

# Factors that Affect the Income Generation of Organic Rice Farmers in The Village of Pagung

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**Abstract:** Farmers in Indonesia generally have limited production factors, but on the other hand, they want to increase their farming business's production. This requires farmers to use their production factors efficiently. Efforts to increase farmer productivity and income are not easy because, in general, farmers in Indonesia have limited production factors and land. One measure that can make to meet this demand is to do farming, especially food crops, namely organic rice. Therefore, it is necessary to develop organic rice plants through the development of cultivation and application of technology, increasing business capital, investment, and product promotion facilities, as well as institutional facilities and partnerships between producers and business actors in organic rice production and marketing centers. The aims of this study were (1) to analyze the effectiveness of rice farming in Pagung Village and (2) to analyze the influence of production factors on land area, seeds, fertilizers, pesticides, and labor. This aim is expected to increase rice production and farmer income in Kepanjen District. The research used a sample of 80 rice farmers spread across Pagung Village, Semen District, Kediri Regency. The selection of respondents used the simple random sampling method because it is assumed that the population characteristics of each farmer were relatively homogeneous.

**Keywords:** Economic; Effectiveness; Farmer; Farming; Organic; Rice; Social.

## Introduction

The food crop sub-sector that Indonesian farmers mainly cultivate is rice. Rice is a food crop that produces rice as a staple food source for most of Indonesia's population. Rice is a food crop widely cultivated by farmers in Indonesia in Pelita IV. Indonesia was once a rice exporting country, namely by achieving self-sufficiency in rice (Iskandar et al., 2018; Lakitan et al., 2018; Zahri et al., 2018). Population growth in Indonesia is increasing, causing the need for food. Farmers in Indonesia generally have limited production factors, but on the other hand, they want to improve their farming business's production. This requires farmers to use their production factors efficiently. Efforts to increase farmer productivity and income are not easy because, in general, farmers in Indonesia have limited production

factors and land (Mariyono, 2019a, 2019b; Rahayu et al., 2019). So that the constraints and problems faced are essential things to solve so that production factors are used properly and optimally so that farmers' income will increase. Therefore, to adapt to current agricultural conditions, it is necessary to increase productivity, so it is hoped that one way to increase production is to study rice cultivation technology. The low level of rice productivity and the relatively slow rate of development of rice production are also caused by the rather more complex problems faced by rice farming (Kumar et al., 2021; Oo et al., 2018). Government policies pay more attention to other sectors than the agricultural sector, in which the agricultural sector is more important in meeting the community's food needs (Daugbjerg & Feindt, 2017; Knickel et al., 2018). Therefore, the factors that influence rice farming are not fully owned by

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farmers in Indonesia. So that the income of farmers and national rice production cannot be maximized. The problem faced in farming is the large number of land conversions from agricultural land to industrial land; therefore, agricultural land is getting narrower, which has an impact on decreasing rice production.

Research on income analysis and factors affecting rice farming (Haryati & Adi, 2019; Islam et al., 2020; Kyaw et al., 2018; Tanjung, 2020) in Pagung Village, Semen District, Kediri Regency, was conducted to determine factors affecting rice production and farm income. It is hoped that in the future, with this research, the productivity of rice farming can be increased through knowledge of the factors that influence rice production. Because in agriculture, the law of growing yields decreases, where the addition of production factors continuously at a point will cause output to fall (Soekartawi, 1994).

Based on BPS data from Kediri Regency, there has been an increase in rice production, but consumption decreased in the last five years. Production increased by approximately 4%, while consumption reduced by 18%. This happens because prices are getting higher due to global conditions such as pandemics and trade wars that are happening in the world, which have an impact on the Indonesian economy. Global conditions have also caused production at the price of needs for factors of production to increase and have impacted rice prices, especially organic rice, even though the Sekar Putih farmer group has been established and has the tools to produce and pack it for sale and market.

That condition is a challenge for organic rice farmers to continue farming based on long-term thinking that will have an impact on the health of the next generation, so this research is used to determine 1) analysis of organic rice farming in Pagung Village, Semen District, Kediri Regency 2) What factors are affecting organic rice farming in Pagung Village, Semen District, Kediri district.

## Method

### *Production Cost*

According to Cakranegara et al. (2022), production costs are the expenses a company must pay during its production process. These include the initial and factory fees. Other expenses are also included in the total cost of production, consisting of production and variable costs, which are then added up and called the total cost.

### *Fixed costs (F.C.)*

Fixed costs are costs that do not change in total (Bösch et al., 2018), even though there is a change in production or sales volume (within certain limits). This means that the costs do not depend on the number of products produced, including fixed costs such as fixed

salaries, land rent, land taxes, tools and machinery, buildings or interest money, and other fixed costs.

### *Variable cost (V.C.)*

Variable costs vary in total according to changes in production or sales volume (Syverson, 2019). This means that variable costs change according to the level of output produced or depending on the scale of production carried out. This includes variable costs in farming, such as seed costs, fertilizer costs, drug costs, and labor costs that are paid based on the calculation of production volume.

A report by Rahardjo & Andajani stated that income is the net profit a person makes from their activities in agriculture (Gassner et al., 2019). Income is classified into two categories: gross income and net income (Zakirova et al., 2020). The first refers to the total amount of money a farmer makes from their activities, while the second refers to the difference between the cost of production and the gross income.

### *Gross Income*

Farm revenue refers to the amount of money a producer gains from selling their goods and services (Hocquette et al., 2018). Farming revenue includes the cost of production, the value of the sales, and the additional inventory added to the farm (Mashud et al., 2021). There are two types of farming revenues: gross income and net income. The former refers to the total income of the farming operation, while the latter refers to the difference between the total expenditure and gross income. The farm's total expenditure refers to the value of all the inputs used in the production process.

Farming operation's gross income is the business's total value during a specific period (Wan, 2004). The income generated by farming operations is affected by physical production, which is the outcome of a process that involves the production of crops during a growing season. If the resulting output increases, the farming income goes up, while it goes down if it decreases.

### *Net Income*

Ojo and Baiyegunhi (2020) state that farming income refers to a farmer's total income from all of their activities. It differs from the total cost of doing business as it reflects the difference between income and expenses. The gross income of farming is the total value of the products that were produced during a specific period. It includes all of the products that were sold, as well as those that were consumed by farming households. Some of these include seeds, fodder, payments, and safekeeping.

The farm income is affected by various factors, such as the selling price of a product and the production costs. These factors are used to determine the farm's total

income. If the prices of a product or a production factor change, the farm's income will also adjust.

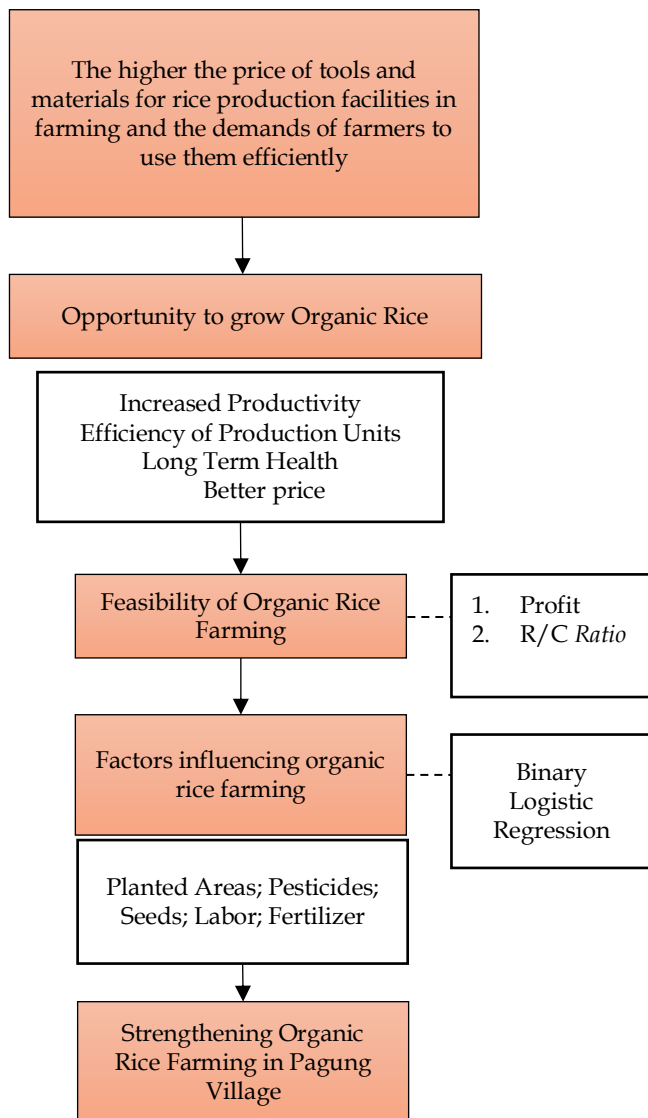


Figure 1. Flowchart of Research

*Factors that Influence Organic Rice Farming*

One of the most critical factors that contribute to the production of the farming island. This is because the amount of land that is used for farming is proportionate to its total output. Other factors that can influence the productivity of a farm include the use of different seeds and fertilizers, as well as proper labor practices. The concept of production refers to the link between various factors that affect the output of a farm (Lankoski & Thiem, 2020). Variables are included in the concept of production, which is the central idea of this research, which is based on the microeconomic theory of production. It supports the successful development of farming by ensuring that adequate raw materials are available.

In addition to the availability of raw materials, production also involves the various resources engaged

in farming. These include land, human labor, capital, and management skills. In the agricultural sector, factors of production are the expenses incurred to achieve the best possible outcome for the farming of crops. These factors are referred to as input, production sacrifice, or output. The size of the product that is obtained is determined by the factors that are involved in production.

According to Soekartawi (1994), capital and land production were the most vital factors that influenced the production of seeds, fertilizers, and medicines. Other factors, such as management skills and labor, are also important. The concept of production refers to the change in the number of inputs used in producing a given product. The relationship between the two factors is evidenced by the fact that the maximum output that can be achieved with specific inputs is often higher than the lowest cost. In production theory, the goal is to maximize profitability by using the lowest possible cost of inputs. On the other hand, the production function is a statistical measure of the relationship between the physical and the input factors.

**Result and Discussion**

Data collection on the analysis of organic rice farming in Pagung Village, Semen Sub-district, Kediri Regency took place between July and August. The survey involved approximately 23 respondents. Based on the research problem, the analysis of organic rice farming in Pagung Village, Semen Sub-district, Kediri Regency is as follows:

*Organic Rice Cultivation Technique*

One of the government's efforts in organic rice farming is the use of the System of Rice Intensification (SRI). The implementation of SRI is currently being carried out because it is environmentally friendly, using organic fertilizers and pesticides, and does not produce products that pollute the environment.

*Farmer's Profile*

The farmers who participated in this research are members of the Sekar Putih farmers' group in Pagung Village, Semen Sub-district, Kediri Regency, totaling 23 respondents. On average, the farmers are 46 years old, and they have been engaged in organic farming for about 21.5 years. They have been involved in organic farming since 2016, which means they have been practicing organic farming for approximately 6 years. The reasons for farmers joining the Sekar Putih farmers' group in Pagung Village, Semen Sub-district, Kediri Regency include long-term goals, such as the ability to produce nutritious rice products needed by future generations and food security. Short-term plans include

obtaining the latest information and ease of getting assistance.

*Fixed Costs*

Fixed costs are not influenced by the quantity of goods produced. The fixed costs in Pagung Village include expenses for equipment maintenance, field maintenance, land taxes, and contributions to the farmers' group.

**Table 1.** Table of Fixed Costs for Organic Rice Farmers in Pagung Village.

Type of cost	Cost Amount (Rp)	Percentage (%)
Ricefield	330,000	60
Tool Care	140,000	25.5
Land Tax	60,000	11
Farmer Group Fees	20,000	3.5
Total	550,000	100

*Variable Costs*

These variable costs are highly dependent on the quantity of rice to be produced, such as fertilizers, seeds, labor, and harvesting activities. The variable costs in Pagung Village, Semen Sub-district, Kediri Regency, are significantly influenced by the quantity of seeds, labor, and the usage of items like fertilizers and soil conditioners. The breakdown of variable cost usage is as Table 2.

**Table 2.** Table of Fixed Costs for Organic Rice Farmers in Pagung Village.

Type of cost	Cost Amount (Rp)	Percentage (%)
Seeds	80,000	9.6
Land Preparation	220,000	26.5
Cultivation	170,000	20.5
Planting	150,000	18
Harvest	210,000	25.4
Total	830,000	100

*Total Costs*

Total costs are the sum of fixed costs and variable costs for each organic rice planting season until harvest. The total costs for organic rice farming activities in Pagung Village, Semen Sub-district, Kediri Regency are as follows:

**Table 3.** Total Costs of Organic Rice Farmers in Pagung Village.

Fee Type	Cost Amount (Rp)	Percentage (%)
Fixed cost	550,000	40
Variable Cost	830,000	60
Total	1,380,000	100

*Revenue*

Revenue is the total income earned to determine the amount of profit obtained by calculating the total sales minus the total expenses incurred, as follows:

**Table 4.** Average Amount of Production, Selling Price per Kg, Receipt, Total Cost and Income of Organic Rice Farmers in Pagung Village

Fee Type	Cost Amount (Rp)
Production Amount	1100 Kgs
Selling price	4800
Reception	5,280,000
Total Cost	1,380,000
Income	3,900,000

*R/C Ratio of Organic Rice Farming*

The R/C (Return/Cost) Ratio analysis helps determine whether organic rice farming in Pagung Village, Semen Sub-district, Kediri Regency is considered viable or not. A value of R/C Ratio equal to 3.82 means that the value is greater than one ( $x > 1$ ), indicating that the farming endeavor is considered viable.

*Factors Affecting Organic Rice Farming In Pagung Village*

The multiple regression analysis results indicate the factors that influence organic rice farming in Pagung Village. Based on the discussion, the conditions that should be recommended to the farmers' group to enable them to carry out organic rice farming effectively are as table 5.

From the results of binary logistic regression analysis, it was found that there were 23 samples observed with an R-square value of 67%. This means that the overall model influences organic rice farming by 67%, while the remaining 33% is influenced by factors not included in the study. Additionally, three variables were found to significantly affect organic rice farming: Land Area ( $X_1$ ), Seeds ( $X_2$ ), and Fertilizers ( $X_3$ ). These variables showed significant significance with a p-value  $< 5\%$ .

**Table 5.** Binary logistic regression analysis

Variables	Coefficients	P Value
Constant	-21.292	0.000
Planted Area ( $X_1$ )	0.250	0.004*
Seed ( $X_2$ )	0.013	0.0031*
Fertilizer ( $X_3$ )	0.185	0.023*
Pesticides ( $X_4$ )	0.028	0.746
Labor ( $X_5$ )	0.040	0.672
Negelkerke R- Squares	0.67	
Observations	23	

\* = significant effect

Land Area ( $X_1$ ) had a significance value of 0.004, meaning  $0.004 < 5\%$ . The coefficient value was 0.250, indicating that land area has a significant impact on organic rice farming. For every unit increase in land area, organic rice farming increases by 0.250. The influence of land area on organic rice farming can affect various aspects of production and environmental sustainability at different scales.



Higher production of organic rice is also influenced by the larger land area used for organic rice farming, as a larger potential for higher yields is associated with larger land areas (Katayama et al., 2019). On a larger scale, farmers can employ efficient organic farming practices such as crop rotation, weed management, and the use of organic fertilizers. This can enhance production yields and the overall quality of organic rice.

**Operational Efficiency:** Larger scales of organic rice farming enable farmers to utilize more efficient agricultural tools and equipment. The use of modern agricultural technology can enhance productivity and reduce production costs, which is beneficial on a larger scale (Tian et al., 2020). Pagung Village might not have a vast land area, but its usage is considered efficient, and the processing and packaging of organic rice are carried out by the farmers themselves.

Seeds ( $X_2$ ) had a significance value of 0.023, meaning  $0.023 < 5\%$ . The coefficient value was 0.185, indicating that seeds significantly affect organic rice farming. For every unit increase in seed usage, organic rice farming increases by 0.185. High-quality seeds have the potential to produce healthier and more productive plants. Good-quality seeds usually have high viability, good germination capacity, and resistance to diseases or pests (Afzal et al., 2019). Plants grown from high-quality seeds tend to yield higher and better-quality crops. The use of locally produced organic seeds or those derived through organic farming practices supports sustainability and the preservation of natural resources. Organic seeds are usually grown without the use of synthetic chemicals, such as pesticides or chemical fertilizers, making them more environmentally friendly and contributing to a sustainable agricultural system. In Pagung Village, certified and registered seeds from the Ministry of Agriculture are used. Overall, selecting the right seeds in organic rice farming is crucial for achieving production success and maintaining environmental sustainability. Choose high-quality organic seeds that are suitable for the local environmental conditions and meet organic requirements.

Fertilizers ( $X_3$ ) had a significance value of 0.009, meaning  $0.009 < 5\%$ . The coefficient value was 0.290, indicating that fertilizers significantly affect organic rice farming. For every unit increase in fertilizer usage, organic rice farming increases by 0.290. Organic fertilizers, such as compost, green manure, and animal manure, can improve soil fertility by providing essential nutrients needed by the plants (Singh et al., 2020). Good soil fertility allows rice plants to receive sufficient nutrients, resulting in optimal growth and production. Organic fertilizers help increase organic rice harvests by providing nutrients gradually and evenly to the plants. Additionally, organic fertilizers can enhance the quality

of the rice harvest, such as improving nutrient content and enhancing the taste and aroma of organic rice.

In Pagung Village, farmers use organic fertilizers to reduce long-term production costs because they can produce their own organic fertilizers using materials available on the farm, including animal manure. One of the nutrients used is coenzymes, which are made from fermented fruits and vegetables that do not rot. Moreover, producing their own organic fertilizers reduces dependency on expensive chemical fertilizers. However, it should be noted that the use of organic fertilizers also poses some challenges. For example, human resources required for producing and applying organic fertilizers may be greater compared to easily applicable chemical fertilizers. Additionally, the use of organic fertilizers must be balanced with proper management to avoid excessive nutrient accumulation in the soil. Overall, the appropriate use of organic fertilizers can help improve the productivity and sustainability of organic rice farming while reducing negative impacts on the environment.

## Conclusion

In conclusion, the multiple regression analysis revealed important factors influencing organic rice farming in Pagung Village. The model showed an overall influence of 67% on organic rice farming, while the remaining 33% was affected by other unidentified factors. Among the variables analyzed, Land Area, Seeds, and Fertilizers were found to significantly impact organic rice farming. Increasing the land area led to a substantial increase in organic rice farming, suggesting the importance of suitable land for higher yields and environmental sustainability. Additionally, using high-quality seeds positively affected organic rice production, resulting in healthier and more productive plants. Moreover, the proper use of organic fertilizers improved soil fertility, leading to optimal growth and increased harvests of high-quality organic rice. To enhance the success and sustainability of organic rice farming in Pagung Village, focusing on these factors and employing efficient organic farming practices is crucial.

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## Author Contributions

Research Supervision, SMP; Data Processing, FM; Conceptual Research Collection, JAI, EP, and AN; Preparing the Manuscript, RAI.

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**Conflicts of Interest**

The authors declare no conflict of interest.

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