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COMPARATIVE ANALYSIS OF ORGANIC AND INORGANIC RICE FARMING (CASE STUDY OF THE MASSUMPULOLOE SATU FARMERS GROUP)

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ABSTRACT
The rice farming system in Indonesia is generally divided into two main approaches, namely organic and inorganic systems, which have differences in the use of production inputs, cost structures, and levels of profit generated. This research was conducted at the Massumpuloloe Satu Farmer Group in Bulo Village, which is under the guidance of P4S Bukit Melintang and has implemented both farming systems. The purpose of the study was to analyze the comparison of production costs, revenues, and profitability levels between organic and inorganic rice farming. The research method used a descriptive quantitative approach with a survey technique through questionnaires and interviews with respondents who were selected purposively, namely having the same land area of 5 Ha. The results showed that organic rice farming had a lower total production cost of Rp 7,057,690 compared to inorganic at Rp 16,531,625, and generated higher revenues of Rp 135,150,000 compared to Rp 95,810,000 in the inorganic system. The profitability of organic farming is also higher, with an ROA of 14.17%, a R/C Ratio of 19.15, an NPM of 94.78%, and a GPM of 94.78%, as well as lower production and price break-even points compared to inorganic farming. Overall, organic rice farming demonstrates better cost efficiency, higher profit margins, and lower risk of loss, making it a potentially more profitable and sustainable alternative farming system.

Keywords: Inorganic, Organic, Rice, Profitability, Farming.

INTRODUCTION

Rice is a crucial food crop that plays a significant role in the development of the agricultural sector. Rice is one of the primary crops cultivated by Indonesian farmers, producing rice, the staple food of the Indonesian population. Indonesia remains a net rice importer, despite the country's average national yield being among the highest among tropical Asian countries. This highlights the significant challenges facing national food security, particularly rice, given the continued high population growth (Aprilliani, 2016).

In practice, rice farming systems in Indonesia, including in Sidrap Regency, are divided into two main approaches: inorganic and organic. Inorganic systems rely on the use of synthetic inputs such as chemical fertilizers, pesticides, and herbicides to rapidly increase crop productivity. However, excessive use of chemical inputs has the potential to cause negative impacts such as soil fertility degradation, environmental pollution, and increased production costs (Soekartawi, 2002).

Organic farming is a form of farming that relies on natural ingredients without the use of synthetic chemicals. The primary goal of organic farming is to provide food that is safe for the health of producers and consumers and does not harm the environment. Converting non-organic farmland to organic takes approximately two years (Santoso, 2012).

The Bukit Melintang Self-Help Agricultural and Rural Training Center (P4S), located in Sidrap Regency, is an institution actively promoting the implementation of organic farming systems through training, mentoring, and demonstration plots. One of its partners is the Massumpuloloe 1 Farmers Group, located in Bulo Village, Panca Rijang District, Sidrap Regency. This farmer group has implemented organic farming systems while still maintaining inorganic systems, making it a relevant location for comparative analysis.

Based on data, the number of farmers implementing organic farming systems has decreased significantly, from 17 in 2016 to only 3 in 2025, while the area of organic land has remained constant at 5

hectares. This indicates that organic farming systems may not yet provide attractive economic returns. Therefore, a comparative profitability analysis between organic and inorganic rice farming is necessary to provide empirical evidence for farmers and policymakers.

Figure 1. Organic Farmers in the Massumpuloloe 1 Farmers Group
Source: Primary Data 2025

MATERIALS AND METHODS

The research used a quantitative descriptive approach. The study was conducted to describe the profitability and cost efficiency of organic and inorganic lowland rice farming in the Massumpuloloe 1 Farmers Group, which is under the guidance of the Bukit Melintang P4S in Sidenreng Rappang Regency.

The research location was the Massumpuloloe 1 Farmers Group in Bulo Village, Panca Rijang District, Sidenreng Rappang Regency, which has received Integrated Organic Farming certification. The study took place from November 2025 to January 2026.

The study population consisted of 21 rice farmers under the guidance of the Massumpuloloe 1 Farmers Group, consisting of 3 organic farmers and 18 inorganic farmers. The sample was determined by purposive sampling with the criteria of farmers who had implemented a farming system during the last two planting seasons and owned relatively the same land area (5 Ha). Data collection was carried out using a census method with 3 organic farmers and 2 inorganic farmers.

Data collection techniques used questionnaire surveys and direct interviews. Data analysis includes: (1) Cost Analysis using the formula TC = TFC + TVC; (2) Revenue Analysis with TR = P × Q; (3) Profitability Analysis including Return on Assets (ROA), R/C Ratio, Net Profit Margin (NPM), Gross Profit Margin (GPM), and Break Even Point (BEP) of production and prices.

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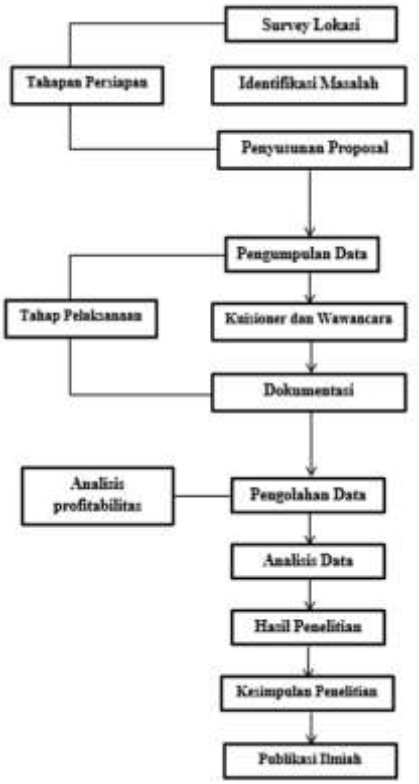

Figure 2.Research Flowchart

RESULTS AND DISCUSSION

OVERVIEW OF RESEARCH AREA

Bulo Village is located in Panca Rijang District, Sidenreng Rappang Regency. With 508.95 hectares of rice paddies, rice farming is the primary activity and crucial to the village economy.

Table 1. Boundaries of Bulo Village

No.	Limit	Village/Sub-district
1.	East	Cipotakari Village, Panca Rijang District, Sidenreng Rappang Regency
2.	West	Bulo Wattang Village, Panca Rijang District, Sidenreng Rappang Regency
3.	North	Patondon Salu Village, Maiwa District, Enrekang Regency
4.	South Side	Talawe Village, Wattang Sidenreng District, Sidenreng Rappang Regency

Source: Bulo Village Office General Data, 2025

Table 2. Land Area of Bulo Village

No.	Land	Area
1.	Settlement	200.21 Ha
2.	Rice fields	508.95 Ha
3.	Plantation	321.32 Ha
4.	Cemetery	90 Are
5.	Yard	91.00 Are
6.	Village Office	15 Are

Source: Bulo Village Office General Data, 2025

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Respondent Characteristics

Table 3. Number of Respondents by Gender

Gender	Number of people)	Percentage
Man	5	100%
Woman	-	-
Total	5	100%

Source: Primary Data After Processing, 2026

All respondents in this study were male (100%). This indicates that rice farming activities in the Massumpuloloe 1 Farmers Group are still dominated by men as the primary land managers, in line with the gender division of labor theory (Caroline, 1993).

Table 4. Number of Respondents by Age Group

Age Group (Years)	Number of people)	Percentage
30–39	1	20%
40–49	2	40%
50–59	2	40%
Total	5	100%

Source: Primary Data After Processing, 2026

The majority of respondents were aged 40–59 (80%). This reflects the phenomenon of aging farmers, where the younger generation tends to choose to work in non-agricultural sectors (Hasyyati, 2025).

Table 5. Number of Respondents Based on Last Education

Last education	Number of people)	Percentage
JUNIOR HIGH SCHOOL	3	60%
SENIOR HIGH SCHOOL	2	40%
Total	5	100%

Source: Primary Data After Processing, 2026

Table 6. Number of Respondents Based on Length of Farming

Length of Farming (Years)	Number of people)	Percentage
20–29	2	40%
30–39	1	20%
40–49	2	40%
Total	5	100%

Source: Primary Data After Processing, 2026

COST ANALYSIS

Table 7. Total Fixed Costs of Rice Farming per 5 Ha per Planting Season

No	Component	Organic (5 Ha) Rp	Inorganic (5 Ha) Rp.
1	Land tax	180,000	155,000
2	Equipment Depreciation	477,690	776,625
3	Miscellaneous expense	500,000	1,000,000
	Total	1,157,690	1,931,625

Source: Processed data, 2026

Based on Table 7, the total fixed costs of organic rice farming are Rp1,157,690, while inorganic rice farming is Rp1,931,625. Fixed costs in inorganic farming are higher, especially for equipment depreciation and the cost of more intensively used equipment.

Table 8. Total Variable Costs of Rice Farming per 5 Ha per Planting Season

No	Component	Organic (5 Ha) Rp	Inorganic (5 Ha) Rp.
1	Seed	900,000	600,000
2	Fertilizer	-	4,500,000
3	Pesticide	-	2,500,000
4	Labor	5,000,000	7,000,000
	Total	5,900,000	14,600,000

Source: Processed data, 2026

The total variable cost of organic farming (Rp5,900,000) is significantly lower than inorganic farming (Rp14,600,000). Organic farmers avoid spending on chemical fertilizers and pesticides because they utilize natural materials available locally.

Table 9. Total Cost of Rice Farming per 5 Ha per Planting Season

No	Description	Organic (5 Ha) Rp	Inorganic (5 Ha) Rp.
1	Fixed Costs	1,157,690	1,931,625
2	Variable Costs	5,900,000	14,600,000
	Total cost	7,057,690	16,531,625

Source: Processed data, 2026

RECEPTION

Table 10. Total Income from Rice Farming per 5 Ha per Planting Season

No	Description	Organic (5 Ha) Rp	Inorganic (5 Ha) Rp.
1	Rice Sales	30,150,000	95,810,000
2	Rice Sales	105,000,000	-
	Total Revenue	135,150,000	95,810,000

Source: Processed data, 2026

Organic farming revenue (Rp135,150,000) is higher than inorganic farming (Rp95,810,000). The high organic revenue is due to farmers not only selling unhusked rice but also processing part of the harvest into rice, thus providing added value and a higher selling price (Rahman et al., 2024).

PROFITABILITY ANALYSIS

Return on Assets (ROA)

Table 11. Analysis of Return on Assets (ROA)

Description	Organic (Rp)	Inorganic (Rp)
Net profit	128,092,310	79,278,375
Total Assets	903,730,000	909,155,000
ROA (%)	14.17%	8.72%

Source: Processed data, 2026

The ROA value of organic farming (14.17%) is higher than inorganic (8.72%), indicating that organic farming is more efficient in utilizing assets to generate profits (Kasmir, 2019).

Return Cost Ratio (R/C Ratio)

Table 12. R/C Ratio

Description	Organic (Rp)	Inorganic (Rp)
Total Revenue	135,150,000	95,810,000
Total cost	7,057,690	16,531,625
R/C Ratio	19.15	5.80

Source: Processed data, 2026

Both farming systems are equally feasible to be cultivated with an R/C ratio value > 1. However, the organic R/C ratio (19.15) is much higher than the inorganic (5.80), indicating better cost efficiency in the organic system (Nasution, 2020).

Net Profit Margin (NPM)

Table 13. Net Profit Margin (NPM)

Description	Organic (Rp)	Inorganic (Rp)
Net profit	128,092,310	79,278,375
Total Revenue	135,150,000	95,810,000
NPM (%)	94.78%	82.75%

Source: Processed data, 2026

Gross Profit Margin (GPM)

Table 14. Gross Profit Margin (GPM)

Description	Organic (Rp)	Inorganic (Rp)
Gross profit	128,092,310	79,278,375
Total Revenue	135,150,000	95,810,000

GPM (%)	94.78%	82.75%

Source: Processed data, 2026

Break Even Point (BEP)

Table 15. Production BEP

Description	Organic	Inorganic
Total Cost (Rp)	7,057,690	16,531,625
Selling Price/kg (Rp)	6,700	6,700
BEP Production (kg)	1,053.39	2,476.41

Source: Processed data, 2026

Table 16. BEP Price

Description	Organic	Inorganic
Total Cost (Rp)	7,057,690	16,531,625
Total Production (kg)	14,250	14,125
Break Even Price (Rp/kg)	495.28	1,170.38

Source: Processed data, 2026

The BEP of organic production (1,053.39 kg) is lower than that of inorganic (2,476.41 kg), and the BEP of organic prices (Rp495.28/kg) is lower than that of inorganic (Rp1,170.38/kg). A lower BEP value in organic farming indicates a lower risk of loss and better cost efficiency (Mulyadi, 2001).

CONCLUSION

Based on the results of research on the Massumpuloloe Satu Farmer Group in Bulo Village, there are clear differences between organic and inorganic rice farming in terms of costs, revenues, and profitability levels. Organic farming has a total production cost of Rp7,057,690 which is lower than inorganic at Rp16,531,625, because the organic system does not use chemical fertilizers and pesticides. In terms of revenue, organic farming earns Rp135,150,000, higher than inorganic at Rp95,810,000. Profitability analysis shows that organic financial performance is better with ROA of 14.17%, R/C Ratio of 19.15, NPM of 94.78%, and GPM of 94.78%, compared to inorganic with ROA of 8.72%, R/C Ratio of 5.80, NPM of 82.75%, and GPM of 82.75%. The break-even point (BEP) for organic production and prices are also lower, indicating a lower risk of loss. Overall, organic rice farming is more efficient and profitable, and has the potential to be a more sustainable agricultural alternative. Based on the research results, it is recommended that farmers in the Massumpuloloe Satu Farmer Group consider expanding their organic rice farming business. Support from the government and supporting institutions such as P4S is needed in the form of technical training, access to capital, and expanding marketing networks. For future researchers, it is recommended to increase the number of respondents and expand the locations, as well as include a more in-depth analysis of social and environmental aspects.

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