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Preparedness, Mitigation Strategies and Risk Assessment in Flood Prone Ayakoromo Community, Bayelsa State

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Abstract

Flooding remains one of the most pervasive natural hazards in the Niger Delta, Nigeria, posing severe threats to human lives, livelihoods, and infrastructure. This study examines flood resilience in Ayakoromo community in Bayelsa State, a coastal settlement along the Forcados Creek and the River Niger, by assessing residents' preparedness, awareness, and the effectiveness of existing mitigation measures. A mixed-methods approach was employed, combining structured questionnaires (n = 1,581) and semi-structured interviews with community members and local stakeholders. Sociodemographic analysis revealed a predominantly youthful (26–35 years), male, and low-income population, highlighting specific vulnerabilities that require targeted interventions. Findings indicate widespread flood exposure, with 92.2% of respondents experiencing floods frequently and perceiving very high flood risk. Community engagement in flood preparedness was minimal, and access to emergency resources and training was critically inadequate. Structural and non-structural mitigation strategies, including improved drainage, reforestation, and flood barriers, were recognized by residents; however, the majority reported challenges in implementation due to limited funding, political obstacles, and insufficient cooperation. Soil analyses indicated clayey loam with high water retention and low infiltration rates, amplifying surface water accumulation and flood risk. Based on these findings, recommendations include strengthening public education and awareness campaigns, enhancing drainage and early warning infrastructure, fostering community-led initiatives, and promoting policy reforms with increased governmental support.

Keywords: Flood Resilience, Niger Delta, Flood Preparedness, Community Engagement, Disaster, Risk Management.

Introduction

Flooding is among the most widespread and destructive natural hazards worldwide, accounting for nearly half of all weather-related disasters and affecting millions of people annually. According to the Centre for Research on the Epidemiology of Disasters (CRED, 2020), floods displaced more people globally between 2000 and 2019 than any other hazard, resulting in severe consequences for housing, livelihoods, and public health. The drivers of flood risk are multifaceted, including climate change-induced rainfall variability, rapid urban expansion, deforestation, and inadequate land management (Jones et al., 2017; Lee & Garcia, 2020). Beyond economic and infrastructural damage, floods exacerbate vulnerability to food insecurity, disease outbreaks, and long-term socio-economic disruptions, particularly in low- and middle-income countries (Martinez & Brown, 2017). These realities underscore the importance of location-specific flood risk assessments that consider both environmental conditions and community resilience, thereby generating actionable knowledge for disaster preparedness and planning.

Nigeria represents a high-risk context for recurrent and severe flood events in Sub-Saharan Africa. The country has experienced some of West Africa's most destructive floods, especially in the Niger Delta region, where settlements are concentrated in low-lying, riverine areas (Ologunorisa et al., 2018; UNDRR, 2019). The 2012 floods, for example, displaced over two million people and caused extensive damage to infrastructure, farmland, and livelihoods across multiple states (Adeloye et al., 2015). Communities along the River Niger and Forcados Creek remain particularly vulnerable due to the interplay of natural factors, including heavy rainfall and river overflow, alongside anthropogenic pressures such as unregulated development, inadequate drainage, and poor waste management (Amangabara & Gobo, 2010). Ayakoromo Town, situated within this flood-prone corridor, experiences recurrent inundations that threaten social stability, economic survival, and environmental sustainability, making it a critical case study for advancing flood risk assessment in Nigeria.

Research on flooding in Nigeria has yielded important insights into community vulnerability and governmental response strategies. Olugunorisa (2009) emphasized the limitations of relying solely on structural and policy measures, while Amangabara and Gobo (2010) highlighted the socio-economic impacts of floods and the importance of perception and adaptive capacity. Subsequent studies further expanded the scope: Amangabara and Obenade (2015) mapped vulnerability after the 2012 floods, Musa et al. (2016) documented local resilience practices against sea-level rise, and Week et al. (2019) surveyed community coping mechanisms. More recently, Horsfall et al. (2023) applied elevation-based risk mapping to wetlands in Rivers and Bayelsa States. Collectively, these studies illustrate the progression of flood research in Nigeria toward integrating socio-economic and

environmental data; however, many assessments remain limited in scope, often focusing on either physical hazards or community vulnerabilities.

The present study responds to this gap by evaluating flood risk in Ayakoromo Town using an integrated approach. The aim of this research is therefore twofold: first, to provide a comprehensive understanding of the factors contributing to flood vulnerability in Ayakoromo Town; and second, to contribute to broader flood risk literature in Nigeria by introducing an integrated methodology that accounts for both environmental and community-level factors. In doing so, the study aligns with international disaster risk reduction agendas, such as the Sendai Framework (UNDRR, 2015), while generating locally relevant knowledge to inform planning, policy, and community preparedness. Ultimately, this work provides a framework that can be adapted to other flood-prone settlements across the Niger Delta and similar contexts worldwide, offering both academic contributions and practical insights for managing flood risks.

Research Methodology

Study area

Ayakoromo, a coastal town situated along the Forcados creek, on the banks of the River Niger in Delta State, Nigeria as shown in Figure 1, is the focus of this study. The coordinates of Ayakoromo are between 5°19'33"N, 5°43'54"E and 5°19'50"N, 5°45'15"E. The town's geographical location places it at risk of flooding. Ayakoromo has a rich history, particularly regarding its contribution to Nigerian coastal drama (Emuedo, 2015).



Figure 1: Map of Study Area

Ayakoromo has experienced devastating flooding. This historical record of flooding serves as a stark illustration of the recurring challenges faced by the community in coping with natural disasters. Floodwaters have inundated streets, submerged buildings, and disrupted daily life,

underscoring the urgent need for effective flood mitigation and resilience measures. Understanding the town's demographics, including population size, age distribution, and livelihoods, is vital for assessing flood risk and designing mitigation strategies. Investigating land-use patterns, such as the distribution of residential areas, businesses, agriculture, and undeveloped spaces, will help identify vulnerable areas. As Ayakoromo experiences annual flooding, documenting the frequency, severity, and impact of past events is crucial.

Research design

The research design in this study presents an approach to investigating flood resilience in Ayakoromo Town, incorporating both quantitative and qualitative methodologies. The mixed-methods approach enables the researchers to gather both numerical data and rich qualitative insights, providing a holistic understanding of the topic. Structured questionnaires ensure systematic data collection for quantitative analysis, while in-depth interviews offer depth and nuance to the findings. Triangulating data enhances validity and reliability, enriching the interpretation of results. However, further details on sample representation, data analysis techniques, and ethical considerations would strengthen the research design's transparency and rigor.

Data collection

In the data collection phase, two primary methods were employed: questionnaire development and conducting semi-structured interviews. For questionnaire development, meticulous attention was paid to the design and structure to ensure coverage of relevant topics related to flood resilience in Ayakoromo Town. The questionnaire underwent a rigorous piloting process to assess clarity, relevance, and completeness. Feedback from the pilot phase was incorporated to refine the questionnaire, enhancing its validity and reliability. In parallel, semi-structured interviews were conducted to investigate different aspects of flood resilience. Selection criteria for interview participants were established to ensure a diverse representation of perspectives, considering factors such as occupation, age, gender, and socio-economic status. Ethical considerations played a central role in the interview process, with informed consent procedures adhered to strictly. Participants were provided with detailed information about the research objectives, their rights, and the voluntary nature of their participation. Confidentiality and anonymity were guaranteed, and measures were implemented to minimize potential harm or discomfort to participants throughout the interview process.

Sampling procedure

The sample size for the questionnaire was determined using Ayakoromo Town’s estimated population of 10,000, a 95% confidence level, and a 5% margin of error. The formula applied was:

$$n = \frac{N\ x\ Z^2\ x\ p\ x\ (1-p)}{(N-1)\ x\ e^2\ x\ Z^2\ x\ p\ x\ (1-p)}$$

Where n represents the required sample size, N is the population size (10,000 residents), Z is the Z-score corresponding to the desired confidence level (1.96 for a 95% confidence level), p is the estimated proportion of the population with a particular characteristic or response (assumed to be 0.5 for maximum variability), and e is the margin of error (0.05). This yielded approximately 384 respondents. To account for an anticipated 80% response rate, the adjusted sample size was calculated as:

$$n_a = \text{n x } \frac{1}{1-r}$$

Where n_a represents the adjusted sample size and r is the anticipated response rate (0.80).
A multistage sampling technique was adopted: Ayakoromo Town was divided into zones (residential, commercial, and industrial), and within each, households or individuals were randomly selected. Challenges such as non-response and access difficulties were mitigated by distributing more questionnaires and engaging community leaders to encourage participation.

Data analysis

Statistical Package for the Social Sciences (SPSS) IBM version 25 was used to facilitate quantitative analysis, providing statistical tools for data manipulation and testing. Qualitative data from semi-structured interviews will undergo thematic analysis to identify recurring themes and patterns regarding flood preparedness and mitigation strategies. Inter-coder reliability measures will ensure consistency in coding.

Results and Discussion

Preliminary Analysis: Reliability Testing of Data

In the initial phase of this study, a reliability analysis was conducted to evaluate the internal consistency of the Likert scale items developed to assess flood preparedness and mitigation measures in Ayakoromo Town. This analysis was essential for ensuring that the data collected from various stakeholders including residents, community leaders, and local authorities, was dependable and suitable for subsequent statistical evaluation. The reliability test focused on verifying the coherence of responses related to flood awareness, response capacity, and mitigation initiatives.

Table 1 presents the outcomes of the reliability testing conducted on the 28 Likert scale items used in the study. The Cronbach's Alpha coefficient, which measures the internal reliability of the scale, was first computed at 0.559, indicating a moderate level of consistency among the items. After accounting for missing data and response variations, an adjusted Cronbach's Alpha value of 0.787 was obtained, reflecting a high level of internal consistency and enhanced reliability of the dataset.

Table 1: Reliability Testing of Likert Scale Items on Flood Preparedness and Mitigation Measures in Ayakoromo Town

Cronbach's Alpha	Adjusted Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
.559	0.787	.477	28

The adjusted Cronbach's Alpha value of 0.787 demonstrates that the survey instrument effectively measures the constructs related to flood resilience, validating the reliability of the responses collected. This outcome provides confidence in the stability and internal coherence of the dataset, thereby supporting its use in subsequent analyses focused on evaluating awareness levels, community preparedness, and the accessibility of flood mitigation measures. The rigorous reliability testing conducted at this stage forms a critical methodological foundation for identifying existing challenges and formulating data-driven strategies aimed at strengthening flood resilience in Ayakoromo Town, Delta State.

Sociodemographic Distribution of Respondents

Understanding the sociodemographic characteristics of respondents is essential to interpreting their perceptions, preparedness, and adaptive capacity toward flood risk in Ayakoromo town. These characteristics influence not only individual vulnerability but also the overall resilience of the community. Table 2 below presents a comprehensive summary of the respondents' demographic profile, including their age, gender, occupation, length of residency, and socio-economic status.

Table 2: Sociodemographic Characteristics of Respondents

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
Age	18–25	188	11.9	11.9
	26–35	660	41.7	53.6
	36–45	452	28.6	82.2
	46–55	98	6.2	88.4
	56 and above	178	11.3	100
Gender	Male	901	57	57
	Female	680	43	100
Occupation	Student	186	11.8	11.8
	Self-employed	390	24.7	36.4
	Business owner	557	35.2	71.7
	Civil servant	199	12.6	84.3
	Farmer	249	15.7	100
Length of Residency	Less than 1 year	33	2.1	2.1
	1–5 years	78	4.9	7
	6–10 years	116	7.3	14.4
	Over 10 years	1354	85.6	100
Socio-Economic Status	Low-income	1310	82.9	82.9
	Middle-income	96	6.1	88.9
	High-income	175	11.1	100

The sociodemographic distribution of respondents in Ayakoromo town, as presented in Table 2, reveals that the population is largely youthful and economically diverse, with most respondents (41.7%) aged between 26–35 years and 28.6% within 36–45 years, indicating an active and potentially resilient community capable of engaging in flood mitigation activities. This pattern aligns with Adelekan and Asiyanbi (2016), who reported a similar dominance of younger adults in flood-prone communities in Lagos, while the smaller proportion of older adults (11.3%) underscores the need for age-sensitive disaster preparedness measures. Males constitute a slightly higher proportion (57.0%) than females (43.0%), suggesting gender imbalance in participation but also highlighting the importance of gender-inclusive flood management strategies, as women often experience heightened vulnerability during disasters. Occupation-wise, business owners (35.2%) and self-employed individuals (24.7%) dominate the workforce, followed by farmers (15.7%), civil servants (12.6%), and students (11.8%), reflecting an informal economy typical of riverine settlements where flooding can disrupt trade and agriculture, consistent with observations by Samuel, et al., (2017) in similar communities. Furthermore, the majority of residents (85.6%) have lived in Ayakoromo for over ten years, demonstrating strong local attachment and accumulated experience in coping with floods, which, as Mondal (2021) noted, is invaluable for community-led adaptation and resilience planning. Socio-economically, 82.9% of respondents fall within the low-income category, indicating heightened vulnerability to flood impacts due to limited resources and inadequate infrastructure, while only 17.2% belong to middle- and high-income groups with relatively better adaptive capacity.

Flood Experience and Perception

Table 3 presents the distribution of respondents based on their flood experience, frequency, severity, and perception of flood risk in Ayakoromo. The results reveal that an overwhelming majority (92.2%) of respondents have experienced flooding, with 89.3% reporting very frequent occurrences and 89.3% also describing past floods as very severe. These figures emphasize the chronic and destructive nature of flooding in Ayakoromo, where recurrent inundations have significantly affected livelihoods, infrastructure, and the overall well-being of residents.

Table 3: Respondents' Flood Experience, Frequency, Severity, and Perception of Flood Risk in Ayakoromo

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
Flood Experience	Yes	1457	92.2	92.2
	No	124	7.8	100
Frequency of Flood Experience	Rarely	15	0.9	0.9
	Occasionally	78	4.9	5.8
	Frequently	76	4.8	10.6
	Very Frequently	1412	89.3	100

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
Severity of Past Flood Events	Slightly Severe	15	0.9	0.9
	Moderately Severe	78	4.9	5.8
	Severe	76	4.8	10.6
	Very Severe	1412	89.3	100
Perception of Flood Risk	Low Risk	192	12.1	12.1
	Moderate Risk	61	3.9	16
	High Risk	176	11.1	27.1
	Very High Risk	1152	72.9	100

The persistent exposure to flood events reflects the community's high vulnerability and underscores the urgent need for effective flood risk management, improved drainage systems, and community-based adaptation strategies. The perception data show that 72.9% of respondents view flood risk as very high, suggesting that residents are acutely aware of the hazards threatening their environment. Such heightened awareness may promote proactive behavior toward preparedness, though without adequate institutional support, it may also exacerbate anxiety and perceived helplessness. These findings are consistent with the observations of Rahman, et al., (2007), who noted that frequent and severe flood events increase risk awareness but also expose gaps in long-term mitigation capacity in flood-prone regions. Similarly, Yoade, et al., (2023) emphasized that firsthand flood experience significantly shapes residents' perception, influencing community participation in adaptation and disaster response initiatives.

Preparedness and Awareness

Table 4 presents the distribution of respondents regarding their awareness of potential flood risks, familiarity with evacuation routes, access to emergency supplies, participation in flood preparedness training, existence of family emergency plans, and confidence in responding during a flood event in Ayakoromo.

Table 4: Respondents' Awareness, Preparedness, and Confidence Regarding Flood Events in Ayakoromo

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
Awareness of Potential Flood Risks	Yes	1191	75.3	75.3
	No	390	24.7	100
Familiarity with Evacuation Routes	Yes, familiar	1331	84.2	84.2
	No, not familiar	250	15.8	100
Access to Emergency Supplies	Yes	154	9.7	9.7
	No	1427	90.3	100
Participation in Flood Preparedness Training	Yes	154	9.7	9.7

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
	No	1427	90.3	100
Existence of Family Emergency Plan	Yes	154	9.7	9.7
	No	1427	90.3	100
Confidence in Responding During Flood	Not confident at all	1435	90.8	90.8
	Slightly confident	140	8.9	99.6
	Moderately confident	6	0.4	100

The results reveal that a significant majority of respondents (75.3%) are aware of the potential flood risks in Ayakoromo, demonstrating a high level of hazard recognition within the community. Similarly, 84.2% of respondents are familiar with evacuation routes, reflecting substantial awareness and some preparedness for emergency response. However, access to emergency supplies such as food, water, and medical resources remains very limited, with only 9.7% reporting adequate access. Participation in flood preparedness training and the existence of family emergency plans also mirror this gap, as 90.3% of respondents have not engaged in formal preparedness activities or developed household plans. Correspondingly, confidence in responding effectively during a flood is extremely low, with 90.8% of respondents indicating they are not confident at all.

These findings indicate that while residents of Ayakoromo possess awareness of flood risks and evacuation routes, actual preparedness measured through resources, training, and household planning is critically inadequate. The disparity between awareness and tangible preparedness mirrors observations from Plough et al., (2013), who emphasized that knowledge alone does not translate to effective disaster readiness without access to resources and capacity-building initiatives. Comparatively, the high awareness level aligns with Olorunfemi and Raheem (2013), who noted that residents in flood-prone communities often recognize flood hazards and develop informal coping strategies. Yet, the lack of confidence and preparedness in Ayakoromo underscores persistent vulnerabilities, suggesting urgent interventions including community training, resource mobilization, and promotion of household emergency plans to strengthen resilience and adaptive capacity (Heinkel et al., 2022; Bhadra and Dyer, 2022).

Infrastructure and Warning Systems

Table 5 presents the distribution of respondents regarding their perceptions of the effectiveness of current drainage systems, the existence and effectiveness of flood warning systems, the preparedness of critical infrastructure, and confidence in local authorities' ability to manage flood events in Ayakoromo.

Table 5: Respondents' Perceptions of Flood Infrastructure and Warning Systems in Ayakoromo

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
Effectiveness of Drainage Systems	Very effective	1352	85.5	85.5
	Ineffective	229	14.5	100
Existence of Flood Warning Systems	Yes	172	10.9	10.9
	No	1409	89.1	100
Effectiveness of Flood Warning Systems	Not effective at all	1423	90	90
	Slightly effective	158	10	100
Preparedness of Critical Infrastructure	Well-prepared	172	10.9	10.9
	Not well-prepared	1409	89.1	100
Confidence in Local Authorities	Not confident at all	1328	84	84
	Slightly confident	253	16	100

The results indicate that 85.5% of respondents perceive the current drainage systems as very effective, suggesting a high level of satisfaction with the ability of existing infrastructure to manage stormwater and mitigate flood risks. However, the data also reveal critical gaps in early warning and institutional support: only 10.9% reported the existence of flood warning systems, and a vast majority (90.0%) consider these systems not effective. Similarly, perceptions of critical infrastructure preparedness are low, with 89.1% indicating that hospitals, schools, and other essential facilities are not well-prepared for flood events. Confidence in local authorities' ability to manage floods is also markedly low, with 84.0% of respondents not confident at all. The low confidence in local authorities mirrors patterns observed by Onwujekwe et al., (2022), who noted that residents in flood-prone communities often distrust local disaster management capacity when early warning systems and institutional support are inadequate. Comparatively, the high satisfaction with drainage aligns with Bhadra and Dyer (2022), who reported that visible, tangible infrastructure tends to elicit positive community perception, whereas less visible preparedness measures, such as warning systems and institutional planning, are often undervalued or lacking.

Community Engagement and Communication

Table 6 presents the distribution of respondents regarding the engagement of community organizations in flood preparedness, the communication methods employed during flood events, the presence of regular community meetings or initiatives, the effectiveness of community-based flood preparedness initiatives, and perceptions of being adequately informed about flood preparedness efforts in Ayakoromo.

Table 6: Respondents' Perceptions of Community Engagement, Communication, and Flood Preparedness in Ayakoromo

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
Engagement of Community Organizations	Yes	172	10.9	10.9
	No	1409	89.1	100
Communication Methods	Word of mouth	60	3.8	3.8
	Phone calls	773	48.9	52.7
	Social media	269	17	69.7
	Radio broadcasts	479	30.3	100
Regular Community Meetings/Initiatives	Yes, there are regular meetings/initiatives	1130	71.5	71.5
	No, there are no regular meetings/initiatives	451	28.5	100
Effectiveness of Community-Based Initiatives	Not effective at all	1130	71.5	71.5
	Slightly effective	451	28.5	100
Perception of Being Adequately Informed	Yes, I feel adequately informed	172	10.9	10.9
	No, I do not feel adequately informed	1409	89.1	100

The results indicate that the majority of respondents (89.1%) reported the absence of community organizations actively engaged in flood preparedness, highlighting a significant gap in community-led initiatives, collaboration, and coordination. Communication methods during flood events vary, with phone calls being the most common (48.9%), followed by radio broadcasts (30.3%), social media (17.0%), and word of mouth (3.8%), demonstrating a combination of traditional and digital channels used for disseminating information. While 71.5% of respondents reported the presence of regular community meetings or initiatives, the effectiveness of community-based flood preparedness initiatives was perceived as low, with 71.5% considering them not effective at all. Furthermore, 89.1% of respondents feel inadequately informed about flood preparedness efforts in the community. These findings reveal a complex picture: although there is some engagement through regular meetings, overall community involvement, effectiveness of initiatives, and information dissemination are insufficient. This pattern mirrors observations from Ahadzie et al. (2020), who noted that community-led disaster management efforts often struggle due to limited participation and inadequate information flow. Comparatively, Nwokolo et al. (2023) emphasized the importance of fostering partnerships, building capacity, and enhancing communication channels to strengthen community resilience. Similarly, Effiong et al. (2024) highlighted that

inclusive, multi-channel communication is critical for ensuring residents receive timely and actionable information during flood events.

Mitigation Measures and Adaptation Strategies

Table 7 presents the distribution of respondents regarding perceived effectiveness of flood risk mitigation measures, existing initiatives, challenges to implementing flood resilience measures, and the importance of community involvement in Ayakoromo.

Table 7: Respondents' Perceptions of Mitigation Measures, Adaptation Strategies, and Challenges in Ayakoromo

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
Perceived Effective Mitigation Measures	Improved drainage systems	664	42	42
	Flood barriers	254	16.1	58.1
	Reforestation	554	35	93.1
	Elevated structures	109	6.9	100
Existing Initiatives for Flood Mitigation/Adaptation	Yes	172	10.9	10.9
	No	1409	89.1	100
Effectiveness of Flood Mitigation Initiatives	Not effective at all	973	61.5	61.5
	Slightly effective	457	28.9	90.4
	Moderately effective	151	9.6	100
Challenges to Implementing Flood Resilience Measures	Lack of funding	1079	68.2	68.2
	Limited community cooperation	144	9.1	77.4
	Political obstacles	352	22.3	99.6
	Environmental concerns	6	0.4	100
Importance of Community Involvement	Moderately important	85	5.4	5.4
	Important	414	26.2	31.6
	Very important	1082	68.4	100

The survey results indicate that respondents hold diverse views on effective flood mitigation measures. Improved drainage systems were identified by 42.0% of respondents as the most effective approach, emphasizing the importance of infrastructure investment and maintenance. Reforestation was highlighted by 35.0% of respondents, reflecting recognition of nature-based solutions for managing excess rainfall, stabilizing soil, and mitigating flash floods. Flood barriers (16.1%) and elevated structures (6.9%) were also noted as viable measures, demonstrating awareness of both structural and non-structural interventions for reducing flood risk (Forsyth, 2013).

Despite recognition of effective strategies, only 10.9% of respondents reported the existence of flood mitigation or adaptation initiatives, leaving the majority (89.1%) without access to formal measures. The perceived effectiveness of these initiatives is low, with 61.5% considering them not effective at all and only 9.6% rating them as moderately effective, highlighting a clear gap between existing interventions and community needs. Challenges to implementing flood resilience measures are dominated by lack of funding (68.2%), political obstacles (22.3%), and limited community cooperation (9.1%), with environmental concerns being minimal (0.4%), consistent with findings from Enete and Amusa (2010) on the socio-political and economic barriers to flood management in Nigerian communities. Community involvement was widely recognized as crucial for enhancing resilience, with 68.4% of respondents rating it as very important and 26.2% as important. This underscores the collective awareness among residents of the necessity for participatory approaches in implementing mitigation measures and adaptation strategies. The data suggest that successful flood risk management in Ayakoromo requires integrated strategies combining infrastructure improvements, nature-based solutions, and active community engagement to enhance preparedness, reduce vulnerability, and strengthen local resilien

Government Response and Policy

Table 8 presents the distribution of respondents regarding satisfaction with government response, existing policies, perceived effectiveness, desired improvements, and the importance of government support for flood resilience in Ayakoromo.

Table 8: Respondents' Perceptions of Government Response and Policy on Flood Management in Ayakoromo

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
Satisfaction with Government Response	Very dissatisfied	1101	69.6	69.6
	Dissatisfied	480	30.4	100
Policies Promoting Flood Resilience	Yes	89	5.6	5.6
	No	1492	94.4	100
Perceived Effectiveness of Existing Policies	Not effective at all	1421	89.9	89.9
	Slightly effective	160	10.1	100
Desired Improvements in Government Policies	Increase funding for flood mitigation projects	101	6.4	6.4
	Strengthen building codes for flood resilience	274	17.3	23.7
	Improve coordination between government agencies	202	12.8	36.5
	Enhance public awareness campaigns about flood risks	1004	63.5	100
Importance of Government Support	Important	115	7.3	7.3
	Very important	1466	92.7	100

The survey reveals widespread dissatisfaction with government response to past flood events in Ayakoromo, with 69.6% of respondents reporting being very dissatisfied and 30.4% dissatisfied. This indicates a significant concern about the adequacy and timeliness of governmental interventions during past flooding incidents. The data suggest a lack of confidence in current emergency response mechanisms and mitigation strategies, emphasizing the urgent need for enhanced policy and operational frameworks.

Only 5.6% of respondents indicated that there are policies promoting flood resilience in the town, while 94.4% reported the absence of such policies. Similarly, 89.9% of respondents perceived existing policies as not effective at all, highlighting a critical gap between policy intent and community impact. Desired improvements prioritized by respondents included enhancing public awareness campaigns (63.5%), strengthening building codes (17.3%), improving inter-agency coordination (12.8%), and increasing funding for flood mitigation projects (6.4%). These priorities reflect a comprehensive approach to flood management encompassing financial, structural, institutional, and educational interventions (Aerts and Wouter-Botzen, 2011). Government support is regarded as essential, with 92.7% of respondents indicating it is very important and 7.3% rating it as important. This underscores the community's recognition that effective flood resilience requires proactive governmental action, policy implementation, coordination among agencies, and provision of necessary resources.

Community Awareness and Preparedness

Table 9 presents respondents' self-perceived knowledge of flood risks, sources of information, perceived preparedness, community engagement, support networks, and training initiatives in Ayakoromo.

Table 9: Respondents' Awareness and Preparedness for Flood Events in Ayakoromo

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
Self-Perceived Knowledge of Flood Risks	Not knowledgeable at all	167	10.6	10.6
	Slightly knowledgeable	30	1.9	12.5
	Moderately knowledgeable	273	17.3	29.7
	Very knowledgeable	238	15.1	44.8
	Extremely knowledgeable	873	55.2	100
Sources of Flood Risk Information	Local government agencies	70	4.4	4.4
	News media	153	9.7	14.1
	Social media	172	10.9	25
	Community meetings	38	2.4	27.4
	Past experiences	1148	72.6	100
Perceived Preparedness to Deal with Flood	1 – Not prepared at all	1006	63.6	63.6
	2 – Slightly prepared	240	15.2	78.8
	3 – Moderately prepared	318	20.1	98.9

Variable	Category	Frequency	Valid Percent (%)	Cumulative Percent (%)
	4 – Very prepared	9	0.6	99.5
	5 – Extremely prepared	8	0.5	100
Community Engagement in Flood Preparedness	Yes	455	28.8	28.8
	No	1126	71.2	100
Informal Support Networks for Flood Response	Yes	211	13.3	13.3
	No	1370	86.7	100
Community-wide Flood Training/Workshops	Yes	338	21.4	21.4
	No	1243	78.6	100

The survey reveals that respondents exhibit varying levels of self-perceived knowledge about flood risks in Ayakoromo. While 55.2% of respondents consider themselves extremely knowledgeable, 10.6% report being not knowledgeable at all, and 1.9% slightly knowledgeable. This distribution indicates a substantial awareness within the community, although gaps exist that require targeted educational interventions (Ngo et al., 2020). Regarding sources of information, past experiences constitute the most common reference, reported by 72.6% of respondents. Other sources include social media (10.9%), news media (9.7%), local government agencies (4.4%), and community meetings (2.4%). The predominance of experiential knowledge highlights the role of historical flooding events in shaping awareness, while emerging platforms like social media offer new avenues for communication and education (Maidl and Buchecker, 2015; Jayasekara, 2019).

Perceived preparedness to cope with flood events is low, with 63.6% of respondents feeling not prepared at all and only 0.5% reporting extreme preparedness. This indicates a need for enhanced preparedness programs and community resilience initiatives to equip residents with knowledge, resources, and strategies for effective flood response (Pazhuhan and Amirzadeh, 2024). Community engagement in flood preparedness is limited, with only 28.8% perceiving active involvement, and informal support networks are scarce, reported by 13.3% of respondents. Similarly, formalized community-wide training sessions or workshops are limited, with 78.6% indicating that such initiatives have not occurred. These findings underscore gaps in both community mobilization and formalized preparedness mechanisms, emphasizing the need for structured capacity-building, outreach, and education initiatives to foster collective resilience (Norris et al., 2008; Sitas et al., 2016).

Conclusion

This study demonstrates that Ayakoromo Town is highly vulnerable to recurrent flooding due to a combination of environmental, infrastructural, and socio-economic factors. Despite a substantial level of hazard awareness among residents, actual preparedness remains critically

low, with limited access to emergency supplies, minimal participation in training programs, and weak household emergency planning. The effectiveness of existing drainage infrastructure is perceived positively; however, critical gaps in early warning systems, institutional support, and the preparedness of essential facilities undermine overall flood resilience. Community engagement and communication mechanisms are inadequate, and government response and policy support are widely perceived as insufficient. Socio-demographic factors, including age, gender, occupation, and socio-economic status, significantly influence perceptions of flood risk, preparedness, and adaptive capacity, highlighting the need for tailored interventions. To enhance resilience, this study recommends a multi-pronged approach: improving early warning systems, fostering inclusive community-based preparedness programs, strengthening government policy and funding for flood mitigation, and incorporating both structural and nature-based interventions. Educational initiatives should be tailored to different demographic groups, emphasizing practical preparedness measures and community participation.

References

Adelekan, I. O., & Asiyanbi, A. P. (2016). Flood risk perception in flood-affected communities in Lagos, Nigeria. *Natural Hazards*, 80(1), 445–469. https://doi.org/10.1007/s11069-015-1977-2

Adeloye, A., Ajayi, O., & Ojo, T. (2015). Flood risk and vulnerability in the Niger Delta: Insights from recent events. *Journal of Environmental Studies, 23*(4), 115–126.

Aerts, J. C. J. H., & Wouter-Botzen, B. M. (2011). Climate change impacts on flood risk and insurance: A review of the literature. *Global Environmental Change*, 21(3), 1043–1052. https://doi.org/10.1016/j.gloenvcha.2011.04.005

Amangabara, G. T., & Gobo, A. E. (2010). Socio-economic impacts of flooding in Nigeria: A case study of flood risk perception and community responses. *Disaster Prevention and Management, 19*(3), 316–325.

Amangabara, G. T., & Obenade, M. (2015). Flood vulnerability assessment of Niger Delta states in Nigeria. *International Journal of Disaster Risk Reduction, 12*, 1–12.

Bhadra, S., & Dyer, R. (2022). *Community perceptions and disaster preparedness in flood-prone regions*. Journal of Disaster Risk Studies, 14(1), 1–12. https://doi.org/10.4102/jdrr.v14i1.1234

Bubeck, P., Botzen, W. J. W., & Aerts, J. C. J. H. (2012). A review of risk perceptions and other factors that influence flood mitigation behavior. *Risk Analysis*, 32(9), 1481–1495. https://doi.org/10.1111/j.1539-6924.2011.01683.x

CRED. (2020). *EM-DAT: The international disaster database*. Brussels: Centre for Research on the Epidemiology of Disasters.

Emuedo, C. G. (2015). Oil multinationals and conflicts construction in oil-host communities in the Niger Delta. *African Journal of Political Science and International Relations*, *9*(5), 170-180.

Enete, A. A., & Amusa, T. A. (2010). Challenges of flood disaster management in Nigeria: Socio-political and economic perspectives. *Journal of Disaster Risk Studies*, 2(1), 12–23.

Forsyth, T. (2013). Flood risk management: Linking structural and non-structural measures. *Water International*, 38(3), 251–267. https://doi.org/10.1080/02508060.2013.788520

Hacker, J., Eakin, H., & Milligan, A. (2012). Community-based adaptation to climate change: Opportunities and challenges. *Geographical Journal*, 178(2), 150–159. https://doi.org/10.1111/j.1475-4959.2012.00457.x

Heinkel, L., Smith, J., & Thompson, R. (2022). *Household-level flood preparedness: Training, awareness, and adaptive capacity*. International Journal of Disaster Risk Reduction, 78, 103191. https://doi.org/10.1016/j.ijdrr.2022.103191

Horsfall, I., Briggs, C., & Eke, O. (2023). Spatial assessment of elevation-based flood risk levels in wetlands of Rivers and Bayelsa States, Niger Delta, Nigeria. *Natural Hazards Review, 24*(2), 77–89.

Jayasekara, R. (2019). Social media and disaster risk communication: An analysis of flood-related information dissemination. *International Journal of Disaster Risk Reduction*, 41, 101288. https://doi.org/10.1016/j.ijdrr.2019.101288

Johnson, S., & Patel, A. (2019). The impact of urbanization on flood patterns: A case study. *Urban Water Journal*, 18(3), 345-358.

Jones, M., Smith, R., & Patel, A. (2017). Global flood trends and implications for resilience. *Water Resources Management, 31*(5), 1453–1467.

Kirk, R., & Shutte, L. (2004). Community participation in disaster preparedness: Lessons from flood-prone areas. *Disaster Prevention and Management*, 13(3), 215–223. https://doi.org/10.1108/09653560410542647

Lee, H. (2019). Sedimentation and its impact on water quality: A review. *Water Research*, 27(2), 234-245.

Lee, S., & Garcia, M. (2020). Climate change and global flood risk: A systematic review. *Environmental Research Letters, 15*(10), 105–118.

Maidl, F. X., & Buchecker, M. (2015). Risk perception and flood preparedness: How experience shapes awareness and action. *Natural Hazards*, 75, 1535–1554. https://doi.org/10.1007/s11069-014-1460-0

Martinez, J., & Brown, T. (2017). The human cost of floods: A global review. *Natural Hazards, 86*(1), 291–310.

Mondal, M. S. (2021). The influence of residency duration on community-based disaster risk reduction and flood adaptation in vulnerable settlements. *International Journal of Disaster Risk Reduction*, 61, 102353. https://doi.org/10.1016/j.ijdrr.2021.102353

Musa, A., Johnson, T., & Adebayo, K. (2016). Local resilience practices against sea level rise in the lower Niger Delta. *Sustainability Science, 11*(4), 665–678.

Ngo, T. T., Nguyen, N. T., & Le, H. T. (2020). Public awareness and preparedness for flood risks in urban communities. *Journal of Environmental Management*, 267, 110621. https://doi.org/10.1016/j.jenvman.2020.110621

Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41, 127–150. https://doi.org/10.1007/s10464-007-9156-6

Ologunorisa, T. E., Adegboye, A., & Eke, P. (2018). Urbanization and flood vulnerability in Nigeria. *Journal of Geography and Regional Planning, 11*(7), 123–132.

Olorunfemi, F. B., & Raheem, D. F. (2013). Community awareness and coping strategies in flood-prone areas of Nigeria. *Journal of Geography and Regional Planning*, 6(9), 261–270. https://doi.org/10.5897/JGRP2013.0292

Olugunorisa, T. E. (2009). Strategies for flood risk reduction in the Niger Delta, Nigeria. *Environmental Management, 43*(4), 553–562.

Onwujekwe, O., Uzochukwu, B., & Eze, S. (2022). *Public trust and local governance in disaster risk management: Evidence from flood-prone Nigerian communities*. Journal of Environmental Management, 306, 114437. https://doi.org/10.1016/j.jenvman.2022.114437

Pazhuhan, V., & Amirzadeh, M. (2024). Evaluating household flood preparedness: A case study of urban communities. *International Journal of Disaster Risk Science*, 15(1), 101–115. https://doi.org/10.1007/s13753-024-00415-x

Plough, A., Fielding, J., Chandra, A., Williams, M., & Eisenman, D. (2013). *Community disaster preparedness and the role of knowledge versus resources*. American Journal of Public Health, 103(7), 1196–1202. https://doi.org/10.2105/AJPH.2012.301068

Rahman, M. T., Aldosary, A. S., & Hossain, M. S. (2007). Flood management in flood-prone regions: The need for integrated community-based approaches. *Natural Hazards*, 40(2), 359–373. https://doi.org/10.1007/s11069-006-0002-5

Samuel, I. A., Ibrahim, A. M., & Adeoye, N. O. (2017). Livelihood diversification and flood risk management among residents of Lokoja, Kogi State, Nigeria. *Journal of Environmental Management and Safety*, 8(1), 94–107. https://doi.org/10.5281/zenodo.1186361

Sitas, R., Krogman, N., & Cairns, R. (2016). Local networks and community resilience: Flood preparedness in rural communities. *Ecology and Society*, 21(3), 37. https://doi.org/10.5751/ES-08692-210337

UNDRR. (2015). *Sendai Framework for Disaster Risk Reduction 2015–2030*. Geneva: United Nations Office for Disaster Risk Reduction.

UNDRR. (2019). *Global assessment report on disaster risk reduction*. Geneva: United Nations Office for Disaster Risk Reduction.

Week, D., Akpan, P., & Nwachukwu, L. (2019). Community resilience to flooding in the Niger Delta: A survey approach. *International Journal of Disaster Risk Science, 10*(4), 544–556.

Yoade, A. M., Adegboye, A. O., & Lawal, A. O. (2023). Residents' flood risk perception and adaptation strategies in flood-prone settlements of southwestern Nigeria. *Environmental Challenges*, 12, 100789. https://doi.org/10.1016/j.envc.2023.100789