



## ECONOMIC ANALYSIS OF CONVERSION OF LAND FUNCTION FOR RICE PICE AGRICULTURE IN SIMALUNGUN DISTRICT (Case of Pamatang Simalungun Village, Rambung Merah, Karang Bangun and Siantar Estate, Siantar District, Simalungun Regency)

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### Abstract

*The conversion of wetland rice farming land is one of the phenomena of changing lowland rice farming land into other food crops and horticultural crops. The aim of this research is to examine the economic value of land before and after land conversion, and analyze the impact of agricultural land conversion on farmers' income, as well as find out what factors influence land conversion. This research uses a case study method, where to answer the research objectives using multiple linear regression analysis, land rent value, farmer income, R-square test, F test, and T-test using the EViews 12 software application. The research results show the value The average land rent for respondents' agricultural land is IDR 24,771,425/year. Based on the classification of agricultural land, the average land rent for respondents for lowland rice crops is IDR 5,920/m<sup>2</sup>/year, and the average land rent for respondents for other food crops and horticulture is IDR 7,287/m<sup>2</sup>/year. For respondents, the average farming income was IDR 38,743,925/year, and based on agricultural land classification, the average yield of wetland rice was IDR 7,370/m<sup>2</sup>/year, as well as other food and horticultural crops of IDR 24,231/m<sup>2</sup>/year. . Based on the results of the regression analysis, the R-square value was obtained at 0.897970, which means that the independent variable explains the change of function of paddy fields in Simalungun Regency by 89.79%, while the remaining 10.21% is influenced by other variables outside the research. The results of the F test (simultaneous) show that all independent variables have a significant effect on the dependent variable with a probability value (F-statistic) of 0.000000 < 0.05, and partially the factors that have a significant effect on land conversion are land area before conversion and acceptance after the change of function as a farmer, while other variables, namely age of the farmer, last education of the farmer, income before the change of function, operational costs before the change of function and operational costs after the change of function have no significant effect (the influence of the variables is very small).*

**Keywords:** *Economic Value of Land, Land Conversion and Farmer Income*

## 1. INTRODUCTION

### 1.1. Background

Agriculture is the second largest sector in the Indonesian economy and is still one of the sectors that has a strategic role in driving the Indonesian economy. Based on data from the Central Statistics Agency (BPS) in 2021, the agricultural sector contributed to gross domestic product (GDP) at current prices of 2,254 trillion (13.28%), and in 2022 the agricultural sector's GDP increased to 2,428 trillion (12.39%) to Indonesia's national GDP. The agricultural sector also has a contribution of 22.04% (189.52 trillion) and in 2022 the GDP contribution value of the agricultural sector will increase to 23.01% (219.80 trillion) to the GRDP of North Sumatra in 2021.

Based on figure 1.1 below, we also see a decrease in the area of lowland rice plantations in Simalungun Regency for the period 2016 to 2021, where in 2016 the area of lowland rice in Simalungun Regency was 102,437 Ha, in 2017 it fell to 71,911 Ha and in In 2021 there will be a drastic decrease of more than 54%, namely from 38,960 Ha to 32,952 Ha. Changes in the area of rice fields indirectly affect the level of rice production in Simalungun Regency, especially in sub-

districts/villages that directly border the city of Pematang Siantar. In Simalungun Regency Regional Regulation Number 10 of 2012 dated 30 November 2012, concerning the Simalungun Regency Spatial Planning Plan for 2011-2031 Chapter IV regarding the Regency Regional Spatial Pattern Plan, the third part of the Cultivation Area Spatial Pattern Plan article 31 paragraph (3) letter a is stated that the wetland agricultural development plan, which has a total area of approximately 35,924 Ha.



Source: bps.go.id/ North Sumatra in numbers

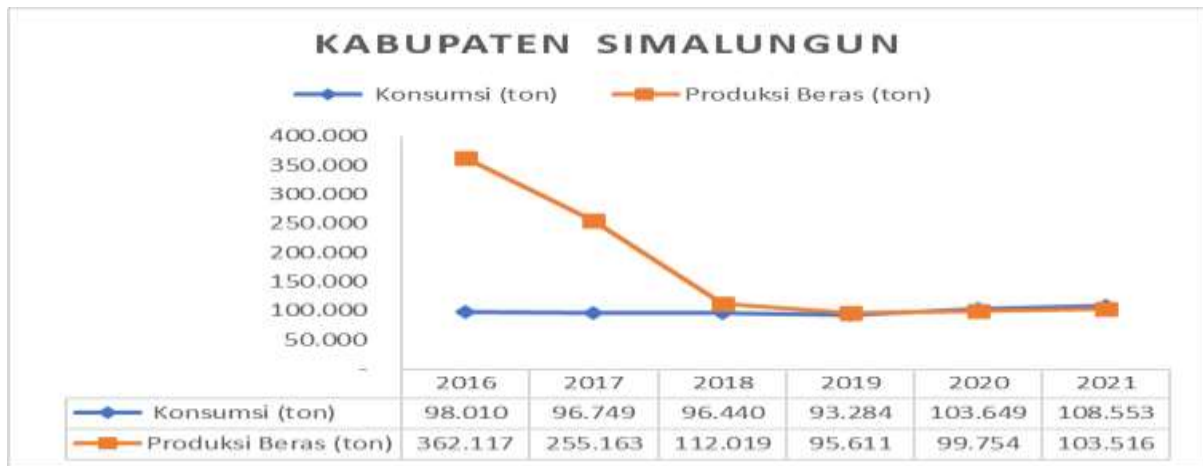


Figure 1.2 Area of Paddy Plantation in Simalungun Regency

Source: bps.go.id/ North Sumatra in numbers

The reduction in the area of rice plants in Simalungun Regency will have an impact on rice consumption and demand to meet food consumption needs every year, especially in 2020 and 2021. unable to meet the food consumption needs of the population of Simalungun Regency. Overall, rice production in North Sumatra province fluctuates and tends to increase. In 2018-2021, rice production cannot meet the food consumption needs of the residents of districts/cities in North Sumatra, so to meet rice consumption needs, imports are made. This is based on the decrease in the amount of wetland rice farming land currently available, as well as the achievement of rice yield productivity which is still around 5-6 tons/ha.

## 1.2. Identification of problems

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Based on the background description above, several problems can be identified as follows:

1. What is the economic value of the land before and after the conversion of wetland rice farming land?
2. What is the farmer's income before and after the conversion of wetland rice farming land?
3. What factors influence the conversion of wetland rice farming land?

### **1.3 Research Objectives**

Based on the background and problem identification above, the objectives of this research are as follows:

1. To analyze the economic value of land between before and after the conversion of wetland rice farming land in Pamatang Simalungun Village, Rambung Merah Village, Karang Bangun Village and Siantar Estate Village, Siantar District, Simalungun Regency.
2. For analyzed farmers' income before and after the conversion of wetland agricultural land in Pamatang Simalungun Village, Rambung Merah Village, Karang Bangun Village and Siantar Estate Village, Siantar District, Simalungun Regency.
3. To analyze what factors influence the conversion of wetland rice farming land in Pamatang Simalungun Village, Rambung Merah Village, Karang Bangun Village and Siantar Estate Village, Siantar District, Simalungun Regency.

## **2. LITERATURE REVIEW**

### **2.1 Definition of Land**

Law no. 41 of 2009 article 1 states that land is the land part of the earth's surface as a physical environment which includes land and all factors that influence its use such as climate, relief, geological and hydrological aspects that are formed naturally or as a result of human influence.

### **2.2 Land Benefits**

According to Kristanto (2003), the land conversion process is directly or indirectly determined by two major factors, namely:

1. Institutional system developed by the community
2. Non-institutional systems that develop naturally in society, either as a result of the development process or as internal processes that exist in society in relation to utilizing land resources.

### **2.3 Land Value (Land Rent)**

Land value is the result of an assessment of land based on the economic capability of the land in relation to the land's economic strategy, and is influenced by function, location, land productivity and other factors that provide economic benefits. Land Rent (economic value of land) is the price or remuneration that must be paid for the use of land or other natural resources whose total supply is fixed and cannot be increased.

### **2.4 Land Rent Theory**

The land rent theory used is the classic model of David Ricardo and Von Thunen (Barlowe, 1986). Where David Ricardo provides the concept of land rental on the basis of differences in soil fertility, especially on the issue of land rental in the agricultural sector, but in his analysis it cannot be separated from the assumption that in new residential areas there are fertile and abundant land resources. Ricardo's opinion states that only fertile land is used for agricultural cultivation and there are no land rental payments in connection with the use of this land because the population is still sparse and small. Heindrich Von Thunen (1826), who was a German economist, argued that the location of land to the center of economic activity is expressed by the distance between the location of the land and the center of economic activity where the products or results from the land are sold. Where Von Thunen states that the "Economic Rent" of a plot of land will become smaller the further the distance from the location of the land to the market (center of economic activity).

### **2.5 Farmer Income**



According to Puti Mandasari (2015) farmer income is the difference between the total income/receipt of the overall production value of agricultural commodities received minus the production costs incurred. Soekartawi (2003), states that farmer income is household income as a result of farming plus household income in the form of labor wages obtained from outside farming.

## RESEARCH METHODS

### 3.1 Place and Time of Research

Determining the research location was carried out purposively (purposive methods), where Siantar sub-district has 17 villages and 92 hamlets, and Pamatang Simalungun Village, Rambung Merah Village, Karang Bangun Village and Siantar Estate Village are villages that are thought to have a tendency to convert agricultural land quite large for residential, trade and industrial activities, where there has been a significant decline in the area of wetland rice farming in the areas mentioned above. This research was conducted for two months from the date the research permit was issued, namely May and June 2023.

### 3.2. Method of collecting data

In this research, the types of data used are primary data and secondary data. Primary data comes from filling out questionnaires and direct interviews with farmers and land owners. Secondary data was obtained from the Central Statistics Agency of North Sumatra Province, BPS Simalungun Regency, journals, and other supporting activities. The respondents were 80 farmers in Pamatang Simalungun Village, Rambung Merah Village, Karang Bangun Village and Siantar Estate Village.

### 3.3. Data Analysis Methods

#### 3.3.1 Land Rent

*Rentis* the difference between the amount received from resource utilization minus the costs incurred. In this case, a comparison will be made between the economic value of the land (land rent) before land conversion and after land conversion for lowland rice farming using the Von Thunen approach (Istiqomah A, Nindyantoro, & Novindra, 2019).

$$RL = Y(P - C) - YDF$$

Information :

RL = Land rent (Rp)

Y = Production (kg)

P = Price per unit of output (Rp/kg)

C = Cost per unit of output (Rp/kg)

D = Distance to growth center (km)

F = Transportation costs (Rp/km)

#### 3.3.2 Multiple Linear Regression Analysis

In studying the factors that influence agricultural land conversion, a multiple linear regression analysis model is used. Where the factors that are thought to influence someone to change land use include:

a. Farmer age

The farmer's age shows productivity at work, the higher the farmer's age, the lower the productivity.

b. Farmer education level

The higher level of education of farmers will influence decisions regarding land conversion.

c. Market price of land

The higher the market price of land will encourage changes in land function.

d. Land area owned

The larger the land owned by farmers, the smaller the possibility of land conversion occurring, conversely a small land area allows land conversion to occur.

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e. Operating costs

The costs incurred by farmers in managing agricultural land for one year.

f. Total Average Revenue of Farmers

The total average income obtained by farmers during a year from the results of agricultural management, both before land conversion and after agricultural land conversion.

g. The resulting land productivity

High productivity will reduce the risk of land conversion, but low productivity will result in land conversion due to reduced farmer income.

h. Farming experience

Long farming experience and increasing farming skills influence the decision to convert land. Where farmers who have high experience and high expertise will continue to defend their land.

The analysis of the multiple linear regression equation in this research is:

$$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \dots + \alpha_n X_n$$

Information :

Y = Area of land converted to function (m<sup>2</sup>)

$\alpha_0$  = Constant (*Intercept*)

X<sub>1</sub> = Age (years)

X<sub>2</sub> = Farmer's last education

X<sub>3</sub> = Revenue after land conversion

(Rp/year)

X<sub>4</sub> = Operational costs after transfer of functions

(Rp/year)

X<sub>5</sub> = Land area before conversion (m<sup>2</sup>)

X<sub>6</sub> = Receipts before land conversion

(Rp/year)

X<sub>7</sub> = Operational costs before transfer of functions

(Rp/year)

$\alpha_n$  = Regression coefficient

### 3.4 Model and Hypothesis Testing

#### 3.4.1 Coefficient of Determination Test (R-Square)

According to Gujarati (2006), the percentage influence of all independent variables on the value of the dependent variable can be determined from the size of the coefficient of determination (R<sup>2</sup>) of the regression equation. Where the R-Square value is  $0 < R\text{-Square} < 1$ .

#### 3.4.2 F Test

The F test is carried out to see the influence of all independent variables together on the dependent variable with the following criteria (Gujarati, 2006):

- F count > 0.05; not significant  
Ho is accepted and Ha is rejected, meaning that all independent (free) variables do not have a significant influence on the dependent (dependent) variable.
- F count < 0.05; significant  
Ho is rejected and Ha is accepted, meaning that all independent (free) variables have a significant influence on the dependent (dependent) variable.

#### 3.4.3 T-test

In the T-test, we see whether each independent variable has a significant influence on the dependent variable with the following criteria:

- $t_{count} > 0.05$ ; not significant  
Ho is accepted and Ha is rejected, meaning that the independent (free) variable does not have a significant influence on the dependent (dependent) variable.
- $t_{count} < 0.05$ ; significant  
Ho is rejected and Ha is accepted, meaning that the independent (free) variable has a significant influence on the dependent (dependent) variable.

### 3.4.4 Classic Assumption Test

To fulfill a good multiple linear regression model, the following classical assumption tests are needed:

#### a. Normality Test

The normality test aims to test whether in the regression model, the dependent variable and the independent variable both have a normal distribution or not by looking at the Jarque-Bera Test histogram graph (Ghozali, 2017: 127).

#### b. Autocorrelation Test

According to Ghozali (2013: 138), the autocorrelation test aims to test whether in a linear regression model there is a correlation between residual errors in period  $t$  and errors in period  $t-1$  (previous). In this case, the Durbin-Watson value will be seen with  $\alpha = 5\%$  ( $du < dw < 4-du$ ).

#### c. Multicollinearity Test

The multicollinearity test aims to test whether in the regression model a high or perfect correlation is found between the independent variables (Ghozali, 2013).

- VIF value  $> 10$ , multicollinearity occurs
- VIF value  $< 10$ , there is no multicollinearity

#### d. Heteroscedasticity Test

According to Ghozali (2013: 105), the heteroscedasticity test aims to test whether in the regression model there is inequality of variance from the residuals of one observation to another observation.

- The significant value between the independent variable and the absolute residual ( $Obs \cdot R$ -squared) is greater than  $\alpha = 0.05$ , so there is no heteroscedasticity.

## 4. RESULTS AND DISCUSSION

### 4.1 Economic Value of Land (Land Rent)

The economic value of land in an area can be reflected in the price level and land rent value generated. Where land owners will usually try to maximize the use of their land to get the highest yields. The economic value of land (land rent) before conversion is the value obtained from respondents which is currently used for lowland rice crops, while the land rent value after conversion of land is the current value of land use in the form of other food crops and horticultural crops.

Qable 4.1. Comparison of Farmers' Income Before and After Agricultural Land Conversion for Research Respondents

No	Uraian	Sebelum Alih Fungsi (Padi Sawah)	Setelah Alih Fungsi (Holtikultura)
1	Pendapatan Terendah Responden (Rp/tahun)	23.802.000	4.860.000
2	Pendapatan Tertinggi Responden (Rp/tahun)	85.710.000	87.466.000
3	Jumlah Total Pendapatan (Rp/tahun)	1.713.741.000	1.385.773.000
4	Pendapatan Rata-rata Responden (Rp/tahun)	42.843.525	34.644.325

Source: Data analysis, 2023 (processed data)

Table 4.2. Land Rent Value of Agricultural Land among Research Respondents



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No.	Uraian	
1	Luas Lahan Pertanian Keseluruhan Responden (m <sup>2</sup> )	332.000
2	Rata-rata Penerimaan Petani Responden (Rp/tahun)	31.578.850
3	Rata-rata Biaya Operasional Petani Responden (Rp/tahun)	6.617.250
4	Rata-rata Pajak Petani Responden (Rp/tahun)	190.175
5	Rata-rata <i>land rent</i> Petani Responden (Rp/tahun)	24.771.425
6	Pendapatan Rata-rata Responden (Rp/tahun)	38.743.925

Source: Data analysis, 2023 (processed data)

Table 4.3. Land Rent Value Classification Agricultural Land among Research Respondents

No.	Klasifikasi <i>Land Rent</i>	
1	Luas Lahan Responden Pertanian Padi Sawah (m <sup>2</sup> )	<b>256.000</b>
2	Luas Lahan Responden Pertanian lainnya & Holtikultura (m <sup>2</sup> )	<b>76.000</b>
3	Rata-rata <i>Land Rent</i> Responden Padi Sawah (Rp/m <sup>2</sup> /tahun)	<b>5.920</b>
4	Rata-rata <i>Land Rent</i> Responden Tanaman lainnya & Holtikultura (Rp/m <sup>2</sup> /tahun)	<b>7.287</b>
5	Rata-rata <i>Pendapatan</i> Responden Padi Sawah (Rp/m <sup>2</sup> /tahun)	<b>7.370</b>
6	Rata-rata <i>Pendapatan</i> Responden Tanaman lainnya & Holtikultura (Rp/m <sup>2</sup> /tahun)	<b>24.231</b>
7	Rata-rata <i>Land Rent</i> Responden Tanaman lainnya & Holtikultura Sebelum Alih Fungsi (Rp/m <sup>2</sup> /tahun)	<b>1.296</b>
8	Rata-rata <i>Pendapatan</i> Responden Tanaman lainnya & Holtikultura Setelah Alih Fungsi (Rp/m <sup>2</sup> /tahun)	<b>6.110</b>

Based on Table 4.1 above, it can be seen in the comparison of farmers' income in Pamatang Simalungun Village, Rambung Merah Village, Karang Bangun Village and Siantar Estate Village, that the overall income of research respondents has decreased, where the lowest income of respondents before the conversion of paddy fields was IDR 23. 802,000/year and after conversion to crops other than lowland rice, it was Rp. 4,860,000/year, while the highest income for respondents before conversion to lowland rice was Rp. 85,710,000/year, which was smaller than the income of respondents from other food crops and horticulture, which was Rp. 87,466,000/year.

The average income of respondents before the conversion of paddy fields was IDR 42,843,525/year is greater when compared to the average income of respondents with other food crops and horticulture, namely IDR 36,644,325/year, this is influenced by the area of land cultivated by respondent farmers where respondents with lowland rice as a commodity have large areas of land. relatively broad compared to respondents of horticultural crops and other food crops.

From Table 4.2 above at the research location, it can be seen that the average income of research respondents is IDR 38,743,925/year, with an average economic land value (land rent) of agricultural land of IDR 24,771,425/year and an average total tax retribution cost. (PBB) paid IDR 190,175/year. The average income of research respondent farmers over a period of one year in cultivating agricultural land is IDR 31,578,850/year and the average operational costs incurred by farmers is IDR 6,617,250/year with a total land area of research respondents of 332,000 m<sup>2</sup> (33, 2 Ha).

Based on Table 4.3 above, it can be classified that the land rent value of agricultural land for respondents with lowland rice crops is Rp. 5,920/m<sup>2</sup>/year with the area of agricultural land for respondents with lowland rice being 256,000 m<sup>2</sup>, while the land rent for other food crops and horticulture is Rp. 7,287/m<sup>2</sup>/ year with the respondent's agricultural land area being 76,000 m<sup>2</sup>. And the average income of paddy rice respondents over a period of one year was IDR 7,370/m<sup>2</sup>/year and respondents from other crops and horticulture generated an average income of IDR 24,231/m<sup>2</sup>/year.





From the results of the economic value of land (land rent) above, it can be seen that the average land rent for respondents from other crops and horticulture is higher when compared to the value of land rent for lowland rice crops if divided by the land area per m<sup>2</sup>, namely IDR 7,287/m<sup>2</sup> /year for other crops and horticulture and IDR 5,920/m<sup>2</sup>/year for lowland rice crops. And if we compare the average value of land rent for respondents from other crops and horticulture before the function was changed to the current function, we get a value of IDR 1,296/m<sup>2</sup>/year and an average income of IDR 6,110.

## 4.2 Influencing Factors

### Transfer of Agricultural Land Functions

The analytical method used to determine the factors that influence land conversion is the Ordinary Least Square (OLS) method and multiple linear regression analysis (Multiple Regression Analysis) with the EViews 12 application.

#### 4.2.1 Classic Assumption Test

##### a. Normality Test

According to Ghozali (2017: 127) there are two ways to predict whether residuals have a normal distribution or not, namely by graphic analysis and statistical analysis. Where the decision whether the residual is normally distributed or not is simply done by comparing the calculated Jarque-Bera probability value with an alpha ( $\alpha$ ) level of 0.05.

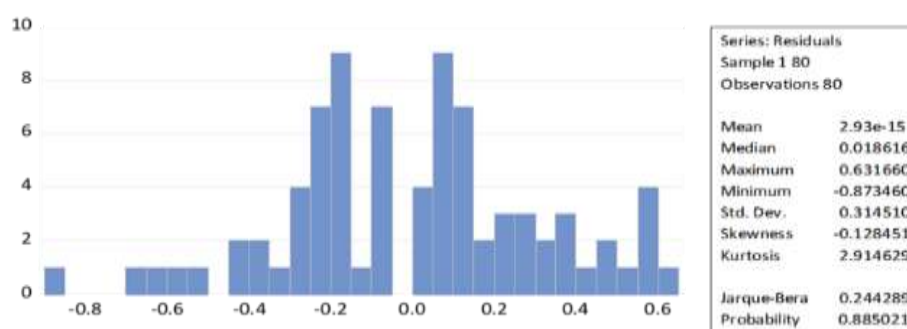


Figure 4.1 Histogram graph

Source: EViews12 data output processed, 2023

From the graph above, the calculated Jarque-Bera probability value is 0.885021 > 0.05, so it can be concluded that the residuals are normally distributed, which means the classic assumption of normality has been fulfilled.

##### b. Autocorrelation Test

The autocorrelation test aims to test whether in the linear regression model there is a correlation between residual errors. In this case, to detect whether there is autocorrelation, researchers tested using the Breusch-Godfrey method or Correlation LM Test, by looking at the Durbin-Watson value with  $\alpha = 5\%$ .

Table 4.4 Table of Autocorrelation Test Results

Mean dependent var	2.93E-15
S.D. dependent var	0.314510
Akaike info criterion	0.757107
Schwarz criterion	1.054861
Hannan-Quinn criter.	0.876485
Durbin-Watson stat	1.994077

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Source: EViews12 data output processed, 2023

The Durbin-Watson value for research observations (n) is 80 and the independent variables (k) are 7 variables, so the Durbin-Watson value with  $\alpha = 5\%$  is  $d_u$  equal to 1.8308. Thus  $d_u < d_w < 4 - d_u$  ( $1.8308 < 1.994077 < 2.005923$ ), it can be concluded that there are no symptoms of autocorrelation in the data.

**c. Multicollinearity Test**

The multicollinearity test functions to test whether in the regression model a correlation is found between the independent variables. The multicollinearity test uses Variance Inflation Factors (VIF) with the condition that if the VIF value is  $> 10$  then it is stated that symptoms of multicollinearity are occurring and vice versa if the VIF value is  $< 10$  then it is stated that there are no symptoms of multicollinearity. The multicollinearity results can be seen in table 4.5 below.

Table 4.5 Table of Multicollinearity Test Results

Variance Inflation Factors			
Date: 08/02/23 Time: 12:01			
Sample: 1 80			
Included observations: 80			
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	2.920441	2152.652	NA
USIA_TAHUN_	2.90E-05	55.39666	1.426459
PENDIDIKAN_TERA...	0.004181	25.84674	1.470972
LUAS_LAHAN_SEB...	1.08E-09	20.93513	8.018295
TOTAL_PENERIMA...	2.36E-16	12.57415	8.028695
BIAYA_OPERASIO...	2.34E-16	13.69808	6.137344
BIAYA_OPERASIO...	1.83E-15	13.20821	7.973992
LN_TOTAL_PENER...	0.010365	2202.673	5.597991

Source: EViews12 data output processed, 2023

**d. Heteroscedasticity Test**

The heteroscedasticity test aims to test whether in the regression model there is inequality of variance from the residuals of one observation to another.

Table 4.6 Table of Heteroscedasticity Test Results

Heteroscedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	0.650396	Prob. F(7,72)	0.7128
Obs*R-squared	4.757590	Prob. Chi-Square(7)	0.6895
Scaled explained SS	3.689145	Prob. Chi-Square(7)	0.8148

Source: EViews12 data output processed, 2023

The results of the Breusch-Pagan-Godfrey test using the EViews 12 application show the probability value of Obs\*R-squared is equal to 0.6895. This value is greater than the alpha ( $\alpha$ ) level of 0.05, so it can be concluded that there are no symptoms of heteroscedasticity.

**4.2.2 Coefficient of Determination Test (R-Square)**

The R-square value lies between zero and one ( $0 < R\text{-square} < 1$ ). The R-square calculation result is 0.897970, this means the farmer's age, farmer's last education, land area before conversion, revenue before conversion, operational costs after conversion, operational costs before conversion, and total revenue after land conversion. What was done had an influence on the area of land that changed function by 89.79%, while the remaining 10.21% was influenced by other variables that were not observed in this regression analysis model.

Table 4.7 Table of Regression Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.530125	1.706930	-3.236018	0.0018
USIA_TAHUN	0.004856	0.005389	0.901025	0.3706
PENDIDIKANTERAKHIR	0.117469	0.054668	1.816788	0.0734
LUAS_LAHAN_SEBELUM_ALH_FUNGSI...	0.000165	3.28E-05	5.037758	0.0000
TOTAL_PENERIMAAN_SEBELUM_ALI...	8.41E-09	1.54E-08	0.416899	0.6780
BIAYA_OPERASIONAL_RP_TAHUN	-2.36E-08	1.53E-08	-1.541368	0.1276
BIAYA_OPERASIONAL_SEBELUM_ALI...	-5.15E-10	4.28E-09	-0.012032	0.9904
LN_TOTAL_PENERIMAAN_RP_TAHUN	0.758938	0.101808	7.454610	0.0000
R-squared	0.897970	Mean dependent var	8.505626	
Adjusted R-squared	0.888060	S.D. dependent var	0.964626	
S.E. of regression	0.339445	Akaike info criterion	0.711822	
Sum of squared resid	7.814428	Schwarz criterion	0.960026	
Log likelihood	-20.47289	Hannan-Quinn criter.	0.807324	
F-statistic	90.52489	Durbin-Watson stat	1.955679	
Prob(F-statistic)	0.000000			

Source: EViews12 data output processed, 2023

#### 4.2.3 F Test (Simultaneous Test)

The F test (simultaneous test) aims to find out whether there is an influence between the independent variables together (simultaneously) on the dependent variable. The statistical results of the F test can be seen in table 4.7 above, where the probability value (F-statistic) of 0.000000 is obtained, which is smaller than the alpha ( $\alpha$ ) significance level of 0.05, namely  $0.000000 < 0.05$ . This shows that the seven independent (free) variables together (simultaneously) have a significant effect on the dependent (dependent) variable.

#### 4.2.4 T-test (Partial Test)

The t test is used to partially test each variable *independent* on the dependent variable. The t test results can be seen in table 4.7 Regression Test Results in the Prob column. If the value in the Prob column.  $< 0.05$ , then it can be said that the independent variable has a significant effect on the dependent variable partially. The results of the individual partial regression coefficient test for each independent variable on the dependent variable can be analyzed as follows:

1. The Farmer Age variable (X1) has a probability value of  $0.3706 > 0.05$  with a coefficient of 0.004856, so it can be concluded that the farmer age variable has no significant positive effect on the area of land that changes function (reject the  $H_a$  hypothesis and accept the  $H_o$  hypothesis).
2. The Farmer's Last Education Variable (X2) has a probability value of  $0.0734 > 0.05$  with a coefficient of 0.117469, so it can be concluded that the farmer's last education variable has no significant positive effect on the area of land that changes function (reject the  $H_a$  hypothesis and accept the  $H_o$  hypothesis).
3. The variable land area before land conversion (X3) has a probability value of  $0.0000 < 0.05$  with a coefficient of 0.000165, so it can be concluded that the land area variable before land conversion has a significant positive effect on the area of land that changes function (reject the hypothesis  $H_o$  and accept hypothesis  $H_a$ ).
4. The variable revenue before conversion (X4) has a probability value of  $0.6780 > 0.05$  with a coefficient of 6.41E-09, so it can be concluded that the variable revenue before conversion of land has no significant positive effect on the area of land converted (reject the  $H_a$  hypothesis). and accept the hypothesis  $H_o$ ).
5. The operational cost variable after conversion (X5) has a probability value of  $0.1276 > 0.05$  with a coefficient of -2.36E-08 or -0.0000000236, so it can be concluded that the operational cost variable

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after conversion of farmer's land has no significant positive effect on area of land that has changed function (reject the  $H_a$  hypothesis and accept the  $H_o$  hypothesis).

6. The variable operational costs before conversion ( $X_6$ ) has a probability value of  $0.9904 > 0.05$  with a coefficient of  $-5.15E-10$ , so it can be concluded that the variable operational costs before conversion of farmers' land does not have a significant positive effect on the area of land converted (reject the  $H_a$  hypothesis and accept the  $H_o$  hypothesis).
7. The variable revenue after conversion ( $X_7$ ) has a probability value of  $0.0000 < 0.05$  with a coefficient of  $0.758938$ , so it can be concluded that the variable revenue after conversion of land has a significant positive effect on the area of land converted (reject the  $H_o$  hypothesis and accept the hypothesis  $H_a$ ).

Based on the results of the multiple linear regression analysis in table 4.7 above, a mathematical relationship model can be written between the area of land that has changed function and the factors that influence it as follows:

$$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \alpha_7 X_7$$

$$Y = -5.530125 + 0.004856X_1 + 0.117469X_2 + 0.000165X_3 + 6.41E-09X_4 - 2.36E-08X_5 - 5.15E-10X_6 + 0.758938X_7$$

The results of multiple linear regression analysis show the factors that have a real influence on the area of land converted to wetland rice farming in Simalungun Regency, namely  $X_3$  (land area before conversion);  $X_7$  (revenue after change of function as farmer), while the other variables are  $X_1$  (age of farmer), has no real effect (the influence of the variable is very small).

## CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusion

Based on the economic analysis of the conversion of wetland rice farming land in Simalungun Regency (Case Study of the Villages of Pamatang Simalungun, Rambung Merah, Karang Bangun and Siantar Estate, Siantar District, Simalungun Regency) the following conclusions were obtained:

1. The average economic value of land (land rent) for all farmers who are research respondents is IDR 24,771,425/year. Based on the classification of agricultural land per  $m^2$ , the average land rent of respondents for lowland rice crops can be obtained at IDR 5,920/ $m^2$ / year, and the average land rent for respondents for other food crops and horticulture is IDR 7,287/ $m^2$ /year.
2. The average overall farming income of farmers who were research respondents in one year was IDR 38,743,925/year. Based on the classification of agricultural land per  $m^2$ , the average income of respondents from paddy fields can be obtained at IDR 7,370/ $m^2$ /year, and the average income for respondents from other food crops and horticulture is IDR 24,231/ $m^2$ /year.
3. Based on the results of the regression analysis, the factors that have a significant influence on the conversion of wetland rice farming land in Simalungun Regency are land area before conversion and revenue after conversion of agricultural land, while other independent variables have no significant effect.

### 5.2 Suggestions

1. The policy on regional spatial planning for Simalungun Regency needs to be strengthened again so that it can control the conversion of wetland rice farming land, especially in the four villages that are the research locations, which are areas directly adjacent to the center of Pamatang Siantar city.
2. Intense assistance and counseling for lowland rice farmers needs to be increased to increase farmers' knowledge in managing their agricultural land, so that they can maintain the productivity of their crops and the fertility of their agricultural land.

3. For future researchers, the results of this research can be used as reference material and considerations to deepen further research regarding the economic analysis of conversion of wetland rice farming land.

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