



Factors Affecting the Production of Rice Farming in Polenga Village, Kecamatan Watubangga District Kolaka Regency

AUTHORS INFO

Muh. Obi Kasmin
Sembilanbelas November Kolaka University
muhammadrobby441@gmail.com
+6285363589284

Kartomo
Sembilanbelas November Kolaka University
kartomousn@gmail.com

ARTICLE INFO

ISSN: 2548-2211
Vol. 3, No. 2, December 2020
URL :
<https://www.usnsj.com/index.php/AJ/article/view/1361>

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Abstract

The productivity of rice farming is largely determined by the use of production factors such as land, seeds, fertilizers, pesticides and labor. High productivity will only be achieved when the allocation of production factors is done effectively and efficiently. This study aims to determine the effect of production factors on the production quantity of rice farming in the Polenga village, Watubangga district, Kolaka regency. The sample determination in this study was performed using the Slovin method, while the data analysis method used in this study was multiple linear regression analysis. The results showed that the production factor of land area had a significant effect on the quantity of rice farming production. Meanwhile, the production factors of the quantity of seeds, the amount of urea fertilizer, the amount of NPK fertilizer, the amount of pesticides and the quantity of workers did not have a significant effect on rice farming production in Polenga village.

Keywords: Production, factors of production, rice farming, regression

A. Background

Rice farming commodity in Southeast Sulawesi are currently showing an increase where in 2012 the area was 118,961 hectares with a production of 491,567 tons of unhulled dry milled rice, in 2013 the area sown was 124,511 hectares with a production of 516,560 tonnes of unhulled dry milled rice, and in 2014 increased where the sown area was 132,415 Ha with a production of 594,255 tonnes of unhulled dry milled rice, so that lowland rice plants are one of the food crops still a priority in development. Indeed, not only because rice is the staple food, most of the population also makes lowland rice cultivation a source of income. However, the destruction of lowland rice plants is inseparable from various problems, one of which is the problem of pests and diseases. (BPS Sulawesi Tenggara, 2014).

The increase in agricultural production, especially food crops, will become heavier in the future (Yasa dan Hadayani, 2017). This condition is caused by the increasing demand for production, especially for rice due to population growth, better advice and increasingly limited land for rice cultivation in the lowlands. To deal with the food problem, the government has always tried to promote agricultural development with various programs. Among the objectives of the program is the ability of farmers to use limited resources. In order to increase agricultural production followed by increased income, farmers are based on efforts to make optimal use of all available resources and funds through identification, extensification, rehabilitation and diversification programs. agricultural. These programs are currently the focus of government attention, including the government of Southeast Sulawesi.

The Kolaka regency is one of the areas that depend on the agricultural sector as a source of regional income. The agricultural sector currently promoted by the regional government is the subsector of food crops, especially rice. This strategy is part of the central government program which has set itself an objective of food self-sufficiency. One of the Kolaka Regency lowland rice production centers is located in Watubangga district. According to data from the Central Bureau of Statistics (BPS) in 2017, the area of lowland rice cultivation in Watubangga district was 1318 ha with an average land productivity of 4.5 tons per hectare.

Besides the role of government with its various sets of policies, the productivity of lowland rice is largely determined by the use of factors of production such as land, seeds, fertilizers, pesticides and labor. High productivity will only be achieved when the allocation of factors of production is done effectively and efficiently. The use of factors of production in lowland rice cultivation in Polenga village as one of the centers of rice production in Kolaka regency is not the same among farmers, even though the cultivated area is the same, so that the amount of output produced is also different. This study aims to determine the effect of the use of factors of production on the production of lowland rice cultivation in the village of Polenga.

B. Methodology

1. Population and sample

The population of this study was all rice farmers in the lowlands of Polenga village, or 372 people. Determination of the sample in this study using the Slovin method, in order to obtain a total sample of 78 people. The determination of the selected sample was carried out using a simple random sampling method.

2. Analisis Data

The data analysis method of this study uses the Cobb-Douglas production function model (Soekartawi, 2003) with the following equation:

$$\text{Log}Y = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + \beta_6 \log X_6 + \varepsilon \dots \dots \dots (1)$$

Keterangan:

LogY = Logaritimized of the rice farming production (kg)

LogX₁ = Logaritimized of the land area (ha)

LogX₂ = Logaritimized of the quantity of seed (kg)

LogX₃ = Logaritimized of the quantity of urea fertilizer (kg)

LogX₄ = Logaritimized of the quantity of NPK fertilizer (kg)

LogX₅ = Logaritimized of the quantity of pesticide (liter)

LogX₆ = Logaritimized of the quantity of labor (HOK)

β₀ = Intercept coefficient

β₁- β₅ = Regression coefficient

ε = Error, the other influencing factors that are not included in the model.

Criteria:

$H_0 = 0$: The independent variable has no effect on the dependent variable.

$H_1 \neq 0$: The independent variable affects the dependent variable.

The individually (partial) regression coefficient test is used to determine the effect of the partially independent variable on the dependent variable. The test method uses a two-tailed test, where $\alpha = 5\%: 2 = 2.5\% = 0.025$. If $t_{\text{calculate}} < t_{\text{table}} (\alpha = 0.05)$, then H_0 is accepted and H_1 is rejected, it means that the variable area of the land, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor have in part no significant effect on the total production variable. rice cultivation. If $t_{\text{calculate}} > t_{\text{table}} (\alpha = 0.05)$, then H_0 is rejected and H_1 is accepted, the variable land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor have in part a significant effect on rice farming production.

C. Findings and Discussion

Quantity of production produced by farmers is strongly influenced by the use of the production inputs used. The more efficient and effective the use of production inputs, the more cereal production will be maximized. In this study, the production factors believed to have an effect on the level of rice farming production at the research site were land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor. In detail, the results of the analysis of the influence of these production factors on the level of rice farming production at the study site are presented in the following table.

Table 1. Results of The Analysis of Factors Affecting Rice Farming Production in Polenga Village, Watubangga District, Kolaka Regency, 2019

Variable	Coefficient	Sig.	t calculate	Prob.
Constant	688,466	*	2,074	0,042
Land area	3236,156	*	3,962	0,000
Quantity of seed	0,489	ns	0,026	0,979
Quantity of urea fertilizer	0,704	ns	0,672	0,504
Quantity of NPK fertilizer	2,077	ns	0,623	0,535
Quantity of pesticide	-40,225	ns	-1,039	0,302
Quantity of labor	3,988	ns	0,538	0,592
R-Squared	0,895			
F calculate	100,747	*		0,000
F table	2,229			
t table	1,667			
$\alpha = 0,05$				
n = 78				

Source: Output of SPSS, 2019

Keterangan:

* = Significant 5%

ns = Non significant

The R-squared (R²) value is 0.895 or 89.5%. This shows that the percentage of the contribution of the influence of independent variables (land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor) can explain 89.5% of the variation of the dependent variable (rice farming production), while the remainder 10.5% is explained by variables not included in this study.

1. Simultaneous Significance Test (F-test)

A simultaneous significance test (F-test) was used to determine whether the independent variables (land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor) together had a significant effect on the independent variable (rice farming production). Based on the results of the analysis, the $F_{\text{calculate}}$ value was obtained as 100.747, because the $F_{\text{calculate}}$ value was greater than

F_{table} ($100.747 > 2.229$) and the probability of significance ($0.000 < 0.05$), simultaneously, the independent variable consisting of land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor have a significant effect on the dependent variable of rice farming production.

2. Partial Significance Test (*t*-test)

The partial significance test (*t*-test) is used to determine whether in the regression model the independent variables (land area, the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor) partially have a significant effect or not on the dependent variable (rice farming production).

a. Land Area

Based on the results of the data analysis, the $t_{calculate}$ of the land area was 3,962, while the value of the t_{table} was 1.667. Since the value of $t_{calculate}$ is greater than the value in t_{table} ($3962 > 1667$) and the probability of significance ($0.002 < 0.05$), partially the independent variable of land area (X_1) has a significant effect on the dependent variable of rice farming production (Y). This condition indicates that the greater the area of land used, the greater the production of rice farming that will be produced. The value of the regression coefficient of the independent variable for land area was 3236.156, indicating that the additional area of 1% in rice farming in Polenga village would increase rice farming production of 3.236.156 kilograms, assuming the other variables had a fixed value.

However, it is very difficult to expand the land area because the land area are overwhelmed by residential areas. Therefore, the increase in production can be continued through intensification, by making optimal use of existing land. It is strongly recommended to apply agricultural intensification in order to obtain more agricultural products or better quality products (Ihsan et al., 2016). Agricultural intensification can increase the Crop Index (PI), which divides the area harvested by the area of rice fields. According to Supriatna (2012), one of the efforts that can be made to increase the production of food crops, especially in rice farming, is technological innovation to increase intellectual property in irrigated and rainfed paddies.

b. Quantity of Seed

Based on the results of data analysis, the value of $t_{calculate}$ of the quantity of seeds was 0.026, while the value of t_{table} was 1.667. Since the $t_{calculate}$ value is less than the t_{table} value ($0.026 < 1.667$) and the significance probability ($0.979 > 0.05$), partially the independent variable the quantity of seeds (X_2) does not have significant effect on the dependent variable of rice farming production (Y). These conditions indicate that the higher the quantity of seeds used in rice farming, the higher the production will be. The value of the regression coefficient of the quantity of seeds variable is 0.489, indicating that a further 1% increase in the quantity of seeds in Polenga village will increase the quantity of production by 0.489 kilograms, assuming that the other variables have a fixed value (*ceteris paribus*).

c. Quantity of Urea Fertilizer

Based on the results of data analysis, the value of $t_{calculate}$ of quantity of urea fertilizer was 0.672, while the value of t_{table} was 1.667. Since the $t_{calculate}$ value is less than the t_{table} value ($0.672 < 1.667$) and the significance probability ($0.504 > 0.05$), partially, the independent variable the quantity of urea fertilizer (X_3) has no significant effect on the dependent variable of rice farming production (Y). This condition indicates that increasing the quantity of urea fertilizer used in rice farming in the study area will increase the quantity of rice farming production. The value of the regression coefficient for the quantity of urea fertilizer is 0.704, which means that adding one unit of urea fertilizer will increase the rice farming production by 0.704 kilograms, assuming other variables have a fixed value (*ceteris paribus*).

d. Quantity of NPK Fertilizer

Based on the results of the data analysis, the $t_{calculate}$ value of the NPK fertilizer was 0.623, while the t_{table} value was 1.667. Since the $t_{calculate}$ value is less than the t_{table} value ($0.623 < 1.667$) and the significance probability ($0.535 > 0.05$), in part, the independent variable the quantity of NPK fertilizer (X_4) has no significant effect on the dependent variable of rice farming production (Y). This condition indicates that increasing the quantity of NPK fertilizer used in rice farming cultivation in the study area will increase the quantity of production. The regression coefficient value for the quantity of NPK fertilizer is 2.077, which means that adding one unit of NPK fertilizer will increase rice farming production by 2.077 kilograms, assuming that a other variable should have a fixed value (*ceteris paribus*).

e. Quantity of Pesticide

Based on the results of the data analysis, the $t_{\text{calculate}}$ of pesticides was -1.039, while the t_{table} value was 1.667. Since the value of $t_{\text{calculate}}$ is less than the t_{table} value ($-1.039 < 2.093$) and the probability of significance ($0.302 > 0.05$), in part, the independent variable the quantity of pesticides (X5) has no significant effect on the dependent variable of the quantity of rice farming production (Y). This condition indicates that the quantity of pesticides used in rice farming cultivation in the study area is not optimal. The regression coefficient value for the quantity of pesticide is -40.225, which means that adding one unit of pesticide use without being followed by adding other variables will reduce the production of rice farming by 40.225 kilograms, assuming that other variable should have a fixed value (*ceteris paribus*).

f. Quantity of Labor

From the results of data analysis, the $t_{\text{calculate}}$ value of the quantity of labor was 0.538, while the t_{table} value was 1.667. Since the value of the $t_{\text{calculate}}$ is less than the value of t_{table} ($0.538 < 1.667$) and the probability of significance ($0.592 > 0.05$), in part, the independent variable the quantity of labor (X6) has no significant effect on the dependent variable of rice farming production (Y). This condition indicates that increasing the quantity of labor used in rice farming cultivation in the research area will increase the quantity of rice farming production. The value of the regression coefficient for the quantity of labor is 3,988, which means that adding the quantity of labor by one unit will increase the quantity of rice farming production by 3,988 kilograms, assuming the other variables have a fixed value (*ceteris paribus*).

D. Conclusion

The land area production factor has a significant effect on the quantity of rice farming production. Meanwhile, the production factors of the quantity of seeds, the quantity of urea fertilizer, the quantity of The NPK fertilizer, the quantity of pesticide and the quantity of labor did not have significant effect on rice farming production in Polenga Village, Watubangga District, Kolaka Regency.

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