FINANCIAL FEASIBILITY STUDY OF RICE FARMING IN JALMAK VILLAGE, PAMEKASAN REGENCY

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ABSTRACT

Rice farming is important for food security and farmers' income, but its feasibility is affected by high input costs, erratic weather, pest and disease attacks, and fluctuating grain prices. This study analyzes the financial feasibility of rice farming in Jalmak Village, Pamekasan Regency, and identifies its supporting and constraining factors. It used a descriptive survey with a mixed quantitative–qualitative approach on 24 rice farmers selected by simple random sampling. Data were collected through observation, questionnaires, interviews, and documentation, and then analyzed using cost, revenue, profit, and Revenue–Cost Ratio (R/C Ratio) analysis, scenario-based sensitivity analysis of changes in yield, price, and cost, and descriptive analysis of the interview data. Average total production cost was IDR 5,819,341.67 per farmer per planting season (fixed cost IDR 608,958.33 and variable cost IDR 5,210,383.33). Average revenue was IDR 27,687,625.00 and average profit was IDR 21,868,283.33, giving an R/C Ratio of 4.76. All 24 farmers had an R/C Ratio above one. The sensitivity analysis shows that farming remains feasible under a 50% yield decline (R/C = 2.38) and under a 30% yield decline combined with a 20% cost increase (R/C = 2.78); the break-even point is reached only if revenue falls by about 79%. The main supporting factors are land availability, farming experience, labor, mutual cooperation (gotong royong), and the availability of production inputs and water, while the main constraints are erratic weather, limited water, pests, expensive fertilizer, and unstable grain prices. Farmers need to strengthen water management, pest and disease control, and cost record-keeping to protect profit.

Keywords: rice-farming; farm-feasibility; rc-ratio; sensitivity-analysis; supporting-and-constraining-factor

INTRODUCTION

Agriculture has long been a strategic sector in Indonesia's development. It provides food, contributes to Gross Domestic Product (GDP), absorbs labor, generates foreign exchange, and supports community income, and it is part of the culture of much of the population (Ibrahim, 2021). Among food crops, rice is the main commodity consumed daily, and the Food and Agriculture Organization ranks it among the world's most important food commodities (FAO, 2022). Rice demand continues to rise with population growth of about 2% per year and a shift in consumption patterns from non-rice staples to rice, while the productivity of irrigated paddy fields tends to level off because of land conversion and declining soil fertility (Vandalisna, 2023). Dependence on imports shows that rice self-sufficiency remains fragile: Indonesia imported about 4.52 million tons of rice in 2024, the highest volume ever recorded (Databoks, 2025).

Advances in cultivation technology, such as balanced fertilization and Integrated Crop Management (ICM), aim to achieve high and sustainable productivity without damaging the soil and other production factors (Vandalisna, 2023). Farmers nevertheless face climate change that shifts the rainy and dry seasons, floods and landslides, pest and disease attacks, and low grain prices at harvest. These conditions make rice farming a risky enterprise, so farmers must be able to manage their farms amid change (Murtadlo, 2023). Farmers' attitudes toward risk influence input allocation, management decisions, and investment decisions, because farmers expect optimal production and income from the resources they commit.

Jalmak Village is one of the villages with considerable agricultural potential in Pamekasan District. Its agricultural land covers 157 hectares, consisting of 136 hectares of paddy fields and 21 hectares of non-paddy land, while non-agricultural land covers 35 hectares. In 2019, the harvested area of paddy rice in Pamekasan District reached 1,112 hectares with production of 58,858 quintals, or a productivity of 53 quintals per hectare. Rice farming is therefore one of the main pillars of the village economy. A preliminary study showed that farmers in Jalmak face strong winds that trigger bacterial leaf blight (*Xanthomonas oryzae* pv. *oryzae*) and neck blast disease caused by the fungus *Pyricularia oryzae* (*Magnaporthe oryzae*). In early 2026, floods in Jalmak and its surroundings inundated paddy fields and caused crop failures with losses of tens of millions of rupiah; plants

submerged for a long time rotted, so farmers had to harvest early or bear the loss.

Previous studies have reported that rice farming is profitable in various regions, such as an R/C Ratio of 2.73 in Cawas District, Klaten (Sholihah & Aslam, 2022) and 5.98 in Tanarara Village, East Sumba (Ndawareha & Saragih, 2025), and have shown that costs, revenue, and efficiency determine feasibility (Azis, 2024). However, these studies have three limitations. First, they generally report a single feasibility figure without testing its resilience to climate-related shocks such as a decline in yield, a drop in price, or an increase in costs. Second, they rarely distinguish profit from farm income, even though the two differ conceptually. Third, they rarely combine financial indicators with farmers' own explanations of the factors that support and hinder production. No study has yet assessed these aspects for rice farming in Jalmak Village, Pamekasan, where yield and price conditions differ from those of the regions already studied.

This study fills that gap. Its objectives are (1) to analyze the financial feasibility of rice farming in Jalmak Village through cost, revenue, profit, and R/C Ratio analysis, (2) to test the sensitivity of profit and the R/C Ratio to changes in yield, price, and cost that represent climate-related risks, and (3) to identify the supporting and constraining factors of rice farming in the village. The novelty of the study lies in combining farm-level feasibility analysis with scenario-based sensitivity analysis and a picture of supporting and constraining factors from the farmers' perspective, in a village that has not previously been studied.

METHODOLOGY

Research design, location, and time

The study used a descriptive survey with a mixed quantitative–qualitative approach, combining quantitative and qualitative elements in a single research sequence to understand the problem both broadly and in depth (Schoonenboom & Johnson, 2017; Sembiring, 2024). The quantitative component measured costs, revenue, profit, and feasibility, while the qualitative component explored supporting and constraining factors. The research location, Jalmak Village, Pamekasan District, was chosen purposively because no study had yet analyzed the feasibility of rice farming in this village and because the researchers wanted to learn how production inputs (type, quantity, quality, timing, and price) are used there. Respondens are rice farmers in jalmak village.

Data collection

Primary data were collected directly in the field through a structured questionnaire and interviews, field observation, and documentation. The questionnaire covered input use and prices, labor, production, sales, and selling prices for one planting season. In-depth unstructured interviews were used to explore the supporting and constraining factors of farming. Interviews can be semi-structured, with a flexible guide of core topics, or unstructured/in-depth, in the form of free conversation to explore narratives in depth; the latter was chosen so that farmers' experiences could be explored fully. Secondary data on land use and rice production were obtained from district statistics.

Data analysis

1. Costs

Total cost is the sum of fixed and variable costs (Ermawati, 2022):

$$TC = TFC + TVC$$

where TC is total cost, TFC is total fixed cost, and TVC is total variable cost (IDR per farmer per planting season).

Variable cost is calculated as the sum of the quantity multiplied by the price of each input:

$$TVC = \Sigma\ (P_i \times X_i),\ \ i = 1, \ldots, n$$

where X_i is the quantity of input i (seed, urea, TSP, KCl, insecticide, and herbicide in kg or liters; labor in person-daysNB

) and P_i is its unit price. Fixed cost consists mainly of depreciation of farm equipment, calculated with the straight-line method (Ermawati, 2022):

$$D = (NB - NS) / MP$$

where D is annual depreciation (IDR/unit), NB is the purchase price of the equipment, NS is the salvage value (assumed to be 20% of NB), and MP is the useful life (years). Annual depreciation was allocated to one planting season.

2. Revenue

Total revenue is calculated with the following formula (Adnyana, 2020):

$$TR = Y \times P_Y$$

where TR is total revenue, Y is the quantity of grain sold (kg), and P_Y is the selling price (IDR/kg). Because selling prices differ among respondents, TR was first calculated for each respondent and then averaged.

Profit and farm income

Profit and farm income are conceptually different measures. Farm income is revenue minus explicit (cash) costs, so it includes the return to the farmer's own labor and capital, whereas profit is revenue minus all costs, including implicit costs such as the value of family labor and depreciation. Because the cost data in this study cover all inputs, labor, and depreciation, the measure calculated is profit (Adnyana, 2020):

$$\pi = TR - TC$$

where π is profit (IDR per farmer per planting season).

Feasibility

Financial feasibility was assessed with the Revenue–Cost Ratio:

$$R/C = TR / TC$$

An R/C value above 1 means the farm is feasible, equal to 1 means break-even, and below 1 means not feasible. The ratio was calculated for each respondent and for the sample average.

Sensitivity analysis

To reflect climate-related risk, profit and the R/C Ratio were recalculated under scenarios of a 10–50% decline in yield (and hence revenue), a 10–30% decline in selling price, a 10–30% increase in production cost, or a yield decline accompanied by a cost increase. Because revenue is proportional to yield and price, the same percentage decline in either has the same effect on revenue. Break-even yield and price were also calculated (TC divided by price, and TC divided by the quantity sold). The scenarios were applied to the sample average values, so they are illustrative rather than forecasts.

Supporting and constraining factors

Interview responses were coded and grouped into themes, and the frequency and percentage of informants mentioning each factor are presented descriptively.

RESULTS AND DISCUSSIONS

Supporting factors of rice farming

Table 1 presents the supporting factors of rice farming according to the 24 informants. Land availability was mentioned by all informants (100%), followed by the availability of seed and fertilizer (91.67%), farming experience (87.50%), water availability (83.33%), and labor (79.17%). Mutual cooperation (gotong royong) (75.00%), farm tools and facilities (70.83%), and family and farmer-group support (66.67%) were mentioned

by fewer informants but remain an important social and material foundation for production.

Table 1. Supporting factors of rice farming in Jalmak Village

No	Supporting factor	Form of support	Frequency	Percentage (%)
1	Farmland	Availability of land for farming activities	24	100.00
2	Farming experience	Farmers' knowledge and skills in managing the farm	21	87.50
3	Labor	Availability of workers for production activities	19	79.17
4	Mutual cooperation (gotong royong) and teamwork	Helping one another in farming activities	18	75.00
5	Family and farmer-group support	Helps carry out and sustain the farm	16	66.67
6	Seed and fertilizer	Support rice crop production	22	91.67
7	Farm tools and facilities	Help carry out farming activities	17	70.83
8	Water availability	Meets the crop's irrigation needs	20	83.33

Source: Interview results, processed (2026). n = 24.

This pattern shows that the success of farming is determined not only by financial capital but also by natural resources, human resources, and social support. This is consistent with Soekartawi (1995), who stated that farm success is determined by the combination of land, labor, capital, and managerial ability, and with Sholihah and Aslam (2022), who found that land area, seed, fertilizer, labor, and experience affect the performance of rice farming. The relatively low frequency of family and farmer-group support indicates that farmer groups in Jalmak are not yet fully used as a venue for input procurement and information exchange, so agricultural extension could add value in this area.

Constraining factors of rice farming

Table 2 shows the constraining factors. Erratic weather was mentioned by all informants (100%), followed by expensive fertilizer (91.67%), high

production costs (87.50%), limited water (83.33%), and unstable grain prices (79.17%). Pests and diseases (75.00%) and labor costs (70.83%) complete the list.

Table 2. Constraining factors of rice farming in Jalmak Village

No	Constraining factor	Form of constraint	Frequency	Percentage (%)
1	Erratic weather	Affects farming activities and production yield	24	100.00
2	Limited water	Hinders crop irrigation	20	83.33
3	Pests and plant diseases	Cause damage and yield decline	18	75.00
4	Expensive fertilizer	Increases production cost	22	91.67
5	High production costs	Reduce farm profit	21	87.50
6	Labor costs	Add to farmers' expenses	17	70.83
7	Unstable grain selling price	Affects farmers' revenue and income	19	79.17

Source: Interview results, processed (2026). n = 24.

The constraints fall into two groups. Weather, water, and pests are production risks that directly reduce harvest yield; all three are consistent with the preliminary study's findings on diseases caused by strong winds, neck blast, and the early-2026 flood. Fertilizer prices, production costs, labor costs, and grain prices are economic risks that act on the cost and revenue sides. Climate variability is the common thread, because it affects water supply, pest and disease pressure, and, indirectly, prices at harvest. This is the basis for the sensitivity analysis in Section 3.7.

Production costs

Table 3 summarizes average production costs. Farmers spent IDR 5,819,341.67 per planting season, with variable costs of IDR 5,210,383.33 (89.5%) and fixed costs of IDR 608,958.33 (10.5%).

Table 3. Average production cost of rice farming per farmer per planting season

Cost component	Average (IDR/planting season)
Fixed cost (TFC)	608,958.33
Variable cost (TVC)	5,210,383.33
Total cost (TC)	5,819,341.67

Source: Primary data, processed (2026). n = 24.

The dominance of variable costs reflects the large share of seed, fertilizer, pesticide, and labor in rice production, in line with the theory that total cost is the sum of fixed and variable costs and that costs rise with the quantity of inputs used. Because farmers also cited expensive fertilizer and labor costs as major constraints, this cost structure indicates that input prices are the main lever on the cost side of rice farming.

Production and revenue

Table 4 presents production and revenue. The average harvest was 4.34 tons per farmer, with 4,335 kg of grain sold at an average price of IDR 6,408.33 per kg. Average revenue was IDR 27,687,625.00 per planting season.

Table 4. Average production and revenue of rice farming per farmer per planting season

No	Item	Average
1	Harvest	4.34 tons
2	Quantity of grain sold	4,335 kg
3	Selling price	IDR 6,408.33/kg
4	Revenue (TR)	IDR 27,687,625.00

Source: Primary data, processed (2026). n = 24.

The product of the average quantity sold and the average price (IDR 27,780,111) differs slightly from the average revenue because revenue was calculated per farmer using each farmer's own selling price before averaging. Farmers sell grain to collector traders and rice mills near the village, so market access is not a problem, but prices fluctuate, especially at peak harvest.

Profit

Table 5 shows an average profit of IDR 21,868,283.33 per planting season (IDR 27,687,625.00 − IDR 5,819,341.67). Revenue is therefore about 4.8 times cost, and profit accounts for about 79% of revenue.

Table 5. Average profit of rice farming per farmer per planting season

No	Item	Average (IDR/planting season)
1	Revenue (TR)	27,687,625.00
2	Total cost (TC)	5,819,341.67
3	Profit (π)	21,868,283.33

Source: Primary data, processed (2026). n = 24.

The high margin should be read with caution. This study covers only one planting season, the figures are not standardized per hectare because

land area was not used, and costs reflect expenses reported by farmers; components that are rarely recorded, such as the opportunity cost of owned land and family labor, may make profit appear too high. Section 3.9 discusses this further.

Financial feasibility (R/C Ratio)

The R/C value calculated from average revenue and average cost is 4.76 (Table 6). Because 4.76 is greater than 1, rice farming in Jalmak Village is financially feasible: every IDR 1.00 of cost generates IDR 4.76 of revenue. Table 7 shows that all 24 farmers (100%) have an R/C Ratio above one, so none is at break-even or infeasible.

Table 6. Feasibility of rice farming based on R/C Ratio

No	Item	Result
1	R/C Ratio	4.76
2	Criterion	Feasible (R/C > 1)

Source: Primary data, processed (2026).

Table 7. Feasibility category of respondent farms

No	Category	Number of farmers	Percentage (%)
1	Feasible (R/C > 1)	24	100.00
2	Break-even (R/C = 1)	0	0.00
3	Not feasible (R/C < 1)	0	0.00
	Total	24	100.00

Source: Primary data, processed (2026). n = 24.

This result is consistent with Azis (2024), who found that costs, revenue, and efficiency determine feasibility and that rice farming remains feasible as long as revenue exceeds costs despite production constraints. It is also in line with Sholihah and Aslam (2022), who reported an R/C Ratio of 2.73 in Cawas, Klaten, and Ndawareha and Saragih (2025), who reported 5.98 in Tanarara, East Sumba; Jalmak's R/C value lies between the two. The differences among studies are presumed to stem from differences in location, land area, input use, land productivity, labor costs, and grain prices, as well as in the components counted as costs.

Sensitivity analysis of climate-related risks

Farmers cited weather, water, and pests as the most common constraints, so Table 8 tests how profit and the R/C Ratio respond when revenue falls (through a decline in yield or price) or when costs rise. The base case is the average farmer in Table 5.

Table 8. Sensitivity of profit and R/C Ratio to changes in yield, price, and cost

Scenario	Revenue (IDR)	Profit (IDR)	R/C Ratio
Base case	27,687,625	21,868,283	4.76
Yield or price falls 10%	24,918,862	19,099,521	4.28
Yield or price falls 20%	22,150,100	16,330,758	3.81
Yield or price falls 30%	19,381,338	13,561,996	3.33
Yield falls 40%	16,612,575	10,793,233	2.85
Yield falls 50%	13,843,812	8,024,471	2.38
Total cost rises 10%	27,687,625	21,286,349	4.33
Total cost rises 20%	27,687,625	20,704,415	3.96
Total cost rises 30%	27,687,625	20,122,481	3.66
Yield falls 20% and cost rises 20%	22,150,100	15,166,890	3.17
Yield falls 30% and cost rises 20%	19,381,338	12,398,127	2.78

Source: Author's calculations based on sample average values (2026). Scenarios are illustrative.

Profit declines in proportion to the shock, but the R/C Ratio stays well above one in every scenario. A 30% drop in revenue reduces profit by about 38% (to IDR 13.6 million) and the R/C Ratio to 3.33. A 30% cost increase reduces profit by only about 8%, which shows that revenue-side shocks, such as flood damage or crop failure from pests, hurt farmers far more than cost-side shocks. Revenue would have to fall by about 79% to reach the break-even point; physically, farmers need only about 908 kg of grain at the average price, or a price of about IDR 1,342/kg at the average quantity sold, to cover total cost. The safety margin is large, so rice farming in Jalmak can, on average, absorb fairly large climate shocks.

This resilience applies to the average farmer in a normal season. A total crop failure, such as that on paddy fields submerged by the early-2026 flood, would bring revenue close to zero and leave the farmer far below break-even, so this feasibility finding does not remove the need for risk management such as rice farm insurance, improved drainage, and early-warning information.

Other feasibility aspects

1. Market and marketing aspects

Farmers sell grain to collector traders and local rice mills, so a market is available, but farmers state that prices fluctuate at peak harvest and reduce revenue. Price stability, not market access, is the main marketing problem.

2. Technical aspects

Farmers carry out all cultivation activities, from land preparation, seed use, planting, fertilizing, and maintenance through to harvest, with the help of labor and farm tools. Weather, pests, and limited water in the dry season still constrain productivity, so pest control and water management need to be improved.

3. Management aspects

The farm is managed independently based on experience, with input planning from the start of the planting season. Most farmers do not record costs and revenue in detail, so financial management remains simple and may leave some costs unrecorded.

4. Social aspects

Rice farming creates job opportunities for local labor in land preparation, planting, and harvesting, and family and farmer-group networks help farmers exchange information on cultivation techniques, production inputs, and the problems they face.

5. Legal and environmental aspects

Farmers cultivate both owned and rented land, so no significant legal obstacles were found. Environmentally, climate variability, limited water, and pests still affect production, and prudent use of fertilizer and pesticides is needed to keep the farm sustainable.

Implications and limitations

Overall, the findings show that rice farming in Jalmak is profitable and fairly resilient, but its sustainability depends on factors that are partly beyond farmers' control. There are three practical implications. First, because revenue-side shocks matter most, investment in drainage, water supply, resistant varieties, and integrated pest and disease control is likely to protect profit better than marginal cost savings. Second, because fertilizer is the most frequently cited cost problem, balanced fertilization and group purchasing through farmer groups can reduce expenses. Third, simple farm record-keeping would give farmers a picture of their true costs and make subsequent analyses more reliable.

There are several limitations. The sample is small (24 farmers) and comes from one village, and only one planting season was analyzed, so the results cannot be generalized to other regions or seasons. Costs were reported by farmers and may not yet include the opportunity cost of owned land and family labor, which, if counted, would raise costs and

lower the R/C Ratio. Figures are not expressed per hectare because land area was not used for standardization. The sensitivity scenarios use sample averages and assume proportional changes. Future research should use a larger sample, express results per hectare, include land rent and family labor explicitly, compare profit with farm income, and apply probabilistic risk analysis across several seasons.

CONCLUSION

Rice farming in Jalmak Village, Pamekasan Regency, is financially feasible. Average total cost was IDR 5,819,341.67 per farmer per planting season (fixed cost IDR 608,958.33 and variable cost IDR 5,210,383.33), average revenue was IDR 27,687,625.00, and average profit was IDR 21,868,283.33, with an R/C Ratio of 4.76; all 24 farmers had an R/C Ratio above one. The sensitivity analysis shows that this feasibility is resilient: the R/C Ratio remains 2.38 with a 50% yield decline and 2.78 with a 30% yield decline accompanied by a 20% cost increase, and revenue would have to fall by about 79% before reaching break-even. The main supporting factors are land availability, seed and fertilizer, farming experience, water, labor, and mutual cooperation (gotong royong), while the main constraints are erratic weather, expensive fertilizer, high production costs, limited water, unstable grain prices, and pests. Because climate-driven yield decline is the most damaging risk, farmers and local government should prioritize water management, pest and disease control, affordable access to inputs, and cost record-keeping to protect profit.

REFERENCES

Adnyana, I. M. (2020). *Studi kelayakan bisnis* [Business feasibility study]. Lembaga Penerbitan Universitas Nasional (LPU-UNAS).

Azis, K. A. (2024). Analisis kelayakan usahatani tanaman padi pada petani padi di Kecamatan Suradadi [Feasibility analysis of rice farming among rice farmers in Suradadi District]. *Agrosainta, 8*.

Databoks. (2025). *New record: Indonesia's rice imports reach 4.5 million tons in 2024 (data Badan Pusat Statistik)*. Katadata. https://databoks.katadata.co.id/en/agroindustry/statistics/68afe0e4e7fad/new-record-indonesias-rice-imports-reach-45-million-tons-in-2024

Ermawati, N. (2022). *Studi kelayakan bisnis* [Business feasibility study] (1st ed.). Badan Penerbit Universitas Muria Kudus.

FAO. (2022). *FAOSTAT: Crops and livestock products*. Food and Agriculture Organization of the United Nations.

Ibrahim, R. (2021). Analisis biaya dan pendapatan usaha padi sawah non irigasi teknis di Kelurahan Tenilo Kecamatan Limboto Kabupaten Gorontalo [Cost and income analysis of non-technically irrigated paddy farming in Tenilo Sub-district, Limboto District, Gorontalo Regency]. *Agrinesia, 5*.

Murtadlo, K. (2023). Perilaku petani padi terhadap risiko usahatani pada suku yang berbeda di Jawa Timur [Rice farmers' behavior toward farming risk among different ethnic groups in East Java]. *Agromix, 14*.

Ndawareha, U. K., & Saragih. (2025). Analisis kelayakan usahatani padi sawah di Desa Tanarara Kecamatan Lewa Kabupaten Sumba Timur [Feasibility analysis of paddy rice farming in Tanarara Village, Lewa District, East Sumba Regency]. *Agribis, 13*.

Schoonenboom, J., & Johnson, R. B. (2017). How to construct a mixed methods research design. *Kölner Zeitschrift für Soziologie und Sozialpsychologie, 69*(Suppl. 2), 107–131.

Sembiring, T. B. (2024). *Buku ajar metodologi penelitian (teori dan praktik)* [Research methodology textbook (theory and practice)] (1st ed.). CV Saba Jaya Publisher.

Sholihah, E. N., & Aslam. (2022). Analisis kelayakan usahatani padi di Kecamatan Cawas Kabupaten Klaten Jawa Tengah [Feasibility analysis of rice farming in Cawas District, Klaten Regency, Central Java]. *Galung Tropika*.

Soekartawi. (1995*).* Analisis usahatani *[Farm analysis]*. Universitas Indonesia Press.

Vandalisna. (2023). *Pengelolaan tanaman terpadu pada usahatani padi* [Integrated crop management in rice farming] (1st ed.). Asosiasi Profesi Widyaiswara Indonesia.