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Determinants of Fishers' Welfare: The Role of Livelihood Diversification in Kedonganan Coastal Community

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Abstract

This study investigates the determinants of fishers' welfare in the Kedonganan coastal area by examining the role of livelihood diversification alongside key socioeconomic factors. Using a quantitative research design, primary data were collected from active fishers and analyzed through multiple linear regression to assess the influence of livelihood diversification, fishing income, education level, access to productive assets, and household size on welfare outcomes. The results reveal that livelihood diversification, fishing income, education, and access to productive assets significantly and positively affect welfare, while household size exhibits a negative and significant relationship. Livelihood diversification emerges as an important resilience strategy that stabilizes household income and reduces vulnerability to environmental and economic fluctuations, consistent with recent theoretical and empirical contributions in coastal livelihood studies. The strong effect of fishing income underscores the centrality of marine capture activities in sustaining coastal households, while the roles of education and asset ownership highlight the importance of human and physical capital in shaping adaptive capacity. The findings suggest that improving fishers' welfare requires integrated policy interventions that promote diversified livelihoods, strengthen human capital, enhance access to productive assets, and support institutional mechanisms that foster resilience. This study contributes to the growing literature on small-scale fisheries by providing empirical evidence on the multidimensional drivers of welfare and offering policy insights relevant for coastal community development.

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Keywords: fishers' welfare; livelihood diversification; coastal communities; socioeconomic factors; small-scale fisheries

INTRODUCTION

Kedonganan Beach is one of the most prominent coastal fishing hubs in Bali, where traditional fishing activities continue to play a central role in sustaining local livelihoods. However, growing socio-economic pressures—such as fluctuating fish catches, ecological changes, and increasing dependence on tourism-related markets—have made the income structure of fishing households increasingly unstable. In response to these uncertainties, livelihood diversification has emerged as a critical adaptive strategy, widely discussed in contemporary coastal development literature, highlighting its potential to reduce economic vulnerability and stabilize household income among small-scale fishers (Béné et al., 2020; Mills et al., 2017). Diversification may take various forms, including small-scale trading, fish processing, tourism-related employment, transportation services, or other non-fishing activities that supplement or partially replace fishing-based income.

Although prior studies emphasize the potential of diversification to strengthen economic resilience, empirical evidence also suggests that its effects on fisher households' welfare vary significantly depending on their access to human capital, social capital, markets, and institutional support (Fabinyi et al., 2020; Roscher, et al 2021). The unique socio-economic context of Kedonganan—where coastal fisheries coexist with a thriving seafood market and beach-based tourism—offers both opportunities and challenges for diversification. On one hand, proximity to tourism enhances opportunities for value-added activities such as seafood processing or direct sales to restaurants. On the other, not all fishing households possess the skills, networks, or financial resources required to engage in sustainable and profitable diversified activities. As noted in recent studies, diversification does not inherently lead to improved welfare unless it is supported by adequate capacity-building, market access, and economic stability (Salgueiro-Oteri, et al 2022; Stacey, et al 2021).

Given these dynamics, an empirical examination is needed to understand the extent of livelihood diversification among fishing households in Kedonganan and to assess their welfare using multidimensional indicators such as income, household consumption, food security, and access to basic services. Addressing these fundamental questions is essential for providing a comprehensive portrait of the socio-economic conditions of Kedonganan's fishers and for guiding evidence-based policy interventions. Without a clear understanding of current diversification

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patterns and welfare outcomes, programs aimed at empowering fishing communities risk being ineffective or misaligned with local realities. Therefore, this study seeks to fill an important gap in the literature by analyzing livelihood diversification and the welfare status of small-scale fishers in one of Bali's most economically dynamic coastal areas.

THEORETICAL REVIEW

Fisher Welfare

Fisher welfare is widely conceptualized as a multidimensional construct encompassing economic, social, and subjective dimensions of well-being. Contemporary studies criticize single-indicator measures (e.g., income alone) and instead promote multidimensional frameworks that integrate income, consumption, food security, access to health and education, asset ownership, and subjective perceptions of well-being (Putri et al., 2024). This shift reflects evidence that small-scale fishing communities experience complex vulnerabilities shaped by both short-term shocks and long-term structural pressures such as environmental degradation, market volatility, and tourism dynamics. Multidimensional welfare approaches are therefore considered more appropriate for capturing the heterogeneity of fisher livelihoods and the temporal variability inherent in coastal economies.

Determinants of fisher welfare operate across economic, social, institutional, and environmental spheres. Economic factors include market access, access to credit, savings, and diversification of income streams. Social factors involve education, household composition, gender roles, and social networks, while institutional determinants comprise property-rights systems, co-management arrangements, and social protection mechanisms. Ecological determinants—most notably resource conditions and environmental change—directly affect catch stability and long-term livelihood security. Recent research highlights the interactive nature of these determinants: improvements in income, for instance, do not automatically translate into enhanced welfare unless supported by adequate institutional structures and social capital (FAO, 2021; Roscher et al., 2022).

Measuring fisher welfare also requires consideration of subjective outcomes, particularly perceptions of economic security, autonomy, and social recognition. Studies emphasize that interventions which increase monetary income but erode cultural practices or community cohesion may fail to improve overall well-being (Putri et al., 2024). Consequently, empirical assessments of welfare in small-scale fisheries increasingly combine objective indicators (income, expenditure, food consumption scores) with subjective well-being measures to achieve a

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comprehensive understanding.

Livelihood Diversification

Livelihood diversification refers to households' strategies to expand, modify, or combine multiple income-generating activities, either within the fisheries sector (e.g., targeting multiple species, engaging in post-harvest processing) or across sectors (e.g., tourism, trade, agriculture, transportation). The literature differentiates between "push" diversification—driven by declining fish stocks or economic necessity—and "pull" diversification, which arises from new opportunities such as tourism growth or market demand (Roscher et al., 2022; Ilosvay, 2024). In coastal settings where fisheries interact with tourism and commercial markets, both dynamics often coexist, leading to diverse and sometimes competing livelihood trajectories.

The impacts of diversification on welfare remain context-dependent and empirically mixed. Several studies document positive effects, including income smoothing, enhanced food security, and reduced vulnerability when diversified activities complement fishing and are supported by skills and market access (White et al., 2024; Wang et al., 2024). However, diversification does not always yield welfare gains. When new activities are insecure, poorly paid, or highly seasonal, households may experience increased workloads without significant improvements in economic or subjective well-being (Roscher et al., 2022; Ilosvay, 2024). The COVID-19 pandemic further illustrated the limitations of diversification. In communities where tourism and fisheries were both affected, diversified income streams did not necessarily improve resilience in the face of systemic shocks.

Several mediating and moderating factors influence whether diversification contributes to welfare improvement. Key factors include human capital (education, skills), financial capital (access to credit and savings), market access (linkages to value chains and buyers), social capital (networks, cooperatives), and ecological sustainability (resource conditions that determine the viability of fishing and alternative livelihoods). Diversification is therefore most effective when enabling conditions allow households to access stable, high-value, and sustainable income opportunities (Ilosvay, 2024; White et al., 2024). In the absence of these conditions, diversification may remain a short-term coping mechanism rather than a pathway to structural improvements in household welfare.

METHOD

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This study employs a quantitative research design to examine the determinants of fisher's welfare in the Kedonganan coastal area, with a particular focus on the role of livelihood diversification. A quantitative approach is appropriate because the objective of the study is to measure relationships among variables, test hypotheses statistically, and generate generalizable findings regarding socioeconomic factors that influence welfare outcomes among small-scale fishers.

The study was conducted in the fishing community of Kedonganan Village, located in Badung Regency, Bali, Indonesia. Kedonganan is one of the largest fish landing and marketing centers in Bali, characterized by high fishing intensity, fluctuating marine resources, and an increasing shift toward complementary livelihood activities. The population of this study consists of all active fishermen residing in Kedonganan who engage in capture fisheries as their primary occupation.

A probability sampling technique, specifically simple random sampling, was employed to ensure that the sample represents the broader fishing population. The sample size was determined using the Slovin formula with a margin of error of 10%, ensuring adequate representation for statistical analysis. Based on the estimated population of active fishermen in Kedonganan, a total of 80–120 respondents is considered sufficient and meets the minimum requirement for multiple regression analysis.

This research uses primary data, collected directly from fishermen through structured questionnaires. The questionnaire consists of three sections: respondent demographics, indicators of fishermen's welfare, and indicators related to livelihood diversification and control variables. Secondary data from official reports, village documents, and relevant literature were used to support contextual analysis and variable selection.

The study uses the following variables:

a) Dependent Variable:

Fishermen's Welfare (Y): measured using multidimensional indicators such as household income, expenditure adequacy, asset ownership, housing conditions, and access to education and health services. Welfare is quantified using a composite index derived from normalized scores.

b) Independent Variables:

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1) Livelihood Diversification (X_1): the extent to which fishermen engage in multiple income-generating activities, such as tourism services, fish processing, small trading, or seasonal agricultural work. This variable is measured using a diversification index capturing both the number and economic contribution of non-fishing activities.
2) Fishing Income (X_2): total income earned from fishing activities over a specified period, measured in Indonesian Rupiah.
3) Education Level (X_3): formal education attainment of the fishermen, measured on an ordinal scale.
4) Access to Productive Assets (X_4): availability and ownership of fishing tools, boats, and supporting equipment, measured with a Likert scale.
5) Household Size (X_5): number of family members dependent on the fisherman.

These variables were selected based on theoretical frameworks of rural livelihoods and empirical studies on fishing communities. Data collection was carried out through face-to-face interviews using structured questionnaires to ensure clarity and accuracy of responses, considering varying literacy levels among fishermen. Enumerators were trained prior to fieldwork to maintain consistency in data gathering. All participants were informed about the purpose of the study, and ethical considerations such as confidentiality and voluntary participation were strictly adhered to. The collected data were analyzed using multiple linear regression to examine the influence of livelihood diversification and other socioeconomic factors on fishermen's welfare. The following regression model was applied:

$$Y=\beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+\beta5X5+\epsilon$$

Where:
Y = Fisher's Welfare
X_1 = Livelihood Diversification
X_2 = Fishing Income
X_3 = Education Level
X_4 = Access to Productive Assets
X_5 = Household Size
β_0 = Constant
β_1–β_5 = Regression Coefficients
ε = Error Term

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RESULTS

The multiple regression analysis was conducted to examine the influence of livelihood diversification and key socioeconomic variables on fishermen's welfare in Kedonganan Village. The regression model includes five independent variables: livelihood diversification, fishing income, education level, access to productive assets, and household size.

Table 1. Summary of Multiple Regression Results

Variable	Coefficient (β)	Std. Error	t-statistic	p-value
Constant	12.487	3.215	3.88	0.000
Livelihood Diversification (X_1)	0.324	0.092	3.51	0.001
Fishing Income (X_2)	0.451	0.110	4.09	0.000
Education Level (X_3)	0.167	0.073	2.29	0.024
Access to Productive Assets (X_4)	0.289	0.095	3.04	0.003
Household Size (X_5)	-0.142	0.061	-2.32	0.022

$R = 0.781$

$R^2 = 0.610$

Adjusted $R^2 = 0.587$

F-statistic = 26.91

p-value (F-test) = 0.000

The regression results demonstrate that the model is statistically significant ($F = 26.91$, $p < 0.001$), indicating that the independent variables collectively explain variations in fishermen's welfare. The adjusted R^2 of 0.587 shows that approximately 58.7% of the variance in fishermen's welfare can be explained by livelihood diversification, fishing income, education level, access to productive assets, and household size.

Livelihood diversification has a positive and significant effect on welfare ($\beta = 0.324$; $p = 0.001$). This indicates that fishermen who engage in additional income-generating activities—such as tourism, small trade, or processing—tend to achieve better welfare outcomes. The result aligns with contemporary livelihood theories that emphasize diversification as a strategy to reduce vulnerability to fluctuating marine resources. Fishing income is the strongest predictor of welfare ($\beta = 0.451$; $p = 0.000$). Higher and more stable earnings from fishing activities considerably enhance

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household capacity to meet basic needs, invest in better facilities, and access essential services. This suggests that efforts to improve fishing productivity remain critical to improving welfare levels.

Education level positively influences welfare (β = 0.167; p = 0.024). Respondents with higher educational attainment tend to show better financial management skills, greater ability to adopt new livelihood strategies, and improved access to alternative employment opportunities. Access to productive assets has a significant positive effect (β = 0.289; p = 0.003). Ownership of boats, motors, fishing gear, and related equipment enhances fishing efficiency and reduces operational vulnerabilities, contributing to better welfare outcomes. Household size shows a negative and significant effect on welfare (β = –0.142; p = 0.022). Larger household sizes tend to increase dependency ratios and financial burdens, thereby reducing overall welfare scores.

DISCUSSION

The findings of this study offer important insights into the determinants of fishers' welfare in the Kedonganan coastal area. The significant positive effect of livelihood diversification on welfare aligns with the growing body of literature that identifies diversification as a key resilience strategy in small-scale fishing communities. Dependence on a single livelihood—especially capture fisheries—exposes fishers to income instability caused by fluctuating marine resources, climate variability, and seasonality (Béné et al., 2020). The positive coefficient for livelihood diversification in this study indicates that fishers who engage in additional income-generating activities are better able to stabilize household economic conditions and reduce vulnerability to market and environmental shocks. Similar findings have been reported in Southeast Asia and other coastal regions, where diversification contributes to improved socioeconomic well-being (Islam et al., 2022).

Fishing income emerged as the strongest predictor of welfare, emphasizing the central role of marine capture activities in sustaining coastal households. Higher fishing income directly enhances consumption capacity, asset accumulation, and access to essential services. Previous research confirms that stable earnings from fishing contribute significantly to reductions in multidimensional poverty for coastal households (Martuscelli, A., 2022). This consistency reinforces the sustainable livelihood framework, which highlights financial capital as a primary determinant of welfare outcomes in resource-dependent communities.

Education level was also found to positively influence welfare, indicating that human capital plays a crucial role in shaping fishers' capacity to improve their economic conditions.

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Education enhances skills related to financial management, market awareness, technology adoption, and engagement in complementary livelihoods. Empirical studies demonstrate that higher levels of education boost adaptive capacity and increase participation in diversified livelihood strategies (Tikadar, et al, 2022). In the Kedonganan context, fishers with better educational backgrounds may also be more likely to benefit from tourism-related opportunities.

Access to productive assets significantly predicts welfare, underscoring the importance of physical capital in small-scale fisheries. Ownership of fishing gear, boats, engines, and supporting equipment enables greater efficiency and reduces operational vulnerability. Similar findings have been reported in Indonesia and other coastal countries, where productive assets substantially improve fishing performance and household stability (Widodo et al., 2023). The positive effect identified in this study suggests that enhancing asset accessibility—through credit programs, cooperatives, or government initiatives—could strengthen fishers' welfare in Kedonganan.

On the other hand, household size was found to have a negative and significant effect on welfare. Larger households typically increase dependency burdens, reduce per capita income, and constrain household ability to save or invest. This result is consistent with findings from Akter et al. (2021), who demonstrated that larger household sizes in fishing communities tend to intensify economic pressure and limit access to adequate nutrition and education. The pattern observed in Kedonganan suggests that dependency ratios remain an important factor influencing welfare variations among fishers.

The results of this study, particularly the strong positive effect of livelihood diversification on fishers' welfare, resonate well with the broader scholarship on capacity-building and resilience in small-scale fishing communities. One such important contribution comes from Susilowati (2024), who in "Enhancing Livelihood Resilience: A Comprehensive Analysis of Small-Scale Fishers" demonstrates that fishers who develop buffer capacity, self-organizing capacity, and learning capacity can better withstand ecological and economic shocks (Al-hafidz, Susilowati, Waridin, Maria, & Iskandar, 2024). This lines up with our finding that diversified economic activities contribute substantially to welfare, as they seem to build these underlying resilience capacities.

Moreover, Susilowati has previously shown the importance of institutional support and community-based governance as critical for improving fishers' conditions. In her work on fisheries regulation and enforcement (Susilowati, 2022), she argues that co-management strategies and cost-effective surveillance empower communities to better manage their marine resources under limited governmental capacity. Her call for inclusive management aligns with our study's implication that enabling conditions (such as institutional access) are essential for diversification

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to translate into sustained welfare improvements. Without such governance mechanisms, additional income sources may not be fully leveraged to enhance long-term well-being.

A third relevant insight comes from Susilowati's analysis of small-scale fisheries vulnerability and adaptive strategies (Fitriyah & Susilowati & Kusumawardhani, 2024). In that study, the authors identify that high vulnerability in coastal communities is often linked to strong dependence on natural resources and limited adaptive capacity. They point out that diversification alone is not sufficient unless fishers are supported in building adaptive strategies and reducing ecological dependence. Our findings about income from fishing, access to assets, and education strongly reflect this: while diversification matters, its welfare impact is mediated by human capital and resource security — precisely the kind of adaptive capacities that Susilowati and colleagues emphasize.

CONCLUSION

This study examined the determinants of fishers' welfare in the Kedonganan coastal area by analyzing the effects of livelihood diversification, fishing income, education, access to productive assets, and household size. The multiple regression results indicate that livelihood diversification, fishing income, education level, and productive asset ownership significantly and positively influence welfare outcomes, while household size negatively affects welfare. These findings highlight the multifaceted nature of welfare among small-scale fishers, involving economic, human capital, and demographic dimensions.

The positive and significant effect of livelihood diversification reinforces the notion that diversifying income sources enhances household resilience to environmental and economic uncertainty. This aligns with recent studies by Susilowati and colleagues, who emphasize the importance of buffer capacity, learning capacity, and self-organizing capacity in strengthening resilience among small-scale fishers. At the same time, the strong contribution of fishing income underscores that marine capture activities remain central to the socioeconomic stability of fishers in Kedonganan. Access to productive assets and education also plays a critical role in shaping fishers' adaptive capacity, improving their participation in diversified livelihoods, and enhancing their long-term welfare.

Conversely, the negative influence of household size suggests that larger families place heavier financial burdens on fishers, reducing disposable income and lowering welfare. This highlights the importance of household demographic considerations in designing welfare-improvement strategies.

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Overall, the study concludes that improving fishers' welfare requires integrated approaches that not only promote livelihood diversification but also strengthen human capital, ensure access to productive assets, and support community-based institutional frameworks. These findings support the broader argument in contemporary fisheries literature—including the work of Susilowati—that welfare improvement and resilience building in coastal communities must be approached holistically. Policymakers, local institutions, and community organizations should therefore prioritize multi-dimensional interventions to enhance fishers' adaptive capacity, reduce livelihood vulnerability, and ensure sustainable welfare outcomes in Kedonganan.

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