Cost And Return Analysis Of Rice Farming And Brick Making In South Konawe District Of Southeast Sulawesi

Haji Saediman, Mustika, La Nalefo, M. Tufaila, Munirwan Zani

Abstract: The study aimed to assess and compare the cost and returns of smallholder rice farming and small-scale brick production. The study was conducted in a village that produced both rice farming and brick production in Konawe district of Southeast Sulawesi. Respondents consisted of 19 rice farmers and 19 brick making producers. Data were collected using a questionnaire-based interview method and were analyzed using cost and return analysis and independent sample t-test. Study results showed that both rice farming and brick making were profitable as can be seen from the revenue-cost ratio being higher than 1. The average returns from brick making were higher than that of rice farming, and the difference was statistically significant. These results indicated that higher economic returns might be one of the reasons for rice farmers to shift to brick production. Integrated efforts should be made to increase productivity and profitability of rice farming to maintain its attractiveness to farmers and villagers.

Keywords: Cost and return, rice farming, brick, Sulawesi.

1. INTRODUCTION

Rice is the most consumed staple food in Indonesia. In 2018, 97% of households consumed rice [1]. Given the crucial role of rice in the national food security for both urban and rural households, development of rice farming has long become a priority of the government [2],[3] and, as a result, rice self-sufficiency was achieved in 1984. After that remarkable achievement of rice self-sufficiency, however, domestic production has been insufficient to meet consumption demand so that Indonesia has to import rice from other countries [4]. A combination of several factors seems to have caused the shortages in the domestic rice supply. They include increased demand due to growing population [5], conversion of rice fields to other crops and non-agricultural uses [6],[7],[8],[9], and shift of livelihoods from rice farming to other types of occupations.

In Southeast Sulawesi, rice is the first leading commodity [10] and is cultivated predominantly in low-land areas. However, in recent years, there have been increasing number of farmers in the province who shift their livelihoods from rice farming to other crops or other types of livelihoods [11],[12], including to brick production [13]. Brick production is often selected because it is relatively easy to operate, has a low capital requirement, has high demand, and clay as raw materials is widely available [14],[15]. However, the principal reason to involve in non-agricultural activities could be higher returns as reported by David [16] and Buyinza et al. [17].

During the preliminary survey, many villagers stated that brick making had increased the flow of cash into the village and its multiplier effect invigorated economic activities in other sectors. This claim needs to be examined as brick making is a marginal business for most small-scale brick producers, particularly those who have difficulty to get working capital [14],[15],[18]. In Southeast Sulawesi, brick-fields are located mostly in villages close to the city or central town, and some of producing villages constitute rice producing areas. The preliminary observation revealed that in some villages, many residents had shifted their livelihoods from rice farming to brick making. One of such villages is Abenggi village in Konawe Selatan district. The village is a transmigration village in which the residents came from Java in 1972. Since their arrival in the village, residents have developed agriculture as their main livelihood, and the village was known as one of the rice-producing villages in the district. However, to improve their economic well-being, village residents have also been involved in the traditional brick making since 2004. Brick making has increasingly been popular since 2011 when more farmers decided to establish their clamps or to become clamp workers. These brick-making enterprises employ more labors from village residents, thus contributing to the scarcity of labor in agricultural activities. Given the importance of rice in the national food security and the implication of rice farming abandonment to domestic rice supply, this study is designed to assess the profitability of rice farming and brick production in the study area. Information on the production cost and returns from the two livelihoods will be useful in the efforts to increase productivity and maintain the competitiveness of rice farming.

2 METHODOLOGY

The study was carried out from February to May 2016 in Abenggi village, Landono sub-district, South Konawe district. South Konawe is situated between the latitude 3°59’ and 4°32’ South, and the longitude 121°58’ and 123°16’ East. The village is situated 43 kilometers from Kendari, the provincial capital. The village population was 634 consisting of 194 households. Villagers working in agriculture accounted for 108 persons, in small-scale enterprises or SMEs (mostly brick-making) 75 persons, and as workers in those SMEs 96 persons. The village has an area of 3.5 km² with an average annual rainfall of 2,726.3 mm. Temperatures range from 23°C to 32°C throughout the year. The survey was conducted to find out and compare the level of economic returns from rice farming and brick making. There were 84 rice farmers and 69 owner-operators of brick making in the village. From the total
population of 153 households, 25% or 38 households were selected, consisting of 19 respondents from rice farming and 19 respondents from brick making. A simple random sampling method was used to select respondents. Data were collected through interviews based on the questionnaires. Data were analyzed using cost and returns analysis [19] and independent sample t-test.

a) Net returns
\[ NR = TR - TC \]

where:
\[ NR = \text{Net returns (Rp/4 months)} \]
\[ TR = \text{Total Revenue (Rp/Kg and Rp/m²)} \]
\[ TC = \text{Total Cost (Rp/4 months)} \]
b) Cost
\[ TC = VC + FC \]

where:
\[ TC = \text{Total Cost (Rp/4 months)} \]
\[ VC = \text{Variable Cost (Rp/4 months)} \]
\[ FC = \text{Fixed cost (Rp/4 months)} \]
c) Revenue
\[ TR = Y \times Py \]

where:
\[ TR = \text{Total Revenue (Rp/4 months)} \]
\[ Y = \text{Amount of production (Kg for rice and m² for brick)} \]
\[ Py = \text{Price (Rp)} \]

To enable comparison between the two types of livelihoods, costs and returns were calculated for four months. This assumption is used because the production cycle of rice farming is four months, whereas the production cycle for brick making is two months. Therefore, for brick making two production cycles were taken in all calculation. In both rice farming and brick production, unpaid family labor costs were not included in the cost calculation. The data of net returns from rice farming and brick making were compared by SPSS 16. The analysis employed independent sample t-test with \( \alpha \) being set at 0.05 and \( p < 0.05 \) considered as statistically significant.

3 RESULTS AND DISCUSSION

3.1 Socio-economic characteristics of respondents

On average, the age of farmer respondents was 50 years, and that of brick producers was 43 years. This average age implies that most respondents were in their active ages, and brick producers were younger than rice farmers. Length of education for the two groups of respondents was the same, namely eight years, or until class 8 in junior high school. The average number of household members was also similar, namely four persons. Length of experience of doing rice farming for rice farmers was 28 years on average, while that for brick producers was five years. This difference in the length of involvement reflected the commencement of the two main livelihoods in the village. Rice farming existed not long after their arrival from Java as migrant farmers, whereas brick making has recently gained more popularity.

3.2 Economic returns of rice farming

Table 1 showed the cost and return analysis of rice farming among the respondents. Total production cost was Rp9,354,087, which consisted of variable cost and fixed cost. The total variable cost was Rp9,107,894 which was 97.37 percent of the total cost. The smallest variable cost was for herbicides (Rp193,105), and the highest was for labor (Rp7,581,053). The cost of paid labor was 81.05 percent of the total cost, which constituted the highest cost among all components in the variable costs. A very high proportion of labor cost in the total variable cost was related to the labor shortage and relatively higher labor wages in the study area.

In this regard, paid labors were needed in land preparation, seedling, planting, weeding, fertilizer application, pest and disease control, harvest and post-harvest operations. Total fixed cost was Rp246,193 or 2.63 percent of the total cost. Fixed costs consisted of depreciation and tax. Depreciation consisted of depreciation for tools and equipment.

The average revenue per hectare generated by rice farmers in the study area was Rp17,645,368, which was obtained from the average milled rice production of Rp1,764.74 kg per production cycle of four months with the price of Rp10,000/kg. The net returns were Rp8,291,281 or Rp2,072,820 per month. The revenue cost ratio was 1.89, meaning that for each Rp1000 used in the production cost, there will be a revenue of Rp1,890. Therefore, based on the information in Table 1, it is obvious that rice production was a profitable venture in the study area. The monthly net returns from rice farming are higher than the provincial minimum monthly wage rate of Rp1.85 million assigned by the provincial government of Southeast Sulawesi. The R/C ratio of 1.89 is lower than the R/C ratio of 2.73 in Konawe district [20], 2.86 in Kolaka district [21], and 3.87 in Kutai Kertanegara district [22]. However, the R/C ratio in this study is higher than the R/C ratio of 1.77 in Landono subdistrict reported by Fausayana et al. [11] and 1.69 in Mowila subdistrict reported by Salwia et al. [23]. These variations in the values of R/C ratio indicated that there are still chances for improvement in the productivity and efficiency of rice farming in the study village.

3.3 Economic returns of brick production

Table 2 showed the cost and returns of brick making among the respondents. Total production cost was Rp14,618,276, which consisted of variable cost and fixed cost. The total variable cost was Rp13,219,999 which was 90.43 percent of the total cost. The smallest variable cost was for sand (Rp220,000), and the highest was for labor (Rp11,073,684). The cost of paid labor was 75.75 percent of the total cost, which constituted the highest cost among all components in the variable costs. In this regard, paid labors were involved in...
clay preparation, molding, drying, stacking in rows, building clamp from layers of uncooked bricks, firing, and stacking ready-to-sell bricks. The total fixed cost was Rp1,398,277 or 9.57 percent of the total cost. Fixed costs consisted of depreciation and tax. Depreciation consisted of depreciation for shed and tools and equipment.

### Table 2. Cost and returns of brick making in the study village

<table>
<thead>
<tr>
<th>Items</th>
<th>Value (Rp)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Variable cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Sand</td>
<td>220,000</td>
<td>1.50</td>
</tr>
<tr>
<td>- Fuelwood</td>
<td>1,515,789</td>
<td>10.37</td>
</tr>
<tr>
<td>- Paid labor</td>
<td>11,073,684</td>
<td>75.75</td>
</tr>
<tr>
<td>- Meals</td>
<td>410,526</td>
<td>2.81</td>
</tr>
<tr>
<td>- Total variable cost</td>
<td>13,219,999</td>
<td>90.43</td>
</tr>
<tr>
<td><strong>B. Fixed cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Depreciation</td>
<td>1,150,090</td>
<td>7.88</td>
</tr>
<tr>
<td>- Rented water pump</td>
<td>120,000</td>
<td>0.82</td>
</tr>
<tr>
<td>- Electricity</td>
<td>67,368</td>
<td>0.46</td>
</tr>
<tr>
<td>- Tax</td>
<td>60,000</td>
<td>0.41</td>
</tr>
<tr>
<td>- Total fixed cost</td>
<td>1,398,277</td>
<td>9.57</td>
</tr>
<tr>
<td><strong>C. Total cost</strong></td>
<td>14,618,276</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>D. Returns</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Revenue</td>
<td>24,740,100</td>
<td></td>
</tr>
</tbody>
</table>
| - Net returns (Revenue - Total Cost) | 10,121,824 | 1.69
| - R/C Ratio            |            |     |

Average production of small scale brick making was 70.69 m³ with the price of Rp350,000/m³ so that total revenue was Rp24,740,100. The net returns were Rp10,121,824. The revenue cost ratio was 1.69, meaning that for each Rp1000 used in the production cost, there will be a revenue of Rp1,690. Therefore, based on the information in Table 2, it was evident that brick production was a profitable venture in the study area. Small-scale brick making as the profitable enterprise is also found in Ranomeeto sub-district of South Konawe district [14].

3.4 Differences in economic returns

Net returns are defined as the difference between total revenue and total cost. As seen in Table 2, average revenue and cost in small-scale brick making were higher than that in rice farming. In average, the net returns from brick-making was Rp10,121,824/four months, which was higher than the net returns from rice farming (Rp8,291,280/four months). The hypothesis of “no differences between the two means” was tested using an independent t-test. The p-value 0.01 is lower than 0.05, indicating that the null hypothesis is rejected in favor of the alternative hypothesis. It can be concluded that there is a statistically significant difference between the net returns from rice farming and brick making enterprises.

The findings of this study revealed that the level of economic returns was one of the primary factors for farmers to leave rice farming to involve in brick making. This agrees to findings reported by David [16], and Buyinza et al. [17] that the level of income is an essential reason for villagers to involve in non-agricultural activities. The result of this study also corroborates the finding of a study by Fausayana et al. [11] that rice farmers shift to key lime farming as net returns from key lime farming is statistically significantly higher than that from rice farming. Study results also indicated that revenues from brick making were much higher than that of rice farming. Higher revenues meant higher total turnover, which was distributed to all of those involved in the business. In fact, in addition to the owner-operators, many villagers were getting benefits from employment in the brick kiln, transportation of bricks to the buyers’ location, and sale of fuel-wood. In addition to two family workers, each brick clamp employed at least two hired workers who got daily wages. More certain, quicker and higher wages attracted village labor to work in the brick making than in rice farming. Village administration could get benefits from the collection of cash contribution from brick making enterprises. Local businesses also got indirect benefits. Indeed, the high turnover in the brick making had multiplier effects in other related economic activities in the village. Brick making can have many positive effects on employment generation, not only in the brick sector itself but also in other sectors as a result of its multiplier effect. Seen from the amount of financial returns and turnover, rice farming seems to have lost comparative benefits from brick making. If this condition is not addressed appropriately, farmers may abandon their rice fields and decide to cultivate other crops or involve in other types of livelihood, such as brick making. Therefore, there should be efforts to improve productivity to the level closer to the potential yields and to restore the attractiveness of rice farming. Strategies to be adopted may include the use of high-yielding varieties, the use of improved technologies, and irrigation water provision and management. Extension activities should be provided to help farmers apply better crop management practices to get higher yield and net returns.

4 CONCLUSION

Both smallholder rice farming and small-scale brick making are profitable ventures as can be seen from R/C ratio being more than 1. Brick making has higher returns than rice farming, and the difference is statistically significant. Higher returns from brick making could be one of the reasons for farmers to leave rice farming and involve in brick making. Seen from the amount of returns and turnover, rice farming seems to have lost its comparative benefits to brick making. Therefore, integrated efforts should be made to increase productivity and efficiency of rice farming and to maintain its attractiveness.

ACKNOWLEDGMENT

The authors are grateful to Pak Wasono, the former head of Abenggi village, for his support during the field survey.

REFERENCES


