Efficiency And Income Of Rice Farming In Rainfed Lowland

Arifin, Andi Adriani Wahditiya, Nirawati, Muhammad Arsyad Biba

Abstract: In resulting farming product will be good if the production factors that are used efficiently means that the resulting output unit is greater than the input unit used. Efforts to enhance the production of food crops through production efficiency became one of the right choices. With efficiency, farmers can use production input in accordance with the provisions to obtain optimal production. The objective of this research is to analyze rice production and income on rainfed lowland, and to analyze the technical efficiency and allocation efficiency of rice farming on rainfed lowland. 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. The results showed that: (1) the use of rice farming inputs in rainfed lowland was technically efficient, and not yet allocatively efficient. (2) On average, rice farming in rainfed lowland increases production and income.

Keywords: Income, Technical Efficiency, Allocative Efficiency, Rainfed Rice

1. INTRODUCTION

Development of the agricultural sector as the main food sector in Indonesia is very important in Indonesia's development (Dewi, 2016). This is because more than 55% of Indonesians work and do their activities in the agricultural sector and live in rural areas (Rani and Singh, 2015; Lumintang, 2013; Effendy, 2010). In agricultural development the use of production factors and the application of technology plays an important role (Soriano et al., 2017). Less precisely the role of technology will lead to low production and high cost of farming. To determine the technology or factors of production optimally, it is necessary to know the production factors which must be increased or decreased (Sari, 2010). In farming, the resulting product will be good if the production factors are used efficiently means that the resulting output unit is greater than the input unit used (Suzana et al., 2011). Arrow in the pop-up tool bar to modify the header or footer on subsequent pages. External factors from the agricultural sector have greater influence than internal factors. Efforts to provide food needs, especially rice and increase the welfare of rice farmers can be done by increasing production and productivity (Caññete and Temanel, 2017; Kea et al., 2016; Kusnadi et al., 2011). Increased production of rice farming, especially with the development and adoption of new technologies and improving farm efficiency (Roy and Chan, 2015; Arifin, 2014; Lakshmi et al., 2012 Suzana et al., 2011). In realizing sustainable agriculture, farmers need to utilize production factors effectively and efficiently for their production (Ologbon et al, 2012, Hutapea et al, 2010). Production efficiency should be of interest to farmers. Efforts to increase food crops production through production efficiency became one of the right choices.

Meanwhile, to obtain the efficiency of the allocation of rice farming in rainfed lowland, the following analysis as follows:

\[ \text{TER} = \frac{Y_i}{\bar{Y}} \]

Where:
- \( \text{TER} \) = Technical efficiency level
- \( \bar{Y} \) = Potential production (frontier)
- \( Y_i \) = Actual production

\[ \text{NPM}_{ai} = P_a \]

Where:
- \( \text{NPM}_{ai} \) = marginal product value
P_i = the opportunity cost of the input
To obtain the production and income of rice farming in rainfed lowland used the following analysis.
π = TR - TC
TR = Y.Py
TC = FC + VC

Where:
π = farm income (IDR/ha)
TR = total revenue (IDR/ha)
TC = total cost (IDR/ha)
FC = fixed cost (IDR/ha)
VC = variable cost (IDR/ha)
Y = production (kg/ha)
Py = production price (IDR/kg)

3 RESULTS AND DISCUSSION

Technical efficiency and allocative efficiency of rice farming in rainfed lowland

1. Technical Efficiency of Rice Farming in Rainfed Lowland

This technical efficiency includes the relationship between input and output. Technical efficiency requires a production process that can utilize a small input to produce the same amount of output. Technical efficiency is a necessary condition for measuring price efficiency and economic efficiency. Technical efficiency requires or requires a production process that can utilize fewer inputs to produce the same amount of output. Technical efficiency is analyzed simultaneously using the stochastic frontier production function model. According to Sumaryanto (2001), the efficiency index value of the analysis results can be categorized as inefficient if the value < 0,70 and categorized efficient if the value is ≥ 0,70. The proportion of the use of each production factor varies among farmers, so that each farmer has different levels of efficiency. A farmer can be said to be more efficient than other farmers if the farmer is able to use fewer or the same production factors as other farmers, but can produce the same or even higher production rate than other farmers. Resource allocation is technically efficient if it is not possible to increase the output of a product without decreasing the production of other types of goods. Based on the results of the technical efficiency analysis of rice farming on rainfed lowland can be presented (Table 1).

Table 1. Results of the Technical Efficiency Analysis of Rice Farming in Rainfed Lowland

<table>
<thead>
<tr>
<th>Technical Efficiency Group</th>
<th>No. of Farmers</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TE &lt; 0.70</td>
<td>21</td>
<td>35,00</td>
</tr>
<tr>
<td>TE ≥ 0.70</td>
<td>39</td>
<td>65,00</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100,00</td>
</tr>
</tbody>
</table>

Average TE 0,81
Minimum TE 0,40
Maximum TE 1,16

Based on the result of Table 1, it can be seen that the technical efficiency, most of the respondent farmers are 39 people (65,00%) have technical efficiency value greater than or equal to 0,70. While the value of technical efficiency is less or below 0,70 there are 21 respondents farmers or 35,00%. This means that overall the use of rice inputs in rainfed lowland conducted by respondent has been technically efficient. Of the 60 respondents available, the average technical efficiency of 0,81. It means that the average farmer has reached 81% of the production potential obtained from the combination of production factors used and there is still a 19% chance to increase rice production. The research results conducted by Murniati et al (2014), states that on average with a value of 0,84 organic rice farming conducted in rainfed lowland rice is technically efficient, and still allows production can be increased by 16%. The research results conducted by Riyardi et al (2017), states that the level of technical inefficiency of organic and inorganic rice agriculture in Kebakkramat district Karanganyar district has been achieved. The level of technical inefficiency is very low, meaning that it is achieved technically efficient. Similarly, the results of research conducted Bahasao (2013), states have achieved technical efficiency rice farming in the implementation of integrated crop management program with component technology management system.

2. Allocative Efficiency of Rice Farming in Rainfed Lowland.

Efficiency is also interpreted as the effort to use the smallest input to get the maximum production. Such a situation will occur if the farmer is able to make an effort if the value of the marginal product for an input equals the input price. Achievement of allocative efficiency can be done if the farmer has known the production factors that affect the rice farming. Availability of farm inputs does not necessarily result in high productivity. Farmers can conduct their business activities efficiently is a very important effort, large revenues do not always show high efficiency, therefore income analysis should be followed by efficiency measurement. Allocative efficiency shows the relationship of cost and output. Allocative efficiency is achieved if a farm is able to maximize profits i.e equalize the marginal product value of each factor of production with price. Farmers get high profit from their farming because of the influence of price, then the farmer can be said to allocate input farming in an efficient price. This allocative efficiency occurs when a farm produces the most favored output by consumers. Allocative efficiency is a farmer's ability to use inputs at optimal proportions at pricess factor and fixed production technology. In other words the ability of farmers to choose the level of minimum input use where factor prices and technology remain. Allocative efficiency explains farmers’ ability to produce a number of outputs on input cost minimization conditions. Based on the results of the analysis on allocative efficiency can be presented (Table 2).

Table 2. Result of Analysis of Allocative Efficiency of Rice-Based Farming in Rainfed Rice

<table>
<thead>
<tr>
<th>Allocative Efficiency Group</th>
<th>No. of Farmers</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE=1.00</td>
<td>0</td>
<td>0,00</td>
</tr>
<tr>
<td>AE &gt; 1.00</td>
<td>60</td>
<td>100,00</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100,00</td>
</tr>
</tbody>
</table>

AverageAE 1,86
MinimumAE 0,48
MaximumAE 3,84

Based on the result of Table 2 it can be seen that the value of the allocative efficiency, most of the respondent farmers are 60 people (100,00%) have the value of allocative efficiency is greater or less than 1,00. While the value of the allocative efficiency is equal to 1,00 no farmer respondents. This means
that overall the use of rice inputs in rainfed lowland conducted by farmers of respondents has not been efficiently allocated. Thus, the use of production input of rice farming in rainfed lowland needs to be added. The addition of these inputs is mainly in the use of fertilizers and seeds. This is due to the average of farmer sample in using fertilizer has not been using recommended fertilizers. Similarly, the use of seeds, the average farmer still uses self-seeded seeds and there is no guarantee that the seed is qualified. Research conducted by Thamrin and Ardilla (2016), stated that based on the value of analysis of allocative efficiency, the production factor of land area must be added because its use is not efficient while production factor of seed, fertilizer, pesticide must be reduced because inefficient in its use. The results of research conducted Nirmawati and Tangkesalu (2014) states the use of input land area, seeds, fertilizers, and labor inefficient, which means no achieved allocative efficiency.

Production and Income of Rice Farming in Rainfed Lowland

Analysis of production aspect is one of important approach in food policy to fulfill food requirement especially that become staple food of society. Farmers in doing their farms expect that every dollar spent will generate a high income. Therefore, farmers need to calculate profit and loss by making the analysis economically. From the results of the analysis, farmers will be able to see the estimation of the amount of costs to be incurred and how much revenue will be obtained, in addition, farmers should be able to choose a more profitable farming. Revenue is one indicator to measure the welfare of a person or society, so that the income of this society reflects the economic progress of a society. Individual income is the income that the entire household receives in the economy from paying for the use of its production factors and from other sources. Revenue is the amount of income received by the population on its performance for a certain period. The net income of farmers is the amount of production multiplied by the minus price of production cost and marketing. The business activity will ultimately earn revenue in the form of the monetary value received from the sale of the product minus the cost incurred. Based on the results of production analysis and income of rice farming on rainfed lowland per hectare can be presented (Table 3).

Table 3. Average Production and Income per Hectare of Rice Farming in Rainfed Lowland

<table>
<thead>
<tr>
<th>Description</th>
<th>Value ( IDR/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Production</td>
<td>3.712.20</td>
</tr>
<tr>
<td>2. Production Price</td>
<td>3.758.33</td>
</tr>
<tr>
<td>3. Revenue</td>
<td>13.904.956.67</td>
</tr>
<tr>
<td>4. Variable Cost</td>
<td></td>
</tr>
<tr>
<td>4.1 Land exercise</td>
<td>863.416.67</td>
</tr>
<tr>
<td>4.2 Seedlings</td>
<td>286.175.00</td>
</tr>
<tr>
<td>4.3 Planting</td>
<td>791.716.67</td>
</tr>
<tr>
<td>4.4 Fertilization</td>
<td>542.727.50</td>
</tr>
<tr>
<td>4.5 Weeding</td>
<td>81.000.00</td>
</tr>
<tr>
<td>4.6 Control of pests and diseases</td>
<td>248.000.00</td>
</tr>
<tr>
<td>4.7 Irrigation</td>
<td>122.500.00</td>
</tr>
<tr>
<td>4.8 Harvest</td>
<td>477.333.33</td>
</tr>
<tr>
<td>5. Fixed Cost</td>
<td></td>
</tr>
<tr>
<td>5.1 Tax</td>
<td>80.166.67</td>
</tr>
<tr>
<td>5.2 Depreciation tool</td>
<td>102.509.13</td>
</tr>
<tr>
<td>5.3 Contribution</td>
<td>50.000.00</td>
</tr>
<tr>
<td>Total Fixed Cost</td>
<td>232.675.80</td>
</tr>
</tbody>
</table>

Table 3 shows that rice farming in rainfed lowland provides both production and income values. The average of income earned by farmers is the average revenue less total cost (variable cost plus fixed cost). The value of income from rice farming in lowland is the final value in a single production process. Revenue earned is a description that farmers are able to manage farming, so the results obtained provide income as expected. Revenue earned by farmers, gives an indication that farming can be used as a picture of farmers are able to manage farming well. Results of research conducted by Chuzaimah et al, (2016), states that one of the variables that can increase income from rice farming is the land area.

4. CONCLUSION

Based on the results and discussion in this study, it can be concluded as follows: the use of rice farming inputs in rainfed lowland has been technically efficient, and not yet allocatively efficient. On average, rice farming in rainfed lowland increases production and income. Allocative efficiency analysis results showed that rice farming in rainfed lowland system is not efficient yet. Therefore, it is suggested to the farmers that in every time to conduct rainfed lowland rice farming needs to consider in advance whether the use of inputs such as seeds, fertilizers, chemical, labor and so on has been in accordance with the needs or not and is expected willing and willing to follow the advice of officers technical or agricultural field extension workers, especially on technical cultivation of paddy in rainfed rice.

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