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FEASIBILITY OF BLACK RICE FARMING IN SUBAK SERASON, PITRA VILLAGE, PENEBEL DISTRICT, TABANAN

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ABSTRACT

Subak Serason, located in Pitra Village, Penebel District, Tabanan Regency, holds strong potential to be developed as a center for black rice cultivation an agricultural commodity with both economic value and cultural significance. This study aims to evaluate the cost structure, revenue, and income from black rice farming, as well as to assess its economic feasibility. The research method employs a farm feasibility analysis approach. The results show that the average total cost incurred per 20 ares of land is IDR 5,838,000, while the average revenue reaches IDR 9,350,000. Consequently, the average net income obtained by farmers amounts to IDR 3,512,000. The R/C ratio of 1.60 indicates that this farming activity is profitable and economically feasible for continuation. This study recommends that farmers receive technical guidance through agricultural extension programs to improve both yield and the quality of black rice. Additionally, to enhance its economic value, harvested crops should be processed into rice before being marketed, enabling higher selling prices and significant value addition.

Keywords: *Black Rice, Farmer Income, Economic Feasibility*

INTRODUCTION

The agricultural sector remains the backbone of the national economy, especially for rural communities in Indonesia. Among the various subsectors supporting the national agricultural system, the food crop subsector plays a crucial role due to its direct relevance to food security and farmer welfare. The leading commodity in this subsector is rice (*Oryza sativa*), which not only serves as the staple food for the majority of the population but also significantly contributes to farmers' incomes and the overall structure of agricultural production in the country (Mirawati, 2011; Hendayana & Maulana, 2019). Rice plays a vital role in two fundamental aspects: first, as the primary source of carbohydrates forming the foundation of national dietary consumption; and second, as a strategic commodity in the agricultural economy, providing employment and serving as the cornerstone of many farming livelihoods (Saragih, 2021). In the framework of sustainable development, improving the productivity and added value of rice commodities is a top priority, particularly through the development of superior varieties with nutritional and economic advantages.

One such variety gaining attention is black rice, a local type of rice known for its higher nutritional content compared to white or red rice. A report from FAO (2020) indicates that black rice contains 8.5 grams of protein per 100 grams, a high fiber content, and significant levels of minerals such as iron. Its distinctive dark purple hue results from a high concentration of anthocyanins, natural antioxidants that help neutralize free radicals and support overall health (Kristamtini, 2012; Sun et al., 2022). Furthermore, black rice is recognized as a functional food, aligning with the growing dietary trends among urban, health-conscious consumers. Although its texture and taste differ from white rice, it is less soft and requires a longer cooking time, it has a unique aroma favored by certain market segments. These attributes offer farmers an opportunity to enter more profitable premium market niches (Narwidina, 2009; Wang et al., 2020). In Bali, particularly in Tabanan Regency, agriculture remains a dominant sector. One village recognized for producing black rice is Pitra Village, located in the Penebel District. Subak Serason, situated within this village, is an agrarian area actively cultivating local black rice, utilizing the traditional *subak*

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system, an indigenous agricultural wisdom that also attracts agrotourism (Adnyana & Putra, 2022).

Despite its great potential, many farmers in this area have yet to apply structured farm feasibility analysis, resulting in inefficient cost and income management (Astiti et al., 2021). To address this issue, an in-depth study on the financial feasibility of black rice farming is needed. This assessment is essential not only for evaluating profit and loss quantitatively but also for serving as a reference in agribusiness decision-making at the farmer level. In this context, a financial feasibility approach involving the evaluation of production cost components, business revenue, net income, and efficiency ratio (R/C ratio) is highly relevant (Prasetya, 2006; Soekartawi, 2023).

Farm business costs can be categorized into fixed costs (e.g., land rent, equipment depreciation) and variable costs (e.g., seed, fertilizer, labor), which together form the total cost (Joesron, 2003; Hernanto, 1989). Revenue is defined as the gross income from harvest sales, while net income is the difference between revenue and total cost (Soekartawi, 2006). The Revenue-to-Cost (R/C) ratio is a key indicator of feasibility, offering farmers an objective overview to evaluate input efficiency and the potential for business development. Furthermore, this approach supports farmer empowerment by providing data-driven insights and economic analysis, ultimately aiming to promote the transformation of traditional farming into market-oriented and sustainable agribusiness. Considering its nutritional benefits, economic value, and local context, black rice from Subak Serason holds strong potential to become a flagship commodity for Bali in developing a healthy, inclusive, and globally competitive agricultural sector.

RESEARCH METHOD

This research was conducted in Subak Serason, located in Pitra Village, Penebel District, Tabanan Regency, Bali. The location was selected purposively, considering its suitable agroecological conditions for black rice cultivation and its recognition as one of the central areas of local black rice production in Bali. In addition to the fertile land and the continued operation of the traditional *Subak* irrigation system, the presence of an organized farmer group further justified its selection as the research site, as it represents a sustainable and community-based farming practice. The population of this study consisted of all farmers actively cultivating black rice in the Subak Serason area, totaling 52 individuals. Due to time, labor, and budget constraints, not all farmers could be included as respondents. Therefore, a sample of 30 farmers was selected using simple random sampling**,** which provides every member of the population an equal chance of being selected. This approach ensures that the collected data remains representative and accurately reflects the general conditions of black rice farming in the area. The research utilized both quantitative and qualitative data**.** Quantitative data included numeric values such as production volume, input costs, selling prices, income, and farm efficiency. Qualitative data consisted of narrative information explaining farmers' socio-economic contexts, decision-making patterns, and challenges faced during cultivation. Primary data were collected directly from respondents through interviews, field observations, and questionnaires. Secondary data were obtained from supporting documents such as reports from the Agriculture Office, farmer group archives, and relevant academic references. The data collection techniques used were:

a. Field observation to monitor farming activities from land preparation to post-harvest.
b. Structured interviews to obtain specific information on production inputs, labor, and technical constraints.
c. Documentation to gather historical or administrative data such as average selling prices and cultivated land size.
d. Literature review to reinforce the theoretical framework and analytical approach of this study.

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Data analysis was conducted using descriptive quantitative methods, aiming to simplify numerical information into easily understandable forms, as follows:

1.Total Production Cost

Calculated by summing fixed and variable costs incurred during farming operations:

TC = TFC + TVC

Where:

- TC (Total Cost): Total farming expenses
- TFC (Total Fixed Cost): Costs that remain constant regardless of production scale, such as equipment depreciation
- TVC (Total Variable Cost): Costs that vary with production intensity, such as seeds, fertilizer, pesticides, and labor

2.Total Revenue (TR)

Calculated by multiplying the quantity of harvested rice sold by the selling price per unit:

TR = Hy × Y

Where:

- TR (Total Revenue): Gross income before deducting costs
- Y: Quantity of black rice produced and sold
- Hy: Selling price per unit at the farmer level

3.Net Income (Pd)

Determined by subtracting total cost from total revenue:

Pd = TR – TC

Where:

- Pd: Net income from farming
- TR: Total revenue
- TC: Total production cost

4.Financial Feasibility Analysis (R/C Ratio)

Assesses profitability by comparing total revenue to total cost:

R/C = TR / TC

Where:

- R/C Ratio: Efficiency indicator; considered feasible if greater than 1
- TR: Total revenue
- TC: Total cost

The R/C ratio serves as a key benchmark to evaluate the financial viability of black rice farming in Subak Serason. A ratio greater than 1 indicates profitability, while a ratio below 1 indicates a loss. This analysis is widely used in agribusiness and farming studies in Indonesia and is considered a reliable method for objectively describing the economic realities faced by farmers (Soekartawi, 2006; Wahyuni et al., 2021; Trisna & Yasa, 2020).

RESEARCH RESULTS AND DISCUSSION

In farm economic analysis, cost structure serves as a fundamental basis for understanding operational efficiency and formulating profit improvement strategies. The findings of this study reveal that the total cost incurred by farmers for black rice farming in Subak Serason amounts to IDR 6,438,000.00 per 55 ares per planting season. These costs consist of two main categories: fixed costs and variable costs, as classified in agricultural economics literature (Soekartawi, 2006; Hernanto, 1993). The fixed cost, amounting to IDR 78,000.00 per season, comes from the depreciation of agricultural tools such as hoes and sickles, which are used over multiple seasons. This amount remains unchanged regardless of production intensity, reflecting the efficiency of simple tools in traditional farming systems that still rely on manual equipment.

The variable cost is the dominant component of total expenses, comprising production inputs (seeds, organic manure, inorganic fertilizers, pesticides, sacks) and labor costs for activities such as land preparation, planting, weeding, fertilizing, pest control, and harvesting. Input costs were recorded at IDR 3,665,000.00, while labor costs amounted to IDR 2,095,000.00. These results indicate that variable costs dominate the farming expenses in small-scale black rice farming, mainly due to the high demand for manual labor (Gunawan et al., 2022; Wahyuni et al., 2021). This cost structure reflects a semi-traditional farming system still dependent on labor-intensive practices and external input purchases. Therefore, efficiency strategies should focus on optimizing input use and managing seasonal labor more effectively.

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Table 1. Cost Structure, Revenue, Net Income, and R/C Ratio of Black Rice Farming

No	Expenditure Component	Volume	Price (Rp/unit)	Total Cost (Rp/ Cultivated Area)	Total Cost (Rp/ Hectare)
I	Input				
A	Variable Costs				
	1. Production Inputs				
	a. Organic Fertilizer)	75 sacks	15.000,00	1.125.000,00	2.250.000,00
	b. Inorganic Fertilizer				
	• Urea	50 kg	15.000.00	750.000,00	1.500.000,00
	• NPK	50 kg	15.000,00	750.000,00	1.500.000,00
	c. Pesticides	6 bottle	72.000,00	648.000,00	1.296.000,00
	d. Storage sacks	10 unit	3.500,00	42.000,00	84.000,00
	e. Seeds	14 kg	25.000,00	350.000,00	700.000,00
	Subtotal 1			3.665.000,00	7.330.000,00
	2. Labor Costs				
	a. Land Preparation	8 HOK	65.000,00	520.000,00	1.040.000,00
	b. Planting	20 are	15.000,00	300.000,00	600.000,00
	c. Tractor Usage	20 are	25.000,00	500.000,00	1.000.000,00
	d. Weeding	4 HOK	40.000,00	160.000,00	320.000,00
	e. Fertilizing	4 HOK	45.000,00	180.000,00	360.000,00
	f. Pest Control	6 HOK	40.000,00	240.000,00	480.000,00
	g. Harvesting	3 HOK	65.000,00	195.000,00	390.000,00
	Subtotal 2			2.095.000,00	4.190.000,00
	Subtotal A			5.760.000,00	11.520.000,00
B	Fixed Cost				
	1. Depreciation Costs				
	a. Hoe	2 units	25.000,00	50.000,00	100.000,00
	b. Sickle	2 units	14.000,00	28.000,00	56.000,00
	Subtotal B			78.000,00	156.000,00
	Subtotal A+ B			5.838.000,00	11.676.000,00
II	Output				
	a. Total Rice Production	1.870			
	b. Farm-Gate Price		5000,00		
	c.Total Value of Rice Production			9.350.000,00	18.700.000,00
	d. Total Costs			5.838.000,00	11.676.000,00
	e. Farmer's Income			3.512.000,00	7.024.000,00
III	R/C			1,60	1,60

Source: Processed Primary Data

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Based on the research findings, the total revenue earned by farmers comes from the sale of black rice harvests, with the farm-gate price set at IDR 5,000 per kilogram and total production reaching 2,062 kg per 55 ares. From this data, the total seasonal revenue per farmer was recorded at IDR 10,310,000.00. When compared to the total cost incurred, the net income achieved per farming season was IDR 3,872,000.00 per 55 ares. This figure is considered high for small-scale farming and indicates that the business is capable of providing a decent net profit. According to Trisna and Yasa (2020), net incomes from rice farming in *Subak* areas generally range from IDR 2 million to 3.5 million per season, depending on the variety and market price. Thus, the result from black rice farming suggests a higher economic potential than conventional rice. This reinforces the argument that developing local varieties like black rice with high functional value can be a strategic adaptation to improve farmers' incomes, particularly in agrarian regions with strong cultural traditions such as Bali.

Financial Feasibility Evaluation

Financial feasibility was assessed using the Revenue-to-Cost Ratio (R/C Ratio), which compares total revenue to total production cost. In this study, the R/C ratio was calculated at 1.60, meaning that for every IDR 1 spent on production, the farmer earns IDR 1.60 in revenue. According to Soekartawi (1995), a farming business is considered feasible and profitable if R/C > 1, as it indicates that the enterprise not only covers its costs but also yields a surplus or profit. An R/C value of 1.60 is relatively high compared to the general standard for rice farming in Indonesia, where the average R/C ratio typically ranges between 1.2 and 1.4 (Wahyuni et al., 2021). This finding suggests that black rice has not only a higher market value but also greater efficiency potential, particularly when managed with a well-planned agribusiness approach. Therefore, this research strengthens the conclusion that black rice farming in Subak Serason is economically feasible and has strong development potential. In addition to providing tangible benefits to farmers, this commodity is also relevant for supporting local food security and promoting healthy, functional food products that are in high market demand.

CONCLUSION AND RECOMMENDATIONS

This study concludes that black rice farming in Subak Serason, Pitra Village, demonstrates promising economic potential. With an average production cost of IDR 6,438,000.00 per 55 ares per growing season, farmers can generate a gross revenue of IDR 10,310,000.00. The difference between total revenue and costs results in a net income of IDR 3,872,000.00. The R/C (Revenue/Cost) ratio of 1.60 indicates that every rupiah spent in the production process yields IDR 1.60 in revenue, reflecting strong business efficiency and financial profitability. These findings affirm that black rice farming can be a stable and sustainable source of income for local farmers, while also supporting the diversification of food commodities based on local wisdom. To ensure the sustainability and improve the profitability of this farming enterprise, several strategic actions are recommended, strengthening farmer institutions is essential to address both technical and non-technical challenges in cultivation. Cooperation among farmers through farmer groups, *Subak* cooperatives, or organic farming communities can enhance production efficiency and facilitate knowledge and technology transfer. Promoting downstream processing and product diversification is necessary to ensure that harvested rice is not only sold as unhusked grain but also processed into high-quality, packaged rice. This creates higher added value and strengthens the marketability of the product. Enhancing digital marketing and community outreach is vital by utilizing social media and e-commerce platforms to target premium markets, including organic product consumers, hotels, restaurants, and Bali souvenir markets. Support from local government and relevant institutions is crucial, especially in facilitating access to capital, providing farm management training, and assisting in the certification of organic or functional food products. With these efforts, black rice from Pitra Village can not only sustain its role as a flagship local commodity but also compete effectively in domestic and national markets.

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