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Livelihood Strategies of Fishermen in the Marine Tourism Area of Pangandaran

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ABSTRACT

The Pangandaran marine tourism area is one of the leading tourism destinations in West Java that serves not only as a tourism hub but also as a livelihood area for fishing communities. The development of marine tourism has encouraged changes in fishermen's livelihood patterns through various strategies to maintain and improve household welfare. This study aimed to analyze the relationship between livelihood assets and fishermen's livelihood strategies in the Pangandaran marine tourism area. This study employed a survey method with a quantitative approach. Samples were selected using simple random sampling involving 89 active fishermen in Pangandaran Beach. Data were collected through interviews, questionnaires, and documentation, and were analyzed using validity and reliability tests, descriptive quantitative analysis, and Spearman's Rank Correlation test. The results showed that fishermen's livelihood assets were generally categorized as good to very good, with physical capital (87%) being the highest, followed by social capital (78%), human capital (75%), natural capital (64%), and financial capital (62%). Fishermen's livelihood strategies were dominated by survival strategies (90%), while diversification (55%), migration (39%), and intensification/extensification (37%) strategies were relatively less practiced. The results of Spearman's Rank Correlation test indicated that there was no significant relationship between livelihood assets and fishermen's livelihood strategies (Sig. > 0.05). These findings suggest that fishermen's livelihood strategies are influenced not only by the ownership of livelihood assets but also by vulnerability factors, environmental conditions, and the socio-economic characteristics of fishing communities.

INTRODUCTION

Pangandaran is a coastal area in West Java that is well known for its diverse marine tourism attractions, including beaches, snorkeling, diving, and other marine-based activities (Hasibuan *et al.* 2022). The rapid development of the tourism sector has transformed Pangandaran into one of the leading marine tourism destinations in West Java and an important contributor to the regional economy (Sunarta 2019). Official statistics from the Pangandaran Regency Tourism, Culture, Youth and Sports Office (DINPARBUD 2025) show that tourist arrivals increased from 1,176,462 visitors in 2024 to 1,723,649 visitors in 2025, indicating a substantial growth in tourism activities. The expansion of tourism has created new economic opportunities for coastal communities. Nevertheless, fisheries remain the primary

livelihood for most households, making fishermen one of the groups most directly affected by the interaction between tourism development and fisheries activities.

Fishermen in Pangandaran face various challenges in improving their welfare. In the eastern coastal area of Pangandaran, more than 76% of lift-net fishermen have more than five family dependents, while most have only completed primary school education (Astiyani 2022). In addition, fishermen's income is highly dependent on seasonal conditions, fish availability, and environmental factors. Although many fishermen have more than nine years of fishing experience, they still face limitations in terms of capital ownership and access to modern fishing technology. Differences in the ownership of production assets among boat owners, skippers, and fishing laborers also create livelihood disparities within fishing communities (Wika 2015).

The development of marine tourism has brought significant socio-economic changes to coastal communities. Besides providing new economic opportunities, tourism encourages fishermen to diversify their livelihood activities beyond fishing. Some fishermen participate in tourism-related activities such as serving as tour guides, operating seafood businesses, and producing marine-based handicrafts (Pratama & Kinseng 2015; Fahmi et al. 2025). These livelihood strategies are influenced by the availability and utilization of livelihood assets, including human, natural, physical, financial, and social capital. The quantity and quality of these assets determine the ability of fishing households to adapt and select appropriate livelihood strategies (Yusuf & Rakhman 2023).

Previous studies have examined the socio-economic conditions of fishermen in Pangandaran (Astiyani *et al.* 2022), the impacts of tourism development on coastal communities (Pratama & Kinseng 2015), and livelihood strategies of fishermen in other coastal regions (Yusuf & Rakhman 2023). However, studies specifically examining the relationship between livelihood assets and fishermen's livelihood strategies in the marine tourism area of Pangandaran remain limited. Therefore, this study fills this research gap by analyzing the relationship between livelihood assets and livelihood strategies among fishermen in Pangandaran's marine tourism area. This study contributes to the literature by providing empirical evidence on whether livelihood assets influence fishermen's livelihood strategies in a marine tourism destination, an aspect that has received limited attention in previous studies.

METHOD

This study employed a survey method with a quantitative approach. Survey research is a method that enables researchers to collect data from a sample selected from a population through standardized interviews and questionnaires (Wika 2015). The study was conducted from October 2025 to May 2026 at Pangandaran Beach, covering both the West Coast and East Coast areas of Pangandaran, Pangandaran Regency, West Java, Indonesia.

Data Collection and Sampling Method

This study used both primary and secondary data. Primary data were collected through interviews, questionnaires, and direct field observations, covering information on fishermen's livelihood strategies, secondary occupations, and livelihood assets. Secondary data were obtained from the Department of Marine Affairs and Fisheries of Pangandaran Regency as well as from relevant literature and previous studies related to this research.

The study population consisted of 798 active fishermen in Pangandaran Beach (DKPKP Pangandaran Regency 2025). The sample size was determined using the Slovin formula because the total population was known and finite, while a complete description of population characteristics was unavailable. The Slovin formula is expressed as:

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

Description:
n = Sample size

N = Population size
E = Error (0.1)

After determining the sample size, respondents were selected using simple random sampling. A sampling frame consisting of all active fishermen registered by the Pangandaran Marine and Fisheries Office was used. Each fisherman was assigned an identification number, and 89 respondents were selected randomly, ensuring that every member of the population had an equal probability of being included in the study.

Research Variables

This study employed several operational variables for data collection. The variables were classified into two main categories: livelihood assets and livelihood strategies. These variables were developed based on the Sustainable Livelihood Approach adapted from Ardiyanto Maksimilianus Gai (2020). The livelihood assets consisted of human capital, natural capital, financial capital, social capital, and physical capital, while livelihood strategies included diversification, intensification/extensification, survival, and migration strategies (Table 1).

Table 1. Operational Variables

No.	Variable	Sub-variable	Indicator	Scale
1	Livelihood Assets	Human Capital	Community health	Ordinal/ Likert
			Educational attainment	Ordinal/ Likert
			Job skills training	Ordinal/ Likert
			Individual skills and competencies	Ordinal/ Likert
		Natural Capital	Water productivity	Ordinal/ Likert
			Access to fishing grounds	Ordinal/ Likert
			Availability of natural resources	Ordinal/ Likert
		Financial Capital	Household income	Ordinal/ Likert
			Secondary occupation	Ordinal/ Likert
			Investment ownership	Ordinal/ Likert
			Access to credit/loans	Ordinal/ Likert
		Social Capital	Kinship relationships	Ordinal/ Likert
			Community participation	Ordinal/ Likert
			Social networks	Ordinal/ Likert
		Physical Capital	Housing condition	Ordinal/ Likert

No.	Variable	Sub-variable	Indicator	Scale
			Vehicle ownership	Ordinal/ Likert
			Road accessibility	Ordinal/ Likert
			Sanitation facilities	Ordinal/ Likert
			Production assets (fishing vessels and fishing gear)	Ordinal/ Likert
2	Livelihood Strategies	Diversification	Natural resource-based side businesses	Ordinal/ Likert
			Non-natural resource-based side businesses	Ordinal/ Likert
		Intensification/Extensification	Expansion of fishing grounds	Ordinal/ Likert
			Increasing working hours	Ordinal/ Likert
		Survival	Reduction of household expenditures	Ordinal/ Likert
		Migration	Changing occupation or work location	Ordinal/ Likert

The variables were measured using an ordinal scale through a 5point Likert scale. The Likert scale was selected because it is widely used in social and economic research to assess respondents' perceptions, attitudes, and evaluations of particular social phenomena. This scale enabled respondents to indicate the extent to which they agreed or disagreed with statements related to their livelihood assets and the livelihood strategies they adopted (Fauzi & Nugroho 2024).

Data Analysis

Data were analyzed using descriptive quantitative analysis, validity testing, reliability testing, and Spearman's Rank Correlation analysis. Responses to the livelihood assets and livelihood strategies variables were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scores obtained from each indicator were summed and converted into percentages using the following formula (Najib et al. 2024):

$$\% = \frac{Ts}{Xmax}\ x\ 100\%$$

Description:
TS = Total score obtained from the sum of all respondents' scores
Xmax = Maximum possible score that can be achieved

Where *TS* represents the total score obtained from respondents and *Xmax* represents the maximum possible score. The percentage values were then classified into five categories to describe the condition of livelihood assets and the frequency of livelihood strategy implementation (Table 2).

Table 2. Percentage Score Interpretation Criteria

Percentage	Livelihood Assets	Livelihood Strategies
0%-19,99%	Very Poor	Very Rarely Practiced
20%-39,99%	Poor	Rarely Practiced
40%-59,99%	Fair	Occasionally Practiced
60%-79,99%	Good	Frequently Practiced
80%-100%	Very Good	Very Frequently Practiced

Source: (Najib *et al.* 2024)

Data validity was assessed using the Pearson Product Moment correlation. An item was considered valid when the calculated correlation coefficient (*r*count) exceeded the critical value (*r*table) (Amanda *et al*. 2019). Reliability testing was conducted using Cronbach's Alpha coefficient. The research instrument was considered reliable when the Cronbach's Alpha value exceeded 0.60 (Darma 2021).

The relationship between livelihood assets (X) and livelihood strategies (Y) was analyzed using Spearman's Rank Correlation because the data were measured on an ordinal scale and did not require a normal distribution assumption (Sugiyono 2002). The Spearman correlation coefficient was calculated using the following formula:

$$\rho = 1 - \frac{6 \sum d^2}{n\,(n^2 - 1)}$$

Description:
ρ = Spearman's rank correlation coefficient
d = Difference between the ranks of variables X and Y
n = Number of samples

Where ρ is the Spearman correlation coefficient, d is the difference between the ranks of variables X and Y, and n is the sample size. A significance value of less than 0.05 indicated a significant relationship between variables, while a value greater than 0.05 indicated no significant relationship.

All statistical analyses, including validity testing, reliability testing, descriptive analysis, and Spearman's Rank Correlation analysis, were performed using IBM SPSS Statistics. Microsoft Excel 2021 was used for data tabulation, score calculation, and data presentation.

RESULT AND DISCUSSION

Overview of Marine Tourism in Pangandaran

The Pangandaran marine tourism area is one of the leading coastal tourism destinations in West Java, supported by rich natural resources and continuously developing tourism facilities (Nauval *et al*. 2025). The growth of the tourism sector has encouraged the participation of coastal communities, particularly fishermen, in various marine tourism activities. Fishermen's involvement can be observed through tourism-based economic activities such as boat rentals, boat taxi services, transportation to White Sand Beach (Pasir Putih), snorkeling services, and coastal sightseeing tours. Fishing boats that were originally used for fishing activities are now also utilized as transportation facilities for tourists.

The development of marine tourism has generated economic benefits for local communities by creating opportunities in tourism services, seafood businesses, and other tourism-related enterprises. This condition highlights the close linkage between the fisheries

and tourism sectors and demonstrates how marine tourism has become an important livelihood strategy for fishermen in Pangandaran (Putra & Djoko 2023).

Validity and Reliability Test of the Research Instrument

The validity test results showed that all questionnaire items had corrected item-total correlation (r-count) values greater than the r-table value (0.361) (Table 3). The correlation coefficients ranged from 0.375 to 0.847, indicating that all items were valid and capable of measuring the intended constructs.

Table 3. Validity Test Results

Variable	Number of Items	r-table	Range of r-count	Result
Human Capital	4	0.361	0.541–0.804	Valid
Natural Capital	6	0.361	0.515–0.679	Valid
Financial Capital	6	0.361	0.543–0.650	Valid
Social Capital	6	0.361	0.527–0.655	Valid
Physical Capital	6	0.361	0.458–0.693	Valid
Diversification	6	0.361	0.384–0.842	Valid
Intensification/Extensification	6	0.361	0.375–0.800	Valid
Survival	6	0.361	0.392–0.755	Valid
Migration	6	0.361	0.390–0.847	Valid

The reliability test further demonstrated that all variables had Cronbach's Alpha values exceeding 0.60, ranging from 0.614 to 0.697 (Table 4). According to Darma (2021), these values indicate acceptable internal consistency. Therefore, the research instrument was considered both valid and reliable for measuring fishermen's livelihood assets and livelihood strategies.

Table 4. Reliability Test Results

Variable	Number of Items	Cronbach's Alpha	Interpretation
Human Capital	4	0.625	Reliable
Natural Capital	6	0.628	Reliable
Financial Capital	6	0.628	Reliable
Social Capital	6	0.614	Reliable
Physical Capital	6	0.616	Reliable
Diversification	6	0.697	Reliable
Intensification/Extensification	6	0.688	Reliable
Survival	6	0.635	Reliable
Migration	6	0.655	Reliable

Respondent Characteristics

The majority of respondents were in the 41–60 years age group, with education levels predominantly limited to primary school (Elementary School). In contrast, younger fishermen tended to have more diverse educational backgrounds than older age groups (Table 5). This condition indicates that older fishermen generally have lower levels of formal education, largely due to limited access to education and economic constraints in the past (Putranto et al. 2023).

Table 5. Respondent Characteristics by Age and Education Level

Age Category	Elementary School	Senior High School	Vocational High School	Junior High School	No Formal Education	Total
20-40	2	6	5	2		15
41-60	43	3	1	17	1	65
61-80	8			1		9
Total	53	9	6	20	1	89

In general, age and educational attainment influence fishermen's ability to develop livelihood strategies. Fishermen with higher levels of education tend to be more receptive to innovation and alternative livelihood opportunities, whereas older fishermen possess extensive fishing experience that serves as valuable capital in fishing activities (Rosalina & Ekomila 2023).

The majority of respondents were fishing laborers (Table 6), while boat owners and fishing gear owners accounted for a smaller proportion of the sample. This indicates that most fishermen in the Pangandaran marine tourism area have limited access to physical and financial capital and therefore depend on owners of production assets for fishing activities.

Table 6. Respondent Characteristics by Fishermen Category

Fishermen Category	Total	Percentage
Boat Owner	31	35%
Fishing Gear Owner	7	8%
Fishing Laborer	51	57%
Total	89	100%

Fishing laborers generally have a high level of dependence on boat and fishing gear owners, particularly in operational activities and profit-sharing arrangements. In contrast, owner-fishermen tend to enjoy better welfare because they control the means of production (Pramoda & Apriliani 2019). This condition reflects the existence of social stratification within fishing communities based on ownership of capital and production assets.

These characteristics also influence fishermen's livelihood strategies. Fishing laborers tend to face greater constraints in developing alternative businesses, leading them to adopt predominantly survival-oriented strategies. Meanwhile, owner-fishermen have greater opportunities to diversify and expand their livelihood activities due to their control over productive assets.

Fishermen's Livelihood Assets in the Pangandaran Marine Tourism Area

Based on the research findings, fishermen's livelihood assets in the Pangandaran marine tourism area were generally categorized as good to very good (Table 7). Physical capital recorded the highest score, followed by social capital, human capital, natural capital, and financial capital. These findings indicate that fishermen possess adequate production facilities, social networks, and work experience to support their livelihoods.

Table 7. Fishermen's Livelihood Assets

Type of Capital	Percentage	Category
Human Capital	75%	Good
Natural Capital	64%	Good
Financial Capital	62%	Good
Social Capital	78%	Good
Physical Capital	87%	Very Good

The relatively high level of human capital indicates that fishermen possess sufficient experience and skills in fisheries-related activities, although limitations in formal education remain. Natural capital also continues to support fishing activities; however, it remains vulnerable to seasonal fluctuations and changes in coastal environmental conditions (Stacey *et al.* 2021). Meanwhile, financial capital received a comparatively lower score than other forms of capital, suggesting limited access to savings, credit, and business development opportunities (Noviandari *et al*. 2025). This finding indicates that although fishermen possess adequate physical assets, limited financial resources may reduce their capacity to invest in technology, improve fishing efficiency, or expand into tourism-related businesses. Consequently, the potential benefits generated by the tourism sector cannot be fully utilized by all fishermen.

The high level of social capital reflects strong relationships and cooperation among fishermen, while the very high physical capital score indicates that fishermen have relatively adequate infrastructure and production facilities to support fishing activities (Koeshendrajana *et al*. 2012). The dominance of physical and social capital indicates that fishermen have accumulated tangible production assets and strong community networks. However, these strengths have not been accompanied by comparable financial capital, suggesting that ownership of production facilities alone is insufficient to improve household economic resilience. Limited access to formal financial institutions and productive credit may constrain fishermen from investing in business expansion or adopting new livelihood opportunities. Similar patterns have also been reported in small-scale fisheries, where financial capital often becomes the primary limiting factor despite relatively adequate physical assets (Sa'adah *et al.* 2026).

Fishermen's Livelihood Strategies in the Pangandaran Marine Tourism Area

The results indicate that fishermen's livelihood strategies in the Pangandaran marine tourism area are predominantly characterized by survival strategies (Table 8), while diversification, intensification/extensification, and migration strategies are practiced less frequently. This finding suggests that most fishermen remain focused on maintaining their basic livelihoods due to economic constraints and uncertainty in fish catches.

Table 8. Fishermen's Livelihood Strategies

Livelihood Strategy	Percentage	Category
Diversification	55%	Occasionally Practiced
Intensification/Extensification	37%	Rarely Practiced
Survival	90%	Very Frequently Practiced
Migration	39%	Rarely Practiced

Diversification strategies have been adopted through additional income-generating activities such as culinary businesses, small-scale trading, and tourism-related services. However, their implementation remains limited because fishermen still rely heavily on fisheries as their primary source of livelihood (Yusuf *et al.* 2020). Likewise, intensification and extensification strategies are rarely practiced due to limited capital, high operational costs, and restricted access to technology (Krisnanto 2025).

Survival strategies are the most commonly practiced, including reducing household expenditures, borrowing money, or seeking temporary employment during periods of low fish catches. This indicates that fishermen continue to face a relatively high level of economic vulnerability (Sudiyono 2015). Migration strategies are also uncommon, largely due to strong social ties, extensive experice in the fisheries sector, and a strong occupational identity as fishermen.

Overall, fishermen's livelihood strategies in the Pangandaran marine tourism area remain largely survival-oriented rather than development-oriented. These findings suggest

that although fishermen possess relatively good livelihood assets, economic pressures and limited capacities continue to influence the livelihood strategies they adopt.

Relationship Between Livelihood Assets and Fishermen's Livelihood Strategies

The results of Spearman's Rank Correlation analysis showed that all livelihood asset variables, namely human, natural, financial, social, and physical capital, had no significant relationship with fishermen's livelihood strategies, as indicated by significance values (Sig.) greater than 0.05 (Table 9). In addition, most correlation coefficients were classified as very weak to weak, suggesting that ownership of livelihood assets does not directly determine the livelihood strategies adopted by fishermen.

Table 9. Results of Spearman's Rank Correlation Analysis

No.	Livelihood Asset	Livelihood Strategy	Significance Value	Correlation Coefficient
1	Human Capital	Diversification	0,056	0,204
		Intensification/Extensification	0,211	0,134
		Survival	0,493	-0,074
		Migration	0,374	-0,095
2	Natural Capital	Diversification	0,839	0,220
		Intensification/Extensification	0,201	0,137
		Survival	0,63	-0,198
		Migration	0,09	0,181
3	Financial Capital	Diversification	0,648	-0,049
		Intensification/Extensification	0,396	-0,091
		Survival	0,075	0,190
		Migration	0,105	0,173
4	Social Capital	Diversification	0,242	-0,125
		Intensification/Extensification	0,261	-0,120
		Survival	0,129	0,162
		Migration	0,982	0,002
5	Physical Capital	Diversification	0,346	0,101
		Intensification/Extensification	0,677	-0,450
		Survival	0,091	0,180
		Migration	0,797	0,028

The absence of significant relationships indicates that livelihood assets alone may not be sufficient to explain the variation in fishermen's livelihood strategies in the Pangandaran marine tourism area. Although fishermen possessed relatively adequate human, social, and physical capital, their livelihood strategies remained predominantly characterized by survival strategies. This finding suggests that the availability of livelihood assets does not necessarily correspond directly to differences in the strategies adopted by fishermen. Other factors not examined in this study, such as vulnerability conditions, seasonal uncertainty, fluctuations in fish catches, environmental changes, and socio-economic pressures, may also be associated with fishermen's livelihood decisions (Saksono *et al.* 2023).

The respondent characteristics may also provide context for interpreting these findings. Most respondents were fishing laborers, had relatively low levels of formal education, and remained highly dependent on fisheries. Such conditions may limit opportunities to utilize available livelihood assets for diversification and business development. However, because

these characteristics were not statistically tested as explanatory variables in this study, their role in shaping livelihood strategies cannot be determined directly. Previous research has nevertheless highlighted the importance of household capacity and access to livelihood opportunities in enabling fishermen to utilize their available assets (Suryana *et al*. 2025).

A comparison with studies conducted in non-tourism fishing communities further suggests that the pattern observed in Pangandaran is not necessarily unique to marine tourism areas. Mufidah and Rijanta (2018), in a study of fishermen in Batu Belubang, Bangka Tengah, found that livelihood strategies consisted of survival, consolidation, and accumulation strategies, which involved combinations of intensification, extensification, diversification, mobility, and compensation. The strategies adopted depended not only on household access to livelihood assets but also on household capabilities in responding to vulnerability. The study was conducted in the context of changes in local livelihood opportunities associated with the development and subsequent restriction of unconventional tin mining. These findings suggest that the relationship between livelihood assets and livelihood strategies may be shaped by broader livelihood conditions and is not necessarily direct or uniform across fishing communities.

Similarly, Aisyah *et al.* (2022), in a non-tourism fishing community in Sungai Keledang, Samarinda, found that capital did not have a significant effect on fishermen's income. Although this study examined fishermen's income rather than livelihood strategies, its findings provide a relevant comparison by showing that the possession of capital may not always be significantly associated with livelihood outcomes. Differences in variables and analytical approaches should, however, be considered when comparing these findings with the present study.

Compared with these non-tourism studies, the Pangandaran findings show a broadly similar pattern in that livelihood assets alone were not significantly associated with the outcome examined. However, the context of Pangandaran differs because fishermen are located within a developing marine tourism area that provides additional livelihood opportunities. Previous studies of marine tourism in Pangandaran have shown that tourism development can affect fishermen's livelihoods and income opportunities (Pratama and Kinseng 2015). In other marine tourism settings, fishermen have also continued to rely on fishing while engaging in tourism-related activities as supplementary sources of income (Muninggar *et al.* 2021). Therefore, the existence of tourism opportunities does not necessarily imply that all fishermen are able to access or utilize these opportunities to the same extent.

Overall, the comparison with studies from both tourism and non-tourism fishing communities suggests that the weak and non-significant relationships observed in this study should not be interpreted as a pattern unique to the Pangandaran marine tourism area. Rather, the relationship between livelihood assets and livelihood strategies appears to vary across local contexts and may depend on how households access, mobilize, and utilize available assets under different livelihood conditions. Therefore, further research incorporating variables related to vulnerability, access to economic opportunities, adaptive capacity, and tourism participation is needed to examine their relationship with fishermen's livelihood strategies more directly.

This study has several limitations. The cross-sectional design only captures the livelihood conditions of fishermen at one point in time and does not fully reflect seasonal, environmental, or tourism-related changes. In addition, this study focused on five livelihood assets and did not include vulnerability, access to economic opportunities, adaptive capacity, or tourism participation, which may also influence livelihood strategies. These factors are particularly relevant in coastal tourism areas, where fishing and tourism activities can interact and provide different opportunities and challenges for local communities.

For future researchers, it is recommended to include vulnerability, adaptive capacity, access to economic opportunities, and tourism participation as additional variables. Longitudinal or mixed-method research is also recommended to examine changes in fishermen's livelihood strategies across different seasons and economic or environmental

conditions. Such research may provide a more comprehensive understanding of how livelihood assets are mobilized into livelihood strategies in coastal tourism areas.

CONCLUSION

The findings of this study revealed that fishermen's livelihood assets in the Pangandaran marine tourism area were generally categorized as good to very good, particularly in terms of physical and social capital. However, fishermen's livelihood strategies were predominantly characterized by survival strategies, while diversification, intensification/extensification, and migration strategies were practiced less frequently. Spearman's Rank Correlation analysis indicated no significant relationship between livelihood assets and fishermen's livelihood strategies. These findings suggest that livelihood assets alone were not significantly associated with the livelihood strategies adopted by fishermen in the study area. Therefore, other factors, such as vulnerability, environmental conditions, seasonality, and socio-economic characteristics, may also contribute to the livelihood strategies adopted by fishing households. However, these factors were not directly examined in the present study and therefore require further investigation.

Future research is recommended to incorporate additional variables, including vulnerability, environmental conditions, institutional support, and market access, as well as to expand the study area in order to obtain a more comprehensive understanding of the factors associated with fishermen's livelihood strategies.

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