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Farming System Analysis of Sweet Potato in Merakurak District, Tuban Regency

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Abstract

Development in Indonesia is still strongly focused on the agricultural sector and remains a top priority; therefore, agriculture plays an important role in national development. Improvements in the living standards of rural communities are greatly influenced by income, which generally originates from farming activities. This study aims to analyse the income generated from sweet potato farming by farmers in Merakurak District, Tuban Regency, and to assess the feasibility and efficiency of sweet potato farming, an analysing the revenue-to-cost ratio (R/C ratio). This study was conducted in Merakurak District, Tuban Regency. The research was conducted over a two-month period, from May to October 2024. The selection of respondent farmers was conducted using a purposive sampling method, in which farmers were deliberately chosen for interviews. A total of 40 respondent farmers were selected to analyse their farming practices. The data used in this study consisted of primary and secondary data. In terms of age, the respondents were generally elderly or non-productive, with an average age of 50 to 60 years. The respondents had extensive farming experience, having been familiar with agricultural activities since childhood; however, they began focusing more seriously on farming activities around 1983 and have continued for approximately 30 years. The educational level of the respondent farmers was relatively low, with most having completed only junior high school education. Regarding labour utilisation, most respondent farmers relied on hired labour from outside the family. The capital used in farming activities primarily came from personal funds. In addition, some farmers borrowed capital from traders in the market during capital shortages through cooperative arrangements, in which the harvested produce was sold to those traders.

Keyword: Farming System, Sweet Potato, Income

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INTRODUCTION

Development in Indonesia is still primarily focused on the agricultural sector and remains a top priority; therefore, agriculture plays an important role in national development. Efforts to enhance development in the agricultural sector aim to improve the living standards of the community, particularly farming households. Improving living standards can be achieved by increasing farmers' income through farming activities. Farming activities must keep pace with technological developments; when it becomes difficult to determine which crops to cultivate, the application of technology in farming practices becomes essential.

Farming activities have existed since humans began managing natural resources to meet their basic needs (Rifai in A. Soeharjo and Patong, 1973). Farming is defined as an organisation of land, capital, and labour aimed at agricultural production. Thus, natural resources, capital, and management play crucial roles in a farming unit. Farming will be successful if land management, performance, and farmers' skills are continuously improved. Sweet potato is a crop that grows easily in lowland areas across Indonesia, including Merakurak District, Tuban Regency.

The improvement of rural living standards is strongly influenced by income, which generally originates from farming activities. According to Mosher (1987), income and profit levels are among the indicators used to measure the success of a farming enterprise. A farming operation is considered successful if the revenue from selling agricultural products to collectors or middlemen exceeds the initial production costs.

However, existing farming systems remain relatively simple, resulting in suboptimal production outcomes that are often insufficient to meet farmers' basic living needs. Therefore, it is necessary to conduct studies on increasing farmers' income and living standards, including analysing whether the farming activities carried out are economically feasible to sustain. This study aims to analyse income generated from sweet potato farming by farmers in Merakurak District, Tuban Regency; assess the feasibility and efficiency of sweet potato farming; and analyse the revenue-to-cost ratio (R/C ratio).

METHOD

Study Area and Research Period

This research was conducted in Merakurak District, Tuban Regency. The study location was selected purposively, given that Merakurak District has strong potential for the development of sweet potato farming and is home to a relatively large number of farmers cultivating this commodity.

The research was carried out over a six-month period, from May to October 2024. This timeframe

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covered the stages of research preparation, field data collection, data processing, and data analysis to obtain results in accordance with the research objectives.

Data Collection Methods

The selection of farmer respondents was conducted using a purposive sampling method, in which respondents were deliberately chosen based on specific considerations. A total of 40 farmers were selected as respondents for the analysis of their sweet potato farming activities.

The data used in this study consisted of primary and secondary data. Primary data were obtained through direct observation and face-to-face interviews with the selected farmer respondents in the study area, using a structured questionnaire prepared in advance. Secondary data were collected from online sources, undergraduate theses, and scientific journals relevant to the research topic.

Data Analysis Techniques

Depreciation of Farm Equipment

Farm tools and buildings with a useful life of more than one cropping season are valued using depreciation calculations. These assets include hand sprayers, hoes, machetes, and harrows. Depreciation was calculated using the straight-line method, assuming that farm assets depreciate at a constant rate each year. The depreciation formula is as follows: (Suratiyah, 2008)

Annual Depreciation (IDR per year) = (Investment Value – Salvage Value)/ Economic Life

Total Revenue

Total revenue is calculated using the following formula:

$$TR = Yi \times Py$$

Where:

TR = total revenue received by farmers (IDR)

Yi = total production (kg)

Py = selling price (IDR per kg)

(Soekartawi, 1995)

Farmers' Income

Farmers' income is calculated as total revenue minus cash costs incurred during production. The formula used to calculate farmers' income is:

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Yi = (Xi × Hx) – Bt

Where:
Yi = farmers' income (IDR)
Xi = total production (kg)
Hx = selling price of the product (IDR per kg)
Bt = cash costs (IDR)
(Hadisapoetra, 1979; Hidayat, 2011)

Farmers' Profit

Farmers' profit is defined as the difference between total revenue and total production costs. Farmers' profit can be calculated using the following formula:

K = (Xi × Hx) – BT

Where:
K = farmers' profit (IDR)
Xi = total production (kg)
Hx = selling price received by farmers (IDR per kg)
BT = total cost (IDR)

Total cost includes all expenses incurred in the production process, including both cash and imputed (non-cash) costs.

Revenue–Cost (R/C) Ratio Analysis

The Revenue–Cost (R/C) ratio analysis compares total output value with total input costs, or the ratio of farming revenue to farming expenditure. This analysis is divided into R/C ratios based on cash costs and total costs. After calculating farmers' profit, the feasibility of the farming enterprise is evaluated using the R/C ratio with the following formulas:

Cash R/C ratio = TR (cash) / TC (cash)

Total R/C ratio = TR (total) / TC (total)

Where:
TR = Total Revenue (IDR)
TC = Total Cost (IDR)

The assessment criteria for the R/C ratio are as follows:

1. **R/C ratio > 1** indicates that for every one unit of cost incurred, the enterprise generates more than one unit of revenue; thus, the farming activity is considered efficient and profitable.

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2. **A R/C ratio of 1** indicates that revenue equals costs, meaning the farming activity is at the break-even point (neither profit nor loss).
3. **R/C ratio < 1** indicates that revenue is less than costs, implying that the farming activity is inefficient and unprofitable.

The R/C ratio represents the amount of revenue generated per unit of cost incurred in farming activities. A higher R/C ratio indicates a more profitable farming enterprise. To determine the level of farmers' income and the profitability of the farming activities, the income and the R/C ratio.

RESULTS AND DISCUSSION

General Conditions of Farmers' Households

Age of Household Members

Based on age characteristics, the respondent farmers can generally be classified as elderly or non-productive, with an average age ranging from 50 to 60 years. The relatively advanced age of Indonesian farmers has a significant impact on productivity in the agricultural sector. Older farmers tend to be more conservative in responding to changes or technological innovations (Soetrisno, 2002).

According to Soeharjo and Patong (1973), farmers' age influences both physical capacity and ways of thinking. Younger farmers are generally more receptive to new ideas and more willing to take risks, enabling them to gain useful experience more quickly for their livelihoods and future development (Rahardja, 2006). In terms of physical capacity, younger farmers usually have greater strength than older farmers.

Farming Experience

The respondent farmers have generally been familiar with agricultural activities since childhood; however, they began to focus seriously on farming activities from 1983 until the present, resulting in approximately 30 years of farming experience (Hernanto, 1988). Most farmers became fully engaged in farming after marriage. The longer farmers are involved in farming, the greater their accumulated experience. Overall, the respondent farmers are highly experienced in farming activities.

This finding is consistent with Soekartawi (1993), who stated that farmers with longer farming experience tend to be more willing to bear the risks associated with adopting new technologies or changes in agricultural practices. With extensive experience, farmers are more responsive and adaptive to potential challenges. Even in the event of failure, experienced farmers

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are better able to make adjustments in their farming activities.

Education

The educational level of the respondent farmers is relatively low, with most having completed only junior secondary school. According to Hernanto (1989), education generally influences farmers' ways of thinking (Mosher, 1987). Higher levels of education and younger age tend to make farmers more dynamic, while education level also affects farmers' ability to introduce and adopt new technologies.

Similarly, Soeharjo and Patong (1973) stated that education plays an important role in shaping farmers' perspectives (Hernanto, 1996). Farmers with higher levels of education and younger ages are generally more dynamic and better able to adopt agricultural technological innovations.

Labour

In terms of labour utilisation, respondent farmers predominantly rely on hired labour from outside the household. Land preparation activities, including plot formation and planting preparation, are contracted using tractors. For planting activities, farmers employ female hired labour from outside the household. Weeding and harvesting activities are also performed by female hired labour.

The installation of bamboo stakes to support the plants and pest control spraying are carried out by the farmers themselves. Harvesting is conducted by female hired labour from outside the household. Overall, respondent farmers rely heavily on non-family labour in their farming operations. For marketing, farmers directly sell their produce at Kemang Market.

Working hours in farming activities generally range from 07:00 a.m. to 12:00 p.m. According to the respondent farmers, the wage rate for male labour is IDR 35,000 for a half-day, while female labour receives IDR 15,000 for the same duration.

Labour is one of the most important production factors in farming. Labour can be sourced from both family and non-family members. Labour quality and wage levels are influenced by gender, with male labour generally receiving higher wages than female labour (Soekartawi et al., 1984).

Capital

According to Mubyarto (1989), farm capital refers to economic assets used to generate income in agriculture. The capital used by the respondent farmers primarily comes from their own

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funds (Syahrul, 2009). However, when facing capital shortages, farmers also obtain loans from middlemen (bandar) in the market through informal cooperation arrangements, whereby the harvested produce is sold to the lender.

These lending arrangements are based on long-standing relationships between farmers and middlemen. No interest is charged on the loans; however, there is an unwritten agreement that the harvested produce must be sold to the middlemen providing the capital.

Farming Costs

Like other farming activities, sweet potato farming costs consist of cash and imputed costs. Cash costs incurred by respondent farmers include fertiliser expenses, hired labour costs, and land tax (Mosher, 1965). Imputed costs are expenses that are not paid in cash but must be recognised as production costs in sweet potato farming.

Imputed costs include family labour, seed, depreciation, and the rental value of owned land. The total cash costs incurred by respondent farmers amount to IDR 6,087,000, while the total imputed costs amount to IDR 1,491,425.

Farm Income

The income earned by respondent farmers from sweet potato farming amounts to IDR 4,313,000. The income analysis indicates that sweet potato farming is profitable. The profit obtained by respondent farmers is IDR 2,821,575.

The R/C ratio based on total costs is 1.4, indicating that for every IDR 1,000 of total costs incurred in sweet potato production, farmers receive IDR 1,400 in revenue. Based on these results, the respondent farmers' sweet potato farming is economically feasible and profitable.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Based on the results of the study, which aimed to analyse income and to assess the feasibility and efficiency of sweet potato farming in Merakurak District, Tuban Regency, it can be concluded that:

1. Sweet potato farming generates positive and profitable income for farmers. The average income indicates that farm revenues cover all production costs, including both cash and imputed costs.
2. The analysis of the revenue–cost ratio (R/C ratio) based on total costs indicates a value of 1.4, indicating that sweet potato farming is feasible and efficient to operate. An R/C ratio greater than one signifies that each unit of production cost generates higher revenue, suggesting that sweet

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potato farming in the study area can continue to be developed as a source of increased farmer income.

Recommendations

Based on the findings showing that sweet potato farming in Merakurak District, Tuban Regency, is feasible and profitable, the following recommendations are proposed:

1. Farmers are encouraged to maintain and further develop sweet potato farming by implementing more efficient farm management practices, particularly in the use of production inputs and labour, in order to reduce costs without decreasing output levels.
2. Support from local government and relevant institutions is needed in the form of agricultural extension services, technical assistance, and facilitation of access to capital and agricultural technology. This support is essential to improve productivity and efficiency, and to enhance farmers' capacity to adopt innovations, given that most farmers are relatively old and have low levels of education.
3. Future studies are recommended to expand the research area and include additional variables, such as risk analysis, marketing aspects, and the use of technology, to provide a more comprehensive understanding of the development of sweet potato farming in the future.

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