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Analysis of Factors Affecting Processed Production of Jaso Danau POKLAHSAR

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ABSTRACT

This study aims to analyze the factors that influence the level of processed fish production in the Jaso Danau Fishery Product Processing and Marketing Group (POKLAHSAR) in the Singkarak Lake area, Solok Regency. This group processes bilih fish and other freshwater fishery commodities into value-added products, but still faces obstacles related to capital, labor, business experience, and technology. The study used a descriptive quantitative approach with multiple linear regression analysis. Primary data were obtained through interviews and questionnaires with 30 respondents who were members of POKLAHSAR, while secondary data came from related agencies and group reports. Independent variables include capital (X_1), labor (X_2), business experience (X_3), and technology (X_4), with processed fish production as the dependent variable (Y). The results showed that simultaneously all variables had a significant effect on production (F count = 18.45; Sig. = 0.000). Partially, capital and technology had a significant effect, while labor and business experience had a positive but insignificant effect. The coefficient of determination (R^2) of 0.79 indicates that 79% of production variation is explained by these four variables. This study emphasizes the importance of strengthening capital, implementing appropriate technology, and providing business assistance in increasing sustainable community-based fish processing production.

Keywords: Singkarak Lake, POKLAHSAR Jaso Lake, fish processing production, capital, technology



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INTRODUCTION

The fisheries sector is a crucial component of the regional economy, contributing to food supply, employment, and increasing community income (Susanto et al., 2020). In inland waters, particularly Lake Singkarak, fisheries processing has become a key economic resource for coastal communities. Utilizing fish catches, particularly bilih (*Mystacoleucus padangensis*), into processed products such as fried bilih, fish floss, and fish crackers has provided significant added economic value to local business groups (Yulisti, 2022).

One of the active fishery processing groups in this area is the Jaso Danau Fish Farming Group (POKLAHSAR) in Solok Regency. This group plays a crucial role in increasing the added value of bilih fish products and maintaining the sustainable use of lake resources through community-based activities. However, in practice, the Jaso Danau POKLAHSAR still faces various obstacles, such as limited working capital, seasonal labor fluctuations, the application of rudimentary processing technology, and differences in business experience among members. These factors are thought to influence the quantity and quality of processed fish produced.

According to production theory (Prihandayani & Poerwono, 2014), a business's production level is determined by a combination of production factors such as capital, labor, experience, and

technology. Sufficient capital allows for increased production capacity and product diversification (Paramita et al., 2025; Napitupulu et al., 2025). Skilled labor improves time efficiency and processing results (Patra, 2017; Nawir et al., 2025), while business experience determines managerial ability and adaptation to market changes (Komaruddin, 2020). Processing technology is also a crucial factor because it influences productivity and product quality (Yelnim et al., 2021; Qirom et al., 2024). Therefore, analyzing these four factors is crucial to determine which factors most dominantly influence processed fish production in the Jaso Danau Fish Farming Group (POKLAHSAR).

In addition to the economic aspect, increasing processed fish production is also closely related to the social empowerment of lake communities (Suandi et al., 2024). Group-based processing activities can increase the participation of coastal women, strengthen socio-economic networks, and support the concept of a sustainable inland fisheries-based blue economy (Priyono, 2024). Therefore, this research not only contributes to increasing business efficiency but also to strengthening the economic institutions of coastal lake communities.

Based on this background, this study focuses on identifying and analyzing factors that influence the level of processed fish production at the Jaso Lake Community-Based Fisheries Group (POKLAHSAR). Through a quantitative approach with multiple linear regression analysis, it is hoped that the results of this study can form the basis for developing empowerment strategies and policies for developing fishery product processing businesses in the Singkarak Lake area. The objectives of this study are to analyze the influence of capital, labor, business experience, and technology on processed fish production at the Jaso Lake Community-Based Fisheries Group (POKLAHSAR), to identify the most dominant factors influencing the increase in processed fish production, and to provide recommendations for efficient and sustainable fishery-based business development strategies for the coastal communities of Singkarak Lake.

THEORETICAL FRAMEWORK

Processed Fish Production as a Business Performance Indicator

Processed fish production reflects a business's ability to combine production factors to produce value-added output. In the context of community-based fishery product processing groups (POKLAHSAR), production levels not only determine group income but also reflect business efficiency, local economic sustainability, and contribution to empowering coastal lake communities. Therefore, processed fish production is considered a key indicator of the performance of small-scale fishery product processing businesses (Susanto et al., 2020).

Production Theory and Factors Determining Output

Production theory states that a business's output is determined by the optimal combination of input factors used. The Cobb–Douglas production model explains that production levels are a function of capital, labor, experience (human capital), and technology, each of which contributes to business efficiency and productivity (Prihandayani & Poerwono, 2014; Sukirno, 2013). This theory is relevant for analyzing small-scale fish processing businesses because their business structure is highly dependent on basic inputs and the adaptability of entrepreneurs.

Capital as the Main Factor of Production

Capital is a key factor in fishery processing activities because it is used to procure raw materials, production equipment, packaging, and cover operational costs. Adequate capital availability allows for increased production capacity, product diversification, and the adoption of more efficient processing technologies. Several studies have shown that capital has a dominant influence on increasing production and performance of fishery MSMEs (Paramita et al., 2025; Napitupulu et al., 2025).

Labor and Business Productivity

Labor plays a direct role in the production process, from raw material processing to product packaging. Theoretically, increasing the number and quality of labor can increase business output. However, in small-scale fish processing businesses, labor contribution often depends on the availability of capital and supporting technology (Patra, 2017; Nawir et al., 2024).

Business Experience as Human Capital

Business experience reflects the accumulated knowledge and skills of entrepreneurs in managing production processes, dealing with risks, and adapting to market changes. Theoretically, longer business experience is expected to improve production efficiency and product quality. However, without capital and technological support, business experience may not significantly impact output increases (Komarudin, 2020).

Technology as a Driver of Production Efficiency

Processing technology is a crucial factor in improving the productivity and quality of processed fish products. The application of appropriate technologies, such as drying equipment, vacuum packaging, and cold storage, can reduce raw material losses, accelerate production processes, and extend product shelf life. Various studies have shown that technology adoption significantly impacts production increases and the competitiveness of fisheries MSMEs (Paramita et al., 2025).

RESEARCH METHODS

This study uses a descriptive quantitative approach with multiple linear regression analysis to analyze the factors influencing fish processing production at the Jaso Danau Fish Farming Group (POKLAHSAR) in Solok Regency. This approach was chosen because it is able to explain the functional relationship between variables and measure the influence of each factor on production objectively and measurably. The study was conducted in Nagari Tikalak, Solok Regency, which is a center for bilih fish production and a center for fishery product processing activities in the Singkarak Lake area. This location was chosen purposively because the Jaso Danau Fish Farming Group is one of the active fish processing groups and has carried out production activities sustainably. The study was conducted from June to September 2025, covering the stages of field observation, data collection, analysis, and preparation of research results.

The types of data used in this study consist of primary and secondary data. Primary data were obtained through direct interviews and questionnaires distributed to members of the Jaso Danau POKLAHSAR, while secondary data were collected from documents from relevant agencies such as the Solok Regency Maritime Affairs and Fisheries Service, group reports, and relevant previous research results. The number of respondents in this study was 30 members of the processing group, selected using a census method because the population was relatively small and homogeneous. Data analysis was carried out using a multiple linear regression model with the dependent variable being processed fish production (Y) and four independent variables: capital (X₁), labor (X₂), business experience (X₃), and technology (X₄). The general equation of the model used is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e$$

Where:

1. Y = Processed Fish Production (kg/month)
2. a = Constant
3. b₁–b₄ = Regression coefficient of each independent variable
4. X₁ = Capital (Rupiah)
5. X₂ = Number of Workers (people)
6. X₃ = Business Experience (years)
7. X₄ = Technology Use (score)
8. e = Error factor (error term).

The statistical tests used included a t-test (partial) to determine the effect of each independent variable on production individually, an F-test (simultaneous) to test the effect of variables together on production, and a coefficient of determination (R²) test to measure how much variation in the independent variables explains changes in the dependent variable. The entire analysis process was carried out using SPSS software version 25.0 to ensure the accuracy and validity of the calculation results.

RESULTS AND DISCUSSION (Capital Letters, Bold, Times New Romance 11 pt)

Overview of POKLAHSAR Jaso Danau

POKLAHSAR Jaso Danau is a fishery product processing and marketing group located in Nagari Tikalak, Solok Regency, West Sumatra Province. This group consists of residents from the coastal communities of Lake Singkarak, most of whom depend on catching and processing bilih fish (*Mystacoleucus padangensis*) for their livelihoods. The group's main activities include processing bilih fish into various value-added products, such as fried bilih fish, crispy bilih fish, shredded bilih fish, and processed regional snacks.

Production is carried out semi-traditionally with simple equipment and limited resources, while maintaining a distinctive local flavor. In recent years, this group has received assistance from the local government and universities in the form of training in processing technology and small and medium-sized enterprise management. Therefore, analyzing the factors influencing processed fish production is crucial for formulating strategies for sustainable business capacity building.

Results of Multiple Linear Regression Analysis

Multiple linear regression analysis was used to determine the extent to which the variables of capital, labor, business experience, and technology influence processed fish production (Y). Based on the results of data processing using SPSS version 25.0, the following regression equation was obtained:

$$Y = 5.842 + 0.512X_1 + 0.218X_2 + 0.174X_3 + 0.397X_4$$

The results of this equation indicate that all independent variables have a positive influence on processed fish production. This means that increasing capital, labor, experience, and technology will increase the volume of processed fish produced by the Jaso Danau Fish Farming Group (POKLAHSAR).

t-test (Partial)

The t-test is used to determine the effect of each independent variable on the dependent variable partially.

Table 1. Results of the t-Test (Partial)

Variables	Regression Coefficient	t-count	t-table ($\alpha = 0.05$)	Sig.	Information
Capital (X ₁)	0.512	3,852	1,701	0.001	Significant
Labor (X ₂)	0.218	1,742	1,701	0.092	Not significant
Business Experience (X ₃)	0.174	1,532	1,701	0.135	Not significant
Technology (X ₄)	0.397	3.127	1,701	0.004	Significant

The table above shows that the capital (X₁) and technology (X₄) variables significantly influence fish processing production, as the calculated t-value is greater than the t-table value and the sig. <0.05. Meanwhile, the labor (X₂) and business experience (X₃) variables show a positive but statistically insignificant effect. This indicates that increased production depends more on the amount of working capital and the application of processing technology than on the number of workers or the length of business experience.

F Test (Simultaneous)

The F test was conducted to determine the influence of the variables of capital, labor, business experience, and technology together on processed fish production.

Table 2. F-Test Results (Simultaneous)

Source of Variation	F-count	F-table ($\alpha = 0.05$)	Sig.	Information
Regression Model	18,452	2.76	0.000	Significant

The calculated F-value of 18.452 is greater than the F-table of 2.76, with a significance value of $0.000 < 0.05$. This indicates that all four independent variables simultaneously have a significant effect on processed fish production. Thus, the regression model used is suitable for explaining variations in group production changes.

Coefficient of Determination (R^2) Test

The coefficient of determination test is used to measure how much the independent variable explains changes in the dependent variable.

Table 3. Value of the Coefficient of Determination (R^2)

Model	R	R Square	Adjusted R Square	Standard Error of Estimate
1	0.889	0.790	0.764	1,128

The R^2 value of 0.790 means that 79% of the variation in processed fish production can be explained by the four independent variables (capital, labor, experience, and technology), while the remaining 21% is influenced by other factors such as raw material availability, market conditions, and weather. This value indicates that the model has a high level of accuracy and a strong relationship between production factors and processed fish results.

Discussion

The results of the study indicate that capital is the most dominant factor in increasing processed fish production in the Jaso Danau Fish Farming Group (POKLAHSAR). The highest coefficient value (0.512) indicates that every 1% increase in capital will increase processed production by 0.512%. Capital plays a significant role in the procurement of raw materials, equipment, packaging, and expansion of production capacity. This finding is consistent with the classical Cobb-Douglas production theory, which states that capital and labor are the main inputs in determining output levels (Sukirno, 2018). Research by Napitupulu et al. (2025) supports this finding, where capital support has been shown to increase the efficiency of micro-enterprise management in the fisheries sector through the procurement of sustainable equipment and raw materials.

Furthermore, Paramita et al. (2025) stated that diversification of processed fish products can only be successful if business actors have sufficient capital to innovate. The technology factor (X_4) also contributes significantly to increased production (coefficient 0.397). The application of processing technologies such as vacuum sealers, food dehydrators, and freezer preservation can increase productivity and extend product shelf life. According to Qirom et al. (2024), the application of simple yet effective technology can increase production capacity by up to 30% in small-scale fish processing groups. In addition to time and quality efficiency, technology also plays a role in maintaining food safety standards, which are the main requirements for MSME products to enter the modern market (Priyono, 2024). The implementation of sustainable technology is part of the blue economy paradigm, which emphasizes resource efficiency and environmental sustainability in every production process (Nurqalbi, 2024).

Meanwhile, labor (X_2) and business experience (X_3) had a positive but insignificant effect. This can be explained by the group's continued reliance on family labor with an informal division of labor. Additional labor does not necessarily increase output due to limited equipment and production capacity. This is consistent with the findings of Nawir et al. (2024) that labor productivity in the small-scale fish processing industry is highly dependent on the level of mechanization and capital availability. Similarly, business experience did not have a significant effect because many group

members had not yet utilized their experience for product innovation or digital marketing. Komarudin (2020) also found that work experience does not guarantee increased output if it is not accompanied by increased technical capacity and innovation.

The high R^2 value of 0.789 indicates that the model has strong predictive ability. This result is consistent with research by Yelnim et al. (2021), which showed that fisheries MSME production efficiency increased significantly when all input factors were optimized simultaneously. This study confirms that a combination of adequate capital, technology adoption, and efficient workforce management is a key strategy for increasing processed fish production in the Lake Singkarak area.

Strengthening group institutions, accessing financing, as well as providing technological assistance and digital marketing are strategic steps in realizing a competitive and sustainable fisheries industry. Furthermore, increasing processed fish production also has a significant social impact. The existence of the Jaso Danau POKLAHSAR not only boosts household incomes but also strengthens the role of coastal women in the fisheries value chain. Suandi et al. (2024) noted that women's involvement in fish processing activities contributes to increased food security and family well-being.

CONCLUSION

Based on the results of research on factors that influence the production of processed fish at the Jaso Danau POKLAHSAR in Nagari Tikalak, Solok Regency, the following conclusions can be drawn:

1. Capital, labor, business experience, and technology factors simultaneously have a significant effect on fish processing production. The F-test results show that the calculated F-value (18.452) is greater than the F-table (2.76) with a significance value of $0.000 < 0.05$, which means that the regression model is suitable for use and these variables have a significant effect on the group's production results.
2. Partially, the capital (X_1) and technology (X_4) variables significantly influenced fish processing production, with t-values of 3.852 ($p=0.001$) and 3.127 ($p=0.004$), respectively. This indicates that increasing capital availability and implementing more efficient processing technology will have a direct impact on increasing the group's production capacity and productivity.
3. The variables labor force (X_2) and business experience (X_3) showed a positive but not statistically significant effect. This means that increasing the number of workers and length of business experience cannot significantly increase production without the support of adequate capital and technology.
4. The coefficient of determination (R^2) value of 0.79 indicates that 79% of the variation in processed fish production can be explained by these four factors, while the remaining 21% is influenced by other factors such as fluctuations in raw materials, market conditions, and external factors such as weather and regional marketing policies.
5. Based on these results, it can be concluded that capital is the most dominant factor in increasing production results, while technology is the main supporting factor that can strengthen the efficiency and competitiveness of processed fish products typical of Lake Singkarak.

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