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Analysis Of The Welfare Levels Of Fishing Households In Batauga Subdistrict, South Buton Regency

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Abstract

This study aims to analyze the welfare level of capture fishery households using the Poverty Probability Index (PPI) and to identify the factors influencing it in Batauga Subdistrict, South Buton Regency. The study was conducted from April to May 2026 with a sample of 84 capture fishery households selected using the proportionate stratified random sampling method. Data analysis was performed descriptively using the Poverty Probability Index (PPI) and multiple linear regression analysis. The results indicate that the average PPI score for fishing households was 34.80, suggesting that the respondents' welfare level remains relatively low. Based on PPI score categories, 66.67% of households fell into the "less well-off" category, 26.19% into the "moderately well-off" category, and 7.14% into the "pre-well-off" category. Based on the probability of poverty (National Poverty Line), 40.48% of households were classified as relatively not vulnerable, 22.62% as moderately vulnerable, 34.52% as vulnerable, and 2.38% as highly vulnerable to poverty. The results of the multiple linear regression analysis indicate that education (X_1), boat ownership (X_3), machinery use (X_4), and fish production (X_7) have a significant effect on the welfare level of fishing households. Conversely, age (X_2), business diversification (X_5), access to subsidized fuel (X_6), and social assistance (X_8) do not have a significant effect on the welfare level of fishing households.

Keywords: household welfare, capture fishermen, Poverty Probability Index (PPI), multiple linear regression, Batauga Subdistrict

INTRODUCTION

Indonesia is the world's largest archipelago, with a maritime area of approximately 1,922,570 km² that is rich in fishery resources. According to Ministerial Decree of the Ministry

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of Marine Affairs and Fisheries No. 19 of 2022, the sustainable potential of fish resources across all of Indonesia's waters amounts to 12.54 million metric tons per year, with a total allowable catch (TAC) of 9.45 million metric tons per year (KKP, 2022). National fisheries export performance is also showing a positive trend, projected to reach USD 6.27 billion by 2025, driven by key commodities such as shrimp, tuna and skipjack, squid, cuttlefish, and octopus, and seaweed (KKP, 2025). This immense potential makes the fisheries sector one of the key pillars of the national economy, as well as the primary source of livelihood for millions of coastal communities.

Although the potential of marine resources is enormous, these benefits have not yet been fully realized by fishermen as the primary actors at the grassroots level. Fishermen's catches are highly dependent on seasonal fluctuations, weather, and unpredictable ecological conditions in the waters. Limited access to business capital, the continued use of traditional fishing technologies, and fishermen's weak bargaining position in the marketing chain result in their incomes being unstable and vulnerable (Patiung et al., 2026; Saediman, Syah, et al., 2019). This economic vulnerability ultimately has a direct impact on the limited ability of fishing households to meet basic needs such as food security, access to education, and health care (FAO, 2022; Afdini, 2021).

This issue is particularly evident in Southeast Sulawesi Province, a region surrounded by extensive coastal areas and islands. Although the number of fishermen in this province is substantial, the vast potential of marine resources has not translated into corresponding levels of well-being for those engaged in the sector. Most fishermen in Southeast Sulawesi still operate using small-scale fleets and simple fishing technologies, resulting in limited production capacity and high vulnerability to climate anomalies (Patiung et al., 2026). This places small-scale fishermen in a high-risk group for poverty (Southeast Sulawesi BPS, 2024).

More specifically, this phenomenon is evident in South Buton Regency, a coastal area where fishing activities dominate. Data from the South Buton Regency Statistics Agency ( ) (2025) indicate that the poverty rate in this region remains at 11.74%. This relatively high figure indicates that a portion of the population, including fishing households, has not yet been able to meet a decent standard of living. Although South Buton's Human Development Index (HDI) reached 71.36 in 2025 and shows an upward trend, crucial dimensions such as education, health, and living standards still require serious intervention. The Open Unemployment Rate (OUR) of 2.78% also indicates that labor absorption in productive economic sectors remains suboptimal (South Buton Regency BPS, 2025).

As one of the centers of capture fisheries activity in South Buton Regency, Batauga

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Subdistrict empirically illustrates the complexity of the challenges faced by small-scale fishermen. Initial observations indicate that the majority of fishermen in this area still rely on small-scale fishing fleets equipped with conventional fishing gear. Limited capital, difficulty accessing subsidized fuel, a lack of dock facilities and fish auction sites (TPI), as well as information asymmetry that leads to low selling prices for their catch, are daily obstacles that fishermen must face. This series of constraints has a direct impact on housing affordability, the ability to purchase basic necessities, and the capacity to finance children's education. This underscores that fishermen's poverty is multidimensional, meaning its measurement cannot be reduced solely to financial income.

Several previous studies have sought to examine issues related to fishermen's well-being. Juliana (2018) analyzed the well-being of fishermen in Medan Belawan using indicators from the Central Statistics Agency (BPS) and found that the majority of fishermen were not yet prosperous, with an inequality level (Gini coefficient) reaching 0.589. Another study by Arifin et al. (2019) in Batu Bara Regency assessed the well-being of traditional fishermen using ten socioeconomic indicators, finding that 60% of fishermen fell into the "moderate well-being" category. Although both studies provide insights into fishermen's vulnerability due to their dependence on seasonal patterns and fishing gear, the instruments used tend to be categorical and focus more on descriptive approaches or sociocultural aspects such as the patron-client system. These studies have not yet used standardized instruments to measure poverty probability, nor have they integrated comprehensive statistical causality tests (regression).

To bridge this research gap, the *Poverty Probability Index* (PPI) developed by *Innovations for Poverty Action* offers a more relevant approach. The PPI estimates the probability that a household falls below the poverty line based on ten easily observable socioeconomic indicators—such as housing conditions, asset ownership, and education (Innovations for Poverty Action, 2022). This approach is considered far more comprehensive than a single monetary measure because it captures well-being in a holistic and standardized manner, thereby enabling precise comparisons (Cadena-Palacios et al., 2024).

Therefore, this study offers novelty in three main aspects. First, in terms of location, this study was conducted in Batauga Subdistrict, South Buton Regency, a coastal area with limited quantitative scientific research. Second, in terms of measurement, this study applies *the Poverty Probability Index* (PPI) to generate a more precise probabilistic poverty score. Third, in terms of methodological analysis, this study combines PPI scores with multiple linear regression analysis. This integrated approach is used to simultaneously test the determinants influencing fishermen's well-being, namely: education, age, boat ownership, engine use, business

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diversification, access to subsidized fuel, fish production, and availability of social assistance. Through these innovations, this study aims to measure the level of welfare among capture fisher households while analyzing the factors that influence it, in order to produce solid empirical findings for the formulation of targeted coastal poverty alleviation policies.

METHOD

This study was conducted in the coastal area of Batauga Subdistrict, South Buton Regency, focusing on three villages: Laompo, Lakambau, and Masiri. These locations were selected purposively, given that the area serves as the primary base for coastal communities whose economic livelihoods depend on the capture fisheries sector. Data collection and field observations took place over eight months, from December 2025 to July 2026, to ensure sufficient time for the validation and in-depth analysis of field data.

The population in this study comprised all fishing households in the three urban villages, totaling 181 households (consisting of 81 households in Laompo, 45 in Lakambau, and 55 in Masiri). The sample size was determined using the Slovin formula (Rianse & Abdi, 2012) with *a margin of error* of 8%. An 8% margin of error was selected to obtain a representative sample size while taking into account the efficiency of the researchers' time, costs, and labor.

Based on these calculations, the sample size was determined to be 84 respondents. Sampling was conducted using the *Proportionate Stratified Random Sampling* technique to ensure that each subdistrict was proportionally represented according to its population size (Sujarweni, 2022). The breakdown of the sample allocation was as follows: 38 respondents from Laompo Subdistrict, 21 respondents from Lakambau, and 25 respondents from Masiri Subdistrict.

This study utilized two types of data: primary and secondary. Primary data were obtained directly from respondents through open-ended and structured interviews based on a questionnaire. Primary data collection was also supported by field documentation techniques to validate information and enhance the accuracy of the research findings. Meanwhile, secondary data were obtained from a review of academic literature (journals and books) as well as reports published by relevant agencies, such as the Central Statistics Agency (BPS) of South Buton Regency, the South Buton Regency Fisheries Office, and the Ministry of Marine Affairs and Fisheries (KKP).

The collected data were processed using SPSS statistical software through two main stages of analysis: descriptive analysis and quantitative analysis (regression). Descriptive analysis was applied to measure the level of well-being of fishing households using *the Poverty*

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Probability Index (PPI) instrument. This instrument, developed by *Innovations for Poverty Action* (2023), estimates the probability that a household falls below the poverty line based on ten socio-economic indicators that have been standardized for the Indonesian region. To facilitate the mapping of the distribution, the PPI scores were classified into five welfare categories (modified from L-IFT, 2018; Schreiner, 2015), namely:

- Score 0–20: Pre-Well-Off
- Score 21–40: Less Well-Off
- Scores 41–60: Moderately Well-Off
- Scores 61–80: Well-Off
- Scores 81–100: Highly Well-Off

Quantitative analysis uses the *Multiple Linear Regression* method. This analysis was used to test hypotheses and analyze the extent to which independent variables (such as educational level, age, boat ownership, engine use, business diversification, access to subsidized fuel, fish production, and social assistance) influence the welfare score of capture fishery households (PPI score) as the dependent variable.

RESULTS AND DISCUSSION

Welfare Levels of Fishing Households

The welfare level of fishing households was measured using the *Poverty Probability Index* (PPI) developed by *Innovations for Poverty Action* (2023). The PPI identifies the probability that a household is below the poverty line based on an accumulation of socioeconomic characteristics, including housing conditions, asset ownership (such as refrigerators and cars), the number of family members, and consumption and expenditure patterns (Schreiner, 2016). PPI scores range from 0 to 100; the higher the score, the less likely the household is to be living in poverty.

Based on the survey results, the PPI scores of the 84 respondent households ranged from a minimum of 13 to a maximum of 56, with an average score of 34.80 (Table 1). This average score indicates that, in general, the well-being of fishermen in Batauga Subdistrict remains in a relatively low category.

Table 1. Results of PPI Score Calculations for Fishery Households

Description	Value
Number of Respondents	84
Minimum PPI Score	13

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Maximum PPI Score	56
Total PPI Score	2,923
Average PPI Score	34.80

This variation in scores reflects the differences in the demographic and economic conditions of each household. Referring to the poverty probability values (*National Poverty Line*) outlined in Table 2, it is found that 40.48% of respondents (34 households) fall into the category of relatively not vulnerable to poverty (≤ 10%). However, cumulatively, more than half of the respondents (59.52%) have a poverty probability ranging from "moderately vulnerable" to "highly vulnerable."

Table 2. Distribution of Poverty Probability (*National Poverty Line*)

Probability Category	Number (Households)	Percentage (%)
Relatively Not Vulnerable (≤ 10%)	34	40.48
Moderately vulnerable (10–20%)	19	22.62
Vulnerable (20–50%)	29	34.52
Highly vulnerable (> 50%)	2	2.38
Total	84	100.00

Based on the PPI score classification groups (Table 3), the majority of fishing households (66.67%) are classified in the "Less Prosperous" category. The predominance of this category is due to low achievement of the indicators that make up the PPI, such as minimal ownership of financial institution accounts, limited durable assets, and a high number of family dependents. Not a single respondent fell into the "Prosperous" or "Very Prosperous" categories. This finding confirms that reliance solely on small-scale capture fisheries has not been fully capable of ensuring economic self-sufficiency, primarily due to seasonal uncertainty and fluctuations in fish prices (Hamzah, Nugroho, & Bathara, 2022).

Nevertheless, the proportion of the near-poor group is relatively small (7.14%). This must be interpreted in light of the local wisdom of the Batauga subdistrict as a center for cassava production (processed into *kaopi* and *kasoami*). The availability of these local food reserves is crucial in sustaining the food security of fishing families amid limited financial purchasing power, so that low monetary scores do not directly imply a hunger crisis (Saediman et al., 2015; Saediman, Aisa, et al., 2019).

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Table 3. Distribution of Welfare Categories Based on PPI Scores

Well-being Category	Number (Households)	Percentage (%)
Pre-well-off (0–20)	6	7.14
Less Prosperous (21–40)	56	66.67
Moderately well-off (41–60)	22	26.19
Well-off (61–80)	0	0.00
Very prosperous (81–100)	0	0.00
Total	84	100.00

Classical Assumption Tests

Before interpreting the multiple linear regression, the data were tested for compliance with the classical assumptions to ensure that the model is valid, predictive, and unbiased (Sugiyono, 2019).

- *Normality Test:* The *One-Sample Kolmogorov-Smirnov* test yielded an Asymp. Sig. (2-tailed) value of 0.093. A value greater than theα of 0.05 indicates that the residual data are normally distributed (Sianturi, 2024).
- *Heteroscedasticity Test:* The Glejser test showed that all independent variables (education, age, boat ownership, engine use, business diversification, subsidized fuel, fish production, and social assistance) had significance probability values above 0.05 (ranging from 0.105 to 0.918). This confirms that the residual variances are constant and free from heteroscedasticity (Silalahi et al., 2024).
- *Multicollinearity Test:* The results of the multicollinearity test indicate that all independent variables have *Tolerance* values > 0.10 (ranging from 0.850 to 0.959) and VIF values < 10 (ranging from 1.043 to 1.176). This means there is no strong correlation among the independent variables (Ningsih & Dukalang, 2019).

Results of the Regression Model Hypothesis Test

The overall model suitability was tested using the Simultaneous Test (F-Test). The calculated F-value was 70.345 with a significance level of 0.000 ($p < 0.05$). This indicates that, collectively, all independent variables significantly influence the level of fishermen's well-being (PPI score). The reliability of this model was also confirmed by the Coefficient of Determination test, in which the *Adjusted R-Square* value reached 0.870. This means that the model is capable of explaining 87% of the variation in the welfare levels of capture fishermen in the study area,

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while the remaining 13% is determined by external factors outside the model, such as seafaring experience, extreme weather, or market price volatility (Mardiatmoko, 2020).

Furthermore, to test the specific contribution of each variable, a partial test (T-test) was conducted. Based on the test, the constant term of the equation was found to be 0.185. This test identified four variables that have a positive and significant effect on well-being (Sig. < 0.05), namely:

- Education (X_1): Regression coefficient 1.017 (Sig. 0.000)
- Boat ownership (X_3): Regression coefficient 3.846 (Sig. 0.000)
- Use of engines (X_4): Regression coefficient 3.483 (Sig. 0.000)
- Fish production (X_7): Regression coefficient 0.053 (Sig. 0.000)

Conversely, four other variables were found to have no significant effect (Sig. > 0.05), namely age (X_2 , Sig. 0.740), business diversification (X_5 , Sig. 0.054), access to subsidized fuel (X6, Sig. 0.126), and government social assistance (X_8, Sig. 0.653). These findings demonstrate that ownership of production assets and the utilization of technology are the primary drivers of fishermen's well-being. Boat ownership (X_3) exerts the strongest influence. Fishermen who act as fleet owners have the independence to determine fishing times and locations and are not burdened by a profit-sharing system with boat owners. This situation aligns with the use of engines (X_4), which is crucial for expanding fishing grounds (reaching more distant *fishing grounds*) while reducing time at sea (Mulyadi, 2018).

An increase in fish production volume (X_7) linearly strengthens the financial condition of fishing families. This is closely tied to the quality of human capital, specifically the level of education (X_1). Education enables fishermen to adopt new technologies, incorporate fishing innovations, and develop financial literacy—all of which impact their well-being scores.

Interestingly, the variables business diversification (X_5) and subsidized fuel (X_6) do not show a significant effect. The lack of significance for business diversification indicates that side jobs have not yet been pursued productively, and the community remains entirely dependent on their primary income from the sea. On the other hand, challenges in the equitable distribution of fuel subsidies mean this instrument has not yet been optimally utilized as an economic lever (Amika et al., 2022).

The government social assistance variable (X_8) actually showed a negative correlation (coefficient -0.035), although it was not statistically significant (Sig. 0.653). This does not mean that social assistance reduces well-being; rather, it indicates that government aid programs tend to be directed toward groups that are already at the lowest economic level. Such assistance is reactive in nature, intended to address short-term basic needs, rather than serving as a

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structural investment that drives long-term socioeconomic mobility. Future strategies should prioritize assistance in the form of productive assets (boats/machinery) over mere social safety nets.

CONCLUSION

Based on the research findings, it can be concluded that the welfare level of fishing households in Batauga Subdistrict, South Buton Regency, is generally still classified as low. This is indicated by an average *Poverty Probability Index* (PPI) score of 34.80, where the majority of fishermen (66.67%) fall into the "less prosperous" category, and no fishermen were found to fall into the "prosperous" or "very prosperous" categories. In terms of determining factors, the welfare level of fishermen in this region is significantly influenced by educational attainment, boat ownership, engine use, and fish production volume. Conversely, factors such as age, business diversification, access to subsidized fuel, and receipt of social assistance do not show a significant influence on the welfare level of fishermen in Batauga Subdistrict.

Based on these findings, local governments are advised to prioritize empowerment programs focused on modernizing fishing equipment, enhancing fishermen's human resource capacity through technical training, and strengthening access to capital and marketing channels for their catch. For fishing households, it is recommended to further optimize the use of efficient fishing technologies and actively participate in fishermen's groups to strengthen their bargaining power and facilitate access to information and government assistance. For future researchers, it is recommended to expand the scope of the study area and include other relevant variables, such as fishing experience, vessel size, market access, and the institutional dynamics of fishing communities, in order to obtain a more comprehensive and representative picture.

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