

Socio-economic Conditions and Welfare Levels of Lobster Fishers in Tabanan Regency, Bali

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Abstract. Lobster (*Panulirus spp.*) is a high-value commodity, making it a target for small-scale fishers in Tabanan Regency, Bali. Most of the poverty in Tabanan Regency is concentrated in coastal villages, where most residents work as fishers. This study aims to determine the socio-economic conditions and welfare levels of lobster fishers in Tabanan Regency, Bali measured in 10 welfare indicators according to the Central Bureau of Statistics (BPS) including income, proportion of expenditure, education, health, quality of housing, housing facilities, ownership status of housing, ownership of Information and Communication Technology (ICT) tools, ease of obtaining public facilities, and social access. This research is descriptive, quantitative, and qualitative, using questionnaire-based data collection techniques, and was conducted with 89 lobster fishers in August 2024 in Tabanan Regency, Bali. All respondents answered the same questions using a value scale of 1 to 3. The score values were totaled and averaged to produce three categories: prosperous, moderate, and not prosperous. This study shows that the socioeconomic conditions of lobster fishers in Tabanan Regency are generally good. Among 89 respondents in Tabanan Regency, Bali, 93% are in the 2.42-3.12 range, indicating the prosperous category, and the remaining 7% are in the 1.71-2.41 range, indicating the moderate category. There are no fishers classified as not prosperous.

Keywords: welfare; lobster; fishers; socio-economic; Tabanan

I. INTRODUCTION

A fisher is someone who makes a living from the sea and generally resides in coastal areas and villages [1]. Indonesia's marine resources hold significant economic value for the welfare of its people, particularly fishing communities [2]. Amid Indonesia's abundant marine and fishery resources, marine lobsters have become a commodity favored by both local and international markets. According to Reference [3], lobster is a premium commodity with high economic value, making it a primary target for small-scale fishers. Lobsters (*Panulirus spp.*) are a group of crustaceans with high production potential amidst Indonesia's rich fisheries resources. Reference [4] reported that Indonesia's marine lobster production reached 7,795 tons, equivalent to IDR 1.75 trillion. Lobsters are a flagship fishery commodity, ranking fourth in export commodities under the crustacean category [5]. According to the Ministry of Marine Affairs and Fisheries

(KKP), Indonesia's marine lobster exports totaled USD 25.70 million and 1,469 tons in 2022. The production of lobsters (*Panulirus spp.*) in Indonesia increases annually in line with market demand. According to Reference [6], the high demand for lobsters drives an increase in wild lobster harvesting activities.

Indonesia has extensive potential lobster resources, including the southern coast of Bali. According to Reference [7], the waters on Bali's southern coast, particularly in the Tabanan area, are highly suitable as lobster habitats. The waters are characterized by sand and coral, which are the main characteristics of lobster habitats. Research by Reference [8] identified five lobster species along Bali's coast, with the sand lobster (*Panulirus homarus*) dominant. Lobster fishing areas along Bali's southern coast are widespread, including Tabanan Regency waters such as Kedungu, Batu Tampih, Yeh Gangga, Klanting, Tegal Mengkeb, Soka, Selabih, and Selemadeg Barat, which border Jembrana [7].

With approximately 75% of Indonesia's territory covered by water, the region is rich in fisheries resources. These resources are not only food for local communities but also commodities with significant economic impacts on coastal communities and the national economy [9]. Despite the lobster potential in Tabanan Regency, research by Reference [3] indicates that poverty levels in the regency are predominantly found in coastal villages, where most of the population works as fishers. According to Reference [10], factors contributing to fishers' poverty include a lack of capital and technology, limited market access, and social factors such as low levels of education and health, as well as insufficient public infrastructure in coastal areas.

Therefore, a sustainable livelihood approach is necessary. This involves activities that enable individuals or communities to sustain their lives by utilizing their capacities or resources (assets) to achieve desired living standards. This study aims to examine the socioeconomic conditions and welfare levels of lobster fishers in Tabanan Regency. In the context of the study, sustainable livelihoods are highly relevant for understanding the socioeconomic conditions and welfare of fishers. As noted by Reference [11], factors influencing the vulnerability of fishers' sustainable livelihoods include weather conditions, fishing area size, fish stock availability, and major changes such as fish price fluctuations and global climate change.

II. METHODS

This research was conducted from August to October 2024. Data collection was carried out in Tabanan Regency, Bali. The methods used in this study are descriptive, quantitative, and qualitative methods. The quantitative research method focuses on the measurement and analysis of numerical data. This method is often used to test hypotheses, measure variables, and determine relationships between variables [12].

The qualitative research method is used to investigate the object's natural conditions, with the researcher serving as the primary instrument. Data collection is conducted through a combination of techniques, analysis is inductive, and qualitative research results emphasize meaning over generalization [13]. This approach is typically carried out through interviews or observations with informants until data saturation is reached [14].

The sample comprised 89 respondents. Respondents for the questionnaire distribution were selected using a purposive sampling method, comprising lobster fishers in Tabanan Regency. The sample size was calculated using the Slovin formula [19] as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Explanation: n is Sample Size; N is Population Size; e is Margin of Error (10%).

In addition to primary data, secondary data was also utilized to strengthen the analysis. Secondary data were obtained from relevant institutions, including information on catch volumes, production values, and related journal articles on lobster fishers in Tabanan Regency, Bali. Secondary data collection also involved interviews conducted to gather information directly from primary sources. The interviews were conducted with the Head of the Capture Fisheries Department of Tabanan Regency, Bali, to obtain the necessary data and information for this research. Secondary data were used to analyze the socioeconomic conditions and welfare levels of lobster fishers in the area.

Socio-economic Conditions Analysis

The classification of socio-economic conditions is determined based on three categories: good, moderate, and poor, for each indicator used. These indicators include income, expenditure proportion, education, health, housing quality, housing facilities, homeownership status, ownership of Information and Communication Technology (ICT) tools, ease of accessing public facilities, and social access, as defined by the Central Statistics Agency. The assessment criteria are established according to the parameters of each welfare indicator. The collected data is entered into Excel and presented in pie charts, which are then analyzed descriptively based on each indicator.

Welfare Levels Analysis

The measurement of welfare levels is conducted by calculating scores based on 10 main indicators set by the Central Bureau of Statistics (BPS): income, expenditure proportion, education, health, housing quality, housing facilities, homeownership status, ownership of Information and Communication Technology (ICT) devices, ease of access to public facilities, and social access.

Each indicator is classified into three scoring categories: good (3), moderate (2), and poor (1). Scores from the classification of these 10 indicators are calculated to determine the welfare level of lobster fishers. The score range is determined using the following formula:

$$RS = \frac{SkT - SkR}{JKI}$$

Explanation: RS is Score Range; SkT is Highest Score (3). SkR is the lowest score (1). 1 = Lowest score for the

Central Bureau of Statistics (BPS) indicators (poor); 2 = Moderate score for the Central Bureau of Statistics (BPS) indicators (moderate); 3 = Highest score for the Central Bureau of Statistics (BPS) indicators (good). JKL is the number of classifications needed (3 classifications: not yet prosperous, moderate, prosperous).

The scoring range (RS) is determined as ten, with the welfare levels of lobster fishers in Tabanan Regency categorized as follows:

1. Score 1.00 – 1.70: Fishers are classified as not yet prosperous.
2. Score 1.71 – 2.41: Fishers are classified as moderate.
3. Score 2.42 – 3.12: Fishers are classified as prosperous.

The total score is derived from the average scores across the 10 welfare indicators, including income, expenditure proportion, education, health, housing quality, housing facilities, homeownership status, ease of access to public facilities, and social access. Based on these scores, fishers are classified into three categories: prosperous, moderate, and not yet prosperous.

III. RESULTS AND DISCUSSION

Socio-economic Conditions of Lobster Fishers

Lobster fishing in Tabanan Regency, Bali, serves as the economic backbone for most fishers in the region. The income generated from lobster catches not only fulfills daily needs but also impacts their overall welfare. However, the socio-economic conditions of lobster fishers are significantly influenced by factors such as fishing seasons, lobster market prices, and access to social services, including education, health care, and infrastructure.

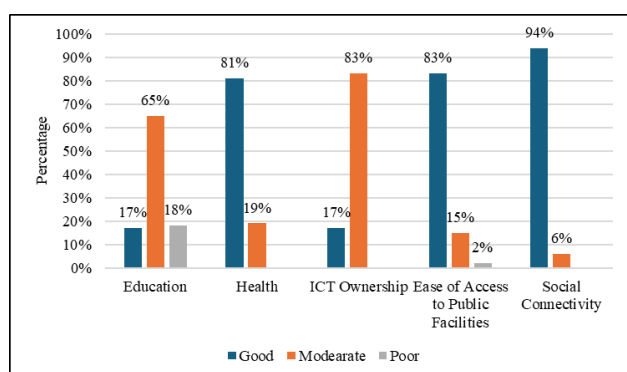


Figure 2. Respondents' Responses to Social Indicators (Percentage).

From a social perspective (Figure 2), 65% of fishers have a moderate level of education, primarily at the junior high school level, suggesting they are more likely to adopt better fishing practices. The health condition of fishers is

generally good, with 81% reporting no serious medical history. All fishers own ICT tools, particularly mobile phones, with 17% owning both a phone and a computer. This reflects their openness to technology, enabling better communication, access to weather information, and marketing of their catches. Ease of access to public facilities is rated positively by 83% of respondents, and social connectivity is deemed good by 94%, demonstrating adequate support for their daily activities.

In terms of social conditions, it was found that the families of fishers predominantly have an intermediate level of education, with the majority having completed Junior High School (Fig. 2). This aligns with research by Reference [2], which found that most lobster fishers in the Pangandaran Coastal Area had a similar level of education.

The health of fishers is generally good, with most having no significant medical history or frequent illnesses. This aligns with Reference [20]'s study, which found that fishers in Seraya Timur Village had good health, meaning that fishers and their families rarely suffer from illnesses. According to the data collected, 100% of respondents own Information and Communication Technology (ICT) devices, particularly mobile phones. This technology proves beneficial in daily life, especially for communication and receiving weather or catch-related information. This is consistent with Reference [21], which stated that mobile phones help fishers stay updated on weather conditions and save them time.

Access to public facilities and social access are also significant factors in determining the welfare of fishers. According to the research, fishers in Tabanan Regency have good access to basic healthcare services, reflecting improvements in their well-being. This aligns with Reference [17], which emphasized that adequate access to public facilities can enhance the welfare of fishers.

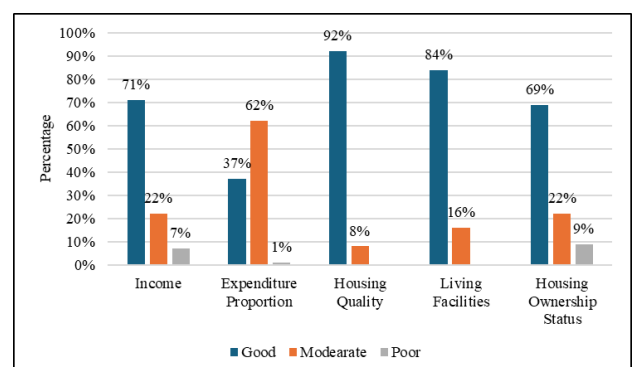


Figure 3. Respondents' Responses to Economic Indicators (Percentage).

From an economic perspective (Figure 3), the income of fishers in Tabanan Regency is relatively high, with 71% earning over IDR 3,000,000 per month, although a small percentage (7%) earn below IDR 1,500,000. Expenditure

proportions indicate that 62% of fishers balance their income with monthly expenses, while 37% report lower expenditures than income, allowing for savings or further investments. Only 1% of respondents reported higher expenditures than income, indicating financial difficulties in meeting basic needs.

Based on the analysis (Figure 3), the income indicator shows that lobster fishers generally earn above the Regency Minimum Wage (UMK) of Tabanan, which is Rp. 2,913,164. On the other hand, Reference [2] found that lobster fishers on the Pangandaran Coast earn around Rp. 2,000,000 to Rp. 3,000,000 per month. One factor influencing income disparity is the productivity of fishers, as found by Reference [18], which shows a positive correlation between productivity and income, suggesting that higher productivity yields higher earnings.

The expenditure proportion of lobster fishers in Tabanan Regency shows that, despite relatively high incomes, their living expenses are considerable, including costs for children's education and the maintenance of fishing equipment. This aligns with Reference [19], which noted that high expenses are often associated with children's education and the upkeep of fishing gear. The housing conditions of fishers in Tabanan Regency, including quality and facilities, are generally simple, although most fishers live in houses with basic amenities such as roof tiles or asbestos and ceramic or cement floors, which can be considered permanent. This aligns with Reference [20], which found that most fishers in Pelehu Village live in permanent homes.

Regarding housing, most fishers live in permanent homes with adequate facilities, including clean water and personal vehicles. Additionally, 69% of respondents own their homes, while the rest live in rented houses or with family members. According to Reference [21], housing is a primary need for every family. Overall, despite challenges faced by fishers in Tabanan Regency, such as income instability and high expenses, they have managed to survive and gradually improve their welfare. This is reflected in improvements in housing quality, access to public and social facilities, and better education.

Welfare Levels of Lobster Fishers

The welfare levels of lobster fishers in Tabanan Regency can be evaluated using 10 welfare indicators established by the Central Bureau of Statistics (BPS): income, expenditure proportion, education, health, housing quality, living facilities, housing ownership status, ownership of Information and Communication Technology (ICT) tools, ease of access to public facilities, and social connectivity.

Based on the recapitulation of welfare indicators for lobster fishers in Tabanan Regency (Table 1), the 10

indicators provide a comprehensive understanding of fishers' welfare. Each indicator contributes to assessing aspects such as income, expenditure proportion, education, health, housing quality, living facilities, housing ownership status, ICT ownership, ease of access to public facilities, and social connectivity

Table 1.
 Recapitulation of Welfare Indicators

Indicator	Score
Income	2.64
Expenditure proportion	2.36
Education	1.99
Health	2.81
Housing quality	2.98
Living facilities	2.84
Housing Ownership Status	2.60
ICT Ownership	2.17
Ease of access to public facilities	2.81
Social connectivity	2.94
Total average score	2.61

The average welfare level score of lobster fishers in Tabanan Regency is 2.61, which falls into the "prosperous" category. This classification is based on the determined scoring range:

1. Scores between 2.42 and 3.12 indicate a prosperous welfare level.
2. Scores between 1.71 and 2.41 indicate a moderate welfare level.
3. Scores between 1.00 and 1.70 indicate a not yet prosperous welfare level.

These 10 Central Bureau of Statistics-referenced indicators provide a clear and comprehensive view of fishers' welfare in the region. This insight is essential for formulating policies and interventions to improve the quality of life for fishing communities.

Table 2.
 Welfare Levels of Respondents

Category	Number of Respondents	Percentage
Prosperous	83	93%
Moderate	6	7%
Not Yet Prosperous	0	0%
Total	89	100%

The respondent count (Table 2) shows that 83 fishers, or 93% of the respondents, fall into the "prosperous" category. Meanwhile, 6 fishers, or 7%, fall into the

"moderate" category, and no fisher is classified as "not yet prosperous." This data reflects that most lobster fishers in Tabanan Regency are in a prosperous condition, although a small percentage are at a moderate welfare level.

The welfare level of lobster fishers in Tabanan Regency can be assessed using indicators from the Central Bureau of Statistics [22][23]. Overall, the lobster fishers in Tabanan Regency fall into the "prosperous" category. The calculations from each fisher show that most are classified as prosperous, accounting for 93% of the total 89 respondents, while 7% are categorized as moderate (Table 2).

According to Reference [24], fishers with high welfare levels have high income and expenditure levels. Prosperous lobster fishers generally earn above Tabanan Regency Minimum Wage and have a sufficient level of education, typically at the junior high school level. On the other hand, those categorized as moderate generally have moderate incomes and lower levels of education, such as no schooling or only completing elementary school. Education is one of the factors influencing income disparities and the welfare level of fishers. This is in line with research by Reference [25], which found a strong correlation between education and Fisher's income. The higher the level of education, the broader the opportunities to run a business.

Overall, the welfare level of fishers in Tabanan Regency shows positive results, with most respondents classified as prosperous. Good income, adequate housing quality and facilities, access to public or social facilities, and ownership of ICT devices indicate that fishers in this area have successfully met most of their basic needs. However, challenges such as high expenses and education costs still need to be addressed to further improve the welfare of fishers. Most fishers are able to meet all their basic family needs because their income aligns with their daily consumption expenditures [26].

Challenges and Support for Lobster Fishers

Based on interviews with the Head of the Tabanan Regency Fisheries and Marine Affairs Office, several key challenges faced by lobster fishers were identified. These challenges include extreme weather conditions, such as high waves and adverse conditions, which often hinder fishing activities and damage fishing gear. As a result, operational costs increase, and the effectiveness of fishing decreases. In addition, market volatility in lobster prices affects fishers' income, while rising fuel prices and maintenance costs for fishing equipment exacerbate their economic burden. Consequently, fishers often must seek alternative sources of income to meet their livelihood needs.

The Fisheries Office has provided assistance in the form of better fishing equipment, skill enhancement training, and information technology to monitor weather conditions. Furthermore, infrastructure improvements, such as lighting along the coastline and access to public facilities, are also part of the efforts to improve fisher welfare. While these interventions have been beneficial, income instability remains a major issue, preventing fishers from fully relying on lobster catches.

Therefore, a more comprehensive government approach is required, not only to improve infrastructure and facilities but also to ensure income stability and mitigate risks in fishing activities. A more strategic and sustainable approach is needed to support the overall welfare of fishers, enabling them to optimize their economic potential and navigate uncertainty more effectively.

IV. CONCLUSION

The socio-economic conditions of lobster fishers in Tabanan Regency, Bali, are generally good. The social aspects, including education and health, are satisfactory, with most fishers having a decent level of education and good health.

Furthermore, 100% of the fishers own Information and Communication Technology (ICT) devices, such as mobile phones, which enhance their social interactions. Access to public facilities and social services in Tabanan is also rated as good and adequate. In terms of economic conditions, the majority of fishers earn above the Tabanan Regency Minimum Wage (UMK) of Rp. 2,913,164, which is considered good. Their expenditure levels are in balance with their income, although some fishers face difficulties in saving money. Most fishers own their homes, which are well-maintained with complete and permanent facilities.

The welfare level of lobster fishers in Tabanan Regency, Bali, is categorized as prosperous. A significant 93% of fishers fall into the prosperous category, while 7% are classified as moderate.

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