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PRODUCTION EFFICIENCY ANALYSIS OF RICE WITH JAJAR LEGOWO METHOD ON SRI IN LIMA PULUH KOTA REGENCY

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Abstract

This study aimed to analyzed the factors that affect the rice production, and to determine the level of production efficiency of rice with jajar legowo method on SRI in Nagari Situjuah Gadang. The study was conducted with survey method on 30 samples taken by proporsionate purposive sampling. The data analysis used multiple linear regression analysis and production efficiency analysis of Cobb-Douglass. The results showed that the use of factors of production of seeds, organic fertilizer, inorganic fertilizer and labor impact together on rice production with a calculated F value of 52.387. Partially, the use of each factor of production have a significant effect on rice production. The results of production efficiency analysis showed that the production process is already technically efficient with a value TER 0,97. The use of factors of production of seed, fertilizer organic and inorganic fertilizer are not economically efficient, and the use of production factor of labor is economically inefficient. Scale rice farming is at a level increasing returns to scale so that the level of optimum use of production factors can not be determined. To increase production, farmers should use as much as 1-3 seeds per planting hole; pay attention to the rules of the use of balanced fertilizer; increase the amount of organic fertilizer use; and reduce the use of labor at harvest..

Keywords : ***production efficiency, jajar legowo, SRI, Coubb-Douglass***

1.INTRODUCTION

One of agricultural commodity that is currently superior is rice. Rice is a food crop that produce rice as a staple food, so the sustainability of rice production is important to be maintained, consider that Indonesian still depend on rice as a staple food. The need for food increases with increasing population growth. Therefore, in Indonesia rice is not only as a food commodity but also as a strategic commodity in maintaining food security.

Efforts to increase rice production have been initiated since the middle of 1950 through the program of Swa Sembada Bahan Makanan (SSBM). Through various programs of rice intensification such as Bimas (Bimbingan Masal), Insus (Intensifikasi Khusus), Inmas, Inmun, Opsus (Operasi Khusus) and Supra Insus can produce rice a number of 12.2 million tonnes in 1969 and increased sharply to 25 million tonnes in 1985, with an average increase rate of 6.9% in the first year. However, since the achievement of rice self-sufficiency in 1984, the national rice production is very volatile and tends to decline continuously reachead 2.7% for the first year in the period of 1985-1997 (Fagi and Kartaatmadja, 2003 in Setyorini et al, 2004:2)

In West Sumatera, the development of rice cultivation technology has always changed. A various of innovations and technologies have been developed to increase rice production. Originally in 2008, through a large school, the government launched a integrated crop management of rice integrated through the use of hybrid rice in 11 regencies in West Sumatera or known as SL-PPT (Sekolah Lapang Pengelolaan Tanaman Terpadu) to accelerate the adoption of rice technology innovations as well as introduce the program package Padi Tanam Sebatang (PTS) or known as SRI (System of Rice Intensification) (BPTP Sumatera Barat , 2015).

In 2015 through the special efforts Upaya Khusus (UPSUS) Swasembada Padi, Jagung dan Kedelai (PAJALE) program introduced rice planting Jajar Legowo (JARWO) to increase the rice productivity as much as 5.28% of the highest ever achieved at the year. Now, Legowo cultivation was developed continuously through the program "Gerakan Pemberdayaan Petani Terpadu Melalui Kegiatan Tanam Serentak" (BPTP Sumatera Barat, 2015).

Situjuah Limo Nagari district is one of the districts in Lima Puluh Kota regency which has applied Jajar Legowo method of rice cultivation. In the beginning, rice cultivation only use conventional cultivation. In the year 2012 introduced SL-PTT package which was continued with the application of SRI in the year 2013 and 2014 through the program SL-PTS, TPT, and OPLA but the results are less maximum because the rice crop is affected by pest attack. Then in 2015 through Badan Penyuluhan Pertanian Kecamatan Situjuah Limo Naga, farmers began to be directed to plant rice with the Legowo method in SRI at the same time. Currently, the implementation of SRI in Situjuah Limo Nagari Sub-district is not purely using a single stem of rice plants, but using two to three rods for one planting hole (BP3K of Situjuah Limo Nagari Sub-district, 2015).

In agriculture, farmer need to allocate the resources effectively and efficiently to gain the maximum income in a time. The efficient point can be reached by using the suitable input. Farmer's input are limited while the farmer want to gain the highest output (Rendasari, 2016: 3).

The utilization of new technology can improve the efficiency on agriculture. Jajar legowo as a new technology on rice cultivation can be utilized in output improvement and productivity. Compare to traditional cultivation, jajar legowo method produce higher output and use input efficiently.

One of the best method to obtain the efficient input utilization is using production efficiency. Production efficiency can be used by using technical and economical approach. Technical efficiency can be reached if farmer allocate input in such a way so the high result can be obtained. While economical efficiency can be reached if value of marginal product in every single input is equal to the input price, and farmer can improve their income in cultivating. However, to make the efficiency input utilization by using efficiency production, we need to know the maximum output in a certain level of technology (Kusnadi, et al, 2011: 31).

2.METHODS

30 farmers are used as sample. It was conducted from a whole of farmer group who used jajar legowo method in cultivating rice. The sample was taken by proporsionate purposive sampling method.

This study used primary data which collected by survey and interview method with questionary. The data were rice output before and after applying jajar legowo method on SRI, seeds, organic fertilizers, anorganic fertilizers, and labor. The data was analyzed by quantitative method such as quantitative descriptive analysis, multiple linear regression analysis and production efficiency analysis of Cobb-Douglass, and also production efficiency using technical and economical efficiency.

The production function of production rice with jajar legowo method on SRI assumed that using Cobb-Douglass form because consist of two variables, which is the first variable as independet variable (X) and the other one as dependent variable (Y). The form between Y and X variables such as :

$$Y = aX_1^{b1}\, X_2^{b2.} \ldots X_i^{bi} \ldots X_n^{bn}\, e^u$$

Where :

Y = dependent variable

X = independent variable
a,b = suspect value
u = *disturbance term*
e = natural logarithmic, e = 2,718

This study used four independent variables, seeds, organic fertilizers, anorganic fertilizers, and labor. To estimate the value of Cobb Douglass , the function must be converted to multiple linear form by logging the equation into a natural logarithm, so the form such as :

$$LnY = Ln\ a + b_1\ Ln\ X_1 + b_2\ Ln\ X_2 + b_3\ Ln\ X_3 + b_4\ Ln\ X_4 + \mu$$

Keterangan :

Y = output (kg/ha)
X_1 = seed (kg/ha)
X_2 = organic fertilizer (kg/ha)
X_3 = anorganic fertilizer (kg/ha)
X_4 = labor (HKP/ha)
a = constant
b_1 = seed coefficient
b_2 = organic fertilizer coefficient
b_3 = anorganic fertilizer coefficient
b_4 = labor coefficient
μ = disturbance term

The equation can be solved by multiple linear regression method. A good regression model must be free from deviating classical assumptions which include normality test, multicollinearity test and heteroscedasticity test. After that, the model must be followed by statistical justification (statistical test). statistical justification is a test of giving goodness of model concerning the accuracy of the sample regression function in estimating actual by looking at the goodness of fit which is statistically measured from the statistical test, such as determination coefficient (R2), F test (simultaneous test), and t test (individual test).

Next, production efficiency analysis is carried out by analyzing technical efficiency and economics efficiency. Nurmalina et al (2012:20), state that production efficiency or technical efficiency can be increased through the application of technology. Technical efficiency is calculated using the formula ::

$$TER_i = \frac{Y_i}{\hat{Y}_i}$$

Where :

TER = *Technical Efficiency Rate*
Y_i = actual production
$\hat{Y}_i$ = potential production

If technical efficiency index > 0,70, so it can be categorized efficienct technically (Coelli, 1998 in Kusnadi et al, 2011: 41).

Then, economical efficiency can be analyzed by efficiency in input using approach (allocative efficiency). That analyzed used to see if the input using or production factor in agriculture has been efficient or not and to determine optimum input using. Th efficiency can be reached if marginal product value for one production factor is equal with the price, so it can be written such as :

NPMxi = Pxi

$$\frac{NMPxi}{Pxi} = 1$$

$$\frac{bi.Y.Py}{Xi} = Pxi \text{ atau } \frac{bi.Y.Py}{Xi.Pxi} = 1$$

Where :
bi = production elasticity i
Y = production
Py = production price
Xi = input total i
Pxi = input price i

To reach efficiency, where NPMxi = Pxi, it is important to calculate the optimum value of each production factor. According to Soekartawi (2003: 44-45), optimum input using can be determined by calculating value added from each factor, it can be written as :

$$\Delta Y.\,Py = \Delta X.\,Px \text{ ; atau}$$

$$\frac{\Delta Y}{\Delta X} = \frac{Px}{Py} \rightarrow PM = \frac{Px}{Py}$$

While,

$$\text{Production elasticity (bi)} = PM \times \frac{X}{Y} \rightarrow PM = \frac{bi.Y}{X}$$

Where :
Y = output
X = input
ΔY = additional output
ΔX = additional input
Py = output price
Px = input price
ΔY/ ΔX = marginal product value (NPM)
bi = production elasticity

Then, th formula (10) can be subtituted to the formula (9), so new formula can be obtained such as :

$$\frac{bi.Y}{X} = \frac{Px}{Py}$$

From formula (11), optimum using of input can be determined such as :

$$X = \frac{bi.Y.Py}{Px} \rightarrow Xi = \frac{bi.Y.Py}{Pxi}$$

Where :
bi = production elasticity i
Xi = input i
Pxi = input price i

After optimum value of each input has been determined, rice cultivating can reach the efficiency point, where NPMxi = Pxi.

3. RESULT

As the result, known that the application of jajar legowo method that farmer using was different each other. 70% of farmer prefer to apply 4:1 type of jajar legowo method. It was suitable with recommendation of BPTP West Sumatera which type 4:1 of jajar legowo method was choosen as planting recommendation to farmer because it consider efficiency point technically and effectivity production price in using fertilizer and seed and also the effect of rice production (BP3K Situjuah Limo Nagari District, 2015). At amount 13,4% farmers applied 2:1 type, 10% farmer apllied 6:1 type, and the others applied 3:1 and 5:1 type. But from this study, the differences between production on jajar legowo type did not showed the result.

Before applying jajar legowo method, farmer in Situjuah Gadang village only applied traditional system which average production for one Ha only 3800 - 4000 kg (3.8 - 4 tons). After applying jajar legowo method on SRI, the production can improve by 30%, so the average of production will get 5200 kg if cultivating rules was applied as recommendation and based on fertilizer balancing using. In area research, the differences in production can be seen in the following table.

Table 1. The Comparison of Average Production and Productivity of Ordinary (Conventional) Rice Planting with Jajar Legowo Planting in Respondents Farmer

Method	Land Area (Ha)	Average Production (Kg)	Average Productivity (Kg/Ha)
Conventional	0,4245	1.617,33	3.809,96
Jajar Legowo	0,4245	1.935,47	4.559,4

From table 1, it can be seen that the productivity of respondents' lowland rice in Nagari Situjuah Gadang increased by 19.67% or by 749.44 Kg / Ha from those who previously applied conventional conventional planting compared to after applying jajar legowo planting. It is because the implementation of jajar legowo contributes to a greater supply of lowland rice production than conventional planting, so that the average lowland rice productivity of respondents in Nagari Situjuah Gadang increases. For respondents, the highest production achieved by farmers for 1 hectare of planting lowland rice which implements jajar legowo method with SRI is 4,560 kg (4.56 tonnes) or 120 katidiang. Whereas in ordinary planting, the highest production produced by farmers was 3,809 (3.8 tons) or equivalent of 100 *katidiang.*

3.1. Classic Assumption Test

Normality Test

The normality test was done by using the P-Plot chart test and the One Sample Kolmogorov-Smirnov Test of statistical test. In Figure 1 below, it can be seen that the points spread and coincide around the diagonal line and the distribution is in the direction of the diagonal line, so it is concluded that the data residuals have a normal distribution and meet the classical assumptions of normality.

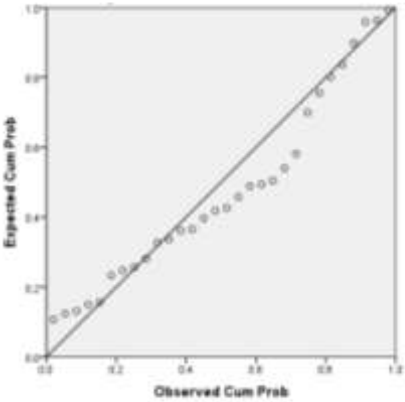

Figure 1. *Normal P-Plot of Regression Standardized Residual*

Furthermore, the results of the One Sample Kolmogorov-Smirnov Test obtained the Asymp value. Sig (2-tailed) or the residual significance value of the data, and all variables, both the dependent variable and the independent variable > 0.05, it can be concluded that the data for each variable has been normally distributed. For more details can be seen in table 2 below.

Table 2. One Sample Kolmogorov Smirnov Test

		Stand. Res	**Y**	**X1**	**X2**	**X3**	**X4**
N		30	30	30	30	30	30
Normal Parameters[a.b]	Mean	0,000	7,382	1,90	5,60	4,87	7,38
	Std. Deviation	0,928	0,623	0,654	1,281	0,414	0,428
Most Extreme Difference	Absolute	0,162	0,132	0,159	0,210	0,162	0,122
	Positive	0,62	0,127	0,159	0,153	0,076	0,085
	Negative	-0,090	-0,132	-0,111	-0,210	-0,162	-0,122
Kolmogorov-Smirnov Z		0,886	0,721	0,868	1,153	0,887	0,667
Asymp. Sig. (2-tailed)		**0,412**	**0,675**	**0,438**	**0,140**	**0,411**	**0,765**

3.2. Multicollinearity Test

The multicollinearity test aims to see whether there is a relationship or correlation between independent variables or not (Latan and Temalagi, 2013: 63). To detect multicollinearity, look at the VIF (Variance Inflation Factor) value and tolerance as in Table 3 below.

Table 3. *Variance Inflation Factor and Tolerance Value*

Variabel	Tolerance	VIF	Conclusion
Seed	0,277	3,607	Multicollinearity does not occur
Organic Fertilizer	0,803	1,246	Multicollinearity does not occur
Anorganic Fertilizer	0,407	2,457	Multicollinearity does not occur
Labor	0,389	2,574	Multicollinearity does not occur

From the analysis, it is obtained that the VIF value of all independent variables is less than 10 and the tolerance value for all independent variables is greater than 0.1. So it can be concluded that there is no multicollinearity. Then to detect multicollinearity between independent variables using the Pair Wise Correlation value as in table 4 below.

Table 4. ***Coefficient Correlations***

	Seed	Organic Fertilizer	Anorganic Fertilizer	Labor
Seed	1,000	-0,278	-0,551	-0,522
Organic Fertilizer		1,000	0,327	-0,150
Anorganic Fertilizer			1,000	-0,171
Labor				1,000

Based on the table, it can be seen that all the value of the Pair Wise Correlation coefficient between the independent variables is <0.70. According to Suliyanto (2011: 85), if the correlation coefficient value between each independent variable is <0.7 then the model does not contain multicollinearity symptoms.

3.3. Heteroscedasticity Test

To detect heteroscedasticity in the regression model, the scatterplot test is used as shown in Figure 3 below. According to Gujarati (2007: 103), a good regression model wants µ1 disorders to all have the same variance (homoscedasticity).

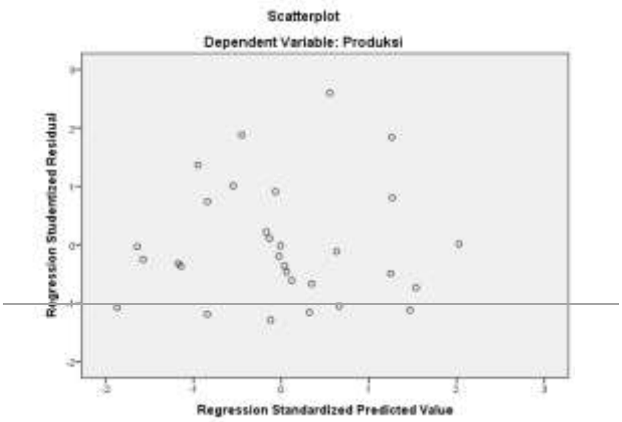

Figure 2. *Scatterplot*

From the scatterplot image, it can be seen that the scatterplot graph points spread randomly below and above the number 0 on the Studentized Residual Regression axis and and do not converge in one place, and do not form a clear pattern. It can be concluded that the regression model is free from heteroscedasticity problems.

3.4. Multiple Linear Regression Analysis

The results of multiple linear regression analysis of the Cobb-Douglas production function show that the coefficient of determination (R2) is 0.893. It means that 89.3% of the variation in rice production is influenced by variations in the variables in the model which include seeds, organic fertilizers, inorganic fertilizers, and labor; while the remaining 10.7% is influenced by other factors that are not included in the model. The results of the analysis are presented in table 5 below.

Table 5. Results of the Production Function Regression Analysis

Variabel	Regression Coefficient (β)	Std Error	Beta	t value	Sig.
(Constant)	2,993	0,736		4,067	0,000
Seed (X_1)	0,452	0,128	0,475	3,831	0,001

Organic Fertilizer (X_2)	0,115	0,035	0,236	3,238	0,003
Inorganic Fertilizer (X_3)	0,325	0,154	0,216	2,107	0,045
Labor (X_4)	0,361	0,152	0,248	2,372	0,026
Calculate F Value		: 52,387			
R *Square*		: 0,893			

Based on the table above, the regression estimator line for the Cobb-Douglas production function in multiple linear form is as follows.

$$\text{Ln } Y = \text{Ln } 2{,}993 + 0{,}452 \text{ Ln } X_1 + 0{,}115 \text{ Ln } X_2 + 0{,}325 \text{ Ln } X_3 + 0{,}361 \text{ Ln } X_4$$

In exponential form :

$$Y = 19{,}9454\, X_1^{0{,}452}\, X_2^{0{,}115}\, X_3^{0{,}325}\, X_4^{0{,}361}$$

The results of the analysis in the table show that the variables of seeds, organic fertilizer, inorganic fertilizer, and labor have a significant effect together with the calculated F value of 52.387 (greater than F table = 2.76 with α = 5%, df1 = 4 , df2 = 25). Of the 4 variables that are thought to affect rice production, the results show that these four variables have a positive effect on rice production.

The estimation result of the seed regression coefficient on production of 0.452 indicates that every 1% addition of seed will cause an increase in production of 0.452% (assuming other factors are considered constant). The calculated t value of 3.381 (greater than t table = 2.059, with α / 2 = 0.025, df = 25) indicates that the seed variable has a partially significant effect on rice production.

The organic fertilizer regression coefficient value of 0.115 indicates that each addition of 1% organic fertilizer will cause an increase in production of 0.115% (assuming other factors are considered constant). The calculated t value of 3.238 (greater than t table) indicates that the organic fertilizer variable has a partial significant effect on rice production.

Then, the regression coefficient value for inorganic fertilizers is 0.325, indicating that each addition of 1% organic fertilizer will cause an increase in production of 0.325% (assuming other factors are considered constant). The calculated t value of 2.107 (greater than the t table) indicates that the inorganic fertilizer variable has a partial significant effect on rice production.

The estimation result of the labor regression coefficient of 0.361 indicates that each addition of 1% organic fertilizer will cause an increase in production of 0.115% (assuming other factors are considered constant). The t value of 2.372 (greater than the t table) indicates that the labor variable has a partially significant effect on rice production.

3.5. Technical Efficiency Analysis

Technical efficiency is carried out to see whether the production process is technically efficient or not. Technical efficiency can be calculated by comparing actual production and potential production. Actual production is the average production yield of respondents in the study area, and potential production is the production obtained from the equation of the production function by entering the average use of each factor of production into the equation. The results of technical efficiency testing can be seen in table 6 below.

Table 6. Technical Efficiency Analysis

Variable	Regression Coefficient	Average of input using
Constant		19,9454
Seed	0,452	8,416
Organic Fertilizer	0,115	429

Inorganic Fertilizer	0,325	140,5
Labor	0,361	40,48
Actual Production	: 1935,5	
Potential Production	: 1990,36	
Technical Efficiency	: 0,97	
Conclusion		: Efficient

The average actual production of the respondents in the study area was 1935.5 kg, while the potential production obtained from the equation of the production function by including the average use of seeds was 8.416 kg; the use of organic fertilizer as much as 429 kg; use of inorganic fertilizers as much as 140.5 kg; and the use of labor as much as 40.48 HKP equal to 1990.36 kg. From the results of the analysis of the technical efficiency test by comparing actual and potential production, the technical efficiency rate is 0.97; meaning that the production process is efficient because it is greater than the efficiency limit (0.97> 0.70). It means that on average the respondents in Nagari Situjuah Gadang are technically efficient in doing business.

3.6. Economic Efficiency Analysis

Economic efficiency analysis is used to see whether the use of production factors in rice farming using the legowo method on SRI is efficient or not. The farming will be economically efficient if the ratio between the marginal product value (NPMxi) for one production factor and the factor price (Px) is equal to one. The results of calculating the ratio between NPMxi and Pxi can be seen in table 7 below.

Table 7. **The Ratio of NPMxi and Pxi of Each Production Factor of Rice Farming Respondents using the Jajar Legowo Method on SRI**

Variabel	β	X	Y	Py	Px	PM	NPM	NPM_{xi}/P_{xi}
Seed	0,452	8,416	1.935,5	5.450	10.350	103,94	566.453,2	54,73
Organic Fertilizer	0,115	429	1.935,5	5.450	516,67	0,5188	2.827,64	5,47
Anorganic Fertilizer	0,325	140,5	1.935,5	5.450	6.054	4,477	24.400,01	4,03
Labor	0,361	40,48	1.935,5	5.450	232.135	17,26	94.069,68	0,41
Σβi	**1,253**							

From the table above, it can be seen that the ratio of NPMxi and Pxi for seeds, organic fertilizers and inorganic fertilizers are > 1, meaning that the use of each production factor is not efficient. To be efficient, the use of seed production factors, organic fertilizers and inorganic fertilizers needs to be added. Meanwhile, the ratio of NPMxi and Pxi of labor is <1, meaning that the use of labor is inefficient. To be efficient, the use of labor production factors needs to be reduced.

Furthermore, in table 13, it can be seen that the number of regression coefficient (Σβi) is 1.253 (greater than one). It means that the scale of the business can be seen if the rice farmers in the study area add a certain amount of production factors, it will increase rice production greater than the added production factors. So it can be said that if farmers add 1% of production factors, it will increase production by more than 1%.

According to the law of diminishing returns, the state of business scale is in stage I, where marginal product > average product, production elasticity> 1, which is indicated by the increasing marginal product in a state of increasing total production (Figure 4). This area is an irrational area, because each addition of each input causes the addition of output that is greater than the addition of the input. At this stage, production has not reached the maximum point, so farmers are still able to obtain a sufficient amount of production that is quite profitable when a number of inputs can still be added (Soekartawi, 2003: 42). To get maximum profit, farmers can increase their income by using more production factors until they get maximum production.

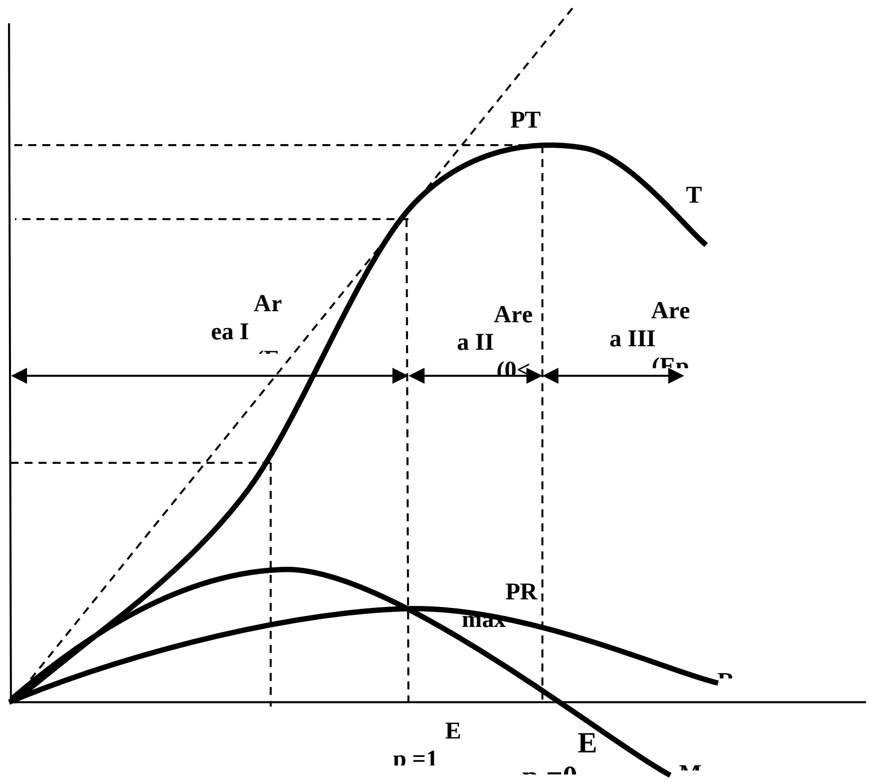

Figure 3. Production Curve of Three Stage Production Function

To achieve economic efficiency, it is important to find the optimum use of production factors for each production factor. If the ratio of NPMxi and Pxi is equal to one, the production process has reached economic efficiency. However, the scale of business in rice farming using the legowo row method on SRI in Nagari Situjuah Gadang is at stage I (indicated by the value Σβi = 1.253> 1), so the optimum combination level of the use of production factors cannot be determined. The level of optimum use of production factors can only be determined during the production process at a reduced yield increase stage or in a rational area (Nerlove, 1965 in Febriamansyah, 1985: 53). In the first stage of production, the maximum production has not been reached, so that the maximum profit has not been achieved by farmers. Farmers can continue to increase the use of production factors to achieve maximum production in stage II.

Bilas (1992: 191) states that the production process in stage I is characterized by an increasing average product, so that the total product must also increase. At this stage the efficiency of production factors increases along with the increase in the use of production and production factors, so that the optimum level of use of production factors cannot be determined. Whereas in stage II, it is marked by decreasing AP and MP, thus the efficiency of production factors decreases so that the optimal use of production factors can be sought to increase efficiency in order to achieve maximum production. If the analysis of the use of optimum production factors is still carried out, the combination of these production factors cannot be applied by farmers in farming. This is because the number of combinations of production factors obtained exceeds the maximum use limit recommended in rice cultivation using the legowo row method on SRI. In addition, the scale of farming in this study was also small, because this study only took a sample (respondents) of 30 people, where each respondent had a small area of land. The average land use of the respondents is 0.42 Ha, so that economic efficiency has not been achieved and the optimum level of input use cannot be determined.

4.CONCLUSION AND RECOMMENDATION

4.1.Conclusion

The appliaction of jajar legowo method on SRI in Nagari Situjuah Gadang was able to increase the average productivity of rice by 19.67% or by 749.44 kg / ha compared to conventional cultivation method. The production factors of seeds, organic fertilizers, inorganic fertilizers, and labor have a significant effect simultaneously and partially significant effect on rice production. Farmers who apply the jajar legowo method on SRI in Nagari Situjuah Gadang, Situjuah Limo had achieved technical production efficiency with a TER value of 0.97. However, the use of production factors is not economically efficient where the value of the NPM / Px ratio of the production factors of seeds, organic fertilizers and inorganic fertilizers is greater than one, and the use of labor is not economically efficient because the value of the NPM / Px ratio of labor is smaller than one.

4.2.Recommendation

The steps that can be taken to increase production and achieve efficiency in farming are to use production factors as recommended, such as using 1-3 seeds per planting hole; pay attention to the rules for the use of balanced fertilizers, namely the use of 100 kg of Urea fertilizer, 150 kg of Phonska fertilizer, and if using SP-36 fertilizer, the use of 100 kg of Phonska fertilizer and 75 kg of SP-36 fertilizer; then increase the amount of use of organic fertilizers; and reduce the amount of labor, especially at harvest. For this reason, government intervention is needed to increase extension programs on legowo rice cultivation to farmers so that the adoption process of technological innovation is spread evenly to each farmer group and especially farmers so that farmers are able to apply jajar legowo method on SRI in accordance with cultivation recommendations to increase production is more significant and it is necessary to supervise and control the farmer groups which applied jajar legowo method.

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