

ECONOMIC EFFICIENCY ANALYSIS OF SALTED ANCHOVY PROCESSING AGROINDUSTRY ON PASARAN ISLAND, BANDAR LAMPUNG CITY

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Abstract

Salted anchovy processing is an important coastal agroindustry in Pasaran Island, Bandar Lampung City, generating economic value through the processing of anchovy into products with higher market value and longer shelf life. However, the economic performance of the industry is affected by production costs, particularly the cost of raw materials. This study aimed to analyze the economic efficiency of the salted anchovy processing agroindustry on Pasaran Island, Bandar Lampung City. The study employed a quantitative descriptive approach. Primary data were collected through structured interviews, field observations, and documentation involving 35 salted anchovy processors selected using purposive sampling. The data were analyzed by calculating production costs, revenue, income, and the Revenue-Cost Ratio (R/C Ratio). The results showed that the average monthly revenue was IDR 461,477,250.00, while total production costs reached IDR 438,572,262.35 per month. The average monthly income was therefore IDR 22,904,987.65. The direct raw material cost constituted the largest share of production costs, accounting for approximately 80.15%. The resulting R/C Ratio was 1.05, indicating that the salted anchovy processing agroindustry was economically efficient because the revenue generated exceeded the production costs. However, the relatively low R/C Ratio indicates a narrow profit margin and highlights the importance of controlling production costs, particularly raw material costs, to improve the economic efficiency of the industry.

Keywords:

Agroindustry ; economic efficiency ; salted anchovy

1. Introduction

The fisheries sector is an important component of Indonesia's economy and plays a significant role in food provision and as a source of income for coastal communities. In 2024, Indonesia's capture fisheries production reached 7.39 million tons, consisting of 6.92 million tons from marine capture fisheries and 0.47 million tons from inland waters (Ministry of Marine Affairs and Fisheries, 2025). This substantial production indicates the availability of fishery resources that can be developed not only through capture activities but also through processing to produce products with longer shelf life and higher economic value. Given the highly perishable nature of fish commodities, processing is an important strategy for reducing the risk of spoilage while extending product shelf life (Ali, Efendi, & Noor, 2018).

From an agribusiness perspective, fishery product processing represents a form of downstream development that enables captured commodities to generate added value through changes in product form, extended shelf life, and broader market access. One of the processing activities commonly carried out at the household scale is salting and drying. Although these activities use relatively simple technology, they require raw materials, labor, salt, energy, equipment, and marketing expenditures.

Therefore, the ability of processing enterprises to manage these cost components is important in determining their financial outcomes. A previous study of small-scale salted fish processing enterprises in Pekalongan found that the availability of fish, labor, equipment, auxiliary materials, and business area were associated with the production process, while the average R/C Ratio of 1.37 indicated that the enterprises remained profitable (Sutanto & Imaningati, 2014).

One of the salted anchovy processing centers that plays an important role in the economy of coastal communities is located on Pasaran Island, Bandar Lampung City, Lampung Province. Pasaran Island is recognized as an anchovy processing center and, in 2024, was designated by the Ministry of Marine Affairs and Fisheries as a Modern Fishing Village (Kampung Nelayan Modern/Kalamo) and an anchovy downstream center. The program is intended to increase productivity, processing capacity, and the economic independence of local communities through infrastructure development and capacity building for business actors (Ministry of Marine Affairs and Fisheries, 2024). Data from the Lampung Province Communication, Informatics, and Statistics Agency indicate that Pasaran Island has 109 processors, 8 marketers/collectors, and nearly 200 workers involved in fish processing, with the main products consisting of *teri nasi*, *teri buntiauw*, and *teri jengki*, which are marketed in Bandar Lampung, other parts of Sumatra, and Jakarta (Lampung Province Communication, Informatics, and Statistics Agency, 2018). The scale of this processing activity is also reflected in its production capacity and economic value. Under normal weather conditions and when sufficient raw materials are available, producers on Pasaran Island are reported to be capable of producing approximately 1–2 tons of anchovies per day, with an average selling price of around IDR 50,000 per kg. These figures indicate that anchovy processing is not merely a household food-processing activity but also an economic activity generating substantial local economic circulation.

The substantial economic potential of this industry does not necessarily indicate that the financial performance of each processing unit is optimal. The salted anchovy processing agroindustry faces uncertainty in raw material availability and production conditions influenced by seasonal and weather factors. Previous research showed that the availability of fresh anchovies on Pasaran Island varies between seasons; raw materials are relatively abundant during the east monsoon, whereas availability declines during the west monsoon due to sea conditions and rainfall that disrupt fishing activities and the drying process (Mahasari, Lestari, & Indriani, 2014). Such conditions may affect production continuity and processors' income. In addition, changes in input prices can increase production cost pressures. In 2023, salted anchovy processors on Pasaran Island reported an increase in the price of salt from approximately IDR 80,000 to IDR 260,000 per sack; processing approximately 1 ton of fish requires about 0.5 tons of salt, meaning that such an increase directly raises production costs (ANTARA, 2023).

Variations in business conditions have also been reflected in previous studies, which found that salted anchovy processing enterprises on Pasaran Island remained profitable, although income varied by season. The income of salted anchovy processors was reported at IDR 25,106,656.37/month during the west monsoon and IDR 40,696,456.41 per month during the east monsoon (Saleh, Riantini, & Nur'aini, 2022). These findings indicate that processors' economic outcomes are determined not only by their ability to sell products but also by raw material availability and production conditions. Meanwhile, previous research showed that anchovy processing in the processing cluster generated an average added value of 12.82%, equivalent to approximately IDR 7,000/kg (Putri, Meylinda, & Rahman, 2024). This finding demonstrates that processing generates additional economic value, while

at the same time emphasizing the importance of cost efficiency and business management to ensure that such added value is reflected in processors' profits.

Previous studies on the salted anchovy agroindustry on Pasaran Island have provided insights from several perspectives. Saleh et al. (2022) analyzed differences in processors' income between the west and east monsoon seasons. Rufaidah examined the financial feasibility of the salted fish processing industry on Pasaran Island using indicators including NPV, IRR, Gross B/C, Net B/C, Payback Period, and sensitivity analysis (Rufaidah, Riantini, Saleh, Nur'aini, & Mirza, 2023). Other research has focused on the business processes and performance of the anchovy processing industry on Pasaran Island and formulated strategies to optimize industrial performance (Putri, Anggraini, & Maarif, 2021). Nevertheless, these studies employed different analytical focuses and observation periods, and therefore have not provided an up-to-date and comprehensive description of the financial condition of salted anchovy processing enterprises at the processor-unit level.

The novelty of this study lies in its focus on the financial performance of the salted anchovy processing agroindustry rather than solely comparing income across seasons or assessing investment feasibility. This approach is intended to describe the relationship among cost structure, revenue, income, and business efficiency as indicators of processors' ability to manage the financial resources used in the production process. Considering changes in business conditions, fluctuations in raw material availability, changes in input costs, and the development of Pasaran Island as an anchovy downstream center, more recent empirical information on economic efficiency at the processor level is needed. Therefore, this study aimed to analyze the economic efficiency of the salted anchovy processing agroindustry on Pasaran Island, Bandar Lampung City. The results are expected to complement previous studies and provide a more current basis for decision-making related to business management and development.

2. Materials and Methods

The study was conducted on Pasaran Island, Bandar Lampung City, Lampung Province, Indonesia. The study site was selected purposively based on its relevance to the research objectives (Amalia, Suwanto, & Widiyanto, 2024). Similar purposive site selection has been applied in previous agribusiness research by selecting study areas based on commodity characteristics and the concentration of business activities (Putriana, Kurniati, & Yurisinthae, 2023). Pasaran Island was deliberately selected because it is one of the major anchovy processing centers in Bandar Lampung City and has been designated as an area for the downstream development of anchovy products (Ministry of Marine Affairs and Fisheries, 2024).

The study used both primary and secondary data. Primary data were obtained directly from salted anchovy processing operators through structured interviews and field observations. Primary data collection involved interviews, observations, and documentation. Interviews were conducted to obtain information on input use, production costs, production volumes, and product selling prices. Observations were conducted to document the salted anchovy processing activities and the use of production facilities, while documentation was used to complement information obtained from the interviews. Secondary data were used to support the analysis and were obtained from Statistics Indonesia, the Ministry of Marine Affairs and Fisheries, the Provincial Government of Lampung, and relevant scientific publications and previous studies..

The respondents consisted of 35 salted anchovy processors on Pasaran Island. The sample size was determined using the Slovin formula (Silaen & Widiyono., 2013). Respondents were selected

using purposive sampling, in which participants were deliberately selected based on the objectives of the study. All respondents were classified as small-scale enterprises, with annual turnover ranging from IDR 2,000,000,000 to IDR 15,000,000,000, in accordance with Government Regulation No. 7 of 2021 (JDIH, 2021).

This study employed a quantitative descriptive approach to analyze the economic efficiency of the salted anchovy processing agroindustry on Pasaran Island, Bandar Lampung City. The quantitative descriptive approach was used to describe business conditions based on quantitative data obtained from the processors. The data were analyzed by calculating production costs, revenue, income, and the Revenue-Cost Ratio (R/C Ratio). A similar approach has been applied in agribusiness studies analyzing production costs, revenue, income, and business feasibility using the R/C Ratio (Subastian & Yuliawati, 2024); (Visasti, Kartika, & Rahayu, 2024).

Business efficiency was analyzed using the Revenue-Cost Ratio (R/C Ratio), defined as the ratio of total revenue to total production costs incurred during the production process. The R/C Ratio indicates the amount of revenue generated for every one unit of currency spent on production costs. The use of the R/C Ratio as an indicator of business efficiency or feasibility is widely applied in agribusiness and fisheries research, including studies based on primary data collected at the business level (Hapsari, Bambang, Ghofar, Fitri, & Adrianto, 2022). The R/C Ratio was calculated using the following equation:

$$R/C \text{ Ratio} = \frac{TR}{TC}$$

Keterangan :

$R/C \text{ Ratio}$ = Revenue Cost Ratio

TR = Total Revenue

TC = Total Cost

An R/C Ratio > 1 indicates that the business is efficient and profitable because the revenue generated exceeds the costs incurred. An R/C Ratio = 1 indicates a break-even condition, whereas an R/C Ratio < 1 indicates that the business is inefficient because the revenue generated is lower than the production costs. In fisheries studies, an R/C Ratio greater than one is also used as an indicator that a business remains feasible and profitable to operate (Hogantoro, Dewi, & Hapsari, 2023).

3. Results

The economic efficiency of the salted anchovy processing agroindustry on Pasaran Island, Bandar Lampung City, was analyzed based on production costs, revenue, income, and the Revenue-Cost Ratio (R/C Ratio). Production costs incurred in salted anchovy processing include all expenditures associated with the production process and consist of fixed and variable costs. Fixed costs include expenditures that are not directly affected by changes in production volume, particularly equipment depreciation, whereas variable costs are associated with the use of production inputs and change according to production activities. The variable costs in this study included the purchase of anchovies as raw materials, salt, labor, fuel, transportation, packaging, and other expenditures incurred during the processing activities.

The analysis also included revenue and income as measures of the economic returns obtained by processors. Revenue was calculated based on the quantity of salted anchovies produced and their selling prices, while income was calculated as the difference between total revenue and total

production costs. Business efficiency was subsequently measured using the R/C Ratio to determine the ratio between revenue and costs incurred during one production period. The presentation of these four components together provides a quantitative overview of the expenditure structure, sales revenue, income generated, and economic efficiency of the salted anchovy processing agroindustry. The results of the calculations are presented in Table 1.

Tabel 1. Economic efficiency of the salted anchovy processing agroindustry on Pasaran Island

No.	Description	Value (IDR/month)
I	Revenue	461,477,250.00
	Salted anchovy : teri nasi	237,319,062.50
	Salted anchovy : teri buntiau	125,466,830.36
	Salted anchovy : teri jengki	98,691,357.14
II	Production Costs	438,572,262.35
	Direct raw material costs	351,511,306.25
	Salted anchovy : teri nasi	157,809,901.79
	Salted anchovy : teri buntiau	105,026,071.43
	Salted anchovy : teri jengki	88,675,333.04
	Direct labor costs	41,409,047.62
	Boiling	25,045,000.00
	Drying and sorting	16,364,047.62
	Overhead costs	45,651,908.48
	Depreciation	3,230,836.31
	Indirect raw material costs	42,421,072.17
III	Income	22,904,987.65
IV	R/C Ratio	1.05

Based on Table 1, the average revenue received by salted anchovy processors on Pasaran Island was IDR 461,477,250.00 per month. Production costs consisted of direct raw material costs, direct labor costs, and overhead costs, with total production costs amounting to IDR 438,572,262.35 per month. The difference between total revenue and total production costs resulted in an average monthly income of IDR 22,904,987.65. Based on these figures, the Revenue-Cost Ratio (R/C Ratio) was 1.05.

4. Discussion

The results showed that the salted anchovy processing agroindustry on Pasaran Island generated an average monthly revenue of IDR 461,477,250.00, with total production costs amounting to IDR 438,572,262.35 per month. The difference between revenue and production costs resulted in an average monthly income of IDR 22,904,987.65. This finding indicates that salted anchovy processing activities were still able to generate a surplus for processors after all production costs had been accounted for. The revenue was generated from three main products, namely salted anchovy (teri nasi) amounting to IDR 237,319,062.50 per month, salted anchovy (teri buntiau) amounting to IDR 125,466,830.36 per month, and salted anchovy (teri jengki) amounting to IDR 98,691,357.14 per month. The largest contribution came from salted anchovy (teri nasi), which accounted for approximately 51.43% of total revenue. This composition indicates that teri nasi was the dominant product contributing to the revenue of the agroindustry in the study area.

The relatively high revenue is closely associated with the position of Pasaran Island as one of the anchovy processing centers in Bandar Lampung City. Anchovy processing in this area has developed beyond serving local markets and has expanded to other regions of Sumatra and Java. The anchovy

processing industry cluster on Pasaran Island has relatively well-developed production and marketing activities, although processors still face challenges related to bargaining power and product quality (Putri, Anggraini, & Maarif, 2021). This condition suggests that access to broader markets can support revenue generation; however, high revenue alone cannot be used as the sole indicator of business performance because it must be assessed relative to the costs incurred during production.

The cost structure shows that direct raw material costs were the largest expenditure component in the salted anchovy processing agroindustry, amounting to IDR 351,511,306.25 per month, or approximately 80.15% of total production costs. These costs consisted of *teri nasi* of IDR 157,809,901.79, *teri buntiau* of IDR 105,026,071.43, and *teri jengki* of IDR 88,675,333.04 per month. The high proportion of raw material costs indicates that salted anchovy processing is highly dependent on the availability and price of anchovies as the main production input. This finding is consistent with previous research showing that the availability of anchovy raw materials on Pasaran Island is influenced by seasonal conditions (Mahasari, Lestari, & Indriani, 2014). In this study, annual income calculations were also divided into the west and east monsoon seasons, and the resulting values were subsequently averaged on a monthly basis. Under certain conditions, particularly when fishing activities are disrupted, raw material availability becomes more limited, potentially affecting production continuity and the economic condition of processors. Consequently, changes in raw material prices or quantities have substantial implications for the cost structure and profitability of the business.

The high dependence on raw materials also indicates that raw material scarcity is an important issue in anchovy fishing and processing activities on Pasaran Island. Raw material procurement is influenced by natural conditions because the anchovies are still directly harvested from the open sea. When raw materials become difficult to obtain, processors face the risk of higher purchase prices or reduced production volumes. For businesses with the cost structure observed in this study, such conditions are particularly important because a large proportion of production costs is allocated to direct raw materials. Therefore, the ability of processors to obtain raw materials at relatively stable prices is an important factor in maintaining business efficiency.

Direct labor costs were the second-largest production cost component after raw materials, amounting to IDR 41,409,047.62 per month, or approximately 9.44% of total production costs. These costs consisted of labor for boiling activities amounting to IDR 25,045,000.00 and drying and sorting activities amounting to IDR 16,364,047.62. The relatively high use of labor in these stages indicates that salted anchovy processing still relies substantially on direct labor, particularly in activities that have not been fully replaced by mechanization. This condition is consistent with the characteristics of the salted fish agroindustry on Pasaran Island, which involves local communities in various stages of processing. Such labor involvement indicates that the agroindustry not only functions as an economic activity for producing processed products but also provides employment opportunities for coastal communities.

Overhead costs amounted to IDR 45,651,908.48 per month, representing approximately 10.41% of total production costs. These costs consisted of depreciation of IDR 3,230,836.31 and indirect raw material costs of IDR 42,421,072.17 per month. The relatively small depreciation cost compared with raw material costs indicates that equipment use was not a major component of the total business cost. In contrast, indirect raw materials contributed substantially to overhead costs. This cost structure suggests that cost-control efforts would be more effective when focused on production inputs with the largest cost shares rather than primarily on equipment depreciation.

The average income of IDR 22,904,987.65 per month indicates that the agroindustry still generated a surplus after all production costs were considered. However, income accounted for only approximately 4.96% of total revenue. This indicates that most of the revenue generated was used to cover production costs. This finding differs from the results of Saleh et al. (2022), who reported that the average income of salted anchovy processors on Pasaran Island was IDR 14,236,308.30 per month during the west monsoon and increased to IDR 28,353,351.96 per month during the east monsoon. The difference indicates that the economic performance of salted anchovy processing can vary according to production conditions, particularly raw material availability and seasonal conditions. The difference in income between the present study and Saleh et al. (2022) should also be interpreted in light of differences in observation periods and business conditions. The previous study demonstrated considerable seasonal variation in income, whereas the present study describes the average business condition during the research period. Therefore, the monthly income of IDR 22,904,987.65 should not be interpreted as a constant figure throughout the year. Fluctuations in raw material availability, input costs, production volume, and selling prices may alter revenue and production costs and consequently affect the income received by processors.

The business efficiency measured using the R/C Ratio yielded a value of 1.05. This value means that every IDR 1.00 spent on production generated IDR 1.05 in revenue. Thus, the salted anchovy processing agroindustry on Pasaran Island remained economically efficient because its revenue exceeded its production costs. However, the level of efficiency was relatively low because the difference between revenue and cost was only IDR 0.05 for every IDR 1.00 of production cost. This indicates that the business has a relatively limited surplus and is fairly sensitive to changes in production costs and revenue. The R/C Ratio of 1.05 was relatively lower than those reported in several other fish-processing studies. Nursida, reported an R/C Ratio of 2.70 for a salted fish business in Ngayau Village, Muara Bengkal District, indicating a substantially larger difference between revenue and production costs. (Nursida, Saputri, & Juraemi., 2024). Meanwhile, a study of salted anchovy processing in Panimbang District, Pandeglang Regency, reported an R/C Ratio of 1.60 (Nuraeni & Budi, 2022). These differences suggest that the efficiency of fish-processing enterprises may vary across locations due to differences in raw material prices, production scale, processing technology, labor costs, and product selling prices.

The relatively low R/C Ratio in the present study was primarily associated with the high proportion of direct raw material costs, which accounted for 80.15% of total production costs. This condition means that even a small change in raw material prices can have a relatively large effect on total production costs and business efficiency. This finding is consistent with Mahasari et al. (2014), who emphasized the importance of raw material availability for the sustainability of salted anchovy processing activities on Pasaran Island. Therefore, improving business efficiency can be pursued through more effective raw material management, including procuring raw materials at competitive prices, controlling the use of auxiliary materials, and improving production-process efficiency so that costs per unit of output can be reduced.

Overall, the findings indicate that the salted anchovy processing agroindustry on Pasaran Island was still able to generate profits and remained economically efficient, although the efficiency margin was relatively narrow. This condition shows that substantial economic activity and revenue generation were not fully accompanied by a high profit margin because most of the revenue was absorbed by production expenditures. The findings reinforce previous evidence regarding the importance of cost

control and raw material availability in salted anchovy processing and provide a more recent description of the economic efficiency of the agroindustry during the study period.

5. Conclusion

The results of the analysis showed that the salted anchovy processing agroindustry on Pasaran Island, Bandar Lampung City, obtained an R/C Ratio of 1.05. This value indicates that every IDR 1.00 of production cost incurred generated IDR 1.05 in revenue. Since the R/C Ratio was greater than one, the salted anchovy processing agroindustry on Pasaran Island was economically efficient. However, the R/C Ratio was only slightly above one, indicating a relatively low level of efficiency. Therefore, controlling production costs, particularly raw material costs, which constituted the largest component of production costs, is necessary to improve the efficiency of the business.

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