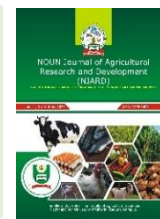




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Original Article

Effect of Climate Variability on Livelihood Choice Decisions among Fishers in Coastal Areas of Akwa Ibom State, Nigeria

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Abstract

Livelihood diversification is a cutting-edge strategy for mitigating the effects of climate variability, poverty, and food insecurity. This study employed a multinomial logistic regression model to examine the effect of climate variability on livelihood choice decisions among fishers in coastal areas of Akwa Ibom State, Nigeria. Data were collected using a structured questionnaire from 180 respondents selected using a multistage sampling procedure. The results showed that respondents predominantly combined fishing with farm and non-farm livelihood activities to mitigate the effect of climate variability. Age ($p < 0.10$; $p < 0.05$), household size ($p < 0.05$; $p < 0.01$), cooperative membership ($p < 0.10$; $p < 0.05$) and rainfall variability ($p < 0.05$; $p < 0.01$) influenced the likelihood of engaging in fishing + farm and fishing + non-farm activities respectively. Amount of credit and level of education ($p < 0.05$, $p < 0.05$) influenced the likelihood of engaging in fishing + non-farm activities. The challenges faced by fishers in sustaining their livelihoods were inadequate access to credit and finance ($\bar{x} = 3.72$), high cost of fishing inputs ($\bar{x} = 3.61$), poor access to storage and processing facilities ($\bar{x} = 3.55$), fluctuating fish prices in the market ($\bar{x} = 3.48$), coastal flooding and related hazards ($\bar{x} = 3.43$), limited access to modern fishing equipment and technology ($\bar{x} = 3.36$), high labour demand during peak fishing seasons ($\bar{x} = 3.25$), social and institutional challenges and illegal fishing practices. The study recommended that effort should be made by government and non-governmental agencies in sensitizing fishing communities on climate-smart fishing activities, environmental fishing practices and effective adaptation practices, in order to promote resource sustainability.

Keywords: Fishers, cooperative membership, rainfall, coastal flooding, temperature, challenges

1.1 Introduction

Fishing is an essential source of food, income, and jobs for millions of people in the rural and coastal regions of Nigeria. Approximately 3.2% of Nigeria's GDP comes from the fishing industry, which employs over 10 million people throughout its value chain (FAO, 2023). More than 80% of

fish produced domestically come from artisanal fisheries, which predominate in the sector, particularly in coastal and riverine regions where fishing is the primary source of income for local communities (Federal Department of Fisheries, 2022). However, climate change has made it necessary for fishermen in Nigeria's coastal regions to reconsider how they make a living and



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manage risk in the face of changing climate. The vulnerability of artisanal fishermen has increased recently due to increased climatic variability, which manifests as varying rainfall patterns, rising temperatures, storm surges, tidal variations, erratic wind intensity, and changes in fish migration (IPCC, 2023; Nwoko, 2021).

Nigeria's coastal regions are home to a variety of fisheries, mangrove forests, and estuarine resources, making them one of the country's most productive ecosystems. However, they are also among the areas most susceptible to pollution, climate change, and environmental deterioration. According to Atairet, Umoh, and Atairet (2025), rising sea levels, unpredictable rainfall patterns, and regular oil spills all have an impact on fishing safety and catch availability for Nigeria's coastal fishermen, and fishers in Akwa Ibom State in particular. Climate-induced changes that have an increasing impact on the fishermen's livelihood choices includes extreme rainfall variability, coastal flooding, saline intrusion, and temperature-driven declines in fish stock availability (Odekunle & Eludoyin, 2022). These changes often influenced fisher's livelihood choice, as they diversify into crop farming, fish processing, transportation, or petty commerce to secure household income.

Akwa Ibom State has one of Nigeria's longest coasts, spanning 129 kilometers from Oron through Mbo, Ibeno, and Eastern Obolo to Ikot Abasi (Akwa Ibom State Government, 2024; Akpan & Udofia, 2013). Artisanal fishing is crucial to the economic survival of people in the coastal local areas of the state. It provides income and improves the welfare of the fishing communities. Species such as bonga, croaker, shrimp, and catfish are supported by the region's rich aquatic habitats (Essien, Eminue, & Ekpo, 2018; Atairet & Umoh, 2022). However, fishing has become less profitable due to overfishing, contamination from oil, diminishing fish stocks, and climate change, forcing fishers to engage in other livelihood activities (Atairet & Umoh, 2022). Furthermore, climate-related variabilities

such longer dry seasons, coastal erosion, larger tidal waves, and seasonal unpredictability further reduce catch and alter fishing schedules (Olanrewaju, 2023).

A livelihood is defined by Chambers and Conway (1992) as the activities, assets, and capacities necessary for a means of subsistence. A person's means, resources, and tactics for making a living are all included in the concept of livelihood. A livelihood is deemed sustainable if it can withstand shocks and strains and bounce back while preserving or improving its assets and capabilities (Okon *et al.*, 2016). Both social assets (such as local institutions and cooperative networks) and natural resources (such as fish stocks and coastal waterways) influence the way of life in fishing villages. Fishermen reevaluate their alternatives in the face of ecological or economic shocks, balancing opportunities and dangers before choosing to diversify into other livelihood activities. Livelihood choice decisions refer to the process by which individuals or households select income-generating occupations based on their resources, limitations, and expected returns (Ellis, 2000; Okon *et al.*, 2016). Age, education, experience, household size, and financial resources are some of the variables that affect these decisions (Oti, Nelson, & Idika, 2024). Livelihood choice in the context of coastal communities in Akwa Ibom reflects how fishermen react to environmental degradation and economic uncertainty (Udoh & Nyong, 2019). Climate variability has shaped fishers' decisions significantly by increasing livelihood risks and reducing the reliability of fishing income (Sly, 2023).

1.2 Statement of the Problem

In Nigeria, coastal fishing communities have been dealing with more environmental and socioeconomic issues lately, especially in areas where fishing is still the main source of income. Artisanal fishing is the primary source of income and food security for many rural coastal residents in Akwa Ibom State; however, because of declining fish stocks, oil pollution, and



unpredictable weather, this occupation is becoming less and less viable (Udoh & Nyong, 2019; Ekong *et al.*, 2022). Consequently, fishermen face unstable earnings, food insecurity, and declining quality of life. Due to the growing frequency of climate-related occurrences, such as unpredictable rainfall, coastal floods, temperature spikes, and storm surges, fishing operations have become more complex, fishing schedules have been interrupted, and the vulnerability of fishing families has increased (IPCC, 2023; NIMET, 2022).

The vulnerability of fishing households is further exacerbated by limited access to contemporary fishing methods, high operating costs, and insufficient institutional assistance (Omoruyi *et al.*, 2019; Atairet *et al.*, 2025). Due to these difficulties, many fishermen are now forced to work in a variety of occupations in order to support their families, including transportation, petty trading, crop farming, and fish processing (Essien *et al.*, 2018). This shift not only reduces their engagement in fishing but also threatens the protein intake of local communities and overall food security.

Despite the crucial role of livelihood diversification in enhancing resilience and income stability among rural fishers, empirical studies on the factors influencing livelihood choice decisions among coastal fishers in Akwa Ibom State remain limited. Most existing research (Ankrah *et al.*, 2024; Atairet *et al.*, 2025; Carvalho *et al.*, 2023; Ekong *et al.*, 2022; Nwoko, 2021) has focused on production constraints, marketing challenges, and fishery resource management, with little attention to how socio-economic factors, resource access, and climate variability shape the livelihood decisions of fishers (Oti *et al.*, 2024).

The specific objectives of the study were to:

- i. examine the socio-economic characteristics of fishers in the coastal areas of Akwa Ibom State.
- ii. categorize the various livelihood activities of fishers in the study area.

- iii. examine the factors influencing the livelihood choice decisions of fishers in coastal communities of Akwa Ibom State.

- iv. identify the challenges faced by fishers' in sustaining their livelihoods in the study area.

1.3 Hypothesis

H0₁: Livelihood choices of fishers are not influenced by socio-economic and climatic factors.

1.4 Literature Review

Climate Variability

Climate variability refers to the natural fluctuations in seasonal or interannual weather patterns, such as shifts in temperature and precipitation, that deviate from the long-term statistical average of a specific region. Climate variability that changes the distribution of fish stocks and decreases catches, undermining the dependability of artisanal fisheries and raising the risk to coastal fishermen's livelihoods (Omoyinmi *et al.*, 2023; Selvaraj, Rosero-Henao & Cifuentes-Ossa, 2023; Ankrah, Monteiro & Madureira, 2024). In order to preserve household income and resilience under such climate-driven stress, many fishermen employ livelihood diversification (e.g., non-fishing income sources, alterations in fishing tactics or times) as adaptive responses (Kasri *et al.*, 2024; Carvalho, Amaral & Alves, 2023). Households' ability to effectively transition away from excessively climate-sensitive fishing livelihoods is influenced by social and economic assets, institutional assistance, and resource accessibility (Carvalho, Amaral & Alves, 2023).

Livelihood

The Sustainable Livelihoods Framework (SLF) provides the finest framework for understanding the idea of "livelihoods," which has its roots in development studies work. A livelihood is made up of the skills, assets (stores, resources, claims, and access), and activities necessary for a means of subsistence (Robert & Gordon, 1992).



According to Chambers and Conway (1992), a livelihood is considered sustainable if it can retain or improve its assets and capacities, recover from stressors and shocks, and offer net benefits to the environment and other livelihoods. Other aspects like vulnerability environment (shocks, trends, seasonality), changing structures and processes (institutions, policies), and livelihood strategies and outcomes are highlighted in later SLF developments (Scoones, 1998; DFID, 2001).

Livelihood Choice

Livelihood choice or diversification describes how households combine or select several livelihood strategies (off-farm, on-farm, and non-farm) according to their resources, risk tolerance, possibilities, and limitations. According to Ellis (2000), in order to disperse risk and improve income stability, rural households are increasingly engaging in a variety of occupations rather than just farming. The idea of diversification has been connected to livelihood adaptation and resilience: households may diversify in response to new opportunities, heightened vulnerability, or diminishing rewards from a primary occupation (Ellis, 2000; Aloba-Loison, 2015). Access to education, credit, land size, market distance, and institutional support are all important factors that impact diversification decisions (Goba, 2021). Conceptually speaking, livelihood choice is the decision-making aspect of the livelihoods framework that uses methods to connect vulnerability and assets to results. Many households in Ibeno and Mbo now supplement their fishing income with secondary businesses such as net manufacture, transportation, food vending, and small commerce (Omoruyi *et al.* 2019; Udoh and Nyong, 2019). According to Ekong, Udoh, and Sunday (2022), fishermen in Eastern Obolo have turned to livelihood diversification as a means of surviving, mostly due to dwindling catches, rising operating expenses, and volatile market prices.

Coastal Areas

The concept of livelihood choice has become especially significant because of heightened

vulnerability to natural resource decline, climate variability, market access constraints and institutional weaknesses. For rural-coastal communities, assets include natural capital (fish stocks, mangroves, coastal waters), human capital (fishing skills, experience), social capital (traditional networks, cooperatives), and physical capital (boats, landing sites). The vulnerability context includes oil pollution, coastal erosion, climate change, sea-level rise, fluctuating resource availability, and market volatility. For example, Scoones (2009) emphasized that vulnerability and resilience must be integrated into livelihood analysis, particularly in ecosystems under stress

1.5 Methodology

Area of the Study

The study was carried out in Akwa Ibom State of Nigeria. Akwa Ibom State is located in the coastal Southeastern part of Nigeria. It lies between latitudes 4°32'N and 5°33'N, and longitudes 7°25'E and 8°25'E. The State is bounded on the north by Abia State, on the West by Rivers State and on the East by Cross River. The entire southern boundary is the Atlantic Ocean. The State occupies a land area of 8,412 square kilometers. Projection population of Akwa Ibom State is put at 7, 200,000 (<https://akwaibomstate.gov.ng>). This study was carried out in Akwa Ibom coastal communities. The occupational life of the people in this area is fishing which they engage in fulltime, both at subsistence and commercial scales. Other occupations apart from fish business include local boat caving, production of net mending needles, mining of sharp sand, production of inputs for fish processing like pinning sticks and rackets. They are also involved in different types of agricultural activities like crop farming and vegetables. Important cash crops are also grown, like oil palm, coconut and raffia palm. Small scale livestock rearing is carried out by the residents. Extraction of mineral resources are an important primary activity in the area and crude oil extraction for petroleum products.



Sampling Procedures

A two-stage sampling procedure was employed for this study. In the first stage, three local government areas namely: Eastern Obolo, Ibeno and Mbo were purposively selected because they represent the major fishing communities in Akwa Ibom State. In the second stage, six (6) villages were randomly selected from each of the 3 Local Government Areas, totaling 18 villages for the study. A list of all fishers in the selected villages was formed with the aid of the village heads. From the list, 10 fishers were randomly selected, giving a total of 180 respondents for the study.

Data Collection

Secondary and primary data were used in the study. Secondary data (average rainfall variability, temperature variability and incidence of coastal flooding, from 2001-2025) were obtained from Nigerian Meteorological Agency (NiMet). Primary data were obtained using a structured questionnaire. Data were collected on the socioeconomic characteristics such as age, sex, marital status, household size, level of education, fishing experience, amount of credit, cooperative membership and income. Data were also collected on the livelihood choices and the challenges faced by the respondents.

Data Analysis

Objective i, ii and iv were analyzed with descriptive statistics such as means, frequencies and percentages

Objective iii was analyzed using Multinomial Logit Model.

Model Specification

Objective iii was analyzed using multinomial logit model, adapted from Okon *et al.* (2018). Let the dependent variable Y_i represent the livelihood choice of farmer i , where:

$$Y_i \in \{0, 1, 2\}$$

$$Y_i = 0 \text{ (Fishing only)}$$

$$Y_i = 1 \text{ (Fishing + farm activities)}$$

$$Y_i = 2 \text{ (Fishing + non-farm activities)}$$

Each farmer i has a set of independent variables $X_i = (X_{i1}, X_{i2}, X_{ik})$, which include socio-economic characteristics.

The probability that household I chooses alternative j is given by:

$$P\left(Y_i = \frac{j}{X_i}\right) = \frac{\exp(X_i \beta_j)}{\sum_{j=0}^J \exp(X_i \beta_j)} \text{ for } j= 0, 1, 2 \dots \dots \dots \text{Equation 1}$$

Where:

β_j = parameter vector associated with choice j

j = total number of choices

The base category (Fishing only, $j=0$) is normalized to zero: $\beta_1=0$

The coefficients β_j show the log-odds of choosing category j relative to the base category

The log-odds interpretation is as follows:

$$\ln\left(\frac{P(Y_i=1)}{P(Y_i=base)}\right) = (X_i \beta_j) \dots \dots \dots \text{Equation 2}$$

Where:

X_1 = Age (years);

X_2 = Sex (1 = male; otherwise = 0);

X_3 = Marital status (1 = married; otherwise = 0);

X_4 = Household size (Number of household members);

X_5 = Level of education (years);

X_6 = Fishing experience (years);

X_7 = Amount of credit (Naira);

X_8 = Cooperative membership (1 = member; otherwise = 0);

X_9 = Income (Naira)

X_{10} = Rainfall variability (mm)

X_{11} = Temperature variability ($^{\circ}\text{C}$ change)

X_{12} = Incidence of coastal flooding (Number of flooding events)

μ = error term.

Results and Discussion

Socio-economic characteristics of fishers in the coastal areas of Akwa Ibom State.

Table 1 showed the mean age of the respondents was 51.84 years, with a standard deviation of 11.33, indicating that in the study area, most fishers are middle-aged. This could be attributed to the fact that fishing remains a labour-intensive occupation requiring physical effort and experience. This finding is in tandem with Okon *et al.* (2018), who reported that most farmers in Akwa Ibom State, Nigeria are middle-aged.



The average household size of about 6 persons was recorded in the study area. This implies that most fishers in the study maintained relatively large household units. This household size can provide essential family labour for fishing and related livelihood activities. However, it can also increase dependency burdens on household resources or reduce per-capita income and increase vulnerability to food insecurity (Anyanwu, 2013).

The mean years of experience of the respondents was 18.67. This is a pointer to the fact that most of the respondents have long participated in the fishing in the study area for almost two decades. This aligns with the report of Opele *et al.*, (2022) that most farmers in Coastal Areas of Southwest, Nigeria has fishing experience of 16-20 years.

The mean years of education of the respondents was 10.43 years. This implies that most of the respondents attained at least primary and secondary schools and could be able to read and write and as well make rational investment decisions and livelihood choices that will enhance their performance in their fishing occupation. This finding corroborates with Oyetade *et al.*, (2025) who assessed the determinants of poverty among coastal artisanal fishers in Lagos state, Nigeria, and reported that most of them obtained secondary education.

Most of the respondents accessed an average amount of ₦284,916.7 as credit. This implies that

most of the respondents employed borrowed funds into their fishing activities for expansionary reasons and invest in resources and equipment that will help them to effectively manage climate change.

The average annual income of the respondents was ₦1,248,735.00, amounting to a monthly income of ₦104,061.25. The income is greater than the current minimum wage in Nigeria. This level of income may have influenced their investment decisions - their capacity to invest in better fishing equipment, access credit, and to manage climate change effectively.

Concerning climatic variables, the average rainfall variability was 678.42 mm, while mean temperature was 26.32 °C. This implies that rainfall variability and temperature conditions caused climatic stress in the study area. It may have influenced fish availability, fishing effort, and household vulnerability. Also, incidence of coastal flooding averaged 2.49 events. This implies that flooding has influenced the activities of the respondents by disrupting fishing activities, damaging equipment, and reducing income. It may have also forced the respondents to adopt various coping strategies in the face of such events. These findings align with Okeke-Ogbuafor *et al.*, (2022), who reported that erratic rainfall and flooding influenced economics activities in fishing communities in Nigeria.

Table 1. Summary Statistics of socio-economic characteristics of fishers in the coastal areas of Akwa Ibom State (n = 180)

Variables	Mean	Std. Dev.	Min	Max
Age (years)	51.84	11.3265	28	78
Household size (persons)	6.214	2.4873	1	13
Fishing experience (years)	18.672	8.9146	2	45
Level of education (years)	10.432	3.2068	0	16
Amount of credit accessed (₦)	284,916.7	142,508.4	50,000	820,000
Income (₦/year)	1,248,735	516,942.6	210,000	2,950,000
Rainfall variability (mm)	678.421	96.3375	512.4	892.7
Temperature variability (°C)	26.318	2.1476	21.0	34.5
Incidence of coastal flooding (number)	2.486	1.3724	0	7

Source: Field Survey, 2025

Various livelihood activities of fishers in the study area

Table 2 showed that a good number of the respondents (53.33%) combined fishing with farm activities. This implies that they manage



climatic variability by engaging in farm activities like crop and animal production, instead of depending solely on fishing for income. This pattern of livelihood diversification is consistent with Philip & Anthony (2025), who reported that most Fisherfolks in the Riverine Areas of Ondo State, Nigeria managed climate change by embarking on fishing and other farm activities.

Results also showed that 32.22 % of the respondents depended exclusively on fishing, while 22.78 % engaged in fishing and non-farm activities. This could mean that they shifted towards alternative income sources such as artisan, trading, processing, civil services among others to manage climatic variability.

Table 2. Various livelihood activities of fishers in the study area (n = 180)

Livelihood choice category	*Frequency	Percentage
Fishing only	58	32.22
Fishing + farm activities	96	53.33
Fishing + non-farm activities	41	22.78

*Multiple responses were recorded; hence, percentages exceed 100%.

Source: Field Survey, 2025.

Factors influencing the livelihood choice decisions of fishers in coastal communities of Akwa Ibom State, Nigeria

Table 3 showed the results of socio-economic and environmental factors influencing livelihood choice decisions among fishers in the coastal areas of Akwa Ibom State. The analysis was done using the multinomial logit model. The base category chosen for the analysis was fishing only. The alternative livelihood strategies considered were fishing + farm activities and fishing + non-farm activities. The likelihood ratio Chi-square statistic ($\chi^2 = 48.32$; $p < 0.001$) showed that the model is highly significant, suggesting strong explanatory power of the included covariates. The pseudo- R^2 value of 0.318 was recorded. This implies that 31.8 % of the variation in fishers' livelihood choice decisions was explained by the independent variables included in the model.

Specifically, age had a positive and statistically significant effect on likelihood of engaging in both fishing + farm activities and fishing + non-farm activities. This suggests that older fishers are experienced and are more likely to diversify their livelihoods compared to relying solely on fishing alone. This finding is in tandem with Béné *et al.*, (2016) who reported that older farmers are experienced and are aware of livelihood risks,

hence, they diversify income sources as a risk-management strategy

Household size had a negative and statistically significant effect on the likelihood of engaging in both fishing + farm activities and fishing + non-farm activities. This implies that larger households are less likely to diversify away from fishing, probably because fishers with larger family sizes depend on family labour and have higher dependency ratios.

Education had positive and statistically significant effect on the likelihood of engaging in fishing + non-farm activities. This could be because education provides credentials, information, skills, and employment opportunities outside the fisheries sector. This finding is in tandem with Cinner *et al.* (2018) who reported that education enhances households' capacity to engage in off-farm and non-farm livelihood strategies.

Access to credit had a positive and significant influence on the likelihood of engaging in fishing + non-farm activities. This is because credit provides start-up capital required to kick start non-farm enterprises. This finding is consistent with Allison & Ellis (2001) who reported that financial assets as a key determinant of households' ability to pursue alternative income strategies.

Table 3. Factors Influencing Livelihood Choice Decisions of Fishers

n = 180



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Variables	Fishing + farm activities ($Y_i = 1$)	Fishing + non-farm activities ($Y_i = 2$)
Intercept	-18.547 (-0.012)	-24.362 (-0.008)
Age	0.032 (0.001) *	0.046 (0.002) **
Sex	0.284 (0.034)	-0.112 (-0.016)
Marital status	0.641 (0.042)	0.379 (0.027)
Household size	-0.118 (-0.008) **	-0.205 (-0.015) ***
Level of education	0.052 (0.006)	0.089 (0.012) **
Fishing experience	0.029 (0.002)	-0.018 (-0.001)
Amount of credit	1.12e-06 (0.00004)	2.35e-06 (0.00012) **
Cooperative membership	0.463 (0.039) *	0.521 (0.041) **
Income	3.87e-07 (0.00002)	5.12e-07 (0.00003)
Rainfall variability	0.024 (0.003) **	0.031 (0.004) ***
Temperature variability	-0.031 (-0.002)	0.028 (0.003)
Coastal flooding	0.127 (0.012)	0.189 (0.018)

Source: Field Survey, 2025

Model Statistics: $\chi^2 = 48.32$; $p > \chi^2 = 0.0000$; Pseudo $R^2 = 0.318$; Number of observations = 180, * $p \leq 0.10$; ** $p \leq 0.05$; *** $p \leq 0.01$ (a) dy/dx is the discrete change of dummy variable from 0 to 1

Cooperative membership had a positive and significant effect on likelihood of engaging in both fishing + farm activities and fishing + non-farm activities. As expected, cooperative societies provide the platform for fishers to access credit, information, and resources needed for livelihood diversification, and effective management of climate change. This finding aligns with Béné *et al.* (2016), who reported that social capital and collective action shapes livelihood decisions among small-scale fishers.

Among the environmental variables, rainfall variability had a positive and significant effect on likelihood of engaging in both fishing + farm activities and fishing + non-farm activities. This implies that fishers tend to diversify their activities due to rainfall variability in the study area. This finding aligns with Hassan & Nhemachena (2008) that rainfall variability influences water levels, river flow, salinity, breeding patterns of fish and fishing yield.

Challenges faced by fishers in sustaining their livelihoods in the study area

Table 4 showed a grand mean of 3.36. This implies that the respondents experienced substantial challenges in sustaining their livelihoods in the study area. Inadequate access to credit and finance was the most common

challenges faced by the respondents with a mean score of 3.72. This may have inhibited their ability to invest in fishing inputs, adopt improved technologies, and diversify into alternative livelihood activities. This finding aligns with Allison & Ellis (2001) who reported that poor access to formal credit remains a major constraint among small-scale fishers in developing countries, particularly in Sub-Saharan Africa. High cost of fishing inputs ($\bar{X} = 3.61$) is also a common challenge in the study area. This is because high cost of input increases operational expenses and reduces net returns from fishing activities. Poor access to storage and processing facilities ($\bar{X} = 3.55$) was another critical constraint. This could lead to post-harvest losses and force fishers to sell their catch at low prices. Fluctuating fish prices in the market ($\bar{X} = 3.48$) was also identified a challenge faced by fishers' in sustaining their livelihoods in the study area. By implication, price volatility fuels income instability, particularly during peak harvest periods when supply exceeds demand, thereby exerting negative influence on sustainability of the business.

Coastal flooding and related hazards ($\bar{X} = 3.43$) were identified in the study area. This challenge does not only disrupt fishing activities, but causes damage to equipment, reduces fishing days, thereby negatively affecting income. Limited

access to modern fishing equipment and technology ($\bar{X} = 3.36$) remains a constraint in the study area. Limited access to modern fishing equipment and technology may reduce fishing efficiency, fisher's yield and sustainability. High labour demand during peak fishing seasons ($\bar{X} = 3.25$) also poses challenges, particularly when

household labour is insufficient or costly. Social and institutional challenges such as conflicts over fishing grounds ($\bar{X} = 3.12$) and illegal fishing practices by other fishers ($\bar{X} = 3.05$) were also accepted by respondents. These issues often result in reduced access to fishing resources and undermine sustainable resource management.

Table 4: Mean Rating of Respondents on the Challenges Faced by Fishers in Sustaining Their Livelihoods (n = 180)

Challenges	$\bar{X}$	Decision
Inadequate access to credit/finance	3.72	Accepted
High cost of fishing inputs (nets, fuel, hooks)	3.61	Accepted
Poor access to storage and processing facilities	3.55	Accepted
Fluctuating fish prices in the market	3.48	Accepted
Coastal flooding and environmental hazards	3.43	Accepted
Limited fishing equipment and technology	3.36	Accepted
High labor demand during peak fishing seasons	3.25	Accepted
Conflicts over fishing grounds	3.12	Accepted
Illegal fishing practices by others	3.05	Accepted
Decline in fish stock/resources	3.01	Accepted
Grand Mean	3.36	Accepted

Source: Field Survey, 2025 Decision rule: Mean ≥ 2.50 = Accepted; Mean < 2.50 = Rejected

1.7 Conclusion

Coastal fishing in Akwa Ibom State is predominantly undertaken by individuals who are middle-aged fishers with relatively large household sizes and substantial fishing experience. They employ family labour in sustaining their fishing operations and related livelihood activities. A good number of the respondents combined fishing with farm and non-farm activities to manage climatic variability and income instability. Household size, level of education, credit, cooperative membership, and rainfall variability influenced livelihood choice decisions of the respondents. The sustainability of fishing activities in the study area was challenged by high input costs, inadequate access to credit, poor storage and processing facilities, price fluctuations, conflicts over fishing grounds, illegal fishing practices, and declining fish stocks. Consequently, ensuring the long-term sustainability of coastal livelihoods in Akwa Ibom State requires holistic, household-centered interventions that combine enhanced access to formal credit and storage infrastructure with cooperative-led climate adaptation strategies.

1.8 Recommendations

1. Effort should be made by government and non-governmental agencies in sensitizing fishing communities on climate smart fishing activities, environmental fishing practices and effective adaptation practices, in order to promote resource sustainability.
2. Younger people, especially those below 40 years, should be encouraged and supported to participate more actively in coastal fishing, through sensitization and financial support, in order to address the ageing structure of the fishing population and ensure sustainability of fishing activities.
3. Fishers should diversify into complementary farm and non-farm livelihood activities within their communities, as livelihood



diversification has proven effective in reducing income vulnerability associated with climatic variability and declining fish stocks.

4. Government and non-governmental organizations should partner with financial institution to improve fishers' access to affordable credit and financial services, particularly through cooperatives, to enable investment in fishing inputs, storage facilities, processing equipment, and alternative income-generating activities.

Declarations

Ethics Approval: Conducted under standard ethical guidelines.

Informed Consent: Written informed consent was obtained from all participants prior to data collection. Participants were duly informed about the purpose of the study, and their participation was voluntary written consent obtained.

Data Availability: Available upon request.

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