

## **Level of efficiency in using rice production inputs in Rainfed Land, Ulak Jeremun Village, Ogan Komering Ilir Regency**

*Tingkat efisiensi penggunaan input produksi beras di lahan tadah hujan Desa Ulak Jeremun Kabupaten Ogan Komering Ilir*

**Muhammad Yamin<sup>1\*</sup>, Siti Ramadani Andelia<sup>2</sup>, Meitry Firdha Tafarini<sup>2</sup>**

<sup>1</sup>Agribusiness Study Program, Department of Agricultural Socioeconomics, Faculty of Agriculture, Universitas Sriwijaya, Jl. Raya Palembang-Prabumulih, Indralaya 30662, South Sumatra, Indonesia

<sup>2</sup>Agribusiness Study Program, Faculty of Agriculture, IBA University, Jl. Mayor Ruslan, 8 Ilir, Palembang City 30164, South Sumatra, Indonesia

<sup>\*</sup>Corresponding author: [yamin@unsri.ac.id](mailto:yamin@unsri.ac.id). Tel.: +62-813-6896-9633

(Received: 23 January 2024, Revision accepted: 25 March 2024)

**Citation:** Yamin, M., Andelia, S. R., & Tafarini, M. F. (2024). Level of efficiency in using rice production inputs in Rainfed Land, Ulak Jeremun Village, Ogan Komering Ilir Regency. *Jurnal Lahan Suboptimal : Journal of Suboptimal Lands*. 13 (1): 61-72. <https://doi.org/10.36706/JLSO.13.1.2024.672>.

### **ABSTRAK**

Produktivitas padi yang tinggi dipengaruhi oleh input produksi yang optimal. Upaya optimalisasi hasil produksi padi antara lain dengan mengkaji efektivitas faktor-faktor yang mempengaruhi produktivitas padi. Penelitian ini bermanfaat untuk memberikan tingkat penggunaan input yang efektif dan efisien sehingga tercipta efisiensi input dalam usahatani padi. Penelitian ini bertujuan untuk menganalisis faktor-faktor yang mempengaruhi produktivitas padi, menganalisis efisiensi penggunaan input produksi pada usahatani padi, dan menghitung pendapatan usahatani padi. Penelitian ini dilakukan di Desa Ulak Jeremun, Kecamatan SP Padang, Kabupaten Ogan Komering Ilir. Pemilihan lokasi dilakukan secara sengaja karena berkurangnya luas tanam di Desa Ulak Jeremun dikarenakan banjir. Pengumpulan data dilakukan pada bulan Agustus sampai dengan September 2023. Metode penelitian yang digunakan adalah Metode Survei. Metode pengambilan sampel yang digunakan adalah metode *simple random sampling* dengan jumlah responden sebanyak 60 orang petani. Data yang digunakan dalam penelitian ini terdiri dari data primer dan data sekunder. Hasil penelitian menunjukkan bahwa (1) Faktor yang mempunyai pengaruh signifikan terhadap produktivitas padi di Desa Ulak Jeremun adalah luas lahan, pupuk urea, dan pupuk TSP. Sedangkan yang tidak mempunyai pengaruh signifikan adalah dosis phonska, pestisida, herbisida, fungisida, dan jumlah pekerja. (2) Efisiensi input produksi ditinjau dari harga dosis penggunaan benih dan jumlah pekerja adalah efisien. Sebaliknya, dosis yang digunakan untuk pupuk, insektisida, dan pestisida bisa lebih efisien. (3) Pendapatan usahatani padi sawah di Desa Ulak Jeremun sebesar Rp 6.940.251 per hektar per tahun. Pendapatan yang relatif kecil karena lahan petani tergenang air, sehingga banyak gulma penyebab hama di sawah yang sulit dikendalikan oleh petani.

Kata kunci: efisiensi pemasaran, pengaruh produktivitas, pendapatan petani padi

### **ABSTRACT**

High productivity was influenced by optimum production input. Efforts to optimize rice production results include examining the effectiveness of factors that influence rice productivity. This research was useful for providing levels of effective and efficient use of inputs to create efficient use of inputs in rice farming. The research aimed to analyze factors that influence rice productivity, analyze the efficiency of using production inputs in rice farming, and calculate rice farming income. This research was conducted in Ulak Jeremun Village, SP Padang District, Ogan Komering Ilir Regency. The location selection was carried out purposively or deliberately due to the reduction in planting area.

Data collection was carried out from August to September 2023. The research method used in this research was the Survey Method. The sampling method used was a simple random sampling method with a total of 60 farmers as respondents. The data used in this research consists of primary data and secondary data. The results of the research show that (1) Factors that have a significant influence on rice productivity in Ulak Jeremun Village are land area, urea fertilizer, and TSP fertilizer. In contrast, those that do not have a significant influence are the dosage of phonska, pesticides, herbicides, fungicides, and the number of workers. (2) The efficiency of production inputs in terms of price for the dose used for seeds and the number of workers was efficient. In contrast, the dose used for fertilizers, insecticides, and pesticides could be more efficient. (3) Rice farming income in Ulak Jeremun Village was IDR 6,940,251 per hectare per year. Income was relatively small because farmers' land was flooded, so many weeds, which cause pests in the fields, were difficult for farmers to control.

---

Keywords: marketing efficiency, influences productivity, rice farmer income

## INTRODUCTION

Agriculture is an economic sector that has an important role in Indonesia. The agricultural sector is very strategic as the basis of the people's economy in rural areas, controlling the livelihoods of some of the Indonesian population, absorbing labor, and contributing 14.44% of the national Gross Domestic Product (GDP). (Abidin & Prasetyani, 2021; Anita et al., 2023; Badibanga & Ulimwengu, 2020). The agricultural sector also plays a major role in providing food to achieve food security, economic, social, political, and national security, and providing raw materials needed by a country (Be, 2022; Devaux et al., 2018). The need for agricultural products is increasing along with the increase in population, and this sector is also a source of employment and income for the majority of the population of developing countries such as Indonesia. An important food crop that is widely cultivated by farming households in Indonesia is rice as a rice producer. We strive to ensure sufficient availability of rice throughout the year because the Indonesian population makes rice a staple food. Ninety-five percent of the Indonesian population consumes this food (Rautaray et al., 2017; Sorokhaibam et al., 2017). In Indonesia, rice is a very important commodity because apart from being a staple food, the condition of rice can indirectly affect other consumption materials.

Rainfed rice fields in the Ogan Komering Ilir (OKI) Regency have an area of 9,397 hectares and have the potential to optimize their yields (Utami et al., 2023). (Randika et al., 2022) states that agricultural land is a determinant of the

influence of agricultural commodities. The area of rice production land in Ulak Jeremun Village, Ogan Komering Ilir Regency, in 2019 was 20,126 ha and was included in the criteria of being quite large but having many obstacles, such as flooded rice fields. Farmers in Ogan Komering Ilir Regency generally have quite extensive land holdings with an average holding of more than one hectare. Increases and decreases in production can occur due to changes in the use of production factors. (Atiyatna et al., 2016) States that agricultural products are produced from a combination of production factors of land, labor, and capital (fertilizer, seeds, and medicines). In farming technology, the use of production factors plays a very important role because inaccurate use of the number and combination of production factors results in low production or high production costs. Low production and high production costs will result in low farmer income. Due to farmers' limited knowledge of farming concepts, there are still many farmers who do not understand how production factors are used efficiently.

Lowland rice productivity has decreased, whereas in 2020, productivity has decreased. The decline in lowland rice production is due to flooding and weeds that cannot be overcome. The increasing trend of intensification efforts through organic fertilization due to land degradation is facing various challenges. The importance of the rice commodity is so important that the researchers tried to examine the production factors that influence rice production, the use of production factors allocated by rice farmers in achieving economic efficiency, and the

conditions of the scale of lowland rice farming in Ulak Jeremun Village. Good production inputs influence good productivity; the point is to produce rice production using efficient inputs. One effort that can be made to optimize rice production results is to look at the efficiency of the factors that influence rice production activities. So that later, we can see whether the use of production inputs can be said to be efficient or not (Gapatutugan et al., 2019; Kintamani & Bangli, 2019).

Production efficiency should be important for farmers to pay attention to (Retnowati et al., 2018). With efficiency, farmers can use production inputs by regulations to obtain optimal production. If the results of using these inputs are inefficient, it means that one of the production factors cannot produce maximum production output. Based on the descriptions above, the research objectives are (1) Analyzing factors that influence rice productivity, (2) Analyzing the efficiency of using production inputs in rice farming, and (3) Calculating rice farming income. The study aimed to analyze factors that influence rice productivity, analyze the efficiency of using production inputs in rice farming, and calculate rice farming income

## MATERIALS AND METHODS

To answer the objectives and test the first hypothesis, namely, it was suspected that the factors that influence rice productivity were the area of land owned, the dosage of urea fertilizer, TSP fertilizer, NPK fertilizer, herbicides, pesticide insecticides and the number of workers which have a positive effect using the function analysis test—cobb-Douglas production. The first preparation was collecting data. Then, after the data has been collected, analysis was carried out. The Cobb-Douglas function was used to determine the effect of using production factors or inputs on the amount of production produced. The factors that influence rice productivity in Ulak Jeremun Village were processed using Multiple Linear Regression analysis with the help of the SPSS application. Multiple Linear Regression was used to see the influence of the independent variable on the dependent variable. In Multiple Linear Regression, it involves more

than one independent variable. Before that, it was also necessary to test the Multiple Linear Regression model in this research to see whether it meets the classical assumption requirements or not. Tests of the classical assumption requirements that will be carried out include normality tests, multicollinearity tests, heteroscedasticity tests, and autocorrelation tests. To make it easier to estimate the parameters of the production function, the function was transferred to logarithmic form, and then the parameters were determined using the Ordinary Least Square (OLS) method or the least squares method (Fahad et al., 2020; Raihan, 2023; Raihan et al., 2023). The equation function was as followed.

$$\ln Y = \ln b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 + b_8 \ln X_8$$

Information:

$b_0$  = Intercept

$b_i$  = Regression coefficient estimating the  $i$ th variable

$Y$  = Rice productivity (kg/ha)

$X_1$  = area of land ownership (ha)

$X_2$  = Dosage of Urea Fertilizer Use (kg/ha)

$X_3$  = Dosage of TSP Fertilizer Use (kg/ha)

$X_4$  = Dose of NPK Fertilizer Use (kg/ha)

$X_5$  = Herbicide Usage Dosage (liter/ha)

$X_6$  = Pesticide Use Dosage (liter/ha)

$X_7$  = Dose of Fungicide Use (liter/ha)

$X_8$  = Number of Workers (HOK)

Then, to test the multiple linear regression model used in this research, three test criteria were used, namely economic criteria, statistical criteria, and econometric criteria. The first step was to test using economic criteria first. Economic criteria could be seen and known through the signs and estimated values of parameters obtained through SPSS processing, namely the unstandardized beta coefficient figures (Abdul Awal et al., 2019).

Then, the data was tested using statistical criteria. This criterion was determined by statistical theory, including the standard error of the estimate and the square of the correlation coefficient, which was called the coefficient of determination of sample data, which  $R^2$  denotes. This coefficient shows the percentage of variation in variable  $x$  that explains variable  $y$ . This  $R^2$

value has a range between 0 to 1 or ( $0 < R^2 < 1$ ). The higher the  $R^2$  (closer to 1), the better the regression model created, meaning that the regression model could explain the diversity of the dependent variable and vice versa. Then, the F test was carried out to see whether or not the influence of the independent variables on the dependent variable was real or not. the same (simultaneous) (Shi & Conrad, 2009a, 2009b). This test was seen through the significance value of the F test, with statistical hypotheses.

H0 :  $\mu_1 = \mu_2$

H1 :  $\mu_1 \neq \mu_2$

$\alpha = 0.05$

The decision rule namely as follows:

- a. If the significance level was  $> 0.05$ , then accept H0, meaning that input of seeds, urea fertilizer, TSP fertilizer, NPK fertilizer, labor, and pesticides does not affect rice productivity.
- b. If the significance level was  $\leq 0.05$ , then reject H0, meaning that input of seeds, urea fertilizer, TSP fertilizer, NPK fertilizer, labor, and pesticides affect rice productivity.

Then, finally, the data was tested using econometric criteria. This criterion was determined by econometric theory (Chandio et al., 2020). Testing with this criterion was used to see whether the estimate meets the required requirements. If the assumptions applied to estimate the parameters were not met, then the estimates were considered invalid. For this reason, a classical assumption test was carried out to provide certainty that the regression equation obtained meets the requirements so that the data has accurate estimates, was consistent, and was not biased. For this reason, classical assumption tests were carried out, which included normality tests, multicollinearity tests, heteroscedasticity tests, and autocorrelation tests. Only then could the data be interpreted.

To answer the objectives and test the second hypothesis, namely, it was suspected that the production inputs used by farmers in Ulak Jeremun Village were already classified as efficient, using the t-table formula with the SPSS 25 analysis tool (Lukman et al., 2019; Rachmasari Ariani, 2021; Tetik et al., 2019).

Analyzing whether they were price efficient using the efficiency formula and a comparison between t-count and t-table. Where the marginal product value (NPM) was the product of the marginal product and the unit price. The final step was to find out the income of rice farmers from rice farming in Ulak Jeremun Village using a formula.

$TR = P_y \cdot Y$

Information:

TR = Revenue (IDR/Ha/Year)

$P_y$  = Price of production (IDR/kg)

Y = Amount of production obtained from farming (kg)

The income formula was as followed:

$P_d = TR - TC$

Note:

$P_d$  = Income (IDR /Ha/Year)

TR = Total Revenue (IDR /Ha/Year)

TC = Total Cost (IDR /Ha/Year)

## RESULTS AND DISCUSSION

The classical assumption test was needed when we analyze regression with OLS because classical assumptions were the conditions that must be met in the OLS linear regression model for the model to be valid as an estimator. The following were the results of testing using SPSS.

Regression Equation Model for Factors that Influence Productivity form Table 1. The Model of Regression Equation could be written as follows:

$Y = -59,4 - 0.1 \text{Log LA} + 0.37 \text{Log U} + 0.45 \text{Log TSP} + 0.22 \text{Log NPK} - 0.003 \text{Log HE} - 0.05 \text{Log IN} - 0.12 \text{Log FU}$

Based on the summary of the regression results presented in Table 1. or the estimated regression equation, economically these two estimated equations were satisfactory as could be seen from the magnitude of all the estimated parameter values which were close to the value of one, which refers to the elastic criteria, namely if it was smaller than one it was said to be no elastic, whereas if it was greater than one it was called elastic.

Table 1. Multiple linear regression test results factors that influence productivity

Coefficients		Standardized				Collinearity Statistics	
Model	Unstandardized Coefficients		Coefficients	t	Sig.	Tolerance	VIF
	B	Std. Error	Beta				
1	(Constant)	-59,441	2,396,852		-.025	,981	
	Land area	-447,069	452,047	-.141	,989	,044	2,470
	Urea	32,547	13,987	,378	2,327	,040	3,218
	TSP	58,247	26,176	,456	2,225	,048	5,127
	NPK	624,413	613,805	,229	1,017	,331	6,211
	Herbicide	6,871	401,831	,003	,017	,987	3,472
	Insecticide	-138,938	390,544	-.051	-.356	,729	2,527
	Fungicide	-374,237	374,995	-.120	-.998	,340	1,759
	Total human resources	1,481	24,888	,009	,060	,954	2,684

a. Dependent Variable: Productivity

### Results of the T Test Regarding Production Input

The results of the research based on the table 1. were that the factors that have a significant influence on rice productivity in Ulak Jeremun Village were land area, urea fertilizer, and TSP fertilizer. In contrast, those that do not have a significant influence were the dosage of phonska, pesticides, herbicides, fungicides, and the number of workers. seen from the sig value which was less than 0.05 or sig <0.05

### General Condition of Rice Farming in Ulak Jeremun Village

The rice planting index in Ulak Jeremun Village was IP 100, with planting carried out during one planting season a year. On average, farmers come from indigenous populations and other districts in South Sumatra and some from the island of Java. The stages of rice cultivation in Ulak Jeremun Village were almost the same as the stages of rice cultivation in general, starting from seed and land preparation, planting, fertilizing, weeding, controlling pests and plant diseases, and harvesting. Seeds area determining factor in the success of plant cultivation. Using quality or certified seeds could reduce the risk of farming failure. In rice farming in Ulak Jeremun Village, many farmers use local seeds, and some use superior and certified rice seeds. The type of rice seed used was Pioneer 32 brand rice seed with a price range of IDR 100,000 per kg. The amount of rice seeds used for cultivation by farmers was usually between 15-20 kg per ha.

Before carrying out the process of planting rice plants, it was necessary to prepare the land first. Land preparation begins with systemic spraying of herbicide to clear weeds. The planting system used by farmers could be done directly. The labor required for manual planting, namely one hectare, requires around 12 workers, with a division of tasks, namely six people making holes and six planters at the same time covering the ground. With an estimate of the time required, it could be around 8 hours per working day. Fertilization was usually carried out in two stages or three stages in one planting period. The first fertilization uses more types of fertilizer compared to the second and third fertilization, usually using SP 36, Urea, and NPK Phonska. The second and third fertilization uses two types of fertilizer, namely Urea and NPK Phonska. Some methods of fertilization also use tools and manuals, using tools that were usually made by farmers themselves using used tanks that have been modified. In contrast, manuals were sown directly by hand. Farmers in Ulak Jeremun Village carry out the weeding stage by spraying twice during the planting period. The first weeding was done on the 12th day after planting, while the second weeding was done on the 30-40th day after planting.

The herbicide dose used for weeding was 1 liter per ha in one spraying. The brand of herbicide used was Kayabas. Herbicides were applied using a sprayer in the form of a hand sprayer. Controlling pests and plant diseases was necessary so that rice plants were always in good condition. The types of pests and diseases on rice

fields in Ulak Jeremun Village were armyworm pests and fungal diseases (blast). Control of pests and plant diseases uses pesticides at an average dose of 1.2 liters per ha. The use of pesticides was usually done on the 25th to 40th day after planting. Rice harvesting was done when the rice was around 105 - 120 days after planting.

### Factors Affecting Rice Productivity

The following was a description of the evaluation of the alleged equation.

### Evaluation of Conjectural Equations

The estimated results of factors influencing rice productivity were presented in Table 1. There were three criteria used, namely economic criteria, statistical criteria, and econometric criteria. Then, the results of the estimated factors that influence rice productivity were presented in the form of an equation expressed in the Cobb-Douglas function. An explanation of each criterion after evaluating the results of whether there was a problem or not was as followed.

### Economic Criteria

Economic criteria were determined by the principles of economic theory, in which the sign and magnitude of the estimated parameter values could be seen. If the sign and magnitude of the estimated parameter values do not match economic criteria, then it must be explained why this phenomenon occurs. These alleged parameters may be accepted if there were strong reasons to state that, in this case, the economic principles do not apply. The sign and magnitude of the estimated parameter values in this study could be seen in the table.

Economically, the regression equation in this study was good. This could be seen from the results of the signs and magnitudes of the estimated parameter values for all production inputs showing positive values, and the estimated parameter values were also good because the average elasticity value was small. Judging from this suitability, it could be concluded that the equations in this research meet economic criteria.

### Statistical Criteria

The statistical criteria were seen from the R Square value, as well as the significance of the F-

test and T-test. Statistically, the expected equation in this study is good. This could be seen from the large R Square value, namely 0.864. This value shows that 86.4 percent of variable x could explain variable y. Then, the remaining 13.6 percent was explained by other variables outside the research.

Furthermore, it could be seen from the results of the significant value of the F test, namely 0.025. Through the decision rule, namely, if the significant value was  $< 0.05$ , it means that variable x together has a significant effect on variable y. The significant value was  $0.025 < 0.05$ , meaning. The variables collectively or specifically, namely the area of land owned by farmers, the dose used for urea fertilizer, and the dose used for TSP fertilizer, have a significant effect. In contrast, those that do not have a significant effect were the variables for the dose used for seeds, the number of workers, and the dose used for pesticides.

### Econometric Criteria

Econometric criteria were determined by testing classical assumptions. The classical assumption test was the condition that must be met in a multiple linear regression model for the model to be valid as an estimation tool. This test consists of a normality test, multicollinearity test, autocorrelation test, and heteroscedasticity test. The first stage of the classic assumption test series was carrying out a normality test. The normality test was carried out to find out whether the data used was normally distributed or not. Normality test results were obtained from the Normal P-Plot Test and the Kolmogorov-Smirnov test. The Normal P-Plot Test Statistical Test could be seen in Figure 1.

Based on Figure 1. It could be seen that the distribution of the points was close to or close to the diagonal line, meaning that the data was distributed normally. To be more convincing, researchers also carried out the Kolmogorov-Smirnov test. Data was normally distributed if the Asymp value was used. Sig (2-tailed)  $\geq 0.05$ . The result obtained was that the significant value was 0.189, meaning that the data was normally distributed. So, it could be concluded that the data in this study was declared to meet the requirements of the normality test, and the data

has spread normally. The second stage of the classic assumption test series was carrying out a multicollinearity test. The multicollinearity test was used to test whether, in the regression model. The results obtained were all tolerance values > 0.1 and VIF values < 10, meaning that the data in this study did not experience symptoms of multicollinearity. The third stage of the classic assumption test series was carrying out a heteroscedasticity test. The heteroscedasticity test was processed using the SPSS application with the scatterplot test and the Glajser test, as in Figure 2.

Based on Figure 2, it could be seen that the points were spread randomly above and below the number zero (0) on the Y-axis, meaning that there were no symptoms of heteroscedasticity in the data. To be clearer, the Glajser test could be carried out. With the decision rule, if the significant value was > 0.05, it means that the data does not have heteroscedasticity, and vice versa. Based on Table 1, the results show that the significant values for all variables were > 0.05, so

it could be concluded that the data in the research do not experience symptoms of heteroscedasticity.

The fourth or final stage of the classic assumption test series was carrying out an autocorrelation test. With the decision rule, if  $du < dw < 4 - du$ , then there was no autocorrelation. This could be seen in Table The dw value was 2.111, the dl value was 1.0974, and the du value was 1.8835. So, it was known that the value was  $1.8835 < 2.111 < 2.1165$  based on the autocorrelation decision rule for this value, namely  $du < dw < 4 - du$ , so there was no autocorrelation in the data in the research. With this, it could be concluded that the data was processed using linear regression analysis. This multiple model meets the requirements of classical assumptions, and it could be ensured that the regression equation obtained was consistent, unbiased, and accurate in estimation so that the assumptions applied to estimate these parameters were considered valid.

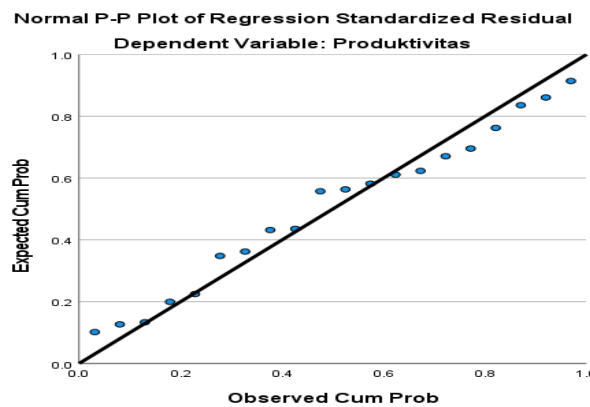


Figure 1. Normality test normal statistical method P-Plot test

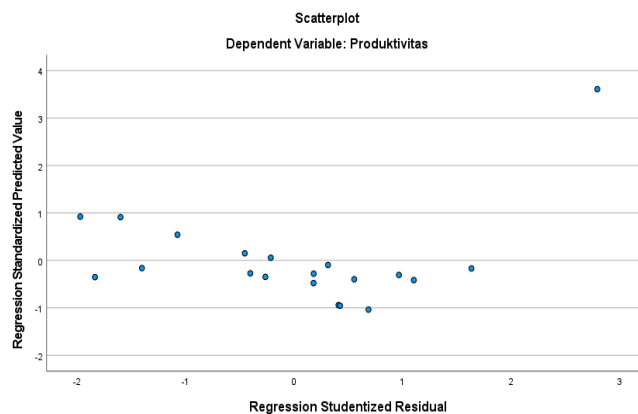


Figure 2. Scatterplot method heteroscedasticity test

### Influence of Each Variable

In this research, six variables influence rice productivity. These variables were land area, urea, and TSP fertilizer, while the other variables have no significant effect. These results were in line with research by Joan et al. (2018) that urea fertilizer has a real effect on rice productivity. This was due to the provision of urea fertilizer on time and by the recommended dosage because rice was a rice variety that was sensitive to fertilization, thereby increasing its productivity. The influence of variable doses of TSP and urea fertilizer use on rice productivity could be seen from the estimated parameter values resulting from the regression analysis. Based on the results of the influence of the estimated parameter values, it means that every 1 percent increase in TSP fertilizer use will increase productivity by 0.58 percent, assuming that other variables were considered constant (*ceteris paribus*).

After the t-test, the significant value was 0.001 at a confidence level of 95 percent. The significant value was  $0.001 < 0.05$ , so reject  $H_0$ . This means that partially, the variable dose of TSP fertilizer use has a significant effect on rice productivity. These results were in line with research (Suparwoto, 2019) that TSP fertilizer has a real effect on rice productivity. This happens due to the availability of sufficient TSP fertilizer and its application according to the recommended dosage so that rice productivity increases. Partially, this variable has no significant effect on rice productivity. This result was in line with research that labor has no real effect on rice productivity. This result was in line with research by Santoso et al. (2013), which states that pesticides have no real effect on rice

productivity. The reason was that the problem of plant pest organisms was not too serious, so the use of pesticides was not too much; the use of pesticides that were not too much causes no effect on rice productivity. Based on field results, it was known that the use of pesticides in Ulak Jeremun Village has had little effect in eradicating plant pest organisms. So, farmers tend not to use pesticides. This was what makes the variable dose of pesticide use not have a positive effect on rice productivity because whatever dose of pesticide was used, productivity will remain the same.

### Production Input Efficiency

In this research, the efficiency value was determined from price efficiency, namely the efficiency of using production inputs on prices. Efficiency value could be achieved if the Marginal Product Value (NPM) for an input was the same as the price of the production input ( $H_x$ ). Based on the results of regression analysis calculations, the regression coefficient value of production input on rice productivity was obtained, which was used to calculate the efficiency value of using production input. After knowing the efficiency value of each production input, the statistical value (t-count) was calculated to see the efficiency of the overall data in this research. Using the decision rule, if  $t\text{-count} \leq t\text{-table}$ , it means that the use of production inputs was efficient, while  $t\text{-count} \geq t\text{-table}$  means that the use of production inputs was not yet efficient. The efficiency index for using production inputs in Ulak Jeremun Village could be seen in Table 2.

Table 2. Efficiency index for using production inputs in ulak Jeremun Village

Production Input	B	$X_i$	$H_x$	t-hit	Criteria
Land Area (X1)	-447.069	1.51	8.980.333	0.044	Efficient
Dosage of Urea Fertilizer Use (X2)	32.547	2.12	290.000	0.040	Efficient
Dosage of TSP(X) Fertilizer Use3)	58.247	1.65	230.000	0.048	Efficient
Dosage of NPK Fertilizer Use(X4)	624.413	0.15	433.333	0.331	Not efficient
Dosage of Herbicide Pesticide Use (X5)	6.871	2.53	260.000	0.987	Not efficient
Dosage of Use of Insecticide Pesticides (X6)	-138.938	1.76	270.000	0.729	Not efficient
Dosage of Use of Fungicide Pesticides (X7)	-374.237	2.15	350.000	0.340	Not efficient
Number of Workers (X8)	1.481	22.7	2.740.590	0.060	Not efficient

T table:  $t(0.05;30) = 1.69726$



### Explanation Per Variable

The results of the t-count calculation show that the land area owned by farmers in Ulak Jeremun Village was classified as efficient by influencing rice productivity in Ulak Jeremun Village. Likewise, the use of urea and TSP fertilizers was efficient. The results of the t-count calculation show that the dose used for urea fertilizer has a value of 16.43. This value was greater than the t-table, namely 1.69726. Based on the decision rule  $t\text{-count} \geq t\text{-table}$ , rejecting  $H_0$  means the use of urea input for production was efficient. This means that the average dose of urea fertilizer used by farmers was according to the recommended dose. Based on recommendations from the Department of Agriculture, Food Crops and Horticulture, Ogan Komering Ilir Regency, the dose of urea fertilizer was three quintals per hectare. In comparison, that used by farmers was 2.95 quintals per hectare. It was necessary to increase the dose of urea fertilizer as recommended so that its use was efficient. The results of the t-count calculation show that the dose of fertilizer used was efficient. This was because the average dose of TSP fertilizer used by farmers was according to the recommended dose. Based on recommendations from the Department of Agriculture, Food Crops and Horticulture, Ogan Komering Ilir Regency, the recommended dose for using TSP fertilizer was 1.78 quintals per hectare. In comparison, that used by farmers was 1.76 quintals per hectare.

In contrast, the use of NPK fertilizer in Ulak Jeremun Village was inefficient. This was because the average dose of NPK fertilizer used by farmers does not match the recommended dose. Based on recommendations from the Department of Agriculture, Food Crops and Horticulture, Ogan Komering Ilir Regency, the recommended dose for using NPK fertilizer was two quintals per hectare. In comparison, that used by farmers was 2.15 quintals per hectare. It was necessary to reduce the dose of NPK fertilizer according to recommendations so that its use was

efficient. The number of HOK workers per hectare for rice farming in Ulak Jeremun Village was inefficient. This was because the labor used was labor due to flooding. Likewise, the dosage of pesticide use could be more efficient. The use of pesticides, insecticides, and herbicides per hectare for rice in Ulak Jeremun Village could be more efficient because farmers tend not to use pesticides at all. Hence, the weeds become tall and block the flow of water.

### Rice Farming Income

Farming income was obtained from total farming revenues minus total production costs. Rice farming in Ulak Jeremun Village was carried out once a year or in one planting season; planting was done in April, and generally, harvesting was in July. In this research, income was calculated from rice farming in 1 planting season in 1 year. The following was an explanation of the income of rice farmers in Ulak Jeremun Village.

### Rice Farming Production Costs

Production costs were the costs incurred by farmers in carrying out their farming business. Production costs consist of fixed costs and variable costs. In this research, rice production costs were calculated in one planting season. Production costs were obtained from the sum of fixed costs and variable costs.

### Fixed Cost

Fixed costs were costs whose use does not end within one planting period, measured in units of rupiah per hectare per year. In fixed costs, there were depreciation costs, which were a reduction in the price of goods based on their economic life. The costs calculated as fixed costs in this research were the costs of depreciation of tools used by farmers, such as hoes, sickles, buckets, and hand sprayers. Details of the average depreciation costs in farming during one rice planting season could be seen in Table 3.

Table 3. Average fixed costs of rice farming in Ulak Jeremun Village

Description	PenDepreciationTools (IDR/Ha/Year)	Percentage (%)
Sickle	9,904	6.65
Hoe	18,854	12.67
Bucket	22,560	15.16
Hand sprayer	97,401	65.48
Amount	148,741	100.00

Based on Table 3, it could be seen that the average depreciation cost for rice farmers' equipment in Ulak Jeremun Village was IDR 148,741 hectares per year. The highest depreciation cost was the hand sprayer, with an amount of IDR 97,401, and the percentage was 65.4 percent, while the smallest depreciation cost was the sickle with an amount of IDR 9,904, and the percentage was 6.65 percent.

### Variable Costs

Variable costs were costs that were used up in one planting season, measured in units of rupiah per hectare per year. In variable costs, if there were changes in rice farming activities, the costs incurred by farmers will also change according to needs. The costs calculated as variable costs in this research were the costs of seeds, pesticides, fertilizers, and labor wages. Details of the average variable costs incurred in farming during one rice planting season could be seen in Table 4.

Based on Table 4. it could be seen that the average amount of variable costs incurred by rice farmers in Ulak Jeremun Village was IDR 7,126,58 per hectare per year. The largest variable cost was labor, with the amount of IDR 2,984,496.

### Total Production Cost

The total production cost was the sum of the fixed costs and variable costs incurred by the sample farmer in rice farming activities carried out during the rice planting season. Details of the

average production costs of rice farming in Ulak Jeremun Village could be seen in Table 5. Based on Table 5, it could be seen that the average total production costs incurred by rice farmers in Ulak Jeremun Village were IDR 7,275,229 per hectare per year. In detail, the fixed costs incurred by farmers were IDR 148,640 per hectare per year with a percentage of 2.04 percent, and the variable costs incurred were IDR 7,126,58 per hectare per year with a percentage of 97.95 percent.

### Rice Farming Revenue

Income from rice farming was obtained from the amount of harvest production multiplied by the selling price. Revenue in this research was the total production received by farmers during one year or one planting season and multiplied by the selling price of rice per kilogram. The rice sold was shelled rice that has been dried in the sun until the water content was around 16-14 percent. Details of the average income of farmers from rice farming in Ulak Jeremun Village could be seen in Table 6. Based on Table 6. it could be seen that in Ulak Jeremun Village, the average rice production obtained from sample farmers was 3,736 kg with an average cultivated area of 1.62 hectares per planting season with an average selling price of shelled rice of IDR 3,805.00 per kg. From the average selling price and rice production, an average revenue of IDR 14,215,480 per hectare per year was obtained.

Table 4. Average Variable Costs of Rice Farming in Ulak Jeremun Village

Description	Cost Variable (IDR /Ha/Year)	Percentage (%)
Seed	1,940,685	20,21
Pesticide	401,022	1.47
Fertilizer	1,800,377	23.85
Labor Wages Work	2,984,496	54.50
Amount	7,126,580	100.00

Table 5. average total production costs of rice farming in Ulak Jeremun Village

Description of Production Costs	Cost (IDR /Ha/Year)	Percentage (%)
Fixed cost	148,640	2.04
Variable Costs	7,126,580	97.95
Production Cost	7,275,229	100.00

Table 6. Average income from rice farming in Ulak Jeremun Village

Description	Revenue (IDR /Ha/Year)
Selling Price (IDR /Kg)	3,805
Production (Kg/Ha/Year)	3,736
Revenue (IDR)	14,215,480

Table 7. Average rice farming income in Ulak Jeremun Village

Description	Income (IDR/Ha/Year)
Revenue	14,215,480
Production Cost	7,275,229
Income	6,940,251

### Rice Farming Income

Rice farming income was obtained from the difference between revenue and total production costs incurred during the rice planting season. Income was influenced by revenue and total production costs. If the revenue obtained was low, and the total production costs incurred were high, then income will be low, and if the revenue obtained was high, and the total production costs incurred were low, then income will be high. Details of the average income of farmers from rice farming in Ulak Jeremun Village could be seen in Table 7.

Based on Table 7, it could be seen that farmers in Ulak Jeremun Village generate an average income from rice farming of IDR 6,940,251 per hectare per year. From these details, the income from rice farming in Ulak Jeremun Village was relatively high, and rice farming was said to be profitable because the income was higher than the production costs incurred by farmers during the rice production process activities.

The source of income in Ulak Jeremun Village was not only from rice farming but also from rice farming and outside farming, such as laborers, artisans, traders, and so on. Based on information from local farmers, the income from rice farming was more profitable than rice farming because the production costs incurred in rice farming activities were lower. Seeing that the income from rice farming alone was profitable, coupled with the income from rice farming and non-farming, it could be concluded that farmers in Ulak Jeremun Village were relatively prosperous with a high level of income.

### CONCLUSION

Based on the research and discussions that have been carried out to test the hypothesis, it can be concluded that the factors that have a positive influence on rice productivity in Ulak Jeremun Village are the area of land owned by farmers, the dosage of urea fertilizer, TSP fertilizer and NPK fertilizer, while those that do not have a

significant effect. Are the doses used for seeds, herbicides, insecticides, fungicides, and the number of workers? The income from rice farming in Ulak Jeremun Village is IDR 6,940,251 per hectare per year.

1. Suggestions that could be given after carrying out this research are as follows:
2. Farmers should use fertilizer doses according to government recommendations and use pesticide doses according to the usage instructions stated on each pesticide package, as well as using the type of pesticide and the correct time to use pesticides to ensure efficiency.
3. For future researchers, it is recommended to conduct in-depth research on the profits and income of farming households in Ulak Jeremun Village.

### ACKNOWLEDGEMENTS

These remarks were conveyed to the Chancellor of Sriwijaya University, the Dean of the Faculty of Agriculture, government officials in South Sumatra Province, stakeholders involved, and farmers in the three sample districts.

### REFERENCES

- Abdul Awal, M., Hossain, M. A., Rostom Ali, M., Huda, F. A., & Monjurul Alam, M. (2019). Economic performance of different paddy storage technologies in Bangladesh. In *2019 ASABE Annual International Meeting*. <https://doi.org/10.13031/aim.201901474>
- Abidin, A. Z., & Prasetyani, D. (2021). Socio-economic study on empowering women farmers to support the SDGs. In *IOP Conference Series: Earth and Environmental Science*, 905(1). <https://doi.org/10.1088/1755-1315/905/1/012135>
- Anita, T., Ratnasih, C., & Meirinaldi, M. (2023). Determinants of Poverty in Indonesia. *Economics Development Analysis Journal*, 2(4), 446–455. <https://doi.org/10.4108/eai.12-11-2022.2327347>
- Atiyatna, D. P., Muhyiddin, N., & Soebyakto, B. B. (2016). The Influence of minimum wages, economic growth and education on labor absorption in South Sumatra Province. *Jurnal Ekonomi Pembangunan*, 14(1), 1829–5843. <https://doi.org/10.29259/jep.v14i1.8771>
- Badibanga, T., & Ulimwengu, J. (2020). Optimal investment for agricultural growth and poverty reduction in the democratic republic of congo a two-sector economic growth model.

- Applied Economics*, 52(2), 135–155. <https://doi.org/10.1080/00036846.2019.1630709>
- Be, E. (2022). Impact of Rice production, rice supply and rice prices on food security in North Timor District. *Jurnal Manajemen dan Agribisnis*, 19(3), 407–417. <https://doi.org/10.17358/jma.19.3.407>
- Chandio, A. A., Magsi, H., & Ozturk, I. (2020). Examining the effects of climate change on rice production: case study of Pakistan. *Environmental Science and Pollution Research*, 27(8), 7812–7822. <https://doi.org/10.1007/s11356-019-07486-9>
- Devaux, A., Torero, M., Donovan, J., & Horton, D. (2018). Agricultural innovation and inclusive value-chain development: a review. *Journal of Agribusiness in Developing and Emerging Economies*, 8(1), 99–123. <https://doi.org/10.1108/JADEE-06-2017-0065>
- Fahad, S., Inayat, T., Wang, J., Dong, L., Hu, G., Khan, S., & Khan, A. (2020). Farmers' awareness level and their perceptions of climate change: A case of Khyber Pakhtunkhwa province, Pakistan. *Land Use Policy*, 96. <https://doi.org/10.1016/j.landusepol.2020.104669>
- Gapatutugan, B. N., Iskandar, S., & Kurniawan, R. (2019). Analysis of Marketing Channels for Organic Rice in Sumber Suko Village, Belitang District, East Ogan Komering Ulu Regency. *Jasep*, 5(2), 41–51.
- Kintamani, K., & Bangli, K. (2019). Analysis of the Efficiency of Using Production Inputs in Shallot Farming in Villages. *Jurnal Agribisnis Dan Agrowisata*, 8(3), 3685–3809.
- Lukman, Hidayat, S., & Iskandar, T. (2019). Analysis of Labor Productivity of Reinforced Concrete on Indonesian National Standard 2002: a Case Study At the Construction of Office Buildings in Bontang Kuala District of Bontang City. In *Russian Journal of Agricultural and Socio-Economic Sciences*, 85(1), 236–245. [cyberleninka.ru. https://doi.org/10.18551/rjoas.2019-01.30](https://doi.org/10.18551/rjoas.2019-01.30)
- Rachmasari Ariani, W. O. (2021). An analysis of technical efficiency and factors affecting rice farming business production in Bombana regency, Southeast Sulawesi. *Journal of Physics: Conference Series*, 1899(1). <https://doi.org/10.1088/1742-6596/1899/1/012009>
- Raihan, A. (2023). An econometric evaluation of the effects of economic growth, energy use, and agricultural value added on carbon dioxide emissions in Vietnam. In *Asia-Pacific Journal of Regional Science* (Vol. 7, Issue 3, pp. 665–696). Springer. <https://doi.org/10.1007/s41685-023-00278-7>
- Raihan, A., Muhtasim, D. A., Farhana, S., Hasan, M. A. U., Pavel, M. I., Faruk, O., Rahman, M., & Mahmood, A. (2023). An econometric analysis of Greenhouse gas emissions from different agricultural factors in Bangladesh. In *Energy Nexus*, 9. Elsevier. <https://doi.org/10.1016/j.nexus.2023.100179>
- Randika, R., Sidik, M., & Peroza, Y. (2022). Analysis of factors influencing lowland rice production in Sepang Village, Pampangan District, Oki Regency. *Societa: Jurnal Ilmu-Ilmu Agribisnis*, 10(2), 66. <https://doi.org/10.32502/jsct.v10i2.4292>
- Rautaray, S. K., Mishra, A., Sinha, M. K. (2017). Energy efficiency and economics of transplanted rice under integrated nutrient management in a rainfed medium land. *Bhartiya Krishi*.
- Retnowati, D., Damayanti, D. U., Lestari, E. F. L., Alfitri, M. E., Adriani, D., Wildayana, E., & Zahri, I. (2018). Cost of Production of Lebak Rice Fields and Factors That Influence It in Sirah Pulau Padang District, Ogan Komering Ilir Re. In: *Proceedings Seminar Nasional Lahan Suboptimal 2018*, 298–305.
- Shi, R., & Conrad, S. A. (2009a). Correlation and regression analysis. *Annals of Allergy, Asthma and Immunology*, 103(4 SUPPL.), 2–7. [https://doi.org/10.1016/s1081-1206\(10\)60820-4](https://doi.org/10.1016/s1081-1206(10)60820-4)
- Shi, R., & Conrad, S. A. (2009b). Correlation and regression analysis. In *Annals of Allergy, Asthma and Immunology* (Vol. 103, Issue 4 SUPPL.). [journal.oxfordcollege.edu.np. https://doi.org/10.1016/s1081-1206\(10\)60820-4](https://doi.org/10.1016/s1081-1206(10)60820-4)
- Sorokhaibam, S., Singh, N. A., & Nabachandra, L. (2017). Effect of liming, planting time and tillage on system productivity, resource use efficiency and energy dynamics of rice (*Oryza sativa*) - Lathyrus (*Lathyrus sativus*) cropping system under rainfed lowland condition of North East India. *Legume Research*, 40(3), 506–513. <https://doi.org/10.18805/lr.v0i0.7845>
- Suparwoto, S. (2019). Production and Income from Rice Farming in Rawa Lebak Land, Ogan Komering Ilir Regency. *SOCA: Jurnal Sosial, Ekonomi Pertanian*, 13(1), 51. <https://doi.org/10.24843/soca.2019.v13.i01.p05>
- Tetik, A. H., Prasetyo, E., & Lukiwati, D. R. (2019). Analysis of economic efficiency for use of production and income factors in local cornself in Wewiku and Malaka Districts of Nusa Tenggara Timur Province, Indonesia. In *Russian Journal of Agricultural and Socio-Economic Sciences*, 92(8), 10–18. [rjoas.com. https://doi.org/10.18551/rjoas.2019-08.02](https://doi.org/10.18551/rjoas.2019-08.02)
- Utami, W., Sarif, M., & Ihsan, M. (2023). Fisiability analysis of Honey Bee Cultivation in Baruga Village, Banggae District, Majene Regency. *Jurnal Penelitian Kehutanan BONITA*. <https://doi.org/10.55285/bonita.v5i1.1986>