

# Feasibility Analysis of Organic Rice (*Oryza Sativa* L) Farming in Sambirejo Village, Banyuasin 1 District

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**Abstract.** The community is currently running the Back to Nature movement. It is considered a response to today's lifestyle activities that are considered unhealthy to cause various kinds of diseases. Organic rice farming in Sambirejo Village has been implemented since 2018, although not all farmers have cultivated organically in their farming. This research aims to determine the feasibility of organic rice farming and determine the impact of organic fertilizer on the organic rice production rate in Sambirejo Village, Banyuasin 1 District. The research was carried out from February 2021 to June 2021. Locations were selected intentionally. The research method was in the form of a direct survey of organic rice farmers. For respondents, 30 farmers were taken using a simple random method. This research indicates that the average income earned by organic rice farmers is Rp5,703,254/Ha/planting season, with a proportion of R/C 1.65. Organic rice is feasible to cultivate when viewed from the proportion of R/C value that provides additional revenue for each additional revenue. Variable use of organic fertilizer has a positive, real and significant effect on increasing organic rice production, based on the result of calculated t value of 9.245 which is greater than t table. So that organic rice farming is very feasible for development in Sambirejo Village.

**Keywords:** feasibility analysis, organic rice farming, production rate

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## 1. Introduction

The increasing need for human food will encourage agricultural people to increase productivity from plants and create diverse foods. Agricultural people do various ways to develop and increase the productivity of crops without thinking that the use of inorganic fertilizers and pesticides can bring changes that impact the soil ecosystem if used unwisely long-term. The use of inorganic fertilizers, which are generally high and unrelenting, can have a detrimental effect on the soil climate, thereby reducing the usability of horticultural land. So far, farmers have been using inorganic fertilizers continuously.

In developed countries, agricultural products that carry organic or non-chemical labels have higher selling prices because they are considered higher quality and safe for consumption by the

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healthy lifestyle that is widely applied today [1]. Recently, people have returned to live the lifestyle of their ancestors. A healthy lifestyle with the theme "Back to Nature" is again loved as a lifestyle in various communities in developed countries. The movement with the theme of returning to nature is considered a response to today's lifestyle activities seen as an unhealthy lifestyle, so it is often a trigger for various types of diseases. This movement means that people need to be healthy and free from synthetic chemicals such as pesticides, chemicals, and hormones regulating plant growth [2].

Given these conditions, agricultural people are trying to replace cultivation techniques that are safe for humans and the environment for both the short and long term. It is what encouraged the emergence of an organic cultivation technique. Organic cultivation is an effort to develop plants using materials derived from natural materials, which can be given through the soil or directly applied to plants without leaving a residue of harmful substances. Organic farming makes it possible to re-engage natural materials as a source of organic fertilizers. The use of organic fertilizers can improve land efficiency and reduce adverse consequences on soil biological systems. Organic fertilizers result from the decomposition of natural materials as living creature wastes that are decomposed by microorganisms, where the results can provide various kinds of nutrients needed by plants to meet their needs and development. From a health perspective, agricultural products labeled as organic are suitable for human consumption because they are free from harmful residues. In addition, products labeled as organic are also considered safe for the balance of the soil ecosystem [3].

As revealed by [4], the increasing public attention to the risks of various synthetic chemical compounds contained in agricultural products has made organic agricultural products more loved by the public. Several agricultural commodities have implemented organic agricultural crop cultivation, one of which is rice. Rice produced from the rice plant is the leading staple food for most Indonesian populations. The high nutritional content of organically cultivated rice is considered healthy food for humans. The bran that is not removed from organic rice makes this rice not look shiny, so organic rice has better fiber content and nutritional value. Likewise, the development of organic rice cultivation is not harmful to the ecosystem. It does not damage and pollute the environment with residues left by synthetic chemicals. It can naturally increase agricultural ecosystems' productivity level, and a balanced and sustainable ecosystem can be well maintained [5].

According to [6], the productivity of organic cultivation in the early stages will decrease but will increase in the long term, while the productivity of traditional cultivation will often decrease in the long term because the soil will lack organic matter, which causes poor nutrients. Apart from productivity issues, the fundamental difference between farming using organic and conventional cultivation systems is costs. The financing components used in organic and conventional

cultivation systems are different. The production inputs used by the two cultivation systems are different, affecting the number of costs incurred.

Based on the results of research [7] the average income of rice farming per hectare of organic farmers is higher than that of inorganic rice farmers. The average organic rice farming income is Rp21,930,504.42/ha, while the average inorganic rice farming income is only Rp14,679,377.09/ha. The feasibility level of organic rice farming is also more feasible than inorganic rice. The BEP of organic rice farming production is 1,173.40 kg/ha while the BEP of inorganic rice farming production is 2,431.68 kg/ha. The BEP for organic rice farming is Rp6,747,034.51/ha, while the BEP for inorganic rice farming is Rp10,699,395.05/ha. The R/C ratio of organic rice farming is 3.68 while the R/C ratio of inorganic rice farming is 2.18. So organic rice farming is feasible to be developed.

According to [8] that the total profit from organic rice farming in Bareng Village, Bareng District MT I and MT II within one year is an average of Rp8,701,690. If detailed, the average total profit of MT I is Rp6,721,631, while the average total MT II Rp1,980,059 within one year. The results of the feasibility analysis (R/C Ratio) show that organic rice farming in Bareng Village, Bareng District is feasible. This can be seen from the comparison of total income with total costs which is greater than one, namely 1.374, so that organic rice farming in Bareng village is profitable and feasible to cultivate.

The Food Independent Village program, commonly called Demapan, in Sambirejo Village with the primary objective of managing and optimally utilizing the available resources to empower the rural poor so that family and regional food self-reliance can be created. Organic rice farming in Sambirejo Village has been widely implemented starting around 2018, although not all rice farmers cultivate organically in their farming. Therefore, it is necessary to analyze the feasibility of organic rice farming and see how much influence the organic fertilizer used has on the organic rice production rate in Sambirejo Village, Banyuasin 1 District. Describes research background, previous studies and research objectives, which is no more than 20 percent of the total page.

## **2. Methods**

This research took place in Sambirejo Village, Banyuasin 1 District. The determination of the research area was carried out intentionally, with the consideration that in Sambirejo Village, Banyuasin 1 District, many farmers were carrying out organic rice cultivation, in addition to that the village was the target village for the Independent Food Village Program (DEMAPAN). This research was conducted from February 2021 to June 2021.

The method used in this study is a survey method, directly with organic rice farmers in Sambirejo Village, Banyuasin 1 District. For sampling, a simple random method was used. Respondents

who became the sample in this study were 30 farmers from a total population of 50 organic rice farmers. In calculating the costs and income received by organic rice farmers, it can be done with a mathematical analysis as follows:

$$R = Q \times P \quad (1)$$

$$I = TR - TC \quad (2)$$

$$TC = TFC + TVC \quad (3)$$

Description: R = Revenue (Rp/Ha/planting season); Q = Quantity (Kg/Ha/planting season); P = Price (Rp/Kg); I = Income (Rp/Ha/planting season); TC = Total Cost (Rp/Ha/planting season); TFC = Total Fixed Cost (Rp/Ha/planting season); TVC = Total Variable Cost (Rp/Ha/planting season).

Furthermore, to calculate the feasibility level of organic rice farming, the R/C ratio analysis is used with the formula:

$$R/C = \frac{\text{Revenue}}{\text{Cost}} \quad (4)$$

When:

R/C > 1: It means that organic rice farming is feasible to run

R/C < 1: It means that organic rice farming is not feasible to run

Meanwhile, to see the effect of how large the amount of organic fertilizer is used on the production of organic rice farming, linear regression analysis was used using IBM SPSS Statistics 25 to produce the equation:

$$y = a + b_x \quad (5)$$

Simple linear analysis was used to find the linear relationship between one independent variable (x) and the dependent variable (y). This analysis can estimate the value of the dependent variable resulting from the increase or decrease in the value of the independent variable, which will later clarify the direction of the relationship between the dependent variable and the independent variable, whether the direction is positive or negative. The t value that is greater than the t table indicates that the independent variable has a significant effect, whereas if the t value is smaller than the t table indicates that the independent variable has no significant effect.

### **3. Results and Discussion**

#### **3.1. Characteristics of Organic Rice Farmers**

The organic rice farmers who became respondents in this study had characteristics seen from their age, number of family members, education level, and land area owned by the farmers. The characteristics possessed by the sample farmers can indirectly determine the feasibility of the organic rice business.

Age is considered very influential on the strength or ability to do physical work related to the management of the farm. The productive age of the respondent farmers can provide physical strength when carrying out various activities in cultivating organic rice. Age above 60 years is considered less productive because the physical ability to manage their farm is decreases so that management becomes less than optimal. As seen in Table 1, the age of the farmers in this study who were respondents had varied ages, which were categorized into two age groups. The lowest age is 40, and the highest is 60 years. It can be concluded that all respondents in the study area are of the productive age. Most of the organic rice farmers are aged 40 to 50 years, with 19 people or around 63.3 percent of the total respondents. While in the age range of 51-60, 11 farmers have a percentage of 36.7 percent of the total number of respondents.

Organic rice farming is also indirectly influenced by the gender of the cultivators. Female farmers have lower physical abilities when compared to male farmers, so female farmers are considered less than optimal in managing their farms. The organic rice farmers who were the respondents were all male. Farm work for women farmers is only used as part-time work that helps husbands manage their farms.

One of the factors that lead to success in managing their farm is the level of education. Organic rice farmers who become respondents have various levels of education. Farmers have various levels of education, starting from the elementary level to the high school level. Various new technological innovations can be easily absorbed by farmers who have a higher level of education to develop well. In this study, farmers were divided into three groups based on their level of education, namely elementary school graduates, junior high school graduates, and high school graduates. It is in line with research [9], which states a significant relationship between education level and rice production. Due to the existing processes in farming requires learning to be able to receive various information and existing innovations. The increase in rice production is influenced by the level of education owned by the farmer. The higher level of education, the easier it is to absorb information that can later be applied directly to rice farming.

Based on Table 1, respondents who have an education level of high school graduates are around 50 percent, with 15 people among all respondents. At the junior high school level, there are 12 farmers, with 40 percent of the total respondents. There are only three respondents with the

smallest percentage for elementary education level, which is 10 percent of the total number of respondents. It shows that the capital that farmers need to have is education. The knowledge and skills needed in all farming activities are needed to absorb various information and innovations.

The smallest part of society consisting of a husband, wife, and children or a father and son or mother and child is called a family. All those who are dependents of the head of the family and live under one roof in their daily lives who are involved in family economic activities, either directly or indirectly, are family members [10]. Various patterns of production and consumption of family members cause differences in production and income. The costs used for consumption will increase along with the number of family members, while in terms of labor allocated in farming, there will be more family members who can assist in doing farming so that there are opportunities to achieve high income.

Table 1 shows that there are 4-7 people, the number of family members owned by organic rice farmers who are respondents, which are categorized into two groups. A total of 22 respondents had several family members ranging from 4 to 5 in the family, or many as 73.3 percent of the total respondents. Meanwhile, those who have family members from 6 to 7 people in one family are eight respondents or 26.7 percent.

**Table 1.** Socio-Economic Characteristics in Sambirejo Village, Banyuasin 1 District

Variable	Amount (Soul)	Percentage (%)
Age	19	63.3
♦ 40-50	11	36.7
♦ 51-60	30	100
Total		
Gender		
♦ Man	30	100
♦ Woman	0	0
Total	30	100
Level of Education		
♦ Elementary School	3	10
♦ Junior High School	12	40
♦ Senior High School	15	50
Total	30	100
Number of families		
♦ 4-5	22	73.3
♦ 6-7	8	26.7
Total	30	100
Land Area		
♦ 0,5-1	12	40
♦ 1-2	18	60
Total	30	100

The land owned by organic rice farmers is also a determining factor for how farmers will obtain much production from organic rice and how much income. Their land also influences farmers'

income for use in organic rice farming. In Indonesia, the area of farmland is a reference for grouping farmers based on their business scale. According to [11], there are three categories of the grouping farmers based on the area of land they have namely small-scale farmers with a land area of fewer than 0.5 hectares, medium-scale with an area of land owned ranging from 0.5 to 1 hectare, and wide-scale where the land owned by farmers for farming is more than 1 hectare. However, this definition does not apply to plantation crops because the land owned by farmers who cultivate plantation crops is more comprehensive than that of food crops and horticulture.

Respondents with land area owned ranging from 0.5 to 1 hectare there are 12 farmers where the percentage is 40 percent of the total number of respondents, while farmers who own land with an area of more than 1 hectare are 18 people, which means 60 percent of the total number of respondents. It shows that in Sambirejo Village, the scale of farming is in the middle to upper scale because the land owned is more than 0.5 ha.

### **3.2. Feasibility Analysis of Organic Rice Farming**

The feasibility analysis used to determine the feasibility of organic rice farming is by calculating the ratio between revenue and production costs. The results of organic rice farming costs calculation can be seen in Table 2. In one growing season, organic rice farming production in Sambirejo Village, Banyuasin 1 District is 4,363 kilograms per hectare. The average income of organic rice farmers for one crop season is Rp. 14,877,000 - per hectare, where the selling price was Rp3,433 per kg. Meanwhile, the average production cost incurred by farmers in organic rice farming is Rp9,173,745 per hectare for one growing season. The income value can be calculated based on the average total revenue and the average production cost. In one growing season, the average income from organic rice farming in Sambirejo Village, Banyuasin 1 District is Rp5,703,254 per hectare.

Achieving efficiency in farming requires a good management process, starting from planting preparation, fertilizer application, harvesting, and marketing of farm products. The maximum profit obtained by organic rice farmers from the farming they manage indicates that the farm is feasible to cultivate. In addition, the application of innovation is very supportive in carrying out farming so that production has increased, which has an impact on increasing the income of organic rice farmers.

The various inputs used in organic rice farming are the total production costs used in farming, including variable costs such as purchasing seeds, purchasing organic fertilizers, labor costs, and fixed costs such as the depreciation of equipment. The multiplication between the selling price and the amount of organic rice production is farm income. To determine the feasibility level of organic rice farming in Sambirejo Village, Banyuasin 1 District, the Return cost ratio (R/C) method was used. Based on Table 2 shows that the value of the ratio between revenue and total production costs (R/C) is 1.65. The R/C value of more than 1 means that organic rice farming in

Sambirejo Village, Banyuasin 1 District is feasible. Because if there is an additional business capital of Rp1,000,000, the farmer will get an additional profit of Rp1,650,000. It shows that the more capital added, the more income obtained from the farm.

**Table 2.** Feasibility Analysis of Organic Rice Farming in Sambirejo Village, Banyuasin 1 District

No	Description	Amount
1	Production (Kg/Ha/planting season)	4,363
2	Selling Price (Rp/Kg)	3,433
3	Revenue (Rp/Ha/planting season)	14,877,000
4	Production Cost (Rp/Ha/planting season)	9,173,745
5	Income (Rp/Ha/planting season)	5,703,254
6	R/C	1.65

The relationship between the use of fertilizers to the amount of organic rice production is presented in Table 3. The magnitude of the correlation value (R) is 0.868. Table 3 shows a relationship between fertilizer use (x) and the amount of production (y) of 0.868. The output results in table 3 show that the coefficient of determination obtained (R<sup>2</sup>) is 0.753. The coefficient value means that the effect of the variable amount of fertilizer (x) on the variable amount of production (y) is 75.3 percent, while 24.7 percent is explained by other variables that were not examined in this research. For a calculated t value of 9.245 with a significance level of 0.000 < 0.05, the variable amount of organic fertilizer used has a significant effect on the amount of organic rice produced. It shows the variable amount of fertilizer used (x) on the variable amount of organic rice production produced (y).

**Table 3.** The Relationship Between the Variables of the Amount of Production and the Amount of Fertilizer

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.868 <sup>a</sup>	.753	.744	.55003

Based on data processing using SPSS Statistics 25, the output results in table 4 can be made into a regression equation, the constant value (a) obtained is 2,693, which means that the variable value's consistency for rice production is 2,693. While the value of the regression coefficient (b) is 0.548, indicating that for every 1 percent addition of the amount of organic fertilizer used, the total production will increase by 2.693. The direction of the variable x on the variable y is positive, which is indicated by the positive coefficient value.

$$y = 2,693 + 0,548x \tag{6}$$



**Table 4.** Determinant Coefficient of Simple Linear Regression

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.693	.283		9.524	.000
	Amount of fertilizer	.548	.059	.868	9.245	.000

Based on the feasibility analysis of farming, an R/C value of more than 1, which is equal to 1.65, indicates that organic rice farming is feasible to run. Because it will provide an additional receipt of 1.65. Meanwhile, after processing the data through IBM SPSS Statistics 25, it shows that the effect of using organic fertilizers is positive on increasing the amount of organic rice production and has a real and significant effect. So the increase in the level of organic rice production is influenced by the amount of organic fertilizer used. So that organic rice farming is feasible to be developed in Sambirejo Village, Banyuasin 1 District.

#### 4. Conclusion

Based on the results of the farming feasibility study, the R/C value of 1.65 indicates that organic rice farming is feasible to run. Because it can provide additional receipts of Rp1.65 for every Rp1 added capital. Meanwhile, data processing through IBM SPSS Statistics 25 shows that the effect of organic fertilizer is positive on the increase in the amount of organic rice production. The R-square value of 0.753 means that organic fertilizers can explain the variable amount of production by 75.3 percent, while the remaining 24.7 percent is explained by other variables not analyzed in this research. Based on the calculated t value which is greater than the t table value, it means that the variable amount of organic fertilizer used has a significant effect on increasing the amount of organic rice production. By increasing the amount of organic fertilizer used according to the dosage, it will increase the amount of organic rice farming production. So the use of organic fertilizers affects increasing organic rice production. Therefore, it is necessary to conduct intensive counseling to farmers who have not applied to organic rice farming to switch to organic rice farming-counseling in the form of human resource development and strengthening the participation of farmers in farmer groups. Assistance in agricultural machinery, production inputs, and the latest, more practical technology is also needed to develop organic rice farming. In addition, it is necessary to open new land that has not been utilized so that the production of organic rice farming will also increase because organic rice farming is very feasible to run.

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