# COST AND REVENUE ANALYSIS OF IRRIGATED RICE FIELDS IN POLANHARJO SUBDISTRICT, KLATEN REGENCY

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**ABSTRACT**

*Polanharjo Subdistrict is one of the major agricultural centers in Klaten that relies on abundant technical irrigation, and as a result, the local economy is supported by this sector. This study aims to analyze the costs and revenues of irrigated paddy farming in Polanharjo Subdistrict, Klaten Regency. The research employed a descriptive-analytical method using a survey technique. A sample of 60 farmers was selected through random sampling across four villages with the largest rice harvest areas. Data were analyzed using the average total costs and revenues derived from various factors under study. The results of the study show that the average total cost of farming per hectare per growing season is IDR. 10.704.494,00, while revenue amounts to IDR. 37.422.367, resulting in a net income of Rp. 26.717.873 per growing season/Hectar. This net profit demonstrates that irrigated rice farming in Polanharjo Subdistrict is profitable and worth continuing in the future.*

**KEYWORDS** *farming; irrigation; income; costs*

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## INTRODUCTION

Polanharjo Subdistrict is located in the northern part of Klaten Regency and covers an area of approximately 23.84 km². The community's economy is largely driven by the agricultural sector. According to a study by Auria et al. (2022), Polanharjo Subdistrict is classified as a leading rice-producing area based on a Location Quotient (LQ) value exceeding one, meaning it is capable of meeting local market demand, exporting to other regions, and playing a more significant role than non-leading areas. Consequently, Polanharjo subdistrict contributes to Klaten's status as a major rice production center and a leading rice granary, particularly in Central Java. According to

data from the Klaten Regency Central Statistics Agency (BPS), the total harvested area for rice in 2024 reached 54,219 ha, with a total production of 304,871 metric tons of milled dry paddy (Kristiono et al., 2024). These results align with a study by Oktaviano (2025), which states that Klaten Regency is one of the agricultural production centers producing a variety of commodities, with rice as its primary crop. One contributing factor is the abundant availability of irrigation water throughout the year, resulting in irrigated farmland dominating land use in the Polanharjo area. Irrigated rice fields are indeed more prevalent in Indonesian agriculture because they provide a stable water supply year-round through man-made canals. Consequently, productivity and harvest frequency are significantly higher compared to rain-fed rice fields, which rely solely on water from the sky as well as climate change, which has caused shifts in rainfall patterns and intensity (Saputra et al., 2022). Approximately 60% of the irrigated rice fields in Polanharjo subdistrict are technically irrigated, meaning that water channels, dams, and water distribution structures are well-managed to ensure a regular supply and controlled flow of water to the rice fields. This is closely tied to the abundant water supply derived from several natural springs or "umbul," whose plentiful water supports the agricultural irrigation channels.

Although supported by a stable supply of irrigation water, the success of rice farming is still influenced by many factors, both internal and external (Yusliana et al., 2020). Internal factors include the efficiency of production cost allocation, such as seeds, fertilizers, pesticides, and labor. External factors, on the other hand, include fluctuations in input prices and the selling price of harvested dry paddy (GKP), which affect farmers' income levels. Therefore, research on the Analysis of Irrigated Rice Farming in Polanharjo Subdistrict is essential to measure the economic efficiency and viability of farming operations in the region.

## RESEARCH METHOD

The study was conducted in Polanharjo Subdistrict, Klaten Regency, after first identifying villages based on the criterion of the largest irrigated paddy field harvest area. The number of farmers in the sample from the two villages was determined using proportional random sampling, in which the sample size was selected in proportion to the total number of farmers in the sample villages. The data collected consisted of primary data obtained through structured interviews and questionnaires administered to 40 respondents selected via random sampling, as well as secondary data obtained from the Klaten Regency Central Statistics Agency.

The data obtained were then tabulated, and calculations were performed for total costs, revenue, income, and business viability using the following formulas (Sepfrian et al., 2024; Nurhalisa et al., 2023) The study was conducted in Polanharjo District, Klaten Regency by first determining the villages based on the criteria of the largest irrigated rice harvest area of the village, namely 4 villages such as Jimus Village, Sidoharjo Village, Kapungan Village and Sidowayah Village. Determination of the number of sample farmers from two villages was carried out using the proportional random sampling method, namely taking the number of samples following the proportion of the number of farmers in the sample village. The data collected were primary data using a structured interview method and questionnaires to 60 respondents by random sampling as well as secondary data obtained from the Central Statistics Agency of Klaten Regency. Total cost, calculated by adding fixed costs and variable costs

$$TC = FC + VC$$

Notes:
TC: Total Cost
FC: Fixed Cost
VC: Variable Cost

1 Revenue is calculated by multiplying the quantity of irrigated rice sold by the price of that rice.
$TR = Q \times P$
Notes:
TR = Total Revenue from irrigated rice (Rp)
Q = Quantity of irrigated rice produced (kg)
P = Price of irrigated rice (Rp/kg)

2 Income Analysis: the difference between total revenue and total farming costs
$Pd = TR - TC$
Notes:
Pd = Income from irrigated rice farming (Rp)
TC = Total cost of irrigated rice farming (Rp)
TR = Total revenue from irrigated rice farming (Rp)

## RESULT AND DISCUSSION

### Business Profile, Prices, and Total Production

Agricultural land in the four villages of Polanharjo Subdistrict is supported by an excellent technical irrigation system fed by natural springs (such as Umbul Ponggok and the surrounding area), enabling a cropping index of 2–3 harvests per year. The average production and selling price of harvested dry paddy per growing season are shown in Table 1.

Table 1. Average Production and Selling Price of Harvested Dry Paddy in Polanharjo Subdistrict

| No | Description | Average Production and Price |
|---|---|---|
| 1 | Price (Rp/kg) | Rp 6000,00 |
| 2 | Production (kg/ha) | 6.237 |

The selling price of dry paddy generally fluctuates between Rp. 5,500 and Rp. 6,500 due to several factors based on field findings, such as the sales system, paddy quality, and market influences. Some farmers who do not cultivate their land directly tend to rely more on the "tebasan" system or sell their crops in bulk at harvest time. The "tebasan" mechanism typically involves estimating the paddy yield based on land area and the condition of the rice plants, followed by negotiating a lump-sum price for the entire harvest (Fauzi et al., 2016). Based on the average price as shown in Table 1, rice productivity in Polanharjo Subdistrict reached 6.2 metric tons of paddy per hectare. This figure is relatively high compared to the national average productivity of 5.32 metric tons per hectare in 2025 (BPS, 2026). Several supporting factors include the availability of high-quality irrigation water, the use of high-yielding rice varieties, and efficient land preparation and fertilization practices in Polanharjo Subdistrict. The efficient use of these production factors plays a crucial role in increasing rice productivity, alongside agroecological conditions and the control of plant pests (Bachtiar, 2026).

**Costs, Revenue, and Profit in Rice Farming**

Based on data analysis, it was found that the production costs incurred by farmers for irrigated rice fields amounted to IDR 10.704.494,00 per hectare, while revenue from irrigated rice farming amounted to IDR 37.422.367, per hectare (Table 2).

Table 2. Average Production Costs and Farm Income in Polanharjo Subdistrict

| No | Description | Average Cost and Revenue of Irrigated Rice |
|---|---|---|
| 1 | Cost | IDR. 10.704.494,00/Hectar |
| 2 | Revenue | IDR. 37.422.367/Hectar,- |

The calculated production costs include fixed costs such as land taxes and equipment depreciation, as well as variable costs such as seeds, fertilizer, pesticides, labor wages, and fuel or irrigation fees, all calculated over a single growing season. Meanwhile, revenue is derived by multiplying production capacity by the price, as shown in Table 1. When calculating net profit, farmers earn an average net profit of IDR *26.717.873* per hectare per growing season after deducting all initial working capital. When calculated as a profit margin, the profitability rate reaches 67.3% of total gross revenue (Sadat et al., 2023). Several factors contributing to these results include planting frequency, a stable water supply with good water quality, and controlled production costs. This indicates that irrigated rice farming in Polanharjo Subdistrict can be considered economically viable, generating profits derived from the difference between revenue and production costs.

## CONCLUSION

The results and Based on data analysis, it was found that the production costs incurred by farmers for irrigated rice fields amounted to IDR 10.704.494,00 per hectare, while revenue from irrigated rice farming amounted to IDR 37.422.367, per hectare. Irrigated lowland rice farming in the Polanharjo Sub District is Highly Profitable.

Irrigated rice farming in Polanharjo Subdistrict achieves optimal land and crop productivity, thanks to a stable supply of technical irrigation water, efficient land management, and cost-effective production, resulting in high profitability. Economically, this farming practice is considered profitable and worth developing. The total revenue earned by farmers far exceeds all operational costs incurred (fixed and variable costs), such as the procurement of seeds, fertilizers, pesticides, and labor.

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