

## Sustainability Analysis Of Organic Rice Farming In Tarakan City

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### ABSTRACT

Rice is the most widely cultivated food crop in Indonesia. This is not surprising because rice is the staple food for most of Indonesia's population. Rice has very promising agribusiness prospects where market demand is increasing along with the growth of Indonesia's population. At this time many people consume organic food, including organic rice. Organic rice is a rice plant that does not use chemicals and chemical fertilizers that are toxic to the environment. Organic rice is an important plant because it produces organic rice that is delicious and healthy for consumption, although in terms of price it is more expensive than ordinary rice. This is comparable to the content of organic rice which has a low glycemic index, which means organic rice is highly recommended for diabetics. With the increasing trend of organic rice consumption, in Tarakan City also developed organic rice plants. Based on what has been explained, this study aimed to analyze the sustainability of organic rice farming in Tarakan City. The location of this research was in Mapan Sejahtera farmer group, Mamburungan Village, East Tarakan District. The number of samples used as respondents as many as 15 people with the census method. Data analysis was carried out by calculating the sustainability index of organic rice farmers' household farming with three sustainability indicators, namely biophysics such as; soil fertility, soil loss, biodiversity, use of organic fertilizers. Economic indicators such as; diversification of income sources, management and decision-making practices, land tenure, distance to credit sources, post-harvest technology facilities, number of farmers using post-harvest, post-harvest location distance. While social indicators such as; education, home ownership status, health status, participation in counseling, presence/no technology for fertilizer production/waste treatment, and attitudes towards the negative impact of chemical fertilizers. The results showed that the analysis of the sustainability of organic rice farming in Mapan Sejahtera farmer group from the three indicators, namely biophysical indicators of 83.03, economic indicators of 82.86 and social indicators of 94.45. The average Sustainability index value was 86.87, this means that the sustainability of organic rice farming in Mapan Sejahtera farmer group, Tarakan City was good and very sustainable.

### Keywords:

Sustainability,  
organic, rice,  
farming, Tarakan  
City

### INTRODUCTION

The contribution of the agricultural sector in a broad sense to economic growth in Indonesia is still taken into account. This can be seen in the

Gross Domestic Product (GDP) of agriculture which shows a significant growth trend. Although there is an increasing trend, in 2019 there was a decrease in growth compared to the previous year, this was due to a decrease in the rate of increase in food crop production due to the long dry season. In addition, due to the transformation of the national economy, which was initially dominated by primary agricultural products, in a narrow sense shifted to other sectors. The agricultural commodity that has an important meaning for the Indonesian economy is rice. Rice production is still a priority in Indonesia's national development. This is because rice is still the main food ingredient for most of Indonesia's population. Rice as a producer of rice is one of the strategic commodities in the agricultural sector. Rice production from 2015 to 2019 tends to decline. In 2015 rice production was 75.4 million tons of milled dry grain (GKG), then increased to 81.15 million tons GKG in 2017. Rice production in 2018 was 59.20 million tons GKG and in 2019 was 54.60 million tons MPD [1]. In 2020 there was an increase in production to 54.65 million tons of GKG, or an increase of 45.17 thousand tons (0.08 percent) compared to 2019 [2].

The increase in population must be followed by the amount of rice production. The government's efforts to increase rice production have been carried out since the New Orde era. At that time the activities of Bimas, Inmas, and Insus had led to Indonesia being self-sufficient in rice in 1984 [3]. Even in the current era, the government is still trying to implement agricultural

development to realize food sovereignty, including: food needs from domestic production, regulating food policies independently and protecting and prospering farmers as the main actors in the food agriculture business. One of the strategies is achieving self-sufficiency in rice, corn, soybeans, chilies, shallots and increasing sugar and meat production.

In general, we know that rice is organic and inorganic. This relates to how to do cultivation, whether to use organic or non-organic/chemical materials in the application of fertilizers and medicines. Although organic farming has sparked a controversial debate in recent decades. Currently it has been scientifically proven that organic farming is more environmentally friendly: the potential benefits of organic production arise from increased soil fertility, organic matter content and biological activity; better soil structure and reduced susceptibility to erosion; reduced pollution from leaching nutrients and pesticides [4]. In Indonesia, many organic farming systems have been developed, including rice cultivation systems to respond to various environmental issues and to produce healthy food. In addition, the threat of ecological damage and human casualties due to chemical pollution in agricultural practices encourages the emergence of environmentally safe alternative agriculture, namely organic farming [5].

The city of Tarakan, which is located in North Kalimantan Province, has developed organic rice farming. Organic farming in Tarakan City is carried out by the Mapan Sejahtera farmer group located in Mamburungan Village. Although

organic rice farming has begun to be developed, the challenges and problems faced by farmers are still complex. Both from the technical side such as systems, methods, and maintenance management that are friendly to the environment and non-technical such as management, and economically. Therefore, it is necessary to analyze the sustainability of organic rice farming in Tarakan City.

#### METHOD

The location of this research is in the Mapan Sejahtera farmer group, Mamburungan Village, East Tarakan District, Tarakan City. The location was taken by purposive sampling with the consideration that the area is a center for organic rice development and the Mapan Sejahtera Farmer Group is a farmer group whose members all cultivate organic rice. The number of samples used as respondents as many as 15 farmers with a saturated/census sampling method, namely all members of the Mapan Sejahtera farmer group because the population is less than 30 people [6]. Data analysis was carried out by calculating the sustainability index of organic rice farmers' household farming with three sustainability indicators, namely biophysics such as; soil fertility, soil loss, biodiversity, use of organic fertilizers. Economic indicators; diversification of income sources, management and decision-making practices, land tenure, distance to credit sources, post-harvest technology facilities, number of farmers using post-harvest, post-harvest location distance. While social indicators; education, home ownership status, health status, participation in counseling, presence/no

technology for fertilizer production/waste treatment, and attitudes towards the negative impact of chemical fertilizers. This is as stated in SEARCA (The Southeast Asian Regional Center for Graduate Study and Research in Agriculture) [7]. Furthermore, the measurement results of the indicators on each dimension of sustainable agriculture are calculated using a composite index which is formulated as follows:

$$\text{Sustainability Index} = \frac{\text{obtained score}}{\text{maximum score}} \times 100\%$$

To find out the status of sustainable agriculture is used sustainable agriculture status categories as follows:

1. index value 00.0-25.0 (poor/unsustainable)
2. index value 25.1-50.0 (less/less sustainable)
3. index values 50.1-75.0 (sufficient/sufficiently sustainable)
4. index value 75.1-100 (good/very sustainable)

#### RESULT AND DISCUSSION

##### 1.1. Description of Research Sites

Mamburungan Village, which is located in the East Tarakan District, Tarakan City which is one of the villages that has organic agricultural development production. This can be seen from the existence of several farmer groups engaged in organic farming. The number of farmer groups in Mamburungan Village is 6 farmer groups, each farmer group has a different area of arable land and commodities, one of which is rice. The farmer group that cultivates rice is the Mapan Sejahtera Farmer Group, which of its 29 members, there are 15 farmers who cultivate organic rice.

*1.2. Profile of Members of Mapan Sejahtera Farmer Group who are Organic Rice Farming*

The profiles of members of the Mapan Sejahtera farmer group are described in the characteristics of the respondents of organic rice farmers in the Mapan Sejahtera Farmer Group based on age, education, farming experience, number of family members, arable land area, and land tanure can be seen in Table 1.

Table 1. Characteristics of respondents from organic rice farmers in the Mapan Sejahtera Farmer Group

Characteristics of Respondents	Category	Frequency
Age	> 50	9
	< 50	6
Education	Primary and secondary school	8
	High school and university	7
Farming experience	> 10	3
	< 10	12
Number of family members	> 4	4
	< 4	11
Cultivated Land Area	> 1	12
	< 1	3
Land tanure	one's own	15
	Not own	-

Table 1 can be explained from the characteristics based on the age of the respondent farmers between productive and unproductive age, which are almost the same. This will affect the productivity of rice related to the physical condition of farmers. Productive age is very influential with the physical ability of farmers to

work optimally, age as a benchmark in seeing a person's activity at work, if with a productive age condition, it is very likely that someone can work well and maximally. [8]; [9]. Based on the education level of the respondent farmers in general have a fairly good level of education, this will affect how rational farmers can adopt appropriate science and technology for their farming. This was in line with the opinion which states that education will affect mental attitude, application of new innovations and work behavior when trying to farm. The higher the farmer's education level, the easier it is to apply innovation and use of new technology [10]. As for the experience of farming, most of the respondents are still under 10 years which will affect the skills of farmers in farming for the better. As the opinion states that farming will help farmers in making farming decisions. The longer the experience possessed by the farmer, the farmer will tend to have a high level of skill. Farmers' experience in farming will also support success in farming. Meanwhile, the large number of respondent's family members were mostly under four people, which will affect the availability of internal labor and the costs incurred in farming, so that it becomes the motivation of farmers to try farming better and increase their production.

This was in line with the opinion that the greater the number of family dependents, the more dynamic a person was in doing the farming because he was driven by a sense of responsibility towards his family members [11]. Based on the area of arable land for organic rice, most of the farmers own more than one hectare of land, while

from the characteristics of the land tenure, it was owned by the respondent farmers. These two things will have an impact on the seriousness, decisions, and sustainability of farmers in managing their organic rice farming. This will also have implications for the production and welfare of farmers. As a statement that explains that the area of land owned will affect the size of production and also affect the income of farmers [12]. While the land tenure was related to the convenience of farmers in making decisions on the farming they do. Farmers will find it easier to make decisions if the land used is their own [13].

### 1.3. Sustainability of Organic Rice Farming in the

No	Indicators	Index
1	<b>Soil fertility</b>	
	a. organic matter content	53.34
	b. soil pH	73.34
	c. Ease of processing	93.34
2	<b>Land Loss</b>	
	a. Soil Depth	53.34
	b. Percentage of rocks	73.34
	c. Percentage of farming	66.67
3	<b>Biodiversity</b>	
	The presence of plants/livestock in the garden according to the farmer's assessment	100
4	<b>Use of external and internal fertilizers</b>	
	a. Fertilizer (organic and inorganic)	100
	b. Use of organic fertilizers and duration of use	100
	c. Plant waste management for fertilizer/animal feed	100
	d. Pesticides (chemical and botanical/ natural)	100
<b>Total</b>		<b>913.34</b>
<b>Average</b>		<b>83.03</b>

#### *Mapan Sejahtera Farmers Group*

Organic rice farming in the Mapan Sejahtera Farmers Group is carried out using the SRI (System of Rice Intensification) method, which is a rice cultivation technique that is able to increase rice productivity by changing the

management of plants, soil, water and nutrients, proven to have succeeded in increasing rice productivity by 50 %. The main advantage of the SRI method is that it is environmentally friendly, does not use chemicals and is replaced by using organic fertilizers (compost, manure and local micro-organisms), as well as the use of pesticides [14].

The indicators for the sustainability of organic rice farming in the Mapan Sejahtera Farmer Group are measured using three indicators, namely; biophysics such as; soil fertility, soil loss, biodiversity, use of organic fertilizers. Economic indicators; diversification of income sources, management and decision-making practices, land tenure, distance to credit sources, post-harvest technology facilities, number of farmers using post-harvest, post-harvest location distance. Social indicators; education, home ownership status, health status, participation in counseling, presence/no technology for fertilizer production/waste treatment, and attitudes towards the negative impact of chemical fertilizers. The measurement results are seen from the Sustainability Index value which can be seen in the following table:

Table 2. Biophysical indicators of sustainable organic rice farming in Mapan Sejahtera Farmer Group

Based on Table 2. It can be explained that from the biophysical indicators the parameters that have a high index value are biodiversity and the use of external and internal fertilizers. Members of the Mapan Sejahtera Farmer Group in their organic rice farming used more fertilizers

and organic medicines such as animal manure and MOL (Local Microorganisms). This is very much in accordance with the SRI method they apply where organic fertilizers used in composted form play an important role in improving the physical, chemical, biological properties of the soil and sources of plant nutrients. Sources of compost material can come from organic waste such as plant residues (straw, stems, branches), household waste, livestock manure, husk charcoal, kitchen ash. The content of nutrients in organic fertilizers is generally low and available slowly, so they are needed in large quantities. The use of organic matter is absolutely necessary in the Rice Intensification System (SRI) [15]. This also in the long term affects the parameters of soil fertility and soil loss. In general, based on the average index value of the biophysical indicators, organic rice farming in the Mapan Sejahtera Farmers Group is in the good/very sustainable category with an index value of 83.03.

The Economic indicators of the sustainability of organic rice farming in the Mapan Sejahtera Farmer Group can be measured by several parameters as shown in Table 3.

Table 3. Economic indicators of sustainable organic rice farming in Mapan Sejahtera Farmer Group

No	Indicators	Index
1	income source diversification	73.34
2	Labor distribution management practices and decision making	53.34
3	Land tenure	100
4	Credit Source Distance	100
5	post-harvest technology facilities	100
6	number of farmers using post-harvest	100
7	post-harvest location distance	53.34

<b>Total</b>	<b>580</b>
<b>Average</b>	<b>82.86</b>

Table 3 can be seen that the lowest index value of the economic indicators was the practice of labor distribution management and decision-making whose value is quite sustainable. This indicates that in managing organic rice farming, farmers have not fully become managers in their farming, so they also have not dared to take decisions on their farming business. They are indeed being assisted by Medco E and P Company. This is what causes them to still depend on their coaches in organic rice farming. Likewise, the post-harvest location distance parameters are quite sustainable. Parameters of land ownership status, distance to credit sources, post-harvest technology facilities, and number of farmers using post-harvest are all of good/very sustainable value. The land owned by the farmers themselves, the easy access for farmers to credit for farming, the assistance of post-harvest machines are very helpful for the sustainability of organic rice farming in the Mapan Sejahtera Farmer Group. Based on the parameters of diversification of income sources, organic rice farmers also have a source of income from off-farm activities. Based on the average index value of the economic indicators of organic rice farming in the Mapan Sejahtera Farmer Group, it is included in the good/very sustainable category with an index value of 82, 86.

Furthermore, social indicators were measured using education parameters, home ownership status, health status, participation in counseling, presence/no technology for fertilizer production/waste treatment, and attitudes towards



the negative impact of chemical fertilizers. The results of the analysis of social indicators can be seen in Table 4.

Table 4. Social indicators of sustainable organic rice farming in Mapan Sejahtera Farmer Group

No	Indicators	Index
1	Education	100
2	Home ownership status	100
3	Health status	66.67
4	participation in counseling	100
5	yes/no technology for fertilizer production/waste management	100
6	attitude towards the negative impact of chemical fertilizers	100
<b>Total</b>		<b>566.67</b>
<b>Average</b>		<b>94.44</b>

Based on table 4, it can be seen that the health status parameter has the lowest value, namely 66.67, although it was still quite sustainable compared to other parameters whose values were already very sustainable. When viewed from the characteristics based on education, half 50% of respondents have an elementary and junior high school education level, but participation as a member of a farmer group who regularly participates in counseling and training activities makes additional science and technology and skills for farmers. This was in line with the results of research which states that training has a positive impact on long-term farming because it can increase expertise, skills, and solving every problem in the organic rice farming they done, as well as changing a person's attitude/behavior in a more productive direction [16]. The sustainability index value of the social indicators was 94.44 which is in the good/very sustainable category.

The three indicators used to measure the sustainability index of organic rice farming in the

Mapan Sejahtera Farmers Group if averaged are 87.77, which means that the sustainability of organic rice farming in the Mapan Sejahtera Farmers Group in Tarakan City is good/very sustainable to be developed.

## CONCLUSION

Based on The results can be concluded that the analysis of the sustainability of organic rice farming in Mapan Sejahtera farmer group from the three indicators, namely biophysical indicators of 83.03, economic indicators of 82.86 and social indicators of 94.44. The average Sustainability index value was 86.87, this means that the sustainability of organic rice farming in Mapan Sejahtera farmer group, Tarakan City was good and very sustainable.

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