# Profitability And Profit Factors Of Rice Farming In Rainfed Lowland Based On Land Tenure

Arifin, Sofyan, Nirawati, Muhammad Arsyad Biba

**Abstract:** The main income sources of the community, especially the rural community, still depend on the agricultural sector. This mean that the life of most households depends on the agricultural sector. Farming activities have a goal to increase productivity for higher profits. Production and productivity can not be separated from the factors of production owned by farmers to increase production and income obtained from farming. The purposes of this study are to analyze the production, profitability and the factors that influence the profit of rice farming in rainfed lowland based on land tenure. This study uses primary and secondary data. The population of this study are farmers who carry out rice farming in rainfed lowland. In the determination of respondents done by simple random sampling method. Data processing is done by using tabulation and percentage. Technical analysis used is quantitative descriptive and multiple regression analysis. The results showed that: (1) production and profitability of rice farming in rainfed lowland based on land tenure is economically feasible and feasible to be cultivated or continued. (2) Factors that have significant effecting the benefits of rice farming in rainfed lowland based on land tenure are land area, labor wage, urea fertilizer price, $SP_{18}$ fertilizer price, farming experience, and land tenure.

**Keywords:** Profitability, Benefit, Land Tenure

## 1. INTRODUCTION

The development of the agricultural sector in Indonesian essentially aims to improve the welfare of farmers and sustain the success of national development and play a role in the structure of the national economy and is the largest source of livelihood nationally (Waryanto et al, 2014; Suharyanto, 2015; Supartama et al., 2013). The main activities and main income sources of the community, especially the rural community, still depend on the agricultural sector. This may mean that the life of most households depends on the agricultural sector (Koirala et al, 2016; Dewi, 2016; Tashikalma et al., 2014; Haneishi et al., 2013; Effendy, 2010). The slowing productivity of rice farming per hectare shows that the marginal productivity of rice farming is almost maximal near leveling off (Kusnadi et al, 2011). Productivity is closely related to the use of production factors because productivity concerns how much the amount of output produced for each particular input unit (Roy and Chan, 2015; Prayoga, 2010). The use of production factors or inputs of production should be considered in farming activities in order to avoid excessive use which may be detrimental to farmers or affect income and lead to unoptimal production levels (Cañete et al, 2016; Chendo GN et al, 2014; Gultom et al., 2014; ). Intensification effort or technological improvement more likely to increase production, while through extensification or expansion of wetlands increasingly inefficient (Kusnadi et al, 2011). Increased population and reduced agricultural land due to land conversion from agricultural land to non-agricultural land, establishment of housing or industries (Ambarsari et al, 2014, Nurjannah and Purwandari, 2012). Under these conditions the government must find and utilize all the potential of natural resources to increase agricultural production one of them by utilizing rainfed lowland (Ngongo and Marawali, 2015). Farming activities have a goal to increase productivity for higher profits (Girei et al, 2016). Production and productivity can not be separated from the factors of production owned by farmers to increase production and income obtained from farming. This requires farmers to use the production factors and income owned in efficient management of farming. The purposes of this study is to analyze the production and profitability of rice farming in rainfed lowland based on land tenure, and to analyze the factors that affecting the profit of rice farming in rainfed lowland area based on land tenure.


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## 2. METHODS

### Study Site

This research was undertaken in Tanete Village Simbang Sub-Regency, Maros Regency, Province of South Sulawesi, Indonesia in 2017. The data collected in this research cover primary and secondary data. To collect data used three techniques, namely observation, recording and interview. This research covers aspects of production, profitability, feasibility and profit factor.

### Population and Sample

The population of this study are farmers who carry out the activities of rice farming in rainfed lowland amounting to ± 300 people in the study sites. In the determination of respondents conducted by simple random sampling method where all population have the same opportunity to be selected as a sample of all farmers in the study area. The number of sample farmers taken is 30 people working on their own land and 30 people working on other people's land, so the total sample size is 60 respondents.

### Technical Analysis

Technical analysis used is quantitative descriptive to get production and profitability, multiple regression analysis for factors affecting the profit of farming. To find the production and profitability of rice farming in rainfed lowland based on land tenure, the following analysis is used.

$\pi = TR - TC$

$= P.Q - (TVC + TFC)$

Where :

$\pi$ = Profit (IDR/ha)
TR = Total Revenue (IDR/ha)
TC = Total Cost (IDR/ha)
P = Output Price (IDR/ha)
Q = Output Amount (IDR/ha)
TVC = Total Variable CostIDR/ha)

TFC = Total Fixed Cost (IDR/ha)
B/C-Ratio = π/TC
Criteria :
if B/C > 1 farming is feasible
if B/C ≤ 1 farming is not feasible
The equation model used to analyze factors affecting the benefits of rice farming in rainfed lowland based on land tenure is :

$$\pi = \ln\beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + \beta_7 \ln X_7 + \delta_1 D_1 + \mu$$

Where :
Y = a normalized profit with an output price
$\beta_0$ = intersept
$\beta_1$- $\beta_7$ = regression coefficient (parameter)
$\delta_1$ = variable coefficient*dummy*
μ = *error term*
$X_1$ = land area (hectare)
$X_2$ = a normalized labor cost with an output price
$X_3$ = the price of a normalized seed with an output price
$X_4$ = the price of urea fertilizer is normalized with the output price.
$X_5$ = the price of $SP_{18}$fertilizer is normalized with the output price.
$X_6$ = the price of a normalized pesticide at the output price.
$X_7$ = experience of farming (year)
$D_1$ = *dummy*farmers (1 = farmers working on their own land; 0 = peasants working on the others land)

## 3 RESULTS AND DISCUSSION

### Production and Profitability of Rice Farming in Rainfed Lowland Based on Land Tenure

Production and income earned by farmers in rice farming in rainfed lowland depend on a combination of various factors that support to obtain maximum yields. The size of the production obtained by the farmers depends on the farmer's decision to allocate some resources (inputs) to be used based on recommendations or rules, the area of land used, the use of farm inputs (seeds, fertilizers, pesticides), and labor. Profitability as the difference between farm revenue and farm cash costs or costs actually incurred by farmers. Calculated farm costs include: fertilizer costs, labor costs, seed costs, pesticide costs, irrigation costs, land taxes, post harvest / processing handling costs, transport costs, and other related costs. The result of calculation of production mean and profitability from rice farming in rainfed lowland based on land tenure is presented (Table 1).

***Tabel 1.****Average Production and Profitability of Rice Farmingin Rainfed Lowland Based on Land Tenure*

| Description | Self-owned land (IDR/ha) | Working onthe others land (IDR/ha) |
|---|---|---|
| 1. Production | 3.056,67 | 4.500,00 |
| 2.Production Price | 3.400,00 | 3.400,00 |
| 3. Revenue | **10.392.666,67** | **15.300.000,00** |
| 4. Variable Cost : | | |
| 4.1. Land preparation | 452.033,33 | 61.666,67 |
| 4.2. Seedlings | 216.116,67 | 53.333,33 |
| 4.3. Planting | 220.000,00 | 433.333,33 |
| 4.4. Fertili-zation | 338.116,67 | 980.000,00 |
| 4.5. Weed Control | 268.333,33 | 53.333,33 |
| 4.6. Control of pests and diseases | 179.066,67 | 236.000,00 |
| 4.7. Irrigation | 50.000,00 | 26.900,00 |
| 4.8. Harvest | 220.000,00 | 1.021.433,33 |
| Total Variable Cost | **1.943.716,67** | **2.876.000,00** |
| 5. Fixed Cost : | | |
| 5.1. Tax | 59.833,33 | 45.500,00 |
| 5.2. Depreciation tool | 176.066,67 | 122.049,44 |
| 5.3. Contribution | 50.000,00 | 26.900,00 |
| Total Fixed Cost | **285.900,00** | **194.449,44** |
| 6. Total Cost (4 + 5) | **2.229.616,67** | **3.070.449,44** |
| Profitability : (3 – 6) | **8.163.050,00** | **12.229.550,56** |
| R/C Ratio | **3,77** | **4,98** |

Table 1 indicated that rice farming in rainfed lowland based on land tenure (farmers working on their land and peasants working on other people's land) provides a value of profitability. The average of profitability earned by farmers is the average revenue less total cost (variable cost plus fixed cost). The profitability value of rice farming in rainfed lowland based on land tenure gives different value between the farmer and his own land. The profitability of farmers working on other people's land is greater than the profitability of farmers working on their own land. This means that the income earned by the peasants working on the others land is greater than of the farmers working on their own land. The amount of income earned by farmers cultivating other people's land, because the income has not been shared with the land owner. Based on the result of business feasibility calculation by using R/C Ratio analysis tool from rice farming in rainfed lowland based on land tenure on average for farmer own tillage 3,77, while farmer work other land of 4,98. With this result both the farmers working on their own land and peasants working on other people's land R/C Ratio greater than one (3,77> 1 and 4,98> 1). The R/C Ratio is greater than one, meaning that rice farming in rainfed rice is done by the farmers working on their own land and the farmers working on other people's land is economically profitable. This indicates that the rice farming done by the farmers working on their own land and peasants working on other people's land is worth cultivated or continued. The difference in the R/C ratio of cash costs is influenced by the amount of cash cost incurred by the farmers during the farming activities. The greater the revenue the higher the R/C ratio, and the smaller the revenue the lower R/C ratio (Indah et al, 2015). Based on these results, farmers have been able to manage and allocate production inputs used to support increased production and income of rice farming. Therefore, to achieve optimal results, farmers are required to continue to manage their farms by taking into account all aspects that support the improvement of the outcome of the final results to the maximum.

### Influential Factors Against Rice Farming Benefits in Rainfed Rice Based on Land Tenure

Factors affecting the benefits of rice farming in rainfed lowland rice based on land tenure are land area, labor wage, seed price, urea fertilizer price, SP18 fertilizer price, pesticide price, farming experience, and dummy (farmer status). The step taken is to analyze the profit factors affecting profits through the Cobb Douglas production function. The results of Cobb Douglas function analysis are presented (Table 2).

***Table 2.*** *Results of Regression Analysis Factors Affecting Production of Rice Farming in Rainfed Lowland Based on Land Tenure*

| Var. | Hopeful sign | Coef. Reg. | Stand. Eror | t-test | Prob. | Sign |
|---|---|---|---|---|---|---|
| C | +/- | 4,020 | 0,289 | 13,907 | 0,000 | *** |
| $X_1$ | + | 0,139 | 0,033 | 4,174 | 0,000 | *** |
| $X_2$ | - | -0,077 | 0,029 | -2,660 | 0,010 | ** |
| $X_3$ | - | 0,054 | 0,041 | 1,318 | 0,193 | ns |
| $X_4$ | - | -0,037 | 0,022 | -1,698 | 0,096 | * |
| $X_5$ | - | -0,226 | 0,096 | -2,349 | 0,023 | ** |
| $X_6$ | - | 0,011 | 0,023 | 0,468 | 0,642 | ns |
| $X_7$ | + | 1,030 | 0,025 | 41,608 | 0,000 | *** |
| D | +/- | -0,020 | 0,008 | -2,534 | 0,014 | ** |

| | | |
|---|---|---|
| $R^2$ | 1,000 | *** : Significant with error level 1% |
| Adjusted R-squared | 1,000 | ** : Significant with error level 5% |
| S.E. of regression | 0, 009 | * : Significant with error level 10% |
| F-statistik | 60.870 *** | ns : not significant |

Based on the Table 2, it is known that the value of determination coefficient (Adjusted $R^2$) is 1,000. This means that as much as 100 percent of the variation of the gain can be explained by the variation of the independent variables in the model. The test results show that the value of F arithmetic (α: 1%), equal to 60,870 bigger than F table (2.41) means that independent variables simultaneously significantly affect the profit. The result of t-test to independent variable shows independent variable which have real effect to profit is land area $X_1$, labor wage ($X_2$), price of urea fertilizer ($X_4$), fertilizer price $SP_{18}$ ($X_5$), experience of farming ($X_7$), and mastery land (D). While the price variable of seed ($X_3$) and price of pesticide ($X_6$) have no significant effect to profit. The regression coefficient of land area variables and experience of farming is marked positive. Means any additional factor will increase profit. While the regression coefficients of labor-wage variables, urea fertilizer prices, $SP_{18}$ fertilizer prices, and land tenure are negative, meaning any reduction in profit factors will increase profits.

**1. Land Area ($X_1$)**

Regression coefficient of land area have positive regression coefficient and have real effect to profit. Regression coefficient of land area equal to 0,139, result of t test have real effect at 99 percent confidence level. This shows that the area of land has a significant effect on the increase of profit. Means any increase in land area of 1 percent will raise profit by 0,139 percent. The addition of farmed area allows farmers to raise paddy farming profits in rainfed rice fields. The greater the area of land obtained from rice farming, the greater the profits obtained by farmers. This is in line with the results of research Damanik (2014), states the land area has a positive and significant impact on the income of rice farmers. This is also true if the farmers are able to manage the maximum farming with the addition of managed land. With the addition of land area managed, the opportunity to get more production and profits can also increase.

**2. Wages of Labor ($X_2$)**

Labor regression coefficient of labor wage has negative regression coefficient and have real effect to profit. Labor regression coefficient of labor wage equal to 0,077, result of t test have real effect at 95% confidence level. This shows that the wage of labor has a significant effect on profit reduction. Means any increase in the wage of labor by 1 percent will reduce or reduce profits by 0,077 percent. Increase in wages of labor means an increase in the costs to be incurred by farmers, resulting in a decrease in profits. Increase in wages of labor in the location of research occurs at harvest and transporting the crops is needed fast handling, so that the wage of labor will increase. If the amount of labor added, it will more cost to be incurred farmers.

**3. Seed Prices ($X_3$)**

Seed price regression coefficient has positive regression coefficient and has no significant effect on profit. Most of the farmers at the study sites did not buy seeds, but the farmers used the seeds from self-made captive breeding. While other farmers who do not do seed breeding, can exchange seeds of breeding results to farmers who have seeds of captivity. with varying prices. Therefore, if there is an increase in the price of seeds then it does not affect the size of farmers' expenditure for seed prices and does not affect the profits derived from farmers from rice farming is done.

**4. Price of Urea Fertilizer ($X_4$)**

The regression coefficient of urea fertilizer price has negative regression coefficient and has significant effect to the profit. Regression coefficient of urea fertilizer price equal to 0,037, result of t test have real effect at 90 percent confidence level. This shows that the price of urea fertilizer significantly affect the profit of rice farming in rainfed lowland. Means any reduction of urea fertilizer price by 1 percent will raise profit by 0,037 percent. Similarly, every urea fertilizer price increase of 1 percent will reduce profits by 0,037 percent. The results of Hanapi and Hutapea (2014) stated that the price of urea ppupuk significantly affect the profit of rice farming. The increase and decrease of urea fertilizer price have an effect on to the profit level of irrigated paddy rice business. These results indicate that the use of urea fertilizer has not reached the maximum requirement, so by increasing the amount of urea fertilizer use within certain limits then the rice production can be increased. With the addition of urea fertilizer, the impact is the expenditure on the cost of urea fertilizer increases, thus reducing the profits derived from rice farming.

**5. Price of $SP_{18}$ Fertilizer ($X_5$)**

Regression coefficient of $SP_{18}$ fertilizer price has negative regression coefficient and have real effect to profit. Regression coefficient of $SP_{18}$ fertilizer price equal to 0,226, result of t test have significant effect on confidence level 95%. This shows that $SP_{18}$ fertilizer prices have a real and positive effect on profit. Means any decrease in $SP_{18}$ fertilizer price by 1 percent will increase profit by 0,226 percent. Vice versa, any increase in $SP_{18}$ fertilizer price by 1 percent will reduce profits by 0,226 percent. Means any increase in $SP_{18}$ fertilizer price will increase the expenditure due to the large cost that must be incurred and reduce the profit. Generally, farmers in the study sites use $SP_{18}$ fertilizer, although $SP_{18}$ fertilizer price is more expensive compared to other fertilizer prices. The consequence is the impact on the greater expenditure and a decline in profits obtained by farmers.

**6. Pesticide Price ($X_6$)**
Pesticide price regression coefficient has positive regression coefficient and no significant effect on profit. These results indicate that the use of pesticides is only done by farmers in case of pest attacks on rice plants. Farmers in using pesticides must be based on the needs of the use and the level of pest attacks. Therefore, if not occur or the level of pest attack on rice plants is still in the low category (safe limit), then the use of pesticides is not necessary or if using pesticides only within certain limits. By not using pesticides or the use of only a few, then the cost for purchasing pesticides can be suppressed so that profits can be gained more.

**7. Experience of Striving ($X_7$)**
The experiential experience variables have positive regression coefficient and have real effect to the profit. The regression coefficient of experience of farming amounted to 1,030, the result of t test had a significant effect on the 99 percent confidence level. This shows that the experience of farming has a significant effect on the benefits of rice farming in rainfed rice fields. Means each 1% increase in the farming experience will increase the profit by 1,030 percent. This shows that generally in the research area most of the inhabitants are farmers. The farmers have long been farming and farming rice as a livelihood. Farmers in rice farming is a part of his life in order to maintain the continuity of the wheels of the farmers' families that rely heavily on rice cultivation. With such farming experience can provide broad insight for farmers to promote and solve every problem faced in the farm. With this experience indirectly have a positive effect to increase the profits obtained by farmers from rice farming conducted.

**8. Land Tenure (D)**
The regression coefficient of land tenure (D) has negative regression coefficient and has real effect to the profit. Coefficient of regression of land tenure equal to 0,020, result of t test have real effect at 95% confidence level. This shows that land tenure has a significant effect on profit. Means any increase in land tenure of 1 percent will reduce profits by 0,020 percent. The land tenure in question is the farmers working on their own land and the peasants working on the land of others. It can be interpreted that both the farmers working on their own land and peasants working on other people's land have an impact on the size of the profits obtained. But the benefits obtained by farmers working on their own land is bigger than farmers working on other people's land. The difference in profits, related to where the farmer till his own land all the profits gained is already his. While farmers work on other people's land, the profits or income earned must still be shared with the land owner. Likewise, most farmers working on other people's land are poor farmers, and have an impact on the limitations of capital and only rely on labor in the family. The limitedness of the farmers has an impact on the ability to finance the use of production inputs to improve the yield of farms and the profits are obtained.

## 4. CONCLUSION
Based on the results and discussion in this research, it can be concluded as follows: the production and profitability of rice farming in rainfed rice based on land tenure profitable economically and feasible cultivated or forwarded. Factors that have a significant effect on the benefits of rice farming in rainfed rice based on land tenure are land area, labor wage, urea fertilizer price, $SP_{18}$ fertilizer price, farming experience, and land tenure. Farming in rainfed lowland rice is based on profitable land tenure. Therefore, the government is expected to pay attention to the welfare of farmers, especially peasants working on other people's land by controlling the implementation of the profit-sharing law, especially from the proportion of costs that must be borne by farmers working on other people's land and own farmers. Government support is also needed on the form of agrarian reform policy, eternal land policy, and various other policies in order to prevent the reduction of paddy fields.

## 5. ACKNOWLEDGMENTS
Authors would like to thank to Directorate of Research and Community Service of the Ministry of Research, Technology and Higher Education as a funder to fund the research grant of novice lecturers. Likewise with the College of Agricultural Science Yapim Maros who support and facilitate so that research can be done.

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