

IbDM Rowosari Village Sumberjambe District, Jember Regency As Village Organic Farming Center

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ABSTRACT

The State Polytechnic of Jember Development Program for Village Partner (PPDM) of 2017 has been well completed. This first year activity focused on the basic step of building the concepts of organic village through these following steps : (1) the existence of the same perception (conceptual) between academics, practitioners, bureaucracies, entrepreneurs and the communities; (2) Building the "image" of organic farming as a sustainable healthy food producer; (3) Assembling organic farming technologies which involves farmers, on an ongoing basis. Therefore, the second year of PPDM activity is planned to include: 1) Developing applicative technology for organic farming system by focusing on physical activity, such in the restoration of a simple green house with automated technology based on micro controller to support organic farming activities; 2) Encouraging partners from both private sectors and the government to activate BumDes; 3) Arranging some pioneer programs about Organic Agriculture System (SPO) such as the certification of organic vegetable products and simple patents of pesnab; 4) Improving the profile website of Desa Mitra. In completing the activities in the second year, besides from having a partnership with Tani Jaya II association, Polije PPDM team also cooperates with the Community and Village Improvement Agency of Jember Regency, through the signing of MOU that has been made in the document of the Joint Agreement Letter between the Regional Government of Jember Regency and State Polytechnic of Jember on last October 2017. Up to July 2018, there are several activities that have been carried out: 1) The development of applicative technology for organic farming by focusing on physical activities, which in the restoration of a simple green house with automated technology based on micro controller which can support organic farming activities; 2) Arranging some pioneer programs about Organic Agriculture System (SPO) with the registration of a simple MOL patent

Keywords: organic farming, Rowosari Village, Green house

1. Introduction

Jember Regency has a hilly landscape, therefore, Jember has been termed "City of a Thousand Hills". This potential is very suitable for developing agriculture and plantations. One of them is Rowosari Village, a village in Jember Regency, which is located 50 km from the city center. Geographically, Rowosari Village is located at 4°21'–3°31' S and 140°10'–115°40 E. The topography of this village's elevation is in medium land which is around 550 m above sea level. Based on BPS data from Jember Regency in 2014, during 2014, rainfall in Rowosari Village averaged at 2,400 mm. the most rainfall occurred in December reaching 405,mm which is the highest rainfall during the 2010 - 2014 period.

Administratively, Rowosari Village is located in Sumberjambe district, Jember Regency, in a position restricted by the neighboring village. The village borders Jambearum village to the north, Sumberjambe village to the west, Gunung Malang village to the south, and the forest to the east. The distance of Rowosari Village to the capital of the district is 6 km, which can be reached in 7 minutes. While the distance to the regency capital is 81 km, which can be reached in about 1.5 hours.



Figure 1. Map of Rowosari Village

By the end of 2010, the population of Rowosari Village has reached 4905 residents, consisting of 2462 men and 2443 women, with 542 of poor households. The population density marked at 45 people/km². The main livelihoods of Rowosari residents are farm laborers (2128 residents), with 72 land owners. The remaining occupations are foreign workers (12 residents) and civil servants (3 residents). This is due to the low level of public education, in which most of the residents only graduated from elementary school or have gone to school but did not graduate, which is 2557 residents. As much as 162 residents only graduated from highschool, 30 residents only graduated from high school and the remaining 17 has graduated from tertiary education (Rowosari village primary data, 2011).

In addition to having supporting natural potential, such as a durian village with a unique taste and the existence of seven waterfalls located in the same watershed (DAS), Rowosari village also has an organic farming area which was initiated by the Tani Jaya II Group, of which the development was motivated by the desire of farmers to have a forum/association that can bridge the interest of the farmers to relevant agencies and/or business partners so that they can have a stronger bargaining power in the market. Since its establishment on the 19th of July, 1977, until now the Tani Jaya II Farmer Group has continued to improve and develop with the numbers of members reaching 109 people, which is classified in the assessment class as “madya” farmer association. The paddy fields of Tani Jaya II Group are irrigated rice fields of which water is always fulfilled, even in the dry season. The commodities cultivated are conventional rice, organic rice and horticulture products. For the members of the farmer association, rice is a staple food plant, therefore, in the cultivation, the farmers always try to use superior technology and production facilities. Various varieties are tried to be developed, so that the desired varieties can be chosen with high production criteria. The Tani Jaya II farmer Group in Rowosari Village Sumberjambe district has a working area of 88 ha, consisting of: irrigated rice fields: 31 ha, dryland 33 ha, and yard: 24 ha, with cropping pattern as seen in table 1.

Table 1. Rowosari Village Planting Patterns

Wetland	Dryland
<ul style="list-style-type: none"> • Rice - Rice - Rice (75%) • Rice - rice - Horticulture (20%) • Rice - rice - Tobacco (05%) 	<ul style="list-style-type: none"> • Corn - corn (40%) • Corn - Horticulture (10%) • Community forest (30%) • Durian (20%)

The organic farming pattern implemented in Rowosari Village leads the village to become one of the organic farming villages, which is defined as a growing and developing village area which is able to spur the development of agricultural system and business that refers to sustainable management of domestic resources so that they can serve, encourage, pull up, and haul agricultural development activities in the surrounding area. Organic farming development is designed and implemented by synergizing various existing potentials to the encourage the development of competitive, populist,

sustainable, and decentralized farming systems and business that are driven by the community and accompanied by universities, as well as facilitated by the government.

The concept of organic farming developed must adhere to the basic principles of (1) healthy ecosystem, through (a) optimizing natural resource empowerment, (b) the use of environmentally friendly materials, (c) increasing ecosystem diversity, (d) crop rotation. (2) applying eco-efficiency principles such as (a) minimalizing tillage, (b) eliminating the use of synthetic materials originating from outside ecosystem (low external input), (building a decision-making system (commodity selection and input use) based on the result analysis of agricultural systems (agroecosystem) and markets, (4) stabilizing production in a sustainable manner, (5) producing poison(pesticides)-free food ingredients, and (6) ensuring environmental sustainability.

Conceptually, the organic agricultural system (SPO) developed must have ecological, economic, social and concept stability to get support from policy makers, especially those related to production, facilities, technology, price incentives and market opportunities for the product produced. For this reason, the development of organic agriculture require several basic steps, such as: (1) the existence of the same perception (conceptual) between academics, practitioners, bureaucracy, businessmen and the community; (2) building the “image” of organic farming as an effort to produce sustainable healthy food ingredients; (3) Assembling organic farming technologies which involves farmers, on an ongoing basis; (4) Developing applicative technology in organic agriculture which involves active participation of farmer communities; (5) Encouraging partners from the private sector and government; (6) creating pilot programs for organic agriculture.

Thus the concept of Organic Farming Village not only sees agriculture in terms of cultivating and hoeing, but also covers the industrial sector, service sector, and tourism sector and so on, with the main basis of being environmentally friendly agriculture system in which the production prioritizes the consumers’ health. In the first year, some basic steps have been taken, namely, the same perception of images between organic activist (farmer groups and youth groups), policy makers (district government and village government), and academics, which leads to creating a complete understanding of organic farming. In the second year, there will be an activity that invites active participation from the community members in realizing organic farming by promoting organic vegetable cultivation in every households, building simple green houses with microcontroller-based automation technology. This organic vegetable planting activity uses raw materials produced by the farmers, such as compost fertilizer, POC and Pesnab that have been made. Thus the organic industry will simply be run. The ultimate goal of this program is the availability of sufficient food in the country that has attributed to safe consumption and good quality, based on local resources to improve the welfare of farmers in particular, and society in general, as well as the sustainable productivity of agricultural resources and avoidance of pollution to the environment.

Thus, the village vision which reads "The Realization of the Harmonious dan Prosperous Rowosari Village and Leading in the Field of Agriculture" will become a reality. Because with this vision, it is hoped that Rowosari Village community will be realized in the field of agriculture so that it can deliver a harmonious and prosperous life. In addition, it is expected that there will also be innovations in rural development in various fields, especially agriculture, plantations, livestock, carpentry, and culture that are supported by religious values.

The general objective of this activity is the realization of a prosperous farmer society through the utilization of competitive, fair, democratic and sustainable food crop, horticultural and natural resources through the optimal and sustainable management of domestic resources with organic farming village center program. Whereas the specific objectives are:

- a. To implement existing research results at the Jember State Polytechnic, especially in the field of agricultural technology and innovation so that it can be more useful, especially the farmers of Rowosari village, Sumberjambe District, Jember Regency in developing villages for organic farming centers.
- b. To develop conventional rice and organic rice agribusiness to increase production and added value.

- c. To increase the empowerment of farmer groups towards strong and independent institutions.
- d. To improve the cultivation skills of agriculture and develop agribusiness.
- e. Increase the quality of the members' HR capabilities
- f. To develop integrated farming commodities (crops and livestock)
- g. To empower farming communities in Rowosari village to become village centers for organic farming
- h. To assist and oversee the certification process of organic agricultural products.
- i. To increase sales through wider market access both conventionally and through online applications.

2. IMPLEMENTATION METHOD

By paying attention to the reality faced by partners, Science and Technology program is necessary for the Village Partners to be agreed between the IbDM team and the target village groups. Programs like this require a complex preparation and exploration process with non-linear stages but rather interactive consisting of a series of activities as follows:

1. Human resource development and empowerment of MitraDesa's natural resources through training and mentoring

There are several stages of training and mentoring such as socialization and training in organic crop cultivation. HR development through organizational governance management training, and marketing and trade management training, both agricultural products conventional sales and the use of information technology such as e-commerce.

Development of natural resources is the use of pure water sources from waterfalls in Desa Mitra as irrigation source by implementing research results on microcontroller-based irrigation innovations.

2. Increasing organic agriculture production through innovation and technology research results

Some of the activities that will be carried out are an analysis of the level of paddy soil fertility, the manufacture of organic fertilizers and organic pesticides, seed production as a source of seeds, utilization of research results such as the implementation of MOL, as well as increasing organic agricultural production and the manufacture of feed banks for livestock.

3. Conventional training on the promotion of organic products and the use of information technology

Marketing of organic agricultural plant products is carried out through conventional and modern marketing through information technology. The training was carried out to village youth who were gathered in the organization of youth organizations in the village partners with the topic of information technology utilization in expanding the market share of these organic plant products.

4. Facilitate certification of organic products

Certification of organic products is needed as the legality of organic products in Rowosari village communities by escorting registration at the Organic Certification Institute (LSO) until certification of agricultural products is issued.

5. Accompanying the realization of the Sentra Organic Farming Village

Continuing mentoring, evaluation and consultation and guidance services to the realization of the Organic Farming Center Village, namely the realization of a prosperous farming community through the utilization of competitive, fair, democratic and sustainable food crop, horticultural and natural resources through optimal management of domestic resources and continuous.

3. RESULTS AND DISCUSSION

In carrying out this IbDM program, Rowosari Village becomes a village portrait with a million potential worthy of being developed with the village government rolled as facilitators of all activities

towards the Village of Sentra Organic Farming. The role of the Farmers Group is as a forum / association that can bridge the interests of farmers to related institutions and or business partners so that they have stronger bargaining power and encourage farmers to conduct organic farming activities and organic seed production. KarangTaruna in Rowosari village, which is one of the youth forums, plays an active role in assisting the village government in developing the development of its village by exploring the potential of the village, participating in entrepreneurship training, management of organizational governance, marketing and others.

The results achieved by the activities of the second year IbDM program are:

a. Smart Green House (SGH) Socialization

This activity has been carried out together with the village government, farmer groups, and KarangTaruna groups in Rowosari village. The activity was held in the meeting hall of the farmer group "Tani Jaya II" on June 2, 2018. This activity was carried out to socialize the benefits and how to use SGH. The land can be planted with various types of plants, whose maintenance and operation are controlled by utilizing internet information technology either through cellphones, ipad or laptops so that SGH is no longer manually operated and controlled, but can automatically be done remotely, even between countries because it is connected to an internet network . The SGH in it is equipped with sensors, fans, lights, water pumping devices, and nutrition (fertilizer) pumping devices. Some of the equipment can be operated remotely through communication devices connected to the internet, such as cellphones, iphone, laptops and etc. In addition, the atmosphere in the green house can be conditioned in such a way that the possibility of pests and diseases that attack plants due to the influence of changing temperatures and humidity can be minimized and the production of plants grown in green houses can be twice as much as plants treated manual because fertilization and irrigation has been done automatically, as well as the needs of light and humidity.

This socialization activity was attended by 15 people from the members of the farmer group, members of the youth organization and the village of Rowosari. This socialization activity with resource persons from Jember State Polytechnic along with Activists from Jember hydroponics, by implementing environmentally friendly agricultural cultivation activities with a pattern of fulfilling farm inputs independently based on agro-ecosystem potential and biodiversity as well as the production of good quality and safe agricultural commodities to be consumed by the community. Development of applicable technology in organic farming systems by focusing on physical activities, namely helping rural communities in simple green house improvements to grow organic vegetables with microcontroller-based automation technology to support organic farming activities

b. Assembly and hydroponic installation training

This training is one of the main activities in realizing organic farming villages. Hydroponics is a way to cultivate plants without requiring soil and spacious land. By using hydroponic methods, people can plant anywhere using used materials and hang them on the wall. Not only that, planting media using water can hone the creativity of the community to process and create new media for farming. But in this hydroponic way of farming, the community is reminded to always pay attention to several aspects, namely; accuracy in the provision of nutrients, light intensity, and also the temperature around the plant grows. The main thing to pay attention to is nutritional water that is right and can be absorbed perfectly. This is because using hydroponics means that nutrients are obtained only through nutritional water.



Figure 2. Assembling a Hydroponic Installation

c. Training in making hydroponic compositions

Nursery training and the making of hydroponic nutrition attracted good enough attention of the participants. This can be seen from the activity during the discussion session. Some participants' questions include the length of time for storing nutrients, when and how long the time of application, and whether the nutrients produced can be applied to all plants that are planted by hydroponics. Based on the presentation of the speakers, things that must be remembered, when cultivating plants by hydroponics, the factor that must be considered is the nutrition of hydroponic fertilizers. Growth in plants in hydroponics systems depends on the level of nutrients used for the main food. In order to save the budget that must be spent, the nutrients are made by first understanding the elements contained in the nutrition ingredients and knowing the right amount of dose. Nutritional elements that are needed by hydroponic plants include nitrogen, magnesium, sulfur, phosphorus, potassium, calcium, manganese, chlorine, iron, zinc, boron, and molybdenum. The nutrients that are made can last up to one year as long as they are kept uncontaminated. The applications is adapted to the age and variety of plants and these nutrients can be used in various varieties.



Figure 3. Hydroponic nutrition

d. Hydroponic plant nursery training

This training activity only teaches nursery methods using rockwool media. In general, hydroponic seeds can be sown like the seeds in conventional system. The difference is only on the place of seedlings. There are 3 stages that are carried out in farming with a hydroponic system, including:

Seedling Stage:

Soak the seeds with warm water. For leafy vegetables (mustard, lettuce, pokchoi), 1-2 hours is enough, whereas water spinach and spinach do not need to be soaked. For fruit vegetables (chili, eggplant, cucumber, tomato), soaking for 2 - 4 hours is applied.



Figure 4. Immersion of Seeds

Next, soak the rockwool in clean water for about 10 minutes. Lift and drain the rock wool, shake a little but do not squeeze.



Figure 5. Rockwool immersion

Then, organize the rockwool system in the seedling container. Make a hole in rockwool using a toothpick, within 3x the size of the seed, adjust it to the seeds that will be planted. For leaf vegetables (mustard, spinach, kale, lettuce) 1 rockwool can be filled with 2-3 seeds. For fruiting vegetables (eggplant, cucumber, oyong, long bean) 1 rockwool is only filled with 1-2 seeds.



Figure 6. Seed Laying

Take the seed with a wet toothpick (the seed will stick to the toothpick) then put the seed into the hole. One seed for one hole. Label the name and date of the seedlings on the seeds so that they know what plants are planted and how long the seedlings are.



Figure 7. Seed Arrangement on Rock Woll Media

After all the seeds are sown, cover tightly with black plastic (black plastic bag) then store it in a dark place / not exposed to direct sunlight.



Figure 8. Closure of Seedling Media with Black Plastic

Spray the nursery every morning and afternoon using plain water so that rockwool would not dry. If the rockwool is still wet, it does not need to be sprayed because the seeds will rot if rockwool is too flooded. After 1-2 days, check whether the seeds have ruptured and sprouted. If they have germinated, open the plastic lid and introduce it to the morning sun (at least 4-5 hours a day). The seeds that have been sprouted are removed and expose them to sunlight. For those who have not sprouted, cover the lid again and wait for the sprouts.



Figure 10. Sprout Seeds

If the seeds are yellow, tall and thin and seems like lack of sunlight, they must be exposed to sunlight to return to normal. After growing 2 real leaves, the seeds can be placed in direct sunlight. Wait for around 7-9 days (depending on variety), then 4 leaves will grow.



Figure 11. Seedlings Ready to Move

After growing 4 leaves, and about 7-12 cm long, then the seeds are ready to be moved into the Netpot which has the panel axis installed.



Figure 12. Plant Age 20 HSP



Figure 14. Harvested Vegetables

- e. **MOL Simple Patent Registration for Cow Rumen and IPR**
This registration is done to protect the product from legal problems in the future. The product listed is the MOL of Cattle Rumen Bacteria. Registration is done through the services of an IPINDO consultant to minimize errors in the patent registration process. Patents have been applied for registration on April 23, 2018 with application number PID201802988 with 2 claims. In addition, the patent invention document has been registered with IPR and has obtained the IPR certificate on August 16, 2018 with the application number EC00201824155 and registration number 000115224.

CONCLUSION

Based on the results of the activities that have been carried out it can be concluded that the implementation of training and mentoring in smart green house applications must be intensified so that public awareness of the importance of implementing environmentally friendly cultivation will increase so that the hope of making Rowosari Village as an organic farming village can be realized.