers. If he finds another farmer uses inorganic fertiliser and/or pesticide, he will take a note and report it to the koperasi. The rice produced in this field cannot be sold in the koperasi or treated as non-organic rice with a regular price. (Mr Supri)

3.3.3. Collective Land Preparation, Seed Provision and Harvesting

Almost all the farmers in Ketapang Village are small farmers who are limited not only by the size of their land but also the workers working on their fields. In general, these farmers cultivate their land independently using the help of family members. However, one common phenomenon that occurs in Ketapang Village, and in rural areas in Indonesia, is that the co-operation of farmers is particularly established within the same farmer groups for land processing and harvesting (paddy). This co-operation strategy is needed to hasten the planting and harvesting time due to the age of the seeds and ready-to-harvest rice. The farmers also work collectively in preparing the land of other farmer, particularly one who has crop failure due to drought.

For the farmer in our group who had crop failure in the previous season, particularly due to drought, we agree to help him in preparing his land. We will work collectively. Since, he has limited capital due to the crop failure; we hope that our help can reduce the cost of his land preparation. (Mr Berkah)

This norm is applicable in this village as the farmers have decided not to plant rice at the same time. This decision ensures the continuity of the rice stock in the koperasi, provides opportunities for the farmers to alternate the planting and harvesting of their field, and reduces the cost of land preparation.

3.3.4. Fairness in Water Distribution

Water distribution from both irrigation and the spring/well functions via gravity and the contours of the land. Hence, paddy fields located higher (upstream) and closer to water sources receive water earlier than others. However, the farmers of this kind of field have to close their water channel to allow the other farmers to receive water.

In the dry season, we use this well to water our fields. Given that we use machine to pump the water, each of us will be charged a certain amount of money to buy the gasoline and pay the maintenance fee. The pump will be operated based on demand. If the field in the upstream has enough water, the farmer needs to close the water channel to his field. (Mr Yanto)

3.3.5. First Come, First Served in Using the Rice Mill

Given that there are only two rice mills in this village, the farmers have agreed that the first farmer who arrives at the mill has the right to be served by the operator. This rule is applied to all

farmers regardless of their position in the farmers' group and the quantity of the rice. It is based on the consideration that the farmers who come to the mill are in an urgent situation because their stock of rice is running very low. Storing rice grain is more secure than hulled rice in terms of the quality of the rice.

We do not have any booking system in using the rice mill. When a farmer wants to use it, he just needs to come here. He can use it directly if the mill is idle, if not, he need to wait until the previous farmer finish the milling process. (Mr Berkah)

3.3.6. Prioritisation of Rice Security for the Farmers

In terms of the mechanism for selling the rice to the koperasi, the Al-Barokah farmers' group has the norm that each farmer needs to have a surplus in their rice production before they can sell it. This norm is set to guarantee that the farmers do not suffer from hunger or malnutrition because they want to profit from organic rice, and also to ensure that the community in this village consumes healthier, organic rice. Hence, the food (rice) consumption in this village can be secured in terms of both the quantity and quality of the rice. The following excerpt illustrates this point:

There is an obligation that the farmers and their families have to consume their farming product [organic rice]. Although organic rice is promising [profitable], our priority is for the health of our villagers. It is expected that they can fulfil their basic needs particularly from food and live healthily. So, the rice that they sell to koperasi is the surplus of their consumption. (Mr Mustofa)

4. Discussion

The organic rice farming production in this Ketapang Village is relatively small scale; however, the activities of the farmers in this village could be in the vanguard of sustainable rural development practice. Organic rice farming seeks to minimise the negative impacts of agricultural activities on the environment, ranging from the selection of local varieties of seeds, to the use of organic fertilisers and pesticides (organic). These farming activities are organised by a farmers' group, the Al-Barokah, whose existence provides advantages for the smallholder farmers in this village. Through this group, the farmers generate information related to farming organic rice, such as how to create organic fertilisers and biological pesticides, monitor their activities and market their organic rice [36,37]. Furthermore, this farmers' group also manages the certification of their rice, and so the farmer members can sell their products through the koperasi. This means the cost of certification is reduced [38], and the value of their rice is greater; they therefore gain more benefit from their rice production [39].

The success of organic rice farming in Ketapang Village cannot be separated from the norms that regulate the daily life of its farmers. The role of norms in governing the collective actions of the farmers, both in the small and large group of farmers in Ketapang Village, is in line with the findings of previous studies on collective action and norms in the context of governing natural resources and organic dairy system [20,26,40–42].

Furthermore, the application of these norms can address issues related to organic farming for smallholder farmers. First, the norms of collective land preparation, seed provision and harvesting can overcome the labour shortage problem in agricultural activities caused by the out-migration phenomenon in most Indonesian villages. This is based on the condition that most Indonesian villages have a critical problem of labour shortage because, for young Indonesians, agriculture is not a promising and interesting job; consequently, most prefer to seek better opportunities in urban areas, leaving the rural areas to be inhabited by relatively old farmers. Given that the previous research on organic farming has addressed the means to increase employment opportunities in rural areas with more labour-intensive farming activities than the conventional ones [7,39,43], exploring the effect of organic farming in preventing out-migration phenomenon in rural areas is thus recommended.

Second, the norms of the development of locally organic fertiliser and biological pesticide in the small group of farmers can address the poor management of pests, diseases, and weeds [39]. In this

village, the small group of farmers develops the best composition of organic fertiliser and biological pesticide based on their local and indigenous knowledge [44], adjusted based on the locally physical characteristics of their fields. Furthermore, this norm is also supported by a monitoring mechanism; one farmer is obliged to monitor five other farmers in his area to maintain rice quality. Sanctions may be applied based on this monitoring. Hence, this study calls for further research related to the innovation of the farmers in developing organic fertiliser and biological pesticides based on local knowledge, which may influence the effectiveness of land preparation and pest control activities. In addition, an exploration of the perception of the farmers related to their norms and sanctions is also recommended as this perception might impinge on collective actions in organic farming.

Third, the norms of fairness in water distribution support previous research on the water conflict in the German state of Brandenburg [45]. In both cases, farmers face the common problem of the distribution of limited water for farming. The farmers act accordingly by setting rules to ensure fairness for all. Similarly, in the case of organic farming in Ketapang Village, the farmers apply two principles of social exchange theory to ensure fairness. These principles are the rationality of the farmers upstream to benefit from the water, which then moves to group gain consideration when they close the water channel in their field to provide water access to the farmers downstream. The commitment of farmers particularly in the upstream area to share water with other farmers is very significant in this situation. However, it can be challenging as one farmer may prefer to gain individual rather than collective benefits. Hence, it is recommended that further research be conducted to explore the behaviours of the farmers as related to when they apply these rationality and group gain principles.

Finally, the applied norms in this village have governed the behaviours of the farmers in this village to overcome the challenges of organic rice farming by utilising their natural resources and social capital. The farmers advance their capacities by varying their expertise in organic farming and their well-being have been leveraged by consuming and selling organic rice. The success of the farmers in this village has encouraged farmers from other villages in this region to join in organic rice farming organized by Al Barokah. This research noted 4 other villages, i.e. Timpik, Koripan, Kenteng, and Sidoharjo are affiliated with this farmers group.

5. Conclusions

In conclusion, this article discusses how a group of smallholder farmers manages their collective activities by applying norms as the rules of the game with the case of rice organic farming in Ketapang Village, Susukan Sub-district, Semarang Regency, Indonesia. The application of Ostrom's IAD Framework [21,22] has facilitated the exploration of norms among the farmers. The norms cover action situations when farmers are involved in all activities in organic rice farming from seed provision to rice milling and processing. The norms are developed to ensure that resources in the village, particularly water from both the spring and the irrigation system, stored seeds and rice mills are shared fairly among the farmers. This study shows the existence of norms to prioritise the welfare of the farmers, both individually (rationality) and collectively in the form of farmers' and community groups [34]; these have driven the success of organic rice farming in the Ketapang Village. Furthermore, the farmers apply and monitor the application of the norms in small groups of farmers in a geographical proximity. This strategy is to ensure that the norms are derived from local problems and resources.

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