

# ANALYSIS OF THE INFLUENCE OF LAND AREA, NUMBER OF PRODUCERS, PRODUCTION COSTS ON THE INCOME OF RICE FARMERS IN TALUNOMBO VILLAGE, BATURETNO DISTRICT, WONOGIRI REGENCY

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**Article history:** received 29 May 2024; revised 21 June 2024; accepted 21 July 2024

**DOI:** <https://doi.org/10.33751/jhss.v8i2.9777>

**Abstract.** The growth rate of the agricultural sector in Wongiri Regency over the last five years has decreased due to several factors that have caused changes in farmers' income. This research aims to determine the effect of land area, production amount, production costs on farmers' income. This research uses quantitative data obtained through a survey of farmers in Talunombo Village. Testing is carried out by carrying out classical assumption tests, multiple regression tests, and hypothesis tests. The results of this research show that the variable area and farmer income have a negative relationship. There is a probability value of 0.0049 which shows that land area has an effect on rice farmers' income. The variables total product and farmer income have a positive relationship. There is a probability value of 0.0000 which can be interpreted as the total product having an effect on rice farmers' income. The variable costs and farmer income have a positive relationship. There is a probability value of 0.0002 which indicates that production costs influence the income of rice farmers. To increase farmers' income, maximum management is needed, such as providing good land and allocating appropriate production costs to increase production results.

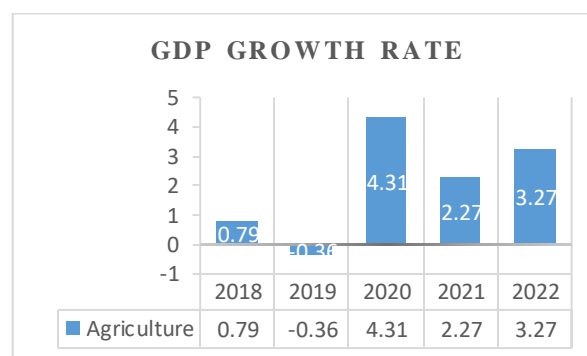
**Keywords:** income; land area; production amount; production costs

## I. INTRODUCTION

The economic development of a country is greatly influenced by its ownership of resources. Developed countries tend to be better in terms of modern technology, while developing countries are better at utilizing natural resources (Kadek, 2017). Indonesia is an agricultural country with a large agricultural sector, which really supports the country's economic growth. Agriculture plays an important role in a country's economy because it can improve the standard of living of local people. The government prioritizes the development of the agricultural sector (Sayifullah and Emmalian, 2018). The growth rate of the agricultural sector in Wongiri Regency over the last five years (2018-2022) has experienced fluctuations influenced by rainfall and climate change. In 2018, growth reached 0.79 percent, but experienced a decline in 2019 of minus 0.36 percent. 2020 recorded significant growth of 4.31 percent, but experienced a decline again in 2021 of 2.27 percent. In 2022, growth will increase again to 3.27 percent. Land is the main factor in agricultural business which has a direct impact on production. The larger the land area, the greater the production produced (Ambarita and Kartika, 2015). Mubyarto, quoted in Jerry, 2015, also stated that land as a production factor has an important contribution to farming, because production results are greatly influenced by the area of land used. An increase in production can improve the welfare of farmers, while a

decrease in production will have a negative impact on their welfare.

**Table 1.** Gross Regional Domestic Product According to Business Fields 2018 – 2022 Wonogiri Regency



Source: BPS

Baturetno District experienced a decrease in planting area from 2,946.10 hectares in 2020 to 2,803.00 hectares in 2021. This decrease was followed by a decrease in production output from 17,198 tons in 2020 to 16,969 tons in 2021. This decrease was caused by land conversion. agriculture, long droughts and pests that damage agricultural land (Source: Agriculture and Food Service, Wonogiri Regency, 2021).

Production according to (Agung, 2017) is the process of producing output using the best combination of inputs and technology. Farmers' income is influenced by the amount of production and product prices. The amount of income depends on the price and quantity of production produced, as well as the production factors used. Production costs, according to (Abdul Hakim, 2018) refer to all expenses that occur in the production process of a good or service. Production costs include all expenses required in the production process. The higher the production costs incurred by rice farmers to obtain certain production factors, the production results tend to decrease. The unavailability of production factors evenly can also prevent production from being optimal or efficient (Widnyana, 2017). Based on the research background above, the aim of the research is to determine the effect of agricultural land area, production amount and production costs on the income of rice farmers in Talunombo Village, Baturetno District, Wonogiri Regency.

## II. RESEARCH METHOD

### Types of Research

This research uses quantitative data obtained through surveys. Quantitative data according to (Makhrus, 2022) is research that uses statistical techniques or other quantification methods to produce new knowledge. The quantitative approach focuses attention on various symptoms or variables that reflect the characteristics of human life. Analysis of relationships between variables in a quantitative approach is carried out using statistical testing tools and objective theory.

### Time and Place of Research

This research was conducted on farmers in Talunombo Village, Baturetno District, Wonogiri Regency, with data collection time from December 2023 to February 2024.

### Population and Sample

Population refers to the entire group of people, events, or objects that are the focus of the researcher's attention (Sugiyono, 2015). For example, the farmer population in Talunombo Village is 492 people.

A sample is a part of a population that is considered to represent the characteristics of the entire population. Researchers use samples because of limited time, funds and energy to study the entire population (Sugiyono, 2015). In this research, samples were taken from rice farmers in Talunombo Village, Baturetno District, Wonogiri Regency. Sampling was carried out using a simple random sampling method, namely a random sampling technique where each member of the population has the same opportunity to be selected as a sample. Determination of sample size using the Slovin formula. as follows :

$$\text{Sample Formula: } n = \frac{N}{1 + Ne^2}$$

Information :

n : Sample size

N : Population (number of all rice farmers in Talunombo Village)

e : error term

$$n = \frac{492}{1 + 492 (0,01)}$$

$$n = \frac{492}{1 + 4,92}$$

$$n = \frac{492}{5,92}$$

$$n = 83 \text{ rounded to } 85$$

### Data Collection Technique

The data used in this research includes primary data and secondary data. Primary data is data collected during observations and interviews through questions in the form of questionnaires that have been prepared previously. Primary data collected is land area, production amount, production costs and farmer income. Secondary data is data obtained by searching for references, namely the Central Statistics Agency (BPS), and scientific journals as research references.

### Data Analysis Method

The data analysis technique used by researchers uses quantitative analysis. This analysis technique is obtained from the results of questionnaire answers and calculations using statistical methods. The data was analyzed using the EvIEWS 10 program. The following are the results of the research model:

$$INCOME = \alpha + AREA_1 + TP_2 + COST_3$$

Information :

Income = Income (Rp)

$\alpha$  = Constant

Area = Land Area (Ha)

Total Product = Production Amount (Quintal)

Total Cost = Production Cost

## III. RESULT AND DISCUSSION

### Factors Affecting Rice Farmers' Income

Factors influencing the income of rice farmers in Talunombo Village, Baturetno District, Wonogiri Regency were analyzed using multiple regression analysis and estimated using the Ordinal Least Squares (OLS) method. The independent variables are land area, production amount, and production costs, while the dependent variable is rice farmer income. The following factors influence the income of rice farmers:

Table 2. Model Estimation Results

INC = 0,440552 - 0,230620LA <sub>i</sub> + 0,911999TP <sub>i</sub> + 0,094056COST <sub>i</sub>			
	(0,0049)	(0,0000)	(0,0002)
R <sup>2</sup> = 0,723019 F - stat = 70,47972 Prob F - stat = 0,000000			
Classic Assumption Test			
(1) Normality Test			
Jarque Bera = 1,709140; Probability = 0,425466			
(2) Multicollinearity (VIF)			
LA = 1,797386; TP = 3,850821; COST = 2,984396			
(3) Heterokedastisitas (Glejser)			
Obs*R-squared = 1,550166; Prob.Chi-Square= 0,6707			

Source: E-Views 10 data processing results

*Classic Assumption Test**Normality Test*

The purpose of the normality test is to determine if the residuals, confounding factors, or regression model have a normal distribution. Analyzing the importance of the data allows one to draw inferences about whether or not it has a normal distribution. A significant value more than 0.05 indicates that the variable has a normal distribution; on the other hand, a significant value less than 0.05 indicates that the variable does not.

The probability value is 0.425466 and the JB (Jarque Bera) value is 1.709140 in table 2. Since the probability value in this instance is greater than 0.05, it may be concluded that the variable value is regularly distributed.

*Multicollinearity Test*

Finding out whether there is a correlation between independent variables is the goal of the multicollinearity test. A situation is referred to be multicollinearity if correlation is present. There shouldn't be any association between the independent variables and a good regression model. The value of the Variance Inflation Factor (VIF) indicates multicollinearity. If VIF is less than 10, then this study does not exhibit multicollinearity, and vice versa.

The VIF value for the area variable is 1.797386, the total product variable is 3.850821, and the cost variable is 2.984396 based on Eviews 10 data processing in table 2. Hence, the VIF value for every variable is less than 10. This demonstrates that the independent variable does not multicollinearly relate to the dependent variable.

*Heteroscedasticity Test*

The purpose of the heteroscedasticity test is to test whether there is inequality in the residual variance or other observations. Therefore, to see whether this research has symptoms of heteroscedasticity or not. So the test was carried out using the Glajser method.

Based on Eviews 10 data processing in table 2, it can be seen that the probability value of Obs\*R-squared is 0.6707. So it can be concluded that the significant value is more than 0.05 so that there is no heteroscedasticity problem.

*Multiple Regression Test*

The multiple regression test aims to determine the relationship between the independent variable and the dependent variable, namely area, total product and costs on farmer income. The results of the regression test using Eviews 10, the following results can be obtained:

$$\text{INC} = 0,440552 - 0,230620\text{LA}_i + 0,911999\text{TP}_i + 0,094056\text{COST}_i$$

The regression equation model can be explained as follows:

## a. Constant Value

The constant value of 0.440552 indicates that if the area, total product and cost are 0 then the Income value remains 0.440552.

## b. Land area

Based on the results of the regression test which shows that the variable value of area has a negative regression coefficient with a value of -0.230620, so based on the results of the regression on area area it is known that if the area

owned increases by 1%, then the income of farmers in Talunombo Village will decrease by 0.23%.

## c. Production Amount

Farmers in Talunombo Village will see an increase in income of 0.911% if the total product owned increases by 1%, according to the results of the regression test, which indicates that the total product variable value has a positive regression coefficient with a value of 0.911999.

## d. Production cost

Farmers in Talunombo Village will see an increase in income of 0.09% if costs increase by 1%, according to the results of the regression test, which indicates that the value of the cost variable has a positive regression coefficient with a value of 0.094056.

*Hypothesis Testing*a. Determination Test ( $R^2$ )

Measuring the degree to which the independent variable can explain the dependent variable is the goal of the determination test. The R-Square value yields the coefficient of determination value.

Based on the data processing results in Table 2, an R-Square value of 0.723 is derived, indicating that the data indicates that area, total product, and cost have a 72.3% influence on revenue, with other variables influencing the remaining 27.7%.

## b. Simultaneous Test (F Test)

The simultaneous influence of independent variables on the dependent variable is ascertained using the simultaneous test. A significance level of 5% (0.05) was applied in this investigation. If the significant value is less than 0.05 and the f-count is larger than the f-table, the regression model is considered significant. When f-count is less than f-table, the regression model is deemed to be not statistically significant.

Table 2 data processing findings indicate that the significant value was  $(0.000000) < 0.05$  and the f-count value was 70.47972 f-table (3.108). Thus, it can be said that the area, total product, and cost factors all concurrently have a positive and considerable impact on revenue.

## c. Partial Test (t Test)

Using a significance level of 5%, the parcel test compares the independent variables—area, total product, and cost—to the dependent variable, which is income. The t test results are as follows:

Table 3. Partial Test Results

Variables	t-statistic	t-table	Prob.
LA	-2,894526	1,988	0,0049
TP	5,494472	1,988	0,0000
Cost	3,894458	1,988	0,0002

From the partial test results in the table above, it can be concluded as follows:

1. The income of rice farmers in Talunombo Village, Baturetno District, is found to be significantly impacted

negatively by land area, as indicated by the above results, which also show that the partial test of the area variable is  $-2.894526 > t\text{-table value } 1.988$  and the significant value is  $0.005 < 0.05$ .

2. The production quantity variable has a positive and significant impact on the income of rice farmers in Talunombo Village, Baturetno District, according to the partial test results, which show  $5.494472 > t\text{-table value of } 1.988$  and a significant value of  $0.000 < 0.005$ .
3. In Talunombo Village, Baturetno District, production costs have a positive and significant impact on rice farmers' income, according to the partial test findings of the production cost variable, which show  $3.894458 > t\text{-table value of } 1.988$  and a significant value of  $0.000 < 0.005$ .

#### Research Discussion

##### 1. Effect of Land Size on Income

Based on the research results, it can be seen that the variable area and farmer income have a negative relationship. There is a probability value of 0.0049. This shows that the probability value is  $<0.05$ . So it can be concluded that land area partially influences rice farmers' income.

Rice farmers' income is negatively influenced by land area, because the majority of farmers are old so their performance in managing land is not optimal. This causes only part of the land to be managed for growing rice, resulting in unstable yields. Apart from that, pest and disease attacks on rice plants also often occur, which can result in crop failure.

The results of this research are supported by research conducted by Mery Wahyuni (2022) explaining that land area has a negative and significant effect on farmers' income. In this research, the problems of rice farmers are in the form of farming skills, narrowing of paddy fields, uncertain rice yields each harvest, uncertain rice prices, and all of this contributes to the uncertainty of income received by farmers.

##### 2. Effect of Production Amount on Farmer Income

The study's findings indicate that there is a positive correlation between the variables total product and farmer income. A probability value of 0.0000 is present. This indicates that there is less than a 0.05 chance. Thus, it may be said that the overall product has some bearing on rice farmers' revenue.

The amount of rice production in Talunombo Village, Baturetno District has a significant effect on farmers' income, so farmers are trying to increase harvest yields to optimize income. An increase in rice prices will benefit farmers by increasing income, while a decrease in rice prices will have a negative impact by reducing farmers' income.

This research is supported by Sitti Aisyah (2019) who states that the amount of production has a positive and significant effect on farmers' income. In this case, if there is an increase in the amount of production, the farmer's income will also increase.

##### 3. Effect of Production Costs on Farmer Income

Based on the research results, it can be seen that the cost and farmer income variables have a positive relationship. There is a probability value of 0.0002. This shows that the

probability value is  $<0.05$ . So it can be concluded that production costs partially influence the income of rice farmers.

Farming production costs in Talunombo Village, Baturetno District involve purchasing fertilizer, seeds, pesticides and paying farm workers. Fulfilling nutritional needs and the right dose of fertilizer affects plant health, such as greener leaves, rapid growth, and increased crop yields. Selection of the best seeds, even at a higher price, provides superior resistance to pests and diseases, which supports optimal harvest results. Routine treatment with pesticides as needed also increases plant resistance to pest attacks, preventing crop failure.

When harvest time arrives, farmers usually need additional labor to help either in the care process during planting or during harvest. purchasing other supporting goods such as planting and harvesting equipment which is considered to require quite large costs. This research shows that the production costs incurred are high so that the income received also increases.

This research is supported by Yakub Berang (2023) who states that production costs influence farmers' income. In this case, if farmers allocate their costs appropriately, production factors will increase so that income will also increase. Usually the biggest expenses are production costs, such as purchasing fertilizer, seeds and pesticides.

#### IV. CONCLUSION

Based on data analysis and discussion findings about the impact of production expenses, land area, and production volume on rice farmers' income in Talunombo Village, Baturetno District, Wonogiri Regency. Thus, a number of conclusions might be drawn. The land area variable has a substantial influence and is adversely correlated with the income of rice farmers in Talunombo Village, Baturetno District, Wonogiri Regency, according to the findings of tests that were conducted using partial tests. In Talunombo Village, Baturetno District, Wonogiri Regency, the production quantity variable has a substantial impact and is positively correlated with rice farmers' revenue. In Talunombo Village, Baturetno District, Wonogiri Regency, the production cost variable has a major impact and is positively correlated with rice producers' income.

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