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Kajian Faktor Produksi Usahatani Padi Sawah Dalam Upaya Peningkatan Produksi Program Nasional Food Estaste Di Kalimantan Tengah

Study Of Rice Farming Production Factors In An Effort To Increase Production For The National Food Estaste ProgramIn Central Kalimantan

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ABSTRAK. Penelitian ini bertujuan untuk menganalisis faktor-faktor produksi usahatani padi sawah dalam upaya peningkatan produksi padi pada program strategi nasional Food Estate di Kalimantan Tengah. Faktor-faktor produksi yang digunakan petani seperti lahan(X1), benih(X2), kapur(X3),pupuk(X4), pestisida(X5), tenaga kerja(X6) dan alsintan(X7), serta variabel dummy seperti sistem tanam(D1), dan pola tanam(D2) berpengaruh secara bersama-sama atau simultan terhadap hasil produksi padi sawah dilahan Food Estate Desa Belanti Siam. Dimana hasil uji Fmenunjukkan nilai Fhitung sebesar 6.373> Ftabel 1,966 dengan signifikansi 0,000<0,05. Secara parsial faktor-faktor produksi yang berpengaruh terhadap produksi padi sawah dilahanFood Estate sebanyak 4 (empat) variabel bebas dengan tingkat signifikan < 0,05 dengan tingkatkesalahan 95% yaitu lahan(X1), benih(X2), kapur(X3), pupuk(X4). Sedangkan 5 (Lima) variabel bebas lainnya dalam penelitian ini tidak berpengaruh secara parsial atau tidak signifikan terhadap hasil Produksi Padi Sawah di Lahan Food Estate Desa Belanti Siam seperti, pestisida(X5), tenaga kerja(X6), alsintan(X7), dummy sistem tanam(D1), dummy pola tanam(D2) dengan tingkat signifikan >0,05.
Kata Kunci: Production Factor, Rice, Food Estate

ABSTRAK. This study aims to analyze the production factors of paddy rice farming in an effort to increaserice production in the National Food Estate strategy program in Central Kalimantan. Production factors used by farmers such as land(X1), seeds(X2), lime(X3), fertilizer(X4), pesticides(X5), labor(X6) and alsintan(X7), as well as *dummy* variables such as plantingsystem(D1), and planting pattern(D2) affect jointly or simultaneously on the results of rice production in Belanti Siam village Food Estate land. Where the F test results show a Fcalculatevalue of 6.373> Ftable 1.966 with a significance of 0.000<0.05. Partially, the production factors that affect the production of paddy rice in *Food Estate* land are 4 (four) independent variables with a significant level of < 0.05 with an error rate of 95%, namely l and(X1), seeds (X2), time (X3), fertilizer (X4). While the other 5 (five) independent variables in this study didnot have a partial or insignificant effect on the results of rice production in Belanti Siam villagefood estate such as, pesticides (X5), l abor(X6), alsintan (X7), d ummy planting system (D1), dummy planting pattern (D2) with a significant level of >0.05.
Keyword: Faktor Produksi, Padi, Food Estate

INTRODUCTION

The agricultural sector is a sector that has an important role in contributing to Indonesia's economic structure. Where theagricultural sector is the second largestcontributor to Gross Domestic Product (GDP), which acts as a driver of national economic growth (Central Statistics Agency,2021). Agriculture is the activity of utilizing biological resources to produce food,industrial raw materials and to manage the environment. So that agricultural development becomes one of the main priorities in Indonesia.

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Through BPS data (2021), it is also noted that the agriculture, forestry and fisheries sectors contribute 13.28% to the Indonesian economy. The largest contribution from the agricultural sector is mostly contributed by the food crops subsector amounting to 2.60% of GDP. Food plants are plants that produce many important nutrients for the body, which contain carbohydrates and protein as human resources. These food plants produce food tomeet human needs.

The World *Food and Agriculture Organization* (FAO) (2020), predicts that theworld, including Indonesia, will face a foodcrisis as a result of the impact of *Covid-19* which is spreading throughout the world. Theissue of the food crisis is a national strategic issue in the world today, where there has been an imbalance between the increase in population and the availability of food, whilethe need for food has increased sharply. Apart from impact The *Covid-19* pandemic predicted food

crisis is also accompanied by the problem of climate change and the transition of agricultural land to residential land (Pantaugambut.id, 2021). For this reason, in responding to this matter, it is necessary to take concrete actions to maintain the food needs of the people of a country in order to achieve food security.

As an agricultural country, Indonesia is a country that always tries to meet its food needs. Responding to the report from FAO, the Indonesian government took immediate action by issuing a decision contained in Presidential Regulation No. 109/2020 concerning accelerating the implementation of the National *Food Estate Strategy Program* to deal with the food crisis (Pantaugambut.id, 2022). *Food Estate* is a wide-scale food development program carried out in an integrated manner covering agriculture, plantations and animal husbandry in an area (Lasminingrat, 2020). The aim of this program is to build a food production center area through upstream-downstream integration based on precision agriculture, farmer corporations, and ecosystem conservation to create community prosperityand increase national food reserves. This program is implemented in several provinces, including Sumatra, East Nusa Tenggara and Central Kalimantan.

Central Kalimantan was chosen as aplace to develop *a Food Estate* to achieve national food security. Central Kalimantan isthe location for this *Food Estate program* based on Minister of Environment and Forestry Regulation No. 24/2020 concerningthe Provision of Forest Areas for *Food Estatedevelopment*, which was later changed to Minister of Environment and Forestry Regulation No. 7/2021 concerning Forestry Planning, changes in the designation of forest areas, and use of the area forest. Based on Minister of Environment and Forestry Regulation No 7/2021 article 485 concerningForestry planning, changes in the designation of forest areas and changes in the function offorest areas and use of forest areas.

Central Kalimantan is an ex-PLG area which is dominated by peat. The locations for implementing this program in Central Kalimantan are located in Kapuas Regency and Pulang Pisau Regency as places for *Food Estate development* (Lasminingrat, 2020). The main commodity for developing the *Food Estate program* in Central Kalimantan, especially in Kapuas and Pulang Pisau Regencies, is rice. Rice is a grass plant whichis one of the identical food producing ingredients in Indonesia. Rice is one of the three food ingredients for rice producers. In Indonesia, rice is one of the staple foods (Lasminingrat, 2020). In order to meet food needs, especially rice, it is necessary to increase rice production so that rice food needs can be met, so that national food security is maintained. Data from the Central Statistics Agency(2021), rice production during the 2021 period was around 54.42 million tons of dry milled grain (GKG), or experienced a decrease of 233.91 thousand tons or around 0.43% compared to 2020. Looking in more detail, the decrease The highest rice production occurred in May 2021, which was around 2.27 million tons lower compared to May 2020. This decrease in production occurred due to a shift in the peak harvest from April 2020 to March 2021.

RESEARCH METHODS

To analyze the data in this research, descriptive and quantitative analysis will be used. Meanwhile, in processing the collecteddata it will be edited and processed in tabulated form for analysis. Data processing was carried out electronically using software using the *SPSS (Statistical Package for the Social Sciences) program* and using *Frontier* 4.1 Software. So the data analysis method in research is to answer the research objectives, using the production function Cobb-Douglas, where this function or equation involves two or more independent variables and a dependent variable. The independent variables in this study are land (X_1), seeds (X_2), lime (X_3), fertilizer (X_4), pesticides (X_5), labor (X_6) and a plant (X_7), aswell as *dummy* variables such as planting system (D_1), and planting pattern (D_2). This quantitative variable will be analyzed to findout what production factors influence lowland rice production, whether they have a positive and significant influence on production. Based on previous research, it is stated that land, fertilizer, pesticides and laborhave a positive and significant effect on rice production, and the quantitative variable of machine tools will be analyzed on the grounds that this program uses a lot of modern agricultural technology in helpingfarmers manage their farming, so what is therole of technology? used whether it has a positive or significant effect on lowland rice production. *Dummy* variables are used to explain qualitative variables into quantitativevariables, so you can see whether they have apositive and significant effect on production or not. Meanwhile, the dependent variable is paddy rice production (Y). For this reason, mathematically the Cobb-Douglas production function is written as follows:

$$Y = a\, X^{b1}\, X^{b2} \ldots, X^{bi} \ldots, X^{\beta neu}$$

1 2 i n

To make it easier to estimate, the Cobb-Douglass production function can be converted into a double natural logarithm form, with the following multiple linearregression form:

$$LnY = Lna + b1\ LnX1 + b2\ LnX2 + b3\ LnX3 + b4\ LnX4 + b5\ LnX5 + b6\ LnX6 + bD1 + b2\ D2 + e$$

Information :

$b0$: Intercept/constant

$b0\ .\ .\ b6$: Coefficient of regression direction for each independent variable

Y : Lowland Rice Production on Food Estate land (Kg/ha)

X_1 : Land (Ha)

X_2 : Number of Seeds (Kg)

X_3 : Lime (Kg)

X_4 : Fertilizer (Kg)

X_5 : Pesticide (L)

X_6 : Labor (HOK)

X_7 : Machinery (Unit)

D_2 : Cropping System Dummy Variable

D = 1, Jajar legowo

D = 0, plant seeds directly

D3 : Plant Pattern Dummy Variable

D = 1, MonocultureD = 0,

Polyculture $d1$, $d2$, $d3$:

Dummy coefficients

After that, to examine whether the production factors used have a joint effect onrice production, an F test will be carried out (f-Test). Meanwhile, to determine theinfluence of each production factor on farming, a regression coefficient significance test will be carried out using the t test. To seehow much the dependent variable contributesto the independent variable, the Coefficient of Determination (R^2) test is carried.

Classic assumption test

a. Multicollinearity Test

This multicollinearity test aims to see whether in the regression model a correlation is found between the independent variables. Usually a good regression model if there is nocorrelation between independent variables means it is free from multicollinearity problems. To see whether there is multicollinearity in the regression model, youcan see the following:

a) R^2 value

b) Multicollinearity can be seen from a tolerance value that is smaller than 0.1 or equal to *Variance inflation factor (VIF)* value greater than 10.

b. Autocorrelation Test

This test aims to test whether there is a relationship between the residuals from one observation and other observations.

RESULTS AND DISCUSSION

A. Classic Assumption Test1

Normality test

The Normality Test is carried out to see whether the regression model is normally distributed. Model A good regression is amodel that has a normal data distribution. Theresults of the normality test on the regressionmodel can be seen in the P-Plot graph in Figure 1.

Table 1. Kolmogorov-Smirnov Test

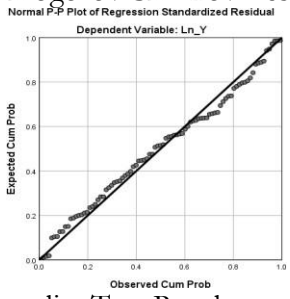

Figure 1 . Normality Test Results
Source : SPSS Processing Results (2023)

Figure 1 shows the results of the normality test on the regression model using the PP Plot table. Based on the test results, it shows that the points follow the diagonal lineand spread along the histogram graph. For this reason, based on the test, this research model has a normal distribution. To find out more precisely whether the data is normally distributed, it will also be seen through astatistical test using Kolmogorov Smirnov.

The results of the normality test using the Kolmogorov Smirnov test can be seen in Table 1:

One-Sample Kolmogorov-Smirnov Test			
	Statistics	df	Sig.
Unstandardized Residuals	,069	89	,200

a. Test distribution is Normal

b. Lilliefors Significance Correction
c. This is a Lower bound of the true significance

Significant or Partial Test (t Test)

To find out what factors have an individual or partial influence on the independent variables land (X_1), seeds (X_2) Table 7. Parsian t test results l chalk(X_3), fertilizer(X_4), pesticide(X_5), labor(X_6) and machinery (X_7), as well as *dummy* variables such as planting system (D_1), and planting pattern (D_2) on the results of lowlandrice production on *food estate land* , a partialsignificance test will be carried out via the t test.

Determining partial variables can be done in two ways, namely by looking at the significance value (Sig.) and by comparing tcount with ttable. In this study, to see the influence of the independent variables partially, it will be seen with a significance value of 0.05 (5%) at an error rate of 95%. The results of the t test analysis show that theindependent variables that have an influence can be seen in Table 7

Coefficients [a]

Model	Unstandardized Coefficienta B	Standardized Coefficients Std. Error	Beta	t	Sig.
1 (Constant)	5,511	,980		5,622	,000
Wide Land	.118	,053	,240	2,227 **	,029
Amount Seed	,206	,092	,223	2,241 **	.028
Chalk	,158	,060	,270	2,635 **	,010
Fertilizer	,155	,066	,219	2,349 **	.021
Pesticide	-.080	,096	-.080	-.836	,406
Power Work	,069	,079	,079	,877	,383
Machinery	,100	,500	.018	,201	,841
System plant	,051	,069	,070	,739	,462
Pattern plant	-.037	,080	-.043	-.461	,646

a. Dependent Variable : Rice Production Results

Note: ***: Significant at α = 1%
** : Significant at α = 5%
* : Significant at α = 10%
ns: Non-significant.

Table 7 shows the independent variables that partially influence the results of lowland rice production in the Belanti Siam village food estate, using a significance of 0.05 (α = 5%) or an error rate of 95%. Based on individual or partial significance tests, of the 9 (nine) independent variables hypothesized, namely land (X1), seeds (X2), lime (X3), fertilizer (X4), pesticides (X5), energy work (X6) and alsintan (X7), as well as *dummy* variables such as planting system (D1), and planting pattern (D2) on the dependent variable, namely lowland rice production on the *Food Estate land* (Y). So we obtained 4 (four) independent variables that had a significant or partial influence, including land (X1), number of seeds (X2), lime (X3), fertilizer (X4), with a significant value of <0.05. Meanwhile, the other 5 (five)independent variables do not have a significant effect on the dependent variable t.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the results of the analysis and iscussion of rice production factors that influence the results of lowland rice production in the Desa Belanti Siam *food estate*, it can be concluded as follows:

1. Paddy rice farming on the *Food Estate land in*

Belanti Siam Village is cultivated on peat swamp land with tidal rice fields. Planting period is a year or with IP 200. Carried out in October-March and April- September. The management of lowland rice farming starts from processing to post-harvest. Rice farming in *the Food Estate* ofBelanti Siam village is classified as mechanized, with the use of modern agricultural technologies such as hand tractors, electric sprayers, combaine harvesters. The land is generally owned byyourself, with a potential land area of 2 hectares. The varieties used in farming are new superior varieties (VUB).

2. Inbred and hybrid varieties. The planting system used is a direct seed planting system and a transplanting system using row legowo. The crop pattern used is the rice monoculture pattern. The results of rice production are sold in the form of milled dry grain which is sold at an average price of IDR 6,000- 6,200/Kg.
3. Production factors used by farmers such asland (X), seeds (X_2), lime (X_3), fertilizer (X_4), pesticides (X_5), labor (X_6) and agricultural machinery (X_7), as well as *dummy* variables such as planting system (D_1), and planting pattern (D_2) have a joint or simultaneous effect on lowland rice production results in *the Food Estate land* in Belanti Siam village. Where the F test results show an F count value of 6,373> Ftable 1.966 with a significance of 0.000 < 0.05. Partially, there are 4independent variables with a significant level of <0.05 with an error rate of 95%, namely Land (X_1), Seed (X_2), Lime (X_3), partial production factors that influence lowland rice production on *Food Estate land*. Fertilizer(X_4). Meanwhile, the other 5 (five) independent variables in this study did not have a partial or significant effect on the results of paddy production in the *Food Estate Land in* Belanti Siam village, such as, pesticides (X_5), labor(X_6), agricultural machinery (X_7), *Dummy* cropping system (D_1), Dummy cropping pattern (D_2) with a signifi cance level of >0.05.
4. Farmers who cultivate lowland rice farming on *Food Estate land* are classified as technically efficient in usingproduction factors with *a cut-off value* >0.70, that the average productivity achieved is around 96.5% of the frontier. Individually, only 88 farmers are classified as technically efficient in the use of production factors. Riceproduction results in Pulang Pisau Regency in 2022 are 61,307 smaller thanin 2021. Likewise, in Pandih Batu sub- district, rice production results in 2022 are smaller than in 2022. Factors that influence the effect of inefficiency are the length of education and age of the farmer. Meanwhile, the inefficiency effect of farming experience does not guarantee that inefficiency can be reduced.

Suggestion

1. There needs to be a policy to increase subsidies for lime and fertilizer to farmers,as production inputs in managing lowland rice farming so that they can secure the amount of lime and fertilizer needed duringproduction. There is a need to review the use of technology that is suitable for use on land in Belanti Siam Village, so that machine tools can be used optimally.
2. There is a need for the role of field agricultural instructors to be able to encourage and train farmers technically in using it machine tools so possible Farmer to improve aspects of cultivation,especially the process of maintaining paddy fields. Farmers must be able to maintain the level of technical efficiency in using all existing production factors optimally. So that it can increase paddy rice production to the maximum.

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