THE ROLE OF RAINFOED FARMING ON FARM HOUSEHOLD INCOME IN WARU VILLAGE BANTARKAWUNG BREBES

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To cite this article:

ABSTRACT

Agriculture is the major contributor to the Brebes Regency's Gross Regional Domestic Product and employment, and rice constitutes the principal crop. Bantarkawung District is the leading producer of rice in the Brebes Regency. However, most of the paddy fields in Bantarkawung are rainfed, so rice growing is hindered during the dry season due to a water shortage. This study's objective is to assess the farm profits obtained by households and the contribution of rice farming to household income. The population comprises 445 rice-farming families in Waru Village, from which 82 rice farmers were randomly selected. Interviews with respondents were conducted in March 2022. The variables include revenue, costs, profit, and household income. The analytical instruments consist of profit analysis and income contribution. Profit analysis was calculated using the R/C ratio, and the income contribution was calculated by comparing the profit of rainfed rice farming with farm household income. The results indicate that rainfed rice cultivation in Waru Village is profitable. The R/C is more than one, in the range of 1.22 to 2.10. Nonetheless, the contribution of rainfed rice farming to household income is small, ranging from 0.7% to 22.85%. The findings suggest that rainfed rice farmers in Waru Village should be able to sustain their farms because this type of cultivation is profitable despite its reliance on rainwater for irrigation. In addition, it is envisaged that the government, through the appropriate agencies, will enhance the road infrastructure to enable the transfer of agricultural inputs and outputs, offer the necessary socialization, and help boost production.

Keywords: contribution; income; rainfed farming; rice farming.

INTRODUCTION

From 2017 to 2019, agriculture, forestry, and fisheries were among the most significant contributors to GDP. Agriculture contributed IDR 2,013.6 trillion to Indonesia's GDP in 2019, or 13.3 per cent (Badan Pusat Statistik, 2020). However, the agricultural sector's per capita income is low compared to other industries because the agricultural sector employs many people. The agricultural sector employs the most people, with 38.1 million people (29.5%) contributing to GDP of 2,013.6 trillion rupiah (13.3%) in 2019. This causes an imbalance between the number of workers and their contribution to GDP, resulting in low wages for agricultural workers. This is inversely proportional to the manufacturing sector, which has a GDP of 3,119.6 trillion rupiahs (20.5%) but a workforce of 18,228,162 people, or 14.1%.

According to data obtained from the Central Bureau of Statistics in Central Java Province for 2020, the agricultural sector contributes the most to Central Java's Gross Regional Domestic Product (GRDP). In 2019, the farm sector contributed 184,225.1 billion rupiah (13.53%), higher than the national figure (13.3%). The proportion of workers employed in the agricultural industry in Central Java is lower (23.48%) than the national average (29.5%). The farm sector employed 4.09 million people in 2019, a slight decrease from previous years (4.2 million in 2018 and 4.32 million in 2017). This demonstrates that the public is beginning to abandon the agricultural sector in Central Java in favour of other industries.
Brebes is one of the districts in Central Java province whose population relies mainly on agriculture. This is evidenced by the substantial contribution of the agriculture sector to the GRDP of the Brebes Regency compared to other industries. The agricultural sector is the most significant contributor to Brebes Regency's gross domestic product, contributing IDR 16,467.5 billion (35.63%) and employing 279,913 people (33.63%). With a GRDP contribution of 38.42% and a labour force of 36.8%, it is evident that the agricultural sector income in Brebes Regency is equivalent to that of other sectors; therefore, working in the agricultural sector is relatively lucrative compared to other industries.

Bantarkawung is one of the Brebes Regency districts that relies heavily on the agricultural sector. Most Bantarkawung District labour force (65.29 per cent) are employed in agriculture. Rice is the most important agricultural product in Bantarkawung, with a harvested area of 11,150.4 hectares, followed by maize, with a harvested area of 3,068.3 hectares. Although rice and maize require water to grow, the lack of adequate irrigation in the Bantarkawung District hinders agricultural activities during the dry season. Approximately 50.3 per cent of agricultural land in the Bantarkawung District is rainfed. Rainfed rice fields are rice fields whose irrigation systems primarily rely on rainfall, so they only produce rice during the rainy season (Jonizar & Martini, 2016). Many crops cultivated in rainfed circumstances provide a living for low-income farmers (Singh et al., 2017). However, rainfed agriculture, characterized by a fragile environment, entails risk and uncertainty (Lucas & Pabuayon, 2011). Indah et al. (2015) found that the income of rainfed rice farming was lower than that of rice farming on technically irrigated land. Global rainfall levels and seasonality have changed as a result of climate change. Rainfed crops primarily rely on predictable rainfall. Hence, yields have declined internationally (Murray-Tortarolo et al., 2018).

Numerous villages in Bantarkawung District lack adequate irrigation, particularly Waru Village, where all rice fields are rainfed. Because rainfed rice fields receive their only water source from rainfall, rice fields in Bantarkawung village can only be planted during the rainy season (October to March) and become unproductive during the dry season (April to September), preventing farmers from earning income. The inhabitants of Waru Village, Bantarkawung District, depend highly on the agricultural sector due to the village’s remote location and forest surroundings, which Perhutani owns. 95.66% of the 1,789 households in Waru Village, Bantarkawung District, are farmers or farm labourers. Waru Village's agricultural sector comprises rice farmers, pine resin tappers, field farmers, cattle breeders, merchants, goats, and sheep. According to the Waru village chief, rice farming is the primary occupation of Waru Village, Bantarkawung District residents. However, because the existing land is rainfed, rice farmers in Waru Village are unemployed during the dry season and do not earn money. According to interviews with the village head, several farmers engage in other occupations, such as tapping pine resin and raising cattle and goats, to overcome this.

Research on profitability analysis and farming contributions has been widely conducted, such as research conducted by Aprilia & Sari (2018), Kernalis et al. (2019), Sundari, Zulfanita, and Utami (2022), and Siahaya and Takimpo (2022), but this research has something different. The difference lies in the characteristics of the research location. Waru Village only has one aspect of rice fields, namely rainfed rice fields, compared to other areas that have several elements of rice fields. In the dry season, the land is not used. Therefore, the authors wish to examine the profit derived from farming and the proportion of farm income to total household income. Thus, the study aims to quantify the profitability of rainfed rice farming and its contribution to household income.

**MATERIALS AND METHODS**

This is quantitative research. Respondents are farmer households in Bantarkawung District's Waru Village. Primary data were collected by conducting questionnaire-based interviews with rice farming households in Waru Village, Bantarkawung District. Preliminary data include general farmer conditions, information on rice farming, data on the use of production inputs such as seeds, fertilizers, land area, labour, rice farming income, and rice farmers' household income. This research was conducted in March 2022. This study's population consisted of 445 rice farming households from Waru Village, Bantarkawung District, Brebes Regency. The Taro Yamane’s formula is used to calculate the minimum sample size (Yamane, 1967):

\[
n = \frac{N}{N + d^2 + 1}
\]  

(1)

According to this formula, the sample size for this investigation was 81.65, rounded to 82. Because the population was primarily homogeneous, a simple random sample procedure was utilized.
to determine the respondents in this study. The randomization process was carried out using the RANDBETWEEN option in Microsoft Excel. This function was used to obtain respondent numbers randomly to maintain objectivity. The first thing to do is to enter the data of all 445 farmers. Then, the RANDBETWEEN formula was used by entering random numbers between 1 and 82. Respondent data is secured by not displaying the respondent's name. Names are replaced with respondent numbers.

Farmer households in Waru Village earn income from rice farming and other sources of income such as pine resin raising cattle and goats. Rainfall affects the profitability of rice farming because in Waru Village, irrigation of paddy fields is only sourced from rainwater, so if it does not rain for an extended period, it will hamper rice growth, resulting in low yields and even crop failure. This research attempts to calculate the profitability of rainfed rice farming and its contribution to household income.

Following is an explanation of the variable's operational definition. Farming income is the rice farming income in the rupiah in 2020. The contribution of rice farming to household income is the proportion of household income attributable to rice farming as a proportion of total household income. Household income is the total rupiah-based income earned by rice-farming households annually. Production is defined as the rice producers' total kilograms yield for 2020. (Kg). Total Revenue (TR) is the total revenue received by farmers in 2020 from the product of price (P) and output quantity (Q), represented in units of rupiah (IDR). Fixed Cost (FC) is the amount spent in 2020 to acquire fixed production elements, such as depreciation expenses and land rental costs, expressed in rupiah units (IDR). Variable Costs are the expenses incurred in 2020 to acquire production components such as fertilizers, seeds, insecticides, and labour wages, expressed in rupiah (IDR). Profits in 2020 represent the difference between total revenue and total production costs described in rupiah (IDR).

Using the following formula (Soekartawi, 1995), the profit from rice farming can be calculated:

\[ \pi = TR - TC \]  
\[ (2) \]

Where \( \pi = \) Profit; \( TR = \) Total Revenue; \( TC = \) Total Cost; To find out whether farming is profitable or not, the R/C ratio formula is used as follows (Soekartawi, 1995):

\[ \frac{R}{C} \text{ ratio} = \frac{TR}{TC} \]  
\[ (3) \]

The authors utilize the following formula to calculate the contribution of rice farming to household income:

\[ A = \frac{B}{C} \times 100 \]  
\[ (4) \]

where: \( A = \) Contribution of rainfed rice farming; \( B = \) Profit of rainfed rice farming; \( C = \) Farm household income

Sugiyono (2012) explains that a research result is valid if there is a similarity between the data collected and the data that occurs on the object under study. This means that the instrument used can measure what should be measured and precisely reveal the variable data studied. The results of validity testing using the Pearson correlation method show that the significance value of the Pearson correlation is below the alpha value of 0.05, so it can be said that this questionnaire is valid. A reliability test is used to determine whether the data has consistency in producing output so that it can be trusted. The reliability test results using Cronbach's alpha method show a value above 0.6, so it can be said that this questionnaire is reliable.

RESULTS AND DISCUSSION

Overview of Respondents

Waru Village is in the Bantarkawung District of the Brebes Province. Waru Village is bounded by Tambak Serang Village, Bantarkawung District to the north, Kutabima Village, Cimanggu District, Cilacap Regency to the south and west, and Karangpari Village, Bantarkawung District to the east. The Waru Village region is comprised of 17 RTs and 5 RWs covering a total area of 1,215.28 hectares, including 205.8 hectares of paddy fields, 228.54 hectares of dry land, 34.94 hectares of public facilities, and 746 hectares of forest land. Waru Village has a population of 3,532, comprising 1,762 males and 1,770 females. Most Waru Village residents have an elementary school education (76.29 percent), while the fewest have a tertiary education (2.69 per cent). Most people are farmers
(70.46 per cent), stock breeders (13.26 per cent), and business owners (14.39 per cent), whereas the least number of people are retirees (1.88 per cent).

Because rainwater is the primary water supply in Waru village, most rice is only grown once a year. Rice is typically cultivated from October to January, around four months. The procedure from planting to harvesting begins with preparing the rice seeds by soaking them in water for approximately one day to stimulate root growth. The seeds are then ready to be sown in the maize of the cultivated fields.

The paddy fields are ploughed while the rice seeds are soaked for one day. Paddy fields are ploughed after they have been inundated by rainwater, causing the soil to soften and making the ploughing process easier. Most use tractors to plough the fields, but some use cattle to reduce production costs.

After the fields have been ploughed, the soaked seeds are sown in the maize of the paddy fields. Ten days later, the ground where the seeds were planted is fertilized. After 20 to 22 days, the seeds are ready for planting. Planting seeds involves 1-2 days and a great deal of labour. After seven days, the rice is fertilized, but before that, the weeds must be removed so that the rice may best absorb the fertilizer. Fertilizer is applied on the 40th and 70th days, while insecticides are only used when plants are exposed to pests.

Rice can typically be harvested on the 105th day after planting when the rice has turned yellow and is drooping. Before rice can be harvested, the paddy fields must be drained of water for between 5 and 10 days. Labour-intensive tasks such as harvesting necessitate assistance from other farmers or farm labourers. Farmers consume part of the harvest, while the remainder is sold to merchants.

Eighty-two rice farmers in Waru Village, Bantarkawung District, Brebes Regency, participated in this study. The characteristics of respondents include education level, age, gender, and land area. 56.09% of respondents had only completed elementary school, while only one had completed higher education. This indicates that the education level of respondents is generally low. The youngest rice farmer is 25, while the eldest is 70. The highest age distribution occurs between the ages of 47 and 53. This indicates that the age distribution includes individuals in their productive years. There were a total of 71 male respondents (87%), while there were 11 female respondents (13%). Based on land area, respondents can be categorized as follows.

Table 1. Distribution of respondents by landholding

<table>
<thead>
<tr>
<th>No.</th>
<th>Landholding (Ha)</th>
<th>Frequency (person)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.13-0.23</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>0.24-0.34</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>0.35-0.45</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>0.46-0.56</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>0.57-0.67</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>0.68-0.78</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>0.79-0.89</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>0.90-1.00</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022

None of the respondents owned more than 1 ha of land. Most land holdings are less than 0.34 ha, meaning that the land farmers own is tiny.

Profitability of Rainfed Rice Farming

Profits are determined by subtracting expenses from revenue. The distribution of respondents by revenue, implicit costs, explicit costs, profits, R/C ratio, and farming’s contribution to family income is depicted in the following tables.

1. Revenue

Revenue is the amount of money earned by rice farmers. Rice farming income is derived from a single season's production. Table 2 shows the amount of farmers' revenue from rice farming in Waru Village, Bantarkawung District. The class interval is based on Sturges (2012).

Table 2 shows that the revenue of farmers in Waru Village is dominated by 29 respondents with a revenue range of 1,575,000-2,979,300, which means the revenue of the majority of farmers is still low. There are only four farmers with revenue above IDR 10,000,000.
Table 2. Distribution of respondents by revenue of rainfed rice farming in Waru village

<table>
<thead>
<tr>
<th>No.</th>
<th>Revenue (IDR)</th>
<th>Frequency (person)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1,575,000-2,979,300</td>
<td>29</td>
<td>35</td>
</tr>
<tr>
<td>2</td>
<td>2,979,301-4,383,600</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>4,383,601-5,787,900</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>5,787,901-7,192,200</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>7,192,201-8,596,500</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>8,596,501-10,000,800</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>10,000,801-11,405,100</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>11,405,101-11,809,400</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022

2. Production Costs

The production costs of rice farming in this study are incurred during one harvest season in November-January 2021. Farmers’ profit margins are determined by their production costs. Rice farming is profitable if the costs incurred are less than the income earned. Costs are classified into two types: implicit and explicit costs. Implied costs are the value of private inputs rice farmers use in production, such as land rent (own property), family labour costs, and depreciation. The cost of renting own land is incurred if the farmer's land is leased to another person for rice planting. Rice farmers in Waru Village spend an average of IDR 771,134 on rental costs for one planting. Family labour costs are incurred when family members work for a wage. Rice farmers in Waru Village incur a total labour cost in the family of IDR 637,012 for one planting. Tab 3 shows the total implicit costs of farmers in Waru Village. Details of equipment depreciation costs can be seen in Table 3.

Table 3. Cost of depreciation of rice farming equipment in one planting season

<table>
<thead>
<tr>
<th>No.</th>
<th>Equipment</th>
<th>Economic age (years)</th>
<th>Cost of depreciation (IDR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hoe</td>
<td>8</td>
<td>19,918</td>
</tr>
<tr>
<td>2</td>
<td>Basket</td>
<td>2</td>
<td>2,179</td>
</tr>
<tr>
<td>3</td>
<td>Sprayer</td>
<td>8</td>
<td>39,051</td>
</tr>
<tr>
<td>4</td>
<td>Sickle</td>
<td>4</td>
<td>31,545</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>92,693</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022

Table 3 shows that the highest average cost is dominated by sprayer depreciation of IDR 39,051, and the lowest average cost is bucket depreciation of IDR 2,179.

Table 4. Distribution of respondents by implicit costs in Waru village

<table>
<thead>
<tr>
<th>No.</th>
<th>Implicit Costs (IDR)</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>710,603-965,953</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>965,954-1,221,303</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>1,221,304-1,476,653</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>1,476,654-1,732,003</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>1,732,004-1,987,354</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>1,987,355-2,242,703</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>2,242,704-2,498,053</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>2,498,054-2,753,403</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022

Table 4 shows that the implicit costs of farmers in Waru Village are dominated by 21 people with IDR 1,155,701-IDR 1,411,050, with two having the highest implicit costs. Taxes, tractor rental, seeds, fertilizers, and pesticides are explicit costs incurred by a rice-farming enterprise to acquire or rent inputs or elements necessary for production. In calculations for one growing season, the average tax that Waru Village rice farmers must pay is IDR 23,264.00. Renting a tractor costs rice farmers in Waru Village an average of IDR 457,692.00. Farmers utilize two types of seeds: Ciherang and IR46. The average number of seeds utilized is 12.57 kg, costing IDR 193,760.00 per kilogram. Costs for fertilizer are given in Table 5.

Table 5 shows that the highest fertilizer cost is dominated by urea, with an average of IDR 150,023, while the type of fertilizer with the lowest cost is SP36, with an average of IDR 46,439.
Table 5. Fertilizer cost for rainfed rice farming in Waru village

<table>
<thead>
<tr>
<th>No</th>
<th>Type</th>
<th>Total (IDR)</th>
<th>Average (IDR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Urea</td>
<td>12,301,900</td>
<td>150,023</td>
</tr>
<tr>
<td>2</td>
<td>NPK</td>
<td>8,097,600</td>
<td>98,452</td>
</tr>
<tr>
<td>3</td>
<td>SP36</td>
<td>3,808,000</td>
<td>46,439</td>
</tr>
<tr>
<td>4</td>
<td>Organic</td>
<td>6,465,600</td>
<td>78,849</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30,673,100</td>
<td>374,062</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022

The average amount of pesticide use can be seen in Table 6. The labour cost outside the family incurred by rice farmers in Waru Village is an average of IDR 749,024.00 in one planting season.

Table 6. Pesticide cost for rainfed rice farming in Waru village

<table>
<thead>
<tr>
<th>No</th>
<th>Type</th>
<th>Total (IDR)</th>
<th>Average (IDR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fastak</td>
<td>2,270,750</td>
<td>27,692</td>
</tr>
<tr>
<td>2</td>
<td>Regent</td>
<td>1,705,000</td>
<td>20,793</td>
</tr>
<tr>
<td>3</td>
<td>Garam</td>
<td>30,000</td>
<td>366</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4,005,750</td>
<td>48,851</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022

The total explicit costs of farmers in Waru Village can be seen in Table 7 shows that the lowest group (30 respondents) dominates the explicit costs of farmers in Waru Village, while the highest group has only one respondent.

Table 7. Total explicit cost of rainfed rice farming in Waru village

<table>
<thead>
<tr>
<th>No</th>
<th>Explicit Costs</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>286,333-871,059</td>
<td>30</td>
<td>37</td>
</tr>
<tr>
<td>2</td>
<td>871,060-1,455,786</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>1,455,787-2,040,512</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>2,040,513-2,625,238</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>2,625,239-3,209,964</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>3,209,965-3,794,691</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>3,794,692-4,379,417</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>4,379,418-4,964,143</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022

3. Profit

Profit in rainfed rice farming is the difference between total income and total costs incurred in one harvest season. Table 8 shows the magnitude of rice farmers' profits in Waru Village, Bantarkawung District.

Table 8. Profit of rainfed rice farming in Waru Village

<table>
<thead>
<tr>
<th>No</th>
<th>Profit (IDR)</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>324,233-917,596</td>
<td>24</td>
<td>29</td>
</tr>
<tr>
<td>2</td>
<td>917,597-1,510,959</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>1,510,960-2,104,322</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>2,104,323-2,697,685</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>2,697,686-3,291,048</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>3,291,049-3,884,411</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>3,884,412-4,477,774</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>4,477,775-5,071,137</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022

Table 8 reveals that most farmers (24 respondents or 29%) earn between IDR 324,233 and IDR 917,596 annually. In contrast, just five responders (6%) achieved the highest profit. Table 9 displays the average revenue, implicit expenses, explicit costs, and earnings of rainfed rice growing in Waru Village.
Table 9. Average implicit, explicit costs and profits of rainfed rice farmers in Waru Village

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Total (IDR/growing season)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Implicit costs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Land rent</td>
<td>771,134</td>
</tr>
<tr>
<td></td>
<td>Family labor</td>
<td>637,012</td>
</tr>
<tr>
<td></td>
<td>Depreciation</td>
<td>92,693</td>
</tr>
<tr>
<td>2</td>
<td>Explicit costs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tax</td>
<td>23,506</td>
</tr>
<tr>
<td></td>
<td>Tractor rent</td>
<td>435,366</td>
</tr>
<tr>
<td></td>
<td>Organic fertilizer</td>
<td>78,849</td>
</tr>
<tr>
<td></td>
<td>NPK</td>
<td>98,452</td>
</tr>
<tr>
<td></td>
<td>SP36</td>
<td>46,439</td>
</tr>
<tr>
<td></td>
<td>Urea</td>
<td>150,023</td>
</tr>
<tr>
<td></td>
<td>Seed</td>
<td>193,768</td>
</tr>
<tr>
<td></td>
<td>Pesticide</td>
<td>48,851</td>
</tr>
<tr>
<td></td>
<td>Non-family labour</td>
<td>749,024</td>
</tr>
<tr>
<td>3</td>
<td>Average costs</td>
<td>2,866,318</td>
</tr>
<tr>
<td>4</td>
<td>Average revenue</td>
<td>4,728,841</td>
</tr>
<tr>
<td>5</td>
<td>Average profit</td>
<td>1,862,524</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022

Table 9 demonstrates that tractor rental has the highest average implicit cost of farming while the average tax rate has the lowest. Non-family labour is used at the most increased explicit cost, while SP36 is purchased at the lowest average cost. Rainfed rice farming generates an average profit of IDR 1,862,524.

4. R/C Ratio of Rainfed Rice Farming

To determine if farming is successful or not, revenue and costs for one growing season are compared (Soekartawi, 1995):

Table 10. Distribution of respondents based on R/C Ratio

<table>
<thead>
<tr>
<th>No.</th>
<th>R/C Ratio</th>
<th>Frequency (person)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.22-1.33</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>1.34-1.44</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>1.45-1.55</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>1.56-1.66</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>5</td>
<td>1.67-1.77</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>1.78-1.88</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>1.89-1.99</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>2.00-2.10</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022

Table 10 shows that the R/C ratio of rice farming is >1. This means that rainfed rice farming in Waru Village is profitable. From Table 4.10, most respondents were between 1.45-1.55 and class 1.56-1.66, with 18 respondents in each category. The highest R/C ratio was two respondents.

Contribution of Rainfed Rice Farming to Farm Household Income

To determine the contribution of rainfed rice farming to farm household income

Table 11. Distribution of respondents by rainfed rice farming contribution to household income

<table>
<thead>
<tr>
<th>No.</th>
<th>Contribution (%)</th>
<th>Frequency (person)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.77-3.53</td>
<td>34</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>3.54-6.29</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>6.30-9.05</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>9.06-11.81</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>11.82-14.57</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>14.58-17.33</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>17.34-20.09</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>20.10-22.85</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Primary data processed 2022
Most rice farming's contribution to household income lies within the range of 0.77 to 3.53 per cent, as shown in Table 11. The gift of rainfed lowland rice production to household income is less than fifty per cent.

Based on the findings, rainfed rice farming in Waru Village is profitable because the R/C is greater than 1. This result aligns with (Rahmadiah et al., 2019), which shows that agriculture in rainfed rice fields is profitable.

Rainfed rice farming contributes 0.77% -22.85% of respondents' household income, less than 50%. This finding is consistent with (Aprilia & Sari, 2018) and (Kernalis et al., 2019), who find that rainfed rice farming contributes 43.48% of farm household income. The finding differs from that of Ariffin et al. (2021), who found that the contribution of rainfed rice growing to household income in Lau, Maros Baru, and Simbang Districts was 90.0%, 70.0% and 57.5%, respectively. Rice farming has a low contribution in Waru Village because rainfed paddy fields are only planted once a year, and most farmers then grow maize because maize requires less water than rice. Furthermore, because Waru Village has a large pine forest, many farmers work as rubber tappers, and many become cattle and goat breeders because there is a lot of grass around the forest. Some migrate outside the village.

Rainfed agriculture accounts for 80% of the world's agricultural production and ensures global food security. However, increasing global population, water shortages, and climate change threaten rainfed agriculture by increasing its susceptibility to drought and other extreme weather events. Rao et al. (2015) believe soil and water management are crucial to increasing productivity. The primary goal is to increase soil organic matter to restore soil health. Water is a critical natural resource, and managing rainwater in situ, as well as harvesting runoff water and recycling, is essential to the sustainability of rainfed farming. An integrated approach to water, soil, and farm management practices is required to make rainfed farming more economical and sustainable. Although some technologies can help raise yields, the marginal gains in products from these technologies in rainfed systems are insufficient (Ragasa & Chapoto, 2017). The finding of de Araújo et al. (2022) highlights the value of employing treated wastewater for supplemental irrigation.

According to (Anderson et al., n.d.) review of previous reports, the size of the gap between average and potential yields of rainfed farming varies according to agroecological zone and available technologies, ranging from about 0.5 to more than 5 t/ha, leaving significant room for future yield improvement. According to the reports reviewed, sustainable yield improvement will necessitate using various methods tailored to specific agroecological conditions. Accordingly, Banayo et al. (2018) found that site-specific nutrient management increased productivity and profitability in the Philippines' rainfed lowlands. Improved varieties and best management practices for nutrient use in rainfed rice production, as well as water reservoir infrastructure and access to information, contribute to the productivity and profitability of rice farming (Kwesiga et al., 2019; Erythrina et al., 2021). Nakano et al. (2018) suggest that training in modern input use and improved agronomic practices has a high potential for transforming favorable rainfed rice growing areas and achieving a green revolution.

Along with initiatives to boost productivity, small farmers need alternative income-generating activities, especially when agricultural commodity markets are adverse. In combination with off-farm activities, drought-tolerant and early-maturing crop varieties have been demonstrated to increase farmers' resilience in the uplands of Zambia (Mubanga & Umar, 2014). Small landowners in Chiapas, Mexico, cultivate more crops and engage in more non-agricultural activities than large landowners, who pursue more specialized and lucrative agricultural prospects (Christman et al., 2015).

CONCLUSIONS AND SUGGESTION

According to this study, rice farming is profitable in Waru Village, Bantarkawung District, because the R/C ratio is more significant than one. Rainfed rice farming contributes less than 50% of farm household income in Waru Village, Bantarkawung District. As a result, rice farmers in Waru Village are expected to be able to maintain this farming, given that it is economically profitable despite being heavily reliant on rainwater as a source of irrigation. Furthermore, farmers should be aware of the selling price and provide intensive care to increase income and reduce the risk of rice farming. The government is expected to improve road access to Waru Village through related agencies because many roads have been damaged, preventing agricultural products from being transported from Waru Village, to provide adequate irrigation so that agricultural land can be used, and to provide socialization and appropriate assistance to farmers so that productivity farming, particularly rice, can improve the standard of living of farm households in Waru Village, Bantarkawung District.
REFERENCES


