

Benchmarking Method to Increase Application of Organic Rice Cultivation Technology

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ABSTRACT

Organic farming is the key to agricultural sustainability in the future, but farmers have not implemented it much. This study aims to determine the application of technology in organic rice cultivation to farmers in the Sri Jati Kalurahan Jatisarone Farmer Group, Kapanewon Nanggulan. This research uses descriptive qualitative with observation and interviews. The research was conducted from January to June 2022. The location determination technique is carried out by *purposive sampling*. The data was analyzed by *benchmarking*, namely comparing businesses at the research site with more advanced organic rice businesses. The results of the study showed that the application of technology in the Sri Jati Farmer Group compared to the Makmur Farmer Group showed differences in the selection of seed varieties. Pros: on the method of cultivation, and harvesting. While the similarities are in aspects: land processing, seeding seedlings, and weed control. Weaknesses in aspects: fertilization and control of pests. Empowerment activities are emphasized on making fertilizer with rabbit urine and controlling pests with natural ingredients.

Keywords: benchmarking, cultivation technology, organic rice

INTRODUCTION

Public awareness to consume healthy food continues to increase. Back to nature lifestyle is an increasing trend as research by [1]. Based on data from the Indonesian Organized Alliance the demand for organic rice (the latest data) was 114 110.2 tons, while production was only 12 276 tons in 2015 [2]

This safe food requirement can be pursued through the application of the development of organic agricultural commodities, one of which is organic rice products. Organic rice is rice produced

through an organic production process based on independent agency standards. The definition of "organic" in general is not to use synthetic chemicals in the form of chemical pesticides or chemical fertilizers, to treat soil fertility naturally, to plant cover *crops or the* use of plant waste, to use a rotational planting system, to control pests with predators and to cover clay grass with straw/mulch. Organic rice is produced through natural cultivation without any interference with chemicals in its treatment [3]

Organic farming is the process of farming in an environmentally friendly way and free from harmful chemicals to produce healthy and highly nutritious products. The purpose of organic farming is to produce quality products that meet good food standards. In addition, the use of *renewable* agricultural resources can also encourage the occurrence of biological recycling processes naturally without causing environmental pollution in agricultural management. There are three important aspects that cannot be separated from organic farming as sustainable agriculture, namely agriculture functions as environmental conservation, economic benefits and is also beneficial to the social sphere of farming families and their communities[4] .

Organic agricultural products, especially organic rice, are still very little available in the market. The obstacle faced is the marketing of products that cannot be done en masse to the commercial market but directly to consumers or special markets. In addition to these obstacles, marketing development is still open if farmers can take advantage of these opportunities. This is characterized by always absorbing organic rice in the market, as research [5] . In addition, the demand for organic rice is also increasing along with the increase in income and public awareness to consume chemical-free food.

The organic rice business has several advantages. In terms of production incentives, the price of organic rice is higher and tends to be stable or non-fluctuating when compared to conventional rice prices. This is an opportunity to increase farmers' income. According to information obtained in the field, the difference in GKP (Dry Harvested Grain/Gabah Kering Panen) prices of organic and conventional rice ranges from IDR1,000 – IDR 2,500/kg, while the price difference in the form of rice reaches IDR.

5,000/kg. In addition to the price difference, organic rice farming businesses can reduce production costs because they use organic fertilizers made by themselves.

Kalurahan Jatisarono is an organic rice producer since 2013 with a land area of 24 ha which already has organic certification by the LeSOS Organic Certification Body (LSO). Organic rice production by Kalurahan Jatisarono can reach 100 tons and is distributed through cooperatives. The sale of organic rice in the cooperative is then marketed online and *offline*. Offline marketing of organic rice products is still limited through Toko Milik Rakyat (TOMIRA), food exhibition activities and government agencies through rice distribution to civil servants. Seeing the condition of this organic rice marketing opportunity, it is necessary to develop an organic rice business so that it can meet market needs and be able to compete with non-organic products.

Sri Jati Farmer Group is relatively new to running organic farming. The productivity of each growing season is 5-6 ton / ha in the form of dry grain ready to grind. The problems faced have not been able to meet consumer demand related to the need for organic rice in the market, so it is necessary to apply innovative technology for farmers, so that later the rice products produced will increase.

The researcher intends to know the cultivation technology that has been carried out in the Sri Jati Farmer Group and efforts to develop organic farming businesses by comparing with more advanced Organic Farmer Groups. The benchmarking results are then applied in empowerment activities for farmers in the Sri Jati Farmer group. The development of cultivation after benchmarking is expected to increase organic rice production.

MATERIALS AND METHODS

This study was carried out at the Sri Jati Kalurahan Jatisarono Farmer Group, Kapanewon Nanggulan, Kulon Progo Regency in January 2022-June 2022. Purposive location determination technique. The data collection

technique was carried out by interviews, observations and focus group discussions on organic farmers totaling 2 people from the location of origin and 2 people from the comparison location. Meanwhile, FGD is carried out at the

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classification, data comparison, and data presentation. The benchmarking method was used to compare the application of technology in the origin group with the comparison group, as research [6], [7], [8].

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RESULTS AND DISCUSSION

Farmer Group Profile

The Sri Jati Farmer Group, which is addressed in Pejaten Kalurahan Jatisarono Kapanewon Nanggulan Hamlet, Kulon Progo Regency, was established on 20 February 1995. This farmer group has as many as 50 farmers and conducts regular meetings every 35 days. The Sri

Jati Farmer Group was chosen to be one of the organic actors in 2018 the Sri Jati Farmer Group started to carry out organic farming "Go Organic". In 2020 the Sri Jati Farmer Group received an organic certificate issued by LeSOS Mojokerto with a certified area of 15 hectares.

Characteristics of informants

Table 1. Key and Primary Informant Identities

No.	Name	Address	Information
1.	Yayuk Sri Purwanti	Jatisarono, Nanggulan, Kulon Progo	Self-help extension officer of Sri Jati Farmer Group
2.	Supriyanta	Jatisarono, Nanggulan, Kulon Progo	
3.	Poniman	Gamparan, Sumberharjo, Prambanan, Sleman	Chairman of the Prosperous Farmers Group
4.	Nasru	Dingin, Sumberharjo, Prambanan, Sleman.	Manager of Gapoktan Cooperative in Sumberharjo Village

Source: Primary Data in 2022

Table 2. Additional Informant Identities

No.	Name	Address	Information
1.	Haryadi	Bantar, Banguncipto, Sentolo, Kulon Progo	Agricultural Extension Officer Kalurahan Jatisarono.

Source: Primary Data 2022

Table 3. Key and Main Informant Characteristics (Age)

No.	Age Classification	Number (Souls)	Percentage
1.	<15	0	0
2.	15-64	5	100
3.	>64	0	0

Source: Primary Data 2022

Table 4. Key and Main Informant Characteristics (Education Level)

No.	Education Level	Number (Souls)	Percentage
1.	Did not finish elementary school	0	0
2.	SD	0	0
3.	SL	4	80%
4.	College	1	20%

Source: Primary Data in 2022

Table 5. Land Tenure Status

No.	Land Tenure	Number (Souls)	Percentage
1.	Owner	2	50%
2.	Tenants	1	25%
3.	Pengarap	1	25%

Source: Primary Data in 2022

Innovation Technology

No.	Success Factors	KT (Nanggulan)	Sri Jati	KT (Prambanan)	Makmur	Information	Excess
1.	Land Processing	Land processing using engine power plows, the first plowing using singcal plows, the second plowing using comb plows or harrows.		Land processing using a machine power plow, the first plowing using a singcal plow, the second plowing using a comb plow or harrow		Same	
2.	Planted seedlings	• Nutrizing • Brown rice		• Red sembada • They went wangi		Different varieties grown	Of the varieties grown red sembada has more delicious flavor compared to nutrizing so that red sembada is more in demand by consumers.
3.	Seeding seedlings	• Making beds in the rice fields • Soaked 24 hours • Ready seedlings for planting age 14-21 days		• Making beds in the rice fields • Soaked 24 hours • Ready seedlings for planting age 14-21 days		Same	
4.	Planting	• Planting uses the Taju system (advanced planting) and has been outlined in a rectangular		• Planting using the Tandur system (reverse planting) by using a blade of bambu for the size of the planting hole		Sri Jati farmer group is superior	Efficient in processing time

5.	Fertilization	• Solid fertilizer using cow dung • Liquid fertilizers using, residual household waste fermented using EM4	• Solid fertilizer using cow dung • Liquid fertilizer using rabbit urine	Prosperous farmer group superior	Because rabbit urine is higher in nutrients
6.	Control of OPT	• Clorine and Beauveria bassiana Uses	• Using soursat leaves, gadung, and mindi leaves	The Prosperous Farmers Group is superior	Natural ingredients are easy to get
7.	Weed Control	• Manually, unplugged and using a tool that is often called a gosrok	• Manually unplugged and using a tool often called a gosrok	Same	
8.	Harvesting	• Harvesting is done manually, and knocked out using a trasher machine	• Harvesting is done manually and is knocked out using serit(human labor)	Group T ani Sri Jati superior	More efficient. time

Varieties

The seeds used by the Sri Jati Farmer Group and the Makmur Farmers Group are of different varieties. The flagship of the Sri Jati Farmer Group is nutrizink, while the flagship of the Makmur Farmer Group is Sembada Merah. The advantages and disadvantages of the nutrizink variety in the Sri Jati Farmer Group, the advantages are that saplings are widely resistant to pests and plant diseases, and have high zinc nutrition so that they can overcome *stunting* in children. The disadvantage of the nutrizink variety is in terms of taste that is not in demand by the public because if the rice texture is cooked hard, this makes consumers less fond of the nutrizink variety, so the price on the market is relatively low. Meanwhile, the advantages and disadvantages of the varieties sembada merah used by the Makmur Farmers Group, the advantage is that the red sembada variety has a higher yield compared to other varieties, and in the market this variety is more in demand by the public, while for the disadvantages of the Sembada merah variety This merah is easy to collapse if exposed to rain and wind this is caused by the stem of the rice tree is not strong enough to support the resulting grains. From the information above, it can be concluded that both farmer groups have their own variety advantages by considering their respective advantages and disadvantages.

Seeding seedlings

The seeding of seeds carried out between the Sri Jati Farmer Group and the Makmur Farmer Group has the same method, namely by making a pinihan board, the pinihan board that is crushed is a place to sow rice seeds. Rice seeds that are ready for planting are generally 14 days old after distribution, but in both farmer groups choose to somewhat age the seedlings up to 21-25 days on the grounds that the young seedlings will be fed by golden keyong pests. From the above exposure, we can conclude that the two groups of farmers in terms of seeding seedlings have something in common.

Material Processing

The land cultivation carried out in the two farmer groups has something in common, namely by using the 2-wheeled plow alsintan, the stages carried out are plowing the first stage using the second singkal plow the key informant reasoned that the function of the singkal plow is to turn over the remaining plant residues and weeds that grow in the rice field area, so that later weeds and plant residues quickly rot and can become compost. As for the second plowing both use a comb harrow plow, the function of this comb harrow plow is to

level the soil and loosen or break the results of the first pirate, so that later it does not complicate the planting process.

Planting

The planting process carried out by the Sri Jati Farmer Group and the Makmur Farmer Group has differences in the way it is planted. The planting method carried out by the Sri Jati Farmer Group is with a garet system, which is called the garet system, which saves more time, because the planting distance has been determined with tools, this tool diffuses to make small plots which later at the corner of the small plot can be planted rice. If you are going to be given a legowo jajar, then one elongated plot is not planted, the planting distance used by the Sri Jati Farmer Group is 20cm x 20cm, in one planting hole 1-2 rice seedlings are given, dan has implemented the legowo 4 and 6 jajar garden system, while for legowo 2 jajar is less in demand because the results are better jajar legowo 4 and 6.

The planting system used in the Makmur Farmer Group is by using ropes to make straight rows of rice seeds while the method of adjusting the planting distance uses blak made of bamboo, so it takes longer than the garet system. The planting distance used is 20x20 and 20 x 25, and has used the jajar legowo 2. 4 and jajar legowo 6 systems. The jajar legowo system is most in demand in the cultivation process in the Makmur Farmers Group used jajar legowo 4, because the results are better and easier in the maintenance process

The planting carried out by the two farmer groups has differences and it can be concluded that the Sri Jati Farmer Group is superior in terms of time efficiency, while for the legowo jajar planting system, both farmer groups have applied.

Fertilization

In terms of fertilization, the two farmer groups use solid and liquid fertilizers, but there are differences in the use of cair fertilizers, but for the use of solid fertilizers, they have similarities, namely made from cow manure.

For the Sri Jati Farmer group using liquid organic fertilizer (POC) and making its own molasses as a starter, the ingredients used are waste

from the remaining cooked vegetables and then fermentation using a starter made by farmers. The method of application of the liquid fertilizer is sprayed on the pankal part of the rice plant.

As for the Makmur Farmer Group, the liquid fertilizer used is made from rabbit urine. Rabbit urine is obtained from the rabbit livestock group managed by members of the Makmur Farmer Group, how to apply liquid fertilizer by spraying in the pan g kal part of therice plant.

In terms of fertilization, it can be concluded that the use of solid fertilizer in farmer groups has something in common, namely using cow dung, while the use of liquid fertilizer of the Makmur Farmer Group is superior because in addition to being practical, the content of substances in rabbit urine is better and more complete. Plants fertilized with rabbit urine are much better than with other organic materials, as in the study (Kristanto et al., 2019; Husen et al., 2022) This can be proven by the results of rabbit urine having the highest content of N, P, K elements, namely (N 2.75%, P 1.1%, K 0.5%) and can be directly applied without waiting for time for fermentation. As for POC from household waste, it will have to wait about 2 weeks in the fermentation process. In this case, the Makmur Farmer Group is superior in making and obtaining liquid organic fertilizer.

Weed Control

Control of weeds or plants that grow wild around the main plants carried out by the Sri Jati Farmer Group and the Makmur Farmer Farmer Group has something in common, namely manually and using tools that are often called gosrok, this control is carried out the day after planting is carried out. It can be concluded that there is no difference in the way of weed control.

Control of OPT

Control of Plant Disturbing Organisms (OPT) carried out by the Sri Jati Farmer Group and the Makmur Farmer Group has differences. Control of pests carried out by the Sri jati Farmer Group is using *Clorin Bacteria* to function as a vegetable fungicide, as well as using *Beaufarium Basiana* which functions as a vegetable insecticide, the material is obtained through the local

agricultural office (BPP), while the application is carried out one week after planting, kemudian continues once every three weeks until harvesting is carried out.

Pest control carried out by the Makmur Farmer Group is using soursop leaves, mindi leaves, and gadung, these materials function to control pests on plants. Pest control with biological agencies will greatly support the sustainability of environmental sustainability as researched [11].

Harvesting

The harvesting carried out by Sri Jati Farmer Group and the Makmur Farmers Group has differences in terms of the use of alsintan. The Sri Jati Farmer Group harvests its organic rice yield at the age of 30-35 days, while for the harvesting method, only the panicle is cut, then for the rice threshing method, the cost of the rice thresher is Rp. 25,000 for 1 quintal of wet grain, while for drying techniques, the Sri Jati Farmer Group is still manual using sunlight.

CONCLUSION

The application of technology in the Sri Jati Farmer Group compared to the Makmur Farmer Group has differences in the selection of seed varieties. The advantage lies in the method of cultivation, and harvesting. While the similarities are in aspects: land processing, seeding seedlings,

For the Makmur Farmer Group, harvesting it is by cutting the pangkal part of the straw / rice stalks, this is so that the straw can be used as cow feed, while for rice threshing techniques it is still manual, namely using human labor, for drying rice is also still a manual system, namely using sunlight. Thus, Sri Jati Farmer Group is superior because the rice threshing system has used machine power, this conclusion was drawn because by utilizing agricultural machinery the farmer's work is lighter and saves labor costs.

Post-harvest handling

Post-harvest handling is an activity or activity carried out by farmers after harvesting is carried out. Post-harvest activities carried out by the srijati farmer group are the sale of dry rice ready to grind to cooperatives in farmer groups. Then the cooperative conducts rice milling then, packaged according to market demand and then organic rice is ready to be marketed. The same is done by the Prosperous Farmers Group.

weed control. Weaknesses in aspects: fertilization and control of pests. Empowerment activities are emphasized on making fertilizer with rabbit urine and controlling pests with natural ingredients.

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