Factors affecting the income of paddy field farm management in Kerinci Regency, Jambi Province

Suandi Suandi1*, Ernawati Ernawati1, and I. Wahyuni1
1Jambi University, Agribusiness Department, Agriculture Faculty, Jambi, Indonesia

Abstract. The productivity of paddy field farming during the last five years has decreased so that it has an impact on farmers' revenue. The purpose of this study was to analyze the level of income and feasibility of paddy field farming and the factors that affect the income of paddy field farming. The research was conducted in Kerinci Regency, Jambi Province, for eight calendar months. Research data is sourced from primary data and secondary data. Primary data were collected through structured interviews using instruments or questionnaires to all respondents. Respondents or farmer units of analysis were taken by random sampling with 225 respondents. The research data were analyzed by descriptive and statistical tests using the Multiple Regression Test tool. The results showed that the average income of paddy field farming in the study area was Rp. 8.646.552,00 per growing season with an R/C ratio > 1 (3.9). Farmers' income is influenced by land area and the number of workers. In contrast, the age of farmers, number of family members, farming experience, and capital do not show a significant effect.

1 Introduction

The Central Agency on Statistics [1] reported that paddy was harvested on 11.377.934,44 ha in 2018 and 10.786.814,17 ha in 2020. It also indicates that land is available for agricultural development, especially paddy plants. However, in 2020 the area will be smaller than in the previous two years. Jambi Province harvested 86.202,68 ha of paddy in 2018 and 86.233,14 ha in 2020.

Even though harvested area increased, paddy yields declined. The Jambi Province paddy crop yielded 44,44 quintals/ha in 2018 and 43,41 quintals/ha in 2020, affecting income, food and nutrition, and farmer welfare [2]. Theoretically, harvesting more land increases productivity. The Covid-19 pandemic that has hit the world, including Indonesia and Jambi Province, has caused the government to constrain people's movement outside the home [3]. No planting or harvesting decreases paddy field productivity. This result is supported by the findings of Salam et al. [4] as well as the study of Balogbog and Gomez [5] which states that the income and profits of paddy field farming are largely determined by farm productivity and the contribution of other inputs.

* Corresponding author: suandi_pertanian@unj.ac.id
Kerinci Regency produces paddy for Jambi Province. Kerinci Regency has 22,886 ha of harvested paddy fields, 19% more than Jambi Province (118,408 ha) [2]. Kerinci Regency is 380,850 ha, with 189,028 ha usable and the rest TNKS. Based on this area, 147,408 ha can be used for agricultural cultivation, including paddy field plants. In comparison, 41,620 ha or 22,12%, is non-agricultural [6]. The harvested rice field area in Kerinci Regency is 22,886 ha, or 15,52% of the total cultivated area, with an average production of 104,521 tonnes, or 4,56 tons/ha [2]. The report from the Central Statistics Agency of Jambi Province [2] shows that in the last two years there has been an increase in the area of rice fields planted, but there has been a decrease in productivity levels, so this phenomenon is very interesting to study. The purpose of this study was to analyze the level of income and feasibility of paddy field farming and the factors that affect the income of paddy field farming.

2 Research methods

The research design is cross sectional. The study was conducted in Kerinci Regency, Jambi Province for 8 calendar months by selecting three districts, namely Sitinjau Laut, Air Hangat Timur, and Keliling Danau. The research objects and variables are characteristics of paddy field farmers (land area owned, land ownership status, age, farming experience, education level, and dependents) and farm income and profits (costs, revenues, prices, number of workers, production). Research data is sourced from primary data and secondary data. The sample of the research area was taken by stratified random sampling based on the area of land cultivated, namely Air Hangat Timur, Keliling Danau, and Sitinjau Laut District. Respond data or household analysis units were taken by simple random sampling of 25 respondent farmers in each village. The total respondents were 225 farmers. Respondents of this study were taken from the owner farmers who worked directly in paddy field farming. Research data were analyzed descriptively and statistical tests using the Multiple Regression Test. The descriptive analysis formula uses a cost and income analysis approach through a nominal approach [7]. The formula for calculating the nominal approach is by:

\[
\text{Revenue} - \text{Total Cost} = \text{Income}
\]

\[
\text{Revenue} = \text{Py.Y}
\]

\[
\text{Py} = \text{Production Price (Rp/kg)}
\]

\[
\text{Y} = \text{Production Amount (kg)}
\]

\[
\text{Total Cost} = \text{Fixed Cost + Variable Cost}
\]

\[
\text{(TC)} = (\text{FC}) + (\text{VC})
\]

To answer the research objectives, the effect of farmer age, number of family members, farmer's experience, land area owned, capital, and number of workers on the income level of paddy field farmers was tested by Multiple Regression test (through SPSS Program) with the following equation [8]:

\[
Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e
\]

Description:

\[
Y = \text{Income of paddy field farm management}
\]

\[
X_1 = \text{Age}
\]

\[
X_2 = \text{Farmer’s experience}
\]

\[
X_3 = \text{Number of family members}
\]

\[
X_4 = \text{Land area owned}
\]

\[
X_5 = \text{Capital}
\]

\[
X_6 = \text{Number of workers}
\]

\[
a = \text{intercept}
\]

\[
e = \text{error}
\]
3 Result and discussion

3.1 Paddy field cost and income analysis

Suratiyah [7] classifies farm costs into fixed and variable. Fixed costs aren't used up throughout production; therefore, their magnitude depends on the number of production processes. Paddy field farming costs include fixed costs (agricultural equipment) and variable costs (seeds, fertilizer, and pesticides), while paddy field farming income is the primary income. Paddy field farming income is the difference between revenues and costs. Revenue is the multiplication of amount of output and price or the product's sales value so that revenue can generate income [7]. Farmer's income is the income that is reduced by the costs incurred in farming and marketing agricultural products [7]. Farm income can be calculated by subtracting total revenues from total costs throughout a year or agricultural cycle [7]. This study calculates paddy field farming income for one growing season.

Table 1. Analysis of profits and feasibility of paddy field farming in the study area, 2021.

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Amount</th>
<th>Price (Rp)</th>
<th>Value (Rp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Revenue</td>
<td>20.175.324</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Production</td>
<td>3308.4</td>
<td>6000</td>
<td>19.850.400</td>
</tr>
<tr>
<td>B</td>
<td>Production Input</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seeds</td>
<td>43.4</td>
<td>4000</td>
<td>173.600</td>
</tr>
<tr>
<td></td>
<td>Fertilizer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Urea</td>
<td>128.2</td>
<td>30.332</td>
<td>3.888.562</td>
</tr>
<tr>
<td></td>
<td>2. NPK</td>
<td>52.5</td>
<td>4.000</td>
<td>210.000</td>
</tr>
<tr>
<td></td>
<td>3. TSP</td>
<td>15.4</td>
<td>11.532</td>
<td>177.593</td>
</tr>
<tr>
<td></td>
<td>4. Compost</td>
<td>88.7</td>
<td>10.863</td>
<td>963.548</td>
</tr>
<tr>
<td></td>
<td>Drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Insecticide</td>
<td>0.4 liter</td>
<td>174.102</td>
<td>69.641</td>
</tr>
<tr>
<td></td>
<td>2. Herbicide</td>
<td>4.6 liter</td>
<td>38.329</td>
<td>176.313</td>
</tr>
<tr>
<td></td>
<td>Equipment Cost:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Handtractor</td>
<td>1</td>
<td></td>
<td>4.257.732</td>
</tr>
<tr>
<td></td>
<td>Total Costs</td>
<td>Rp 11.514.479</td>
<td></td>
<td>4.257.732</td>
</tr>
<tr>
<td></td>
<td>Profit</td>
<td>Rp 8.646.552</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>R/C (Revenue/Cost)</td>
<td>3,9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Labor Productivity</td>
<td></td>
<td></td>
<td>150.000,00</td>
</tr>
<tr>
<td></td>
<td>Labor Wages Minimum in the Study Area</td>
<td></td>
<td></td>
<td>100.000,00</td>
</tr>
</tbody>
</table>

According to field data collection, paddy field farming in the study area has an average cost of Rp. 11.514.479 per planting season and a net income of Rp. 8.646.552 per season (Table 1). The level of paddy field farming revenue in the study area is substantially higher than in other studies, such as Karmini [9], Arifin et al. [10], and Arifin et al. [11] but slightly lower than the findings of Wardana et al. [12] with a revenue of Rp. 9.143.061 per growing season, and Nwahia [13] with an revenue level of Rp. 10.034.000 per growing season. These findings are supported by the theory that agribusinesses need revenue and income to exist and grow [14]. Revenue and income are highly tied to farmers' or a group's goals in managing their farming based on pattern, type, style, and structure [15]. As expressed by Islam et al. [16] that farmers have attitudes and perceptions of various risks of farming. Tien et al. [17] added that paddy field farming has many vulnerabilities in farmer households. Table 1 shows
paddy field farming in study area analysis. Analyses reveal that paddy field farming is feasible in the studied area. The R/C ratio of 3.9 indicates that acceptance is higher than paddy field farming management. The R/C Ratio value obtained in this study area is greater than the R/C Ratio research value of Mashudi et al. [18] (2.97), Tiro et al. [19] (1.7), Beding et al. [20] (3.42), Slameto et al. [21] (3.48). Another analysis is labor productivity, which is Rp.150,000, substantially more significant than the present pay in the study area (Rp.100,000).

3.2 Factors affecting the level of paddy field farming income

Table 2 shows $R^2=0.581$, $F=50.208$, and $F$ significance=0.000, which is less than 0.05. The variables of farmer age, number of family members, farmer experience, farm area, capital, and number of workers significantly affect paddy field farming income in the study area, reaching 58.1%. Additional factors affect 42%. It confirms the research model's validity. Age, number of family members, experience, farm area, capital, and number of workers affect paddy field agricultural income in the study area. Land area, number of workers and the number of workers affect paddy field farming income in the study area, but age, family size, farmer experience, and capital do not. The results of this study are in line with the research of Zhang [22], Boubacar et al. [23], Karmini [9], Cañete [24], Alam and Effendy [25], Ginting et al. [26], Rachmawati et al. [27], Arifin et al. [28], Chau and Ahamed [29]. The findings of this study support the hypothesis that farming is a technique for farmers to combine production components such as land, labor, and capital to deliver maximum and continuous outcomes [7].

The land area factor has a regression coefficient of 2.693.327,042, a t-count of 3.698, and a significance level of 0.000. The land area significantly positively affects paddy field farming income at 1% alpha. Each unit of the land area increases paddy field farming income by 2,693. It is excellent since the more land a farmer has, the more paddy fields he can plant, increasing his income. Land is more valuable than capital and labor since it has a function, value, and lower maintenance expenses [14]. Farmers aim to increase business land to boost productivity and profits. Arifin et al. [28] found that varying land area affects farmers' income positively and significantly.

The number of workers component has a regression coefficient of -78.533,337 and a t count of -6.492. The labor cost significantly negatively affects paddy field income at the 1% alpha level. Every unit of labor increases paddy farm income by 78,533. The study area's paddy field farming has entered the third phase (law of declining returns) [30]. Multiple regression analysis shows that farmer age, the number of family members, farmer’s experience, and capital do not affect paddy field farming income in the study area.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>T</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (a)</td>
<td>5.385,522,123</td>
<td>4,373**</td>
<td>0,000</td>
</tr>
<tr>
<td>Farmer’s Age (X1)</td>
<td>17.135,595</td>
<td>0,725</td>
<td>0,469</td>
</tr>
<tr>
<td>Number of Family Members (X2)</td>
<td>-109.787,956</td>
<td>-0,520</td>
<td>0,603</td>
</tr>
<tr>
<td>Farmer’s Experience (X3)</td>
<td>-52.197,424</td>
<td>-1,709</td>
<td>0,089</td>
</tr>
<tr>
<td>Land area owned (X4)</td>
<td>2.693,327,042</td>
<td>3,698**</td>
<td>0,000</td>
</tr>
<tr>
<td>Capital (X5)</td>
<td>0,060</td>
<td>0,495</td>
<td>0,621</td>
</tr>
<tr>
<td>Number of Workers (X6)</td>
<td>-78.533,337</td>
<td>-6,492**</td>
<td>0,000</td>
</tr>
</tbody>
</table>

$F$-hit $= 50,208$

$R^2 = 0,581$
4 Conclusion

Analysis shows that land area and some workers influence paddy field farming income in the study area. According to the Multiple Regression test, the land area factor has a regression coefficient of 2.693.327,04, a t value of 3,698, and a significance level of 0.000. The land area significantly positively affects paddy field farming income at 1% alpha. The number of workers factor yields a regression coefficient of -78.533,337 and a t count of -6.492. The number of workers significantly reduces paddy field income at the 1% alpha level. Every unit of labor increases paddy farm income by 78,533. Theoretically, paddy field farming in the study area has reached the third phase (law of diminishing return).

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29. N. T. Chau and T. Ahamed, Sustainability 14, 8842 (2022)