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Cost-Efficiency Analysis (Case Study: Bude Darmo's Tempe Chips Agroindustry) In Lalombonda Village, Amonggedo Subdistrict, Konawe Regency

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Abstract

This study aims to analyze the cost efficiency of Bude Darmo's tempeh chip agroindustry in Lalombonda Village, Amonggedo Subdistrict, Konawe Regency. This home-based agroindustry has great potential to increase community income by processing tempeh into chips, which have a higher market value. However, the business owner faces various challenges, particularly in managing production costs. This study employs a case study approach, with data collection conducted through observation, interviews, and documentation. The data were analyzed descriptively, qualitatively, and quantitatively, using the Revenue-to-Cost Ratio (R/C Ratio) as an indicator to measure cost efficiency. The results show that total production costs of Rp841,000 per production cycle generated revenue of Rp1,480,000, resulting in an R/C Ratio of 1.76. This indicates that Bude Darmo's tempeh chip business is viable and efficient for development, as every Rp1,000 in costs incurred generates Rp1,760 in revenue. These findings make an important contribution to the development of home-based agroindustries as a means of empowering the local economy and strengthening the self-reliance of small businesses

Keyword: Cost Efficiency, Revenue-to-Cost Ratio (R/C Ratio), Agroindustry, Tempe Chips, Home-Based Business

INTRODUCTION

Agriculture plays a strategic role in supporting national economic growth, not only as a provider of food but also as a source of raw materials for various industrial activities. The development of the agricultural sector through agribusiness and agroindustry approaches

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enables agricultural products to move beyond the primary production stage and continue through post-harvest processing, manufacturing, and marketing, thereby generating higher added value. Agroindustry is a form of agriculture-based economic development because it strengthens the link between the agricultural and industrial sectors and increases community income by processing agricultural products into goods with higher economic value (Suprianto *et al*., 2020).

Agroindustrial development occurs not only on a large scale but also on a small scale through home-based enterprises (*home industry*). Home-based enterprises play a role in creating jobs, increasing income, and driving local community economic activity. The limited capital and labor typically available to home-based enterprises make resource management and production costs critical factors in ensuring the sustainability of these businesses. Sari *et al*. (2022) explain that *home-based industries* can contribute to increasing community income while creating jobs through the utilization of resources available in the surrounding environment.

One agricultural commodity closely linked to the agroindustry is soybeans. Soybeans are a food ingredient that can be processed into various products, one of which is tempeh. Processing soybeans into value-added food products can increase their economic value compared to simply selling the raw material. One form of tempeh-based product diversification is tempeh chips. This processing offers business operators the opportunity to generate added value while reducing dependence on the marketing of raw soybeans or soybean products. Anwari *et al.* (2023) indicate that processing soybeans into tempeh chips can serve as an alternative for increasing value-added, as the raw material is transformed into a ready-to-eat food product.

Tempeh chips are a processed product made from tempeh that is sliced thinly, coated in a seasoned flour batter, and then deep-fried to produce a product with characteristics distinct from its raw material. This processing creates added value but simultaneously incurs additional production costs, including those for raw materials, auxiliary materials, labor, energy, packaging, and other expenses. Therefore, a business operator's ability to effectively control and allocate production costs is a key factor in determining business efficiency. Costs that are not managed optimally can increase production costs and the cost of goods sold, thereby potentially reducing the profits earned by business operators.

This situation is relevant to the development of the tempeh chip agroindustry in Lalombonda Village, Amonggedo Subdistrict, Konawe Regency. Lalombonda Village possesses agriculture-based economic potential that supports the growth of household-scale food processing businesses. One such thriving business is Bude Darmo's tempeh chip agroindustry.

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This business utilizes tempeh as a raw material to produce tempeh chips with a higher market value. The existence of this business indicates agricultural processing activities that have the potential to contribute to household income and the local economy.

Based on a preliminary survey, Bude Darmo's tempeh chip agroindustry still faces a number of challenges in business management, particularly regarding production costs. High raw material prices, the use of rudimentary production equipment, and limited knowledge of cost accounting and management are factors that can affect production efficiency. These conditions necessitate that business operators allocate costs carefully so that the use of raw materials, labor, equipment, and other production inputs can yield optimal results. Cost efficiency is fundamentally related to a business's ability to utilize resources optimally with controlled expenditures without compromising product quality (Kusnadi, 2020).

Several studies have examined the economic aspects of the tempeh chip agroindustry. Selvianingsih *et al*. (2022), for example, analyzed the efficiency and value added of the tempeh chip agroindustry in Malang City and found that these businesses generated an *R/C Ratio* of 1.9 and value added of Rp65,321 per kilogram of soybean raw material. These results indicate a relationship between cost management, revenue, and value added in the development of the tempeh chip agroindustry. Meanwhile, Prabowo (2023) analyzed a home-based tempeh chip business in Wonogiri Regency using an approach that considered production costs, revenue, profit, the *R/C ratio*, the *B/C ratio*, and the *break-even point* (BEP). Another study by Afifah *et al*. (2024) on the *home-based industry* of tempeh-sago chips in Bekasi also showed that an analysis of costs, value added, and business feasibility can provide insight into the economic conditions of household-scale food processing businesses.

Although previous studies have addressed the efficiency, value added, and business viability of tempeh chips in several regions, research specifically on cost efficiency in the household-scale tempeh chip agroindustry in Lalombonda Village, Amonggedo Subdistrict, Konawe Regency remains limited. Differences in location, business scale, input prices, production technology, and business management characteristics can result in varying levels of cost efficiency. Thus, research findings from other regions cannot directly reflect the conditions of Bude Darmo's tempeh chip agroindustry. A study at the local business level is necessary to obtain an empirical understanding of the cost structure and allocation, as well as the business's ability to manage its production costs.

Given these conditions, this study was conducted to analyze cost efficiency in the Bude Darmo tempeh chip agroindustry in Lalombonda Village, Amonggedo Subdistrict, Konawe Regency. This study is expected to provide information on cost allocation in the production

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process and serve as a basis for business operators to improve the efficiency of business management and optimize revenue from the processing of tempeh into chips.

METHOD

This study employs a case study method with a descriptive approach to analyze cost allocation and cost efficiency at the Bude Darmo tempeh chip agroindustry. The research was conducted from February to July 2025 in Lalombonda Village, Amonggedo Subdistrict, Konawe Regency. The research location was determined *purposively*, considering that Bude Darmo's tempeh chip business is one of the household enterprises that processes tempeh into chips. The research subject was the owner of the Bude Darmo tempeh chip business, who served as the primary informant. The subject was selected *purposively* based on the consideration that the business owner has firsthand knowledge of production activities, the use of raw materials, labor, production costs, production volume, selling prices, and business revenue.

Data collection was conducted through observation, interviews, and documentation. Data analysis was performed using both quantitative and qualitative descriptive methods. According to Ibrahim *et al*. (2021), business revenue can be expressed as:

$\pi = TR - TC$

Explanation:

π = Business revenue (Rp/month)

TR = Total revenue (Rp/month)

TC = Total costs (Rp/month)

Total revenue is calculated based on the quantity of products sold multiplied by the selling price, using the formula:

$TR = P \times Q$

Explanation:

P = Product selling price (Rp/unit)

Q = Quantity of products sold (units)

Next, business efficiency is analyzed using the Revenue-to-Cost Ratio (R/C Ratio), which is the comparison between total revenue and total costs incurred in the production process (Rahardi and Hartono, 2003). The formula used is:

$R/C\ Ratio = TR / TC$

Definitions:

R/C Ratio = *Revenue-to-Cost Ratio*

TR = Total revenue (Rp)

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TC = Total cost (Rp)

Business efficiency criteria are determined based on the R/C Ratio value. An R/C value > 1 indicates that revenue exceeds costs, meaning the business is economically efficient. Conversely, an R/C value ≤ 1 indicates that the business is not yet economically efficient.

RESULTS AND DISCUSSION

Bude Darmo's Tempe Chips Agroindustry

Bude Darmo's tempe chips agroindustry is a household-scale food processing business operating in Lalombonda Village, Amonggedo Subdistrict, Konawe Regency. This business processes tempe into chips as a food product with a higher market value. Production utilizes raw materials sourced from local suppliers, and most of the production process is still carried out manually with the support of family labor.

Bude Darmo's tempeh chip business has been operating since 2019 and, as of the time of this study, had been in operation for approximately five years. Production is carried out periodically in accordance with market demand. Products are marketed through traditional markets, small shops, as well as direct sales and orders via text messages. These conditions indicate that agroindustrial activities not only produce processed goods but also generate economic activity through the marketing and distribution of products at the local level.

The production equipment used is relatively simple, including a plastic press, a stove, a gas cylinder, a regulator, a frying pan, a colander, and a basin. Production takes place in the owner's home, which serves as a facility for processing, cooling, packaging, and storing the products. The use of simple equipment allows the business to operate with relatively limited investment; however, it can also limit production capacity and process efficiency if demand increases.

The production process begins with selecting tempeh that has a firm texture and is not too moist. The tempeh is then sliced thinly and evenly, soaked in a seasoning mixture consisting of garlic, salt, flavor enhancer, and MSG for approximately five minutes. Next, the tempeh slices are fried in hot oil for about three minutes until they turn golden yellow and become crispy. The product is then drained, cooled, and packaged in 100-gram and 200-gram plastic bags. These steps demonstrate that product quality is significantly influenced by the precision of the slicing, marinating, frying, and packaging processes.

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Production Cost Structure

The cost structure is a crucial aspect in assessing business efficiency because it indicates the amount of economic resources used to produce the product. In Bude Darmo's tempeh chip agroindustry, production costs consist of variable costs and fixed costs. Variable costs fluctuate according to the use of production inputs, while fixed costs primarily stem from equipment depreciation.

Table 1. Monthly Variable Costs of Bude Darmo's Tempeh Chip Business, 2025

No.	Component	Quantity	Price (Rp)	Total (Rp)
1	Tempeh	48 kg	10,000	480,000
2	Tapioca flour	48 kg	11,000	528,000
3	Oil	16 liters	21,000	336,000
4	Plastic bags	16 packs	8,000	128,000
5	Garlic	4 kg	25,000	100,000
6	Salt	2 packs	5,000	10,000
7	Flavor enhancer	2 packs	13,000	26,000
8	MSG	2 packets	13,000	26,000
9	Transportation	7 liters	13,000	91,000
10	Water	–	–	0
11	Gas	4 cylinders	25,000	100,000
12	Electricity	1	50,000	50,000
13	Labor	1 person	400,000	400,000
	Total			2,275,000

Based on Table 1, the variable costs incurred in production activities amount to Rp2,275,000 per month. The largest cost components are tapioca starch at Rp528,000, tempeh at Rp480,000, and labor at Rp400,000. The magnitude of the costs for these three components indicates that auxiliary materials, raw materials, and labor are crucial components of the business's expense structure.

The cost of tapioca starch is even slightly higher than the cost of tempeh raw materials. This situation indicates that cost efficiency can be achieved not only through controlling primary raw materials but also through the use of auxiliary materials. Controlling the amount of flour, oil, and other ingredients used must be adjusted to production volume to prevent waste.

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Meanwhile, utilizing family labor can help reduce dependence on outside workers and provide flexibility in business management.

The business's fixed costs stem from the depreciation of production equipment. Depreciation calculations are necessary because the equipment loses value due to wear and tear during production activities.

Table 2. Fixed Costs of Bude Darmo's Tempe Chips Business, 2025

No.	Equipment	Depreciation (Rp/month)
1	Press	20,000
2	Stove	50,000
3	Gas cylinder	25,000
4	Regulator	10,000
5	Frying pan	15,000
6	Colander	5,000
7	Basin	6,000
	Total	131,000

The total fixed costs of Rp131,000 per month are relatively smaller compared to the variable costs of Rp2,275,000. This indicates that the business's cost structure is more heavily influenced by costs directly related to production activities. Thus, changes in the use of raw materials and auxiliary materials will have a greater impact on total costs than changes in equipment depreciation costs.

Based on these two components, total production costs can be calculated as follows:

TC = TVC + TFC

TC = Rp2.275.000 + Rp131.000 = Rp2.406.000/month

Thus, the total cost required to operate Bude Darmo's tempeh chip business is Rp2,406,000 per month. This structure indicates that controlling variable costs is a more critical aspect in efforts to improve the business's cost efficiency.

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Business Revenue and Income

Business revenue is derived from the sale of tempeh chips in two package sizes. The 100-gram packages are sold for Rp6,000 each, while the 200-gram packages are sold for Rp10,000 each.

Table 3. Monthly Revenue from Bude Darmo's Tempeh Chip Business, 2025

No.	Product	Quantity (packages)	Price (Rp/package)	Revenue (Rp)
1	100-gram tempeh chips	640	6,000	3,840,000
2	200-gram tempeh chips	800	10,000	8,000,000
	Total	1,440		11,840,000

Based on Table 3, total business revenue amounts to Rp11,840,000 per month. The largest portion of revenue comes from the 200-gram tempeh chips, amounting to Rp8,000,000 or approximately 67.57% of total revenue. Meanwhile, the 100-gram package generates revenue of Rp3,840,000, or about 32.43%.

This difference in revenue contribution indicates that package size and sales volume are key factors in determining business revenue. The 200-gram package contributes more to revenue because its sales volume is higher. This suggests that packaging strategy can serve as a marketing tool directly linked to business revenue.

Business profit is calculated by subtracting total production costs from total revenue. Based on the calculations, the business profit is:

$\pi = TR - TC$

π = Rp11.840.000 − Rp2.406.000 = Rp9.434.000/month

Table 4. Monthly Business Revenue from Bude Darmo's Tempe Chips, 2025

No.	Description	Amount (Rp/month)
1	Total revenue	11,840,000
2	Total costs	2,406,000
	Income	9,434,000

Revenue of Rp9,434,000 per month indicates a significant positive difference between revenue and production costs. This occurs because production costs are relatively lower than the revenue generated from product sales. However, the amount of revenue must be

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understood within the context of the production period and the cost structure used in this study; thus, it should not be viewed solely based on the nominal value of revenue but also in terms of cost efficiency.

Cost Efficiency Based on the R/C Ratio

Business efficiency is analyzed using the *Revenue-to-Cost Ratio* (R/C Ratio), which is the comparison between total revenue and total costs. This value provides an indication of the ability of the costs incurred to generate revenue.

Based on the study results, the R/C Ratio for Bude Darmo's tempeh chip business is:

R/C Ratio = TR / TC
R/C Ratio = Rp11.840.000 / Rp2.406.000 = 4,92

An R/C Ratio of 4.92 indicates that every Rp1.00 in costs incurred generates revenue of Rp4.92. Thus, revenue exceeds costs, and based on the criteria used in this study, Bude Darmo's tempeh chip business is economically efficient.

These results align with the study by Selvianingsih et al. (2022), which showed that the tempeh chip agroindustry can achieve an R/C ratio greater than one. This similarity indicates that the processing of tempeh into chips holds economic potential because the processing can generate revenue that exceeds production costs. However, efficiency levels may vary across businesses due to factors such as production scale, raw material prices, technology, labor costs, selling prices, and marketing characteristics.

The results of this study are also consistent with the findings of Afifah et al. (2024), who found an R/C Ratio of 1.53 in a home-based sago tempeh chip industry. Although both studies show values above one, the difference in R/C Ratio values indicates that the economic efficiency of an agroindustry is highly dependent on the cost and revenue structure of each business.

In Bude Darmo's business, low fixed costs and the use of household-scale labor are part of the cost structure that supports the obtained R/C Ratio. The findings of this study indicate that cost efficiency in Bude Darmo's tempe chip agroindustry is determined not only by low production costs but also by the business's ability to generate revenue through product processing and marketing. Processing tempeh into chips provides economic added value compared to selling the raw material in its unprocessed form. Thus, controlling the costs of raw materials and auxiliary materials, optimizing labor utilization, and managing the volume and type of packaging are aspects that must be maintained to ensure business efficiency.

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Overall, the research findings indicate that Bude Darmo's tempeh chip business has a cost structure dominated by variable costs, with total monthly revenue of Rp11,840,000, monthly income of Rp9,434,000, and a profit-to-cost ratio (R/C Ratio) of 4.92. These findings provide an empirical overview of the economic conditions of the household-scale tempeh chip agroindustry in Lalombonda Village while also demonstrating that cost management is a key factor in sustaining the business.

CONCLUSION

Based on the research results, Bude Darmo's tempeh chip agroindustry in Lalombonda Village is a household business that processes tempeh into value-added products using simple equipment in its production process. Although operating on a household scale, this business is able to carry out production and marketing activities sustainably and contributes to family income.

The analysis results show that Bude Darmo's tempe chips business has an R/C Ratio of 4.92. This value is greater than 1, indicating that production costs have generated revenue exceeding the expenses incurred. Thus, Bude Darmo's tempeh chip business is economically efficient and has the potential for growth through improvements in cost management, product quality, production capacity, and marketing reach.

The business owner is advised to improve cost management efficiency while maintaining product quality and hygiene. Developing packaging designs, diversifying tempeh-based products, and utilizing digital marketing can be implemented to expand market reach and enhance the business's competitiveness. Local governments, through relevant agencies, are also expected to provide support in the form of business management training, hygienic food processing, digital marketing, and the provision of production equipment tailored to the needs of microenterprises.

Future research could broaden the scope of the study by involving several tempeh chip agro-industries or by comparing efficiency across regions. Studies on supply chains, marketing, value addition, and business sustainability could also be conducted to obtain a more comprehensive picture of the development of the tempeh chip agro-industry.

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