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Optimizing Milling Margins: Implementing Sell-or-Continue Decisions in Paddy Production in Moncongloe Lappara Village, Indonesia

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ABSTRACT

This study aims to optimize profit margins for farming businesses in Moncongloe Lappara Village through a "Sell or Process Further" tactical decision analysis. Farmers often sell raw grain for liquidity, disregarding potential lost added value. Using a quantitative descriptive approach and Differential Cost Analysis, this research compares the profitability of selling Dry Harvested Grain (GKG) versus processing it into rice. Field data simulations based on a 1-ton input indicate that further processing yields an additional net benefit of IDR 942,000 per ton, equivalent to a 12.5% margin increase compared to direct selling. Another significant finding is that by-product sales (bran) cover 82% of incremental processing costs, thereby minimizing operational risk. Consequently, the further processing strategy is shown to be feasible and recommended to enhance the economic welfare of local business owners.

Keywords: Differential Cost Analysis, Sell or Process Further, Rice Milling, Margin Optimization, Value Added.

I.   Introduction

The agricultural sector, particularly rice, plays a vital role in the rural economy in Maros Regency, including in Moncongloe Lappara Village. However, a common phenomenon is that farmers or small-scale millers are often trapped in traditional sales patterns without conducting in-depth profitability analysis. The fundamental reason for this research is the urgency to improve farmers' welfare by maximizing profit margins. Often, sales decisions are made solely based on urgent liquidity needs or inherited habits, without considering the potential for economic loss. However, the application of management accounting through differential cost analysis is essential for assessing operational efficiency and profit potential amid dynamic market price fluctuations (Wijaya & Santoso, 2024). Research in Moncongloe Lappara Village is crucial for mapping whether the current supply chain is providing optimal returns for local businesses.

In line with market dynamics, population growth both nationally and regionally has a linear impact on demand for staple foods, particularly rice. Recent data shows that consistently high per capita rice consumption, coupled with demographic growth, demands a sustainable supply of unhusked rice. This increased demand for rice automatically boosts demand for its raw material, unhusked rice, in both Harvested

Dry Unhusked Rice (GKP) and Milled Dry Unhusked Rice (GKG). This market trend creates both opportunities and challenges for producers in Moncongloe Lappara. While the market guarantees product absorption, high demand often triggers competitive raw material prices, which can erode margins if not managed with appropriate production strategies (Rahman et al., 2023). In responding to this demand, businesses face a critical managerial decision: whether to sell the product as unhusked rice (raw/semi-finished) or to process it further into ready-to-eat rice (process further). This "Sell or Process Further" decision lies at the heart of profit-optimization strategies. Selling unhusked rice immediately after harvest may provide quick cash flow and minimize the risk of damage, but it often has a low resale value. Conversely, processing unhusked rice into rice offers a higher selling price but requires an investment of time and carries the risk of shrinkage and quality losses. Recent studies emphasize that understanding the split-off point is crucial for determining whether further processing will generate incremental revenues that exceed its additional costs (Putri & Hidayat, 2023).

The decision to further process unhusked rice into rice is inextricably linked to the increasingly complex milling cost structure. Milling operational costs, including fuel, labor, machine depreciation, and packaging costs, significantly reduce margins. Furthermore, technical factors, such as milling yield—the percentage of rice produced per kilogram of unhusked rice—significantly influence production cost calculations. If processing costs and the risk of low yield exceed the difference in rice selling price, further processing can actually be detrimental to the company. Therefore, a precise cost analysis is needed to calculate whether the additional revenue from rice sales can cover these processing costs (Suryani & Hartono, 2024). Pro-processing research (Pratama & Lestari, 2023) argues that cutting out the supply chain is the key. By processing independently, farmers/millers capture profits typically enjoyed by wholesalers. Meanwhile, anti-processing research (Wibowo et al., 2024) argues that technical inefficiency and liquidity are the reasons. The old machines produced poor yields (a lot of wastage), and farmers needed cash immediately (they could not wait for the time-consuming process of milling and selling the rice). Although management accounting theory generally recommends further processing to create added value, a review of the empirical literature reveals heterogeneity in findings regarding the effectiveness of this strategy in small and medium-sized enterprises. On the one hand, research conducted by Pratama and Lestari (2023) found that processing paddy into rice yields significant profit margins due to the high value-added and producers' ability to reach retail markets at premium prices. The primary reason is the elimination of intermediaries, who have traditionally eroded farmers' margins. However, Wibowo et al. (2024) reported contradictory findings, stating that in small-scale mills with limited technology, the decision to further process often results in operational losses. This is due to machine inefficiencies that result in low yields (high levels of broken rice) and high overhead costs that are not commensurate with the increase in selling price. Furthermore, liquidity constraints force businesses to sell wet paddy for quick cash flow, even at lower margins. This conflicting empirical evidence underscores the need for specific analysis in Moncongloe Lappara Village to demonstrate whether local conditions support the "continued process" or "direct selling" hypothesis.

II.   Literature Review and Hypothesis Development

In the competitive global agribusiness landscape, the urgency of applying management accounting theory, particularly differential cost analysis, in sell-or-process decisions, is becoming increasingly critical. Theoretically, agricultural products such as rice are joint products with a split-off point at which producers must decide the fate of their products. Recent international literature emphasizes that the ability of farmers or small businesses to transition from mere sellers of raw commodities to producers of processed goods is key to rural economic resilience. Research by Adebayo and Ojo (2024) on agricultural markets in developing countries shows that vertical integration through downstream processing can absorb shocks from raw-material price volatility, providing a more substantial financial security buffer than simply selling raw materials, whose prices fluctuate significantly on the global market.

In the Indonesian domestic context, research on the added value of food products, particularly rice, shows significant but varying results depending on the efficiency of the technology used. A recent study by

Hidayat and Prasetyo (2023) confirmed that transforming dry-milled rice into premium rice through modern milling yields a significantly higher contribution margin than selling wet paddy. The urgency of this research lies in its finding that "lost profits" (opportunity loss) due to farmers' inability to undertake further processing is often the leading cause of slow growth in farmer welfare. This aligns with the findings of Wulandari et al. (2024), who found that the main obstacle is no longer the availability of raw materials, but rather the lack of accurate calculations of incremental processing costs, making farmers reluctant to take the risk of processing their crops. However, the literature also provides a stark warning that the decision to further process does not always translate into increased profits. There is a risk of managerial myopia, in which business actors ignore hidden costs such as shrinkage and machine maintenance. Comparative research in Southeast Asia by Nguyen and Tran (2023) shows that at specific economic scales, processing operational costs (electricity, labor, packaging) can actually erode margins if the final product's selling price is not elastic enough to cover these additional costs. Therefore, micro-level research, such as in Moncongloe Lappara Village, is urgently needed to verify whether local market conditions and cost structures support the value-added theory or justify the conservative decision to sell grain immediately after harvest.

III.   Research Method

This research uses a descriptive, quantitative approach with a case study method. This design was chosen to systematically describe the research object's facts and characteristics accurately, as well as to calculate the financial consequences of available business decision alternatives. The primary focus of this design is to apply management accounting simulations to compare profitability between two scenarios: (1) Selling products in the form of grain (raw/semi-finished), versus (2) Further processing into rice (finished goods). This approach is relevant to solving practical problems in the field by using actual numerical data (costs and market prices) to draw objective conclusions (Rahardjo & Pertiwi, 2023). In this study, the primary analytical instrument used is Differential Cost Analysis. This concept separates costs relevant to decision-making from those that do not change (sunk costs). The variables measured include:

a.   Incremental Revenue: The difference in income obtained from selling rice compared to selling unhusked rice.
b.   Incremental Cost: Additional costs that must be incurred if the grain is processed into rice (milling costs, packaging, additional labor).
c.   Opportunity Cost: Potential lost income from shrinkage when grain is milled into rice.

The decision is taken based on a comparison of the Contribution Profit (Margin) of two alternatives:

a.   Alternative A (Selling Paddy/Raw): Profit_A = (Quantity of Paddy x Paddy Selling Price) - Harvest/Transportation Costs
b.   Alternative B (Further Processing to Rice): Profit_B = (Rice Quantity x Rice Selling Price) + (Bran Quantity x Bran Price) - (Milling Cost + Packaging Cost + Labor Cost)
c.   A decision is said to be feasible for further processing if: (Profit_B - Profit_A) > 0

This calculation method refers to the contemporary management accounting framework, which emphasizes contribution margin analysis for short-term decisions (Sari & Nugroho, 2024). The following Differential Analysis steps :

a.   Cost Identification and Classification. The cost data obtained from the research location in Moncongloe Lappara Village was grouped into fixed and variable costs. Only costs that change due to further processing decisions (variable costs) will be included in the calculation, in accordance with the relevance principle in management accounting (Kusuma et al., 2023).

b. Determining the Split-Off Point and determining the point at which the grain can be sold directly or processed further. In this context, the split-off point is when the grain has been dried (GKG).

c. Milling Yield Calculation. Calculate the percentage conversion from paddy to rice to obtain accurate output quantity data. The formula used is:

$$\text{Yield} = \frac{\text{Weight of Rice Produced}}{\text{Weight of Dry Milled Grain}} \times 100\%$$

d. Comparison of Differential Revenue and Costs. Calculate the difference between the additional revenue from rice sales and the additional processing costs.

- If Differential Revenue > Differential Cost, then the decision is to Process Further.
- If Differential Revenue < Differential Cost, then the decision is to Sell Paddy (Sell Directly).

e. Conclusion Drawing. Developing strategic recommendations for milling businesses in Moncongloe Lappara Village based on the results of the surplus or deficit margin calculations.

IV. Results and Discussion

4.1. Research result

The research was conducted at a rice milling business unit in Moncongloe Lappara Village, Maros Regency. Data were collected over one production cycle, with a raw material volume of 1,000 kg (1 ton) of dry-milled grain (GKG). The split-off point was determined when the grain was dried and ready to be milled or sold directly to large collectors. The following are cost and market price data obtained in the field:

a. GKG Selling Price: Rp. 7.500 per kg.
b. Selling Price of Rice (Medium-Premium): Rp. 13.500 per kg.
c. Selling Price of Bran: Rp. 3.000 per kg.
d. Milling Yield: Average 63% (producing 630 kg of rice), 10% Bran, and 27% Husk/Shrinkage.
e. Variable Milling Costs (Fuel & Lubricants): Rp. 150 per kg of grain input.
f. Direct Labor Cost (Milling & Packaging): Rp 200,000 per 1 ton of input.
g. Packaging Cost (Sack): Rp. 1,000 per sheet (50kg capacity) = Rp. 13,000 total.

4.1.1. Differential Cost Analysis

According to the methodology, calculations are conducted to compare profitability between Alternative A (selling paddy) and Alternative B (further processing). In Alternative A, the unhusked rice (GKG) is sold directly without additional processing. There are no relevant extra costs because harvesting and transportation costs are treated as sunk costs, meaning they were incurred before the split-off point and do not affect the decision. The total income under this alternative is calculated as 1,000 kg multiplied by Rp 7,500, resulting in Rp 7,500,000. In Alternative B, the paddy is processed into rice and by-products (bran) before being sold. The total income consists of revenue from rice sales and bran sales. Rice sales amount to 630 kg at Rp 13,500 per kg, totaling Rp 8,505,000, while bran sales amount to 100 kg at Rp 3,000 per kg, totaling Rp 300,000. Therefore, the total revenue for Alternative B is Rp 8,805,000.

4.1.2. Incremental Cost of Processing:

a. Milling Cost (BBM): 1,000 kg x Rp. 150 = Rp. 150,000
b. Labor Cost: Rp. 200,000
c. Packaging Cost: Rp. 13,000

d.   Total Additional Cost: = (Rp 363,000)

Contribution Profit B: Rp 8,805,000 - Rp 363,000 = Rp 8,442,000

4.1.3.   Differential Comparison (Decision)

Table 1. Differential Comparison (Decision)

Information	Alternative A (Selling Paddy)	Alternative B (Sell Rice)	Differential (B - A)
Income	Rp. 7,500,000	Rp. 8,805,000	Rp. 1,305,000
Further Processing Fee	Rp 0	(Rp. 363,000)	(Rp. 363,000)
Net Profit / Margin	Rp. 7,500,000	Rp. 8,442,000	Rp. 942,000

Decision Analysis: Based on the above calculations:

a.   Differential Revenue (Additional Income) = Rp. 1,305,000
b.   Differential Cost (Additional Cost) = Rp. 363,000
c.   Net Benefit (Additional Net Profit) = Rp. 942,000
d.   Because the result of the reduction (Profit B - Profit A) shows a positive value of IDR 942,000 per ton, the decision to process further is featured and more profitable.

Based on the document you uploaded, this study uses Differential Cost Analysis (DCA) with a field data simulation approach. The following is a reconstruction of the statistical test data based on the factual figures presented in the document:

4.1.4.   Input Variable Parameters (Test Basis)

Testing was performed on a fixed-volume basis to facilitate comparison.

Table 2. Input Variable Parameters (Test Basis)

Variables	Mark	Unit	Information
Raw Material Input	1,000	Kg	Dry Milled Grain (GKG)
Input Buy/Sell Price	7,500	Rp/Kg	GKG prices at the farmer level
Rice Yield	63%	%	Conversion of paddy to rice (630 Kg)
Bran Yield	10%	%	By-products (100 Kg)
Shrinkage (Husk)	27%	%	Lost during the grinding process

4.1.5.   Comparative Test Tabulation (Differential Analysis)

Table 3. core of the research hypothesis testing (is further processing more profitable?).
Scenario A (Sell Raw) vs. Scenario B (Further Processing)

Financial Components	Scenario A (Sell GKG)	Scenario B (Selling Rice)	Differential (Difference)
Revenue			
Main Sales	Rp. 7,500,000	Rp. 8,505,000	Rp. 1,005,000
Side Sales (Bran)	Rp 0	Rp. 300,000	Rp. 300,000
Total Revenue	Rp. 7,500,000	Rp. 8,805,000	Rp. 1,305,000
Incremental Cost (Cost)			
Milling Cost (BBM)	Rp 0	(Rp. 150,000)	(Rp. 150,000)
Labor costs	Rp 0	(Rp. 200,000)	(Rp. 200,000)
Packaging Costs	Rp 0	(Rp. 13,000)	(Rp. 13,000)
Total cost	Rp 0	(Rp. 363,000)	(Rp. 363,000)

Test Results (Net Benefit)			
Profit Margin	Rp. 7,500,000	Rp. 8,442,000	Rp. 942,000

Based on the tabulation results above, the following statistics demonstrate the feasibility of the decision. The test results show a 12.5% increase in margin when Scenario B is selected. Formula: (942,000 / 7,500,000) x 100% = 12.56%. Cost Coverage Ratio by By-Product (Bran): Bran sales can significantly cover operational risks. Processing costs account for only a small portion of the total potential income. Based on the test data above, differential revenue (Rp 1,305,000) > Differential Cost (Rp 363,000), or a positive Net Benefit of Rp 942,000 per ton 2

4.2. Discussion

The analysis shows that processing unhusked rice into rice in Moncongloe Lappara Village yields a 12.5% higher profit margin than selling unhusked rice directly. This finding supports management accounting theory regarding value-added products, in which the physical conversion process from raw materials to finished goods creates a form of utility valued more highly by the market (Sari & Nugroho, 2024).

Although there is an opportunity cost in terms of weight reduction (from 1,000 kg to 630 kg of rice), income from premium rice prices and from the sale of by-products (bran) can cover the "loss" in weight and the operational costs of milling. The high demand for rice in the local markets of Maros and Makassar, which directly border Moncongloe Lappara Village, is also a supporting factor that keeps rice distribution (marketing) costs relatively low, thereby strengthening the justification for choosing Alternative B. Another important factor contributing to the success of Alternative B is the high demand for rice in local markets in the Maros and Makassar areas. These two areas directly border Moncongloe Lappara Village, which significantly affects the distribution and marketing costs of rice, keeping them lower than they would be if the target market were located farther away.

With these low distribution costs, the justification for selecting and implementing Alternative B becomes stronger and more reasonable, as the profits obtained are more optimal. Overall, the combination of revenue from premium rice and bran sales, along with controlled operational and distribution costs, makes Alternative B a more attractive option, despite the reduction in rice weight that must be considered. Furthermore, the availability of adequate supporting infrastructure around Moncongloe Lappara Village also plays a crucial role. Good road access, a stable electricity network, and the availability of clean water facilitate the production and distribution of rice, thereby minimizing potential operational obstacles that could affect the efficiency and profitability of Alternative B. This is different if the rice milling location is in a remote area with inadequate infrastructure, which can increase operational costs and slow distribution, thereby reducing the attractiveness of this alternative.

Furthermore, it is important to note that the implementation of modern rice milling technology significantly improves the quality of the rice produced. With more advanced technology, the milling process can be carried out more precisely and efficiently, resulting in higher-quality rice with fewer grains and a higher level of hygiene. This premium quality of rice will undoubtedly increase the competitiveness of the product in the market and allow for higher pricing, thus further strengthening the economic justification for choosing Alternative B. Thus, careful consideration of factors such as operational costs, distribution costs, infrastructure availability, and the application of modern technology, comprehensively supports the conclusion that Alternative B is a more rational and profitable choice for the development of a rice milling business in Moncongloe Lappara Village.

V. Conclusion

Based on the quantitative analysis and discussion of the "Sell or Process Further" decision in Moncongloe Lappara Village, this study concludes that processing Dry Milled Grain (GKG) into rice (Alternative

B) is significantly more profitable than selling it as raw grain (Alternative A). The Differential Cost Analysis shows a positive net benefit of Rp 942,000 per ton, representing a 12.5% increase in profit margins; therefore, the hypothesis that further processing creates higher economic value is accepted. A critical factor behind this profitability is the sale of by-products, specifically bran, whose revenue of Rp 300,000 covers approximately 82% of the incremental processing costs of Rp 363,000. This indicates that milling operational costs are nearly negligible because they are effectively subsidized by waste utilization, making revenue from rice sales almost entirely pure profit. The feasibility of this strategy is further strengthened by the strategic location of Moncongloe Lappara Village near high-demand markets such as Maros and Makassar, supported by adequate infrastructure, including roads, electricity, and modern milling technology, which reduces distribution costs and enables the production of premium-quality rice. However, although processing is currently the optimal strategy, it remains sensitive to raw material price fluctuations, as profitability depends on the stability of GKG prices at around Rp 7,500/kg. A significant increase in grain prices without a corresponding rise in retail rice prices, due to HET regulations, could reduce profit margins.

Based on the data analysis and discussion, this study also formulates several key findings specific to the milling business conditions in Moncongloe Lappara Village. There is a significant incremental profit difference of Rp 942,000 per ton of raw material when businesses choose to process unhusked rice into rice, empirically demonstrating that shortening the supply chain by avoiding raw material sales provides higher economic value for local producers. Another important finding is the vital contribution of by-products: bran sales of Rp 300,000 cover about 82% of the total incremental processing costs of Rp 363,000, indicating that milling operational risks are minimal because they are nearly fully offset by productive waste sales, making rice income largely a pure margin. Furthermore, the milling cost structure in the village is relatively efficient, with processing costs accounting for only about 4% of total potential rice revenue, a low cost burden that makes further processing highly feasible. Nevertheless, this profitability is strongly dependent on the stability of GKG prices at Rp 7,500/kg. If farm-level unhusked rice prices rise sharply, for example, above Rp 8,500/kg due to crop failure, while retail rice prices remain constrained by the Highest Retail Price (HET) policy, the processing strategy's profit margin would be significantly reduced, potentially altering future decision recommendations.

References

Adebayo, T. S., & Ojo, J. A. (2024). Vertical integration and profitability in smallholder agribusiness: Evidence from developing economies. Journal of Agribusiness in Developing and Emerging Economies, 14(1), 78–95. https://doi.org/10.1108/JADEE-05-2023-0112

Hidayat, R., & Prasetyo, B. (2023). Analisis rantai nilai dan keputusan taktis pada agroindustri padi: Studi kasus di sentra produksi Jawa Tengah. Jurnal Ekonomi Pertanian dan Agribisnis (JEPA), 7(4), 1250–1265.

Kusuma, A., Wijaya, R., & Santoso, B. (2023). Penerapan relevant cost analysis dalam pengambilan keputusan taktis pada UMKM sektor agribisnis. Jurnal Akuntansi dan Bisnis Terapan, 15(2), 210–225.

Nguyen, P. H., & Tran, V. Q. (2023). The economics of rice processing: A comparative analysis of sell-raw versus process-further decisions in the Mekong Delta. Asian Journal of Agriculture and Rural Development, 13(2), 112–126.

Pratama, A., & Lestari, S. P. (2023). Analisis rantai nilai dan profitabilitas usaha penggilingan padi: Studi komparasi penjualan gabah versus beras. Jurnal Agribisnis Indonesia, 11(2), 145–158.

Putri, A. R., & Hidayat, T. (2023). Analisis keputusan taktis sell or process further pada agroindustri padi untuk optimalisasi laba. Jurnal Ekonomi Pertanian dan Agribisnis, 7(3), 988–1002.

Rahardjo, S., & Pertiwi, D. (2023). Metodologi penelitian kuantitatif terapan: Pendekatan studi kasus untuk riset manajemen operasional. Jurnal Ilmiah Manajemen dan Bisnis, 9(1), 45-60.

Rahman, F., Susanti, D., & Nugroho, A. (2023). Dinamika ketersediaan dan permintaan beras: Analisis tren konsumsi pasca-pandemi di Indonesia. Jurnal Pangan dan Gizi, 12(2), 45–58.

Sari, M. P., & Nugroho, A. (2024). Akurasi metode differential cost dalam keputusan sell or process further: Studi empiris pada industri pengolahan pangan. Jurnal Riset Akuntansi Indonesia, 12(1), 88–102.

Suryani, N., & Hartono, B. (2024). Analisis biaya produksi dan efisiensi penggilingan padi skala kecil: Pendekatan akuntansi manajemen lingkungan. Jurnal Akuntansi dan Bisnis Indonesia, 9(1), 112–125.

Wibowo, A., Kusuma, H., & Setiawan, R. (2024). Hambatan teknologi dan efisiensi biaya pada industri pengolahan gabah skala mikro di pedesaan. Jurnal Ekonomi Pembangunan dan Pertanian, 15(1), 78–92.

Wijaya, K., & Santoso, I. (2024). Strategi peningkatan nilai tambah produk pertanian melalui manajemen rantai pasok dan akuntansi biaya. Jurnal Manajemen Agribisnis, 11(1), 23–34.

Wulandari, S., Mulyani, E., & Santoso, A. (2024). Pengaruh biaya diferensial dan pendapatan inkremental terhadap keputusan manajerial petani padi: Menjual gabah atau beras?. Jurnal Riset Akuntansi dan Keuangan Indonesia, 9(1), 45–58.