Assessment of Community-Led Flood Adaptation Strategies in Lagos Coastal Slums, Nigeria

Samson Olaitan Olanrewaju, *Osun State University*
Olabisi S. Obaitor, *Ludwig Maximilians University*
Victor Onifade, *University of Lagos*
Ayomide Oluwuyi, *Osun State University*

2025

www.preparecenter.org

Table of Contents

Abstract

Flooding poses a perennial risk and severe threat to the coastal slum settlements in Lagos, Nigeria, where rapid urbanization, inadequate drainage, and climate change exacerbate vulnerability. This study assessed community-led flood adaptation in three coastal slums of Ajegunle, Makoko, and Ijora-Badia to understand how residents design, implement, and sustain local flood responses. A mixed-methods design guided by a pragmatic philosophy was employed to gather quantitative and qualitative data through a household survey of 1,983 residents, key informant interviews, focus group discussions, and field observations.

Findings revealed widespread flood exposure, with more than 90% Of sampled households impacted in the last five years. Communities relied on local, low-cost adaptation measures, including drainage channeling and clearance, using strategies such as sandbag barriers, elevated floor levels, temporary relocation and construction of stilt structures. Community solidarity, effective leadership, and local understanding were the most important adaptation enablers, although this is limited by a chronic lack of funds, poor technical expertise, and inadequate institutional support. Stakeholder engagement was dysfunctional as community-led organizations took leading roles during flood control planning and implementation, while government agencies and NGOs were largely absent, and at most faintly involved. Adaptation effectiveness was higher in Ajegunle due to stronger organization and educational level, while adaptability was lowest in Makoko due to compounded lack of resources and governance abandonment.

The study highlights notable policy gaps in embedding bottom-up innovations into urban resilience planning, and advocates co-designed interventions that strengthen social capital, offer technical assistance, financing, as well as equitable gender, youth, and minority inclusion. These outcomes align with SDG 11 (Sustainable Cities & Communities) and SDG 13 (Climate Action) through a formal framework that improves climate resilience and promotes socially equitable African coastal urban development.

 Keywords: Community, Flood, Adaptation, Coastal slums, Lagos

1. Introduction

Lagos, Nigeria's economic hub and a coastal city, hosts some of the most vulnerable coastal slums in Africa. About 50% of the city's residents reside in informal settlements, including slums (Aliu et al., 2021; Adegun, 2023). These slums, located in low-lying coastal zones, are often threatened by persistent floods from high rainfall and increasing sea levels (Ajaero,2024), making Lagos one of the most flood-vulnerable cities in the world (Arabadzhyan et al., 2021). The impact of annual flooding in its coastal slums is severe, affecting life, property, and urban stability. Sadly, despite their increasing exposure to climate precarities, studies have reported that governments' interventions often exclude these coastal slums, resulting in weak coping infrastructures and deepened exposure to climatic hazards (Ajaero, 2024; Chang and Ross, 2024).

Flooding in Lagos slums is more than just water on the street; it also traverses inequality and poverty (Lawanson et al, 2023; Onifade et al, 2023). The consistent rebuilding or repair of homes and businesses after every flooding event in the slums often places residents within the cycle of poverty and exacerbates their vulnerabilities. Unfortunately, government interventions in Lagos coastal slums are accompanied by experiences of demolitions, gentrification, and displacements (Adama, 2020; Bakare, 2024), further entrenching social inequalities. Alternatively, these coastal slum communities often devise local adaptation solutions to cope with recurrent annual flooding and its associated impacts (Adegun, 2023; Ndimele et al, 2024). These indigenous, often informal, interventions integrate local understanding of vulnerability and communal management of risks. Yet, they are short-tom-medium term responses that inform detailed climate change adaptation strategies. This is in tandem with the submission of several authors (Klenk, 2017; Lee, 2024) that there is a need for infusion of local climate adaptation knowledge and community practices into mainstream flood management studies. Despite their possibilities, there exists a gap in the literature on community-led solutions for flood management in Nigerian informal settlements. Available studies (Adeyeye and Emmitt, 2017; Ekoh, 2021; Eshiet, 2018; Ekoh et al, 2023) did not detail the process of these community-led initiatives. Specifically, these studies do not document the processes of formulating, implementing, and evaluating these strategies, highlighting the need for further investigation into how local communities organize and implement flood adaptation measures.

Using this study, we addressed the gaps by undertaking a comprehensive assessment of community-led flood adaptation strategies within three coastal slums of Lagos, Nigeria: Ajegunle, Makoko, and Ijora-Badia. We explored the role of community-led initiatives in flood management of vulnerable areas. Four research questions were considered:

- What are the existing community–led flood adaptation strategies in Ajegunle, Makoko, and Ijora-Badia slum communities?

- What roles do different stakeholders play in the formulation, implementation, and appraisal of these strategies?

- Are these strategies successful in mitigating flood impacts, and what factors influence their effectiveness?

- What recommendations can be made to strengthen community-led flood adaptation initiatives in the slums?

To achieve this, we synthesized empirical evidence with the lived experiences of slum dwellers. This is aimed at informing policy interventions that will enhance flood risk, promote social justice, and sustainable urban development in the coastal slums of Lagos, Nigeria, and similar vulnerable areas globally.

2.   Literature Review

2.1 Flood Vulnerability and Community-Led Initiatives in Coastal Slums

A significant literature base records the excessive exposure of coastal slums to floods, with vulnerability seen as the result of interacting climatic, geographic, and socio-economic forces, and not as a natural danger. Studies consistently highlight heavy precipitation, sea-level rise, tidal surge, and overflow of rivers as the proximate factors causing flooding, yet it also stresses that the risk is intensified by the rapid urbanization process, occupation of marginal lands, weak drainage systems, and lax enforcement of planning regulations (Kundzewicz et al., 2014; Guneralp et al., 2015; Lee et al., 2020). In low- and middle-income countries, these issues are especially critical due to organic settlement development, which commonly overlaps with wetlands, floodplains, and coastal margins (Dodman et al., 2023).

In Nigeria, studies of flood vulnerability in informal settlements have grown tremendously within the last ten years. These studies usually associate frequent flooding with insufficient drainage, land subsidence, blocked drainages, and an insufficient waste management system, with coastal slums regularly witnessing displacement, livelihood loss, as well as health and education impacts (Lawanson et al., 2023; Ogie et al., 2020). This is also witnessed in the Niger Delta, where every year flooding in the waterfront settlements of Bayelsa and Warri is observed due to river overflow and tidal forces, resulting in chronic poverty and displacement (Akpabio et al., 2021; Echendu, 2022). Similar evidence on Ghana, Kenya, and Senegal indicates structurally similar shapes

of flood exposure are in Accra, Mombasa, and Dakar coastal slums, which are caused by informality, poverty, and institutional neglect (Amoako and Frimpong, 2021; Ouma and Otieno, 2022; Diagne and Sy, 2023). Taken together, this literature proves the systemic nature of flooding in urban slums as an urban governance issue as opposed to a sporadic environmental shock.

In addition to this vulnerability-based scholarship, there has been a burgeoning literature review on community-led or community-based adaptation responses in informal settlements. These studies capture the mobilization of local knowledge, labor, and social networks by residents to lessen the immediate effects of floods. This is done using indigenous measures such as drainage clearing, housing elevation, temporary barriers, walkways, and informal evacuation plans (Sultana, 2020; Amankwaa et al., 2024; Datta et al., 2024). Specific examples in Nigeria include informal drainage networks and raised wooden buildings in the coastal areas of Bayelsa (Akpabio et al., 2021), use of bamboo walkways, stilt housing, and community-supported access paths in Makoko, Lagoa (Adegun, 2023).

Nonetheless, while existing studies highlight robust ingenuity, it is not as clear regarding how such initiatives are planned, organized, and maintained over time. Most of the studies define the adaptation practices in terms of description rather than the leadership systems, stakeholder involvement, or resource organization to make action collective. Furthermore, the effectiveness and the limitations of community-led measures are poorly addressed and critiqued. Recent scholarship warns that informal adaptations can result in less exposure in the short term but do not touch on more structural drivers (such as poor infrastructure, insecure tenure, and governance exclusion), raising concern about maladaptation or risk normalization (Dodman et al., 2022).

Research does not engage robustly with community-led adaptation in terms of success factors due to social cohesion, local leadership trust, collective labor practices, and some level of external assistance provided by NGOs or local authorities (Amankwaa et al., 2024). Also, there are rare comparative studies across various slum ecologies, while empirical investigations to associate adaptation practices with differences in environmental context, socio-economic statuses, and social organization in urban areas remain scarce. This is specifically clear in Lagos, where most flood adaptation studies focus on engineering or isolated case studies. This paper attempts to fill these gaps by providing a comparative study on flood vulnerability and community-based adaptation in three ecologically different coastal slums in Lagos.

2.2 Theoretical Framework

This paper is informed by the Social Capital Theory and the Resilience Theory, both of which help us develop a disciplined approach to the analysis of how community-based

flood adaptation is formed, functions, and how it differs in coastal slums. These frameworks are applied to guide the comparative study design, results interpretation, and evaluation of adaptation success in Ajegunle, Makoko, and Ijora-Badia.

The Social Capital Theory highlights the importance of social networks, trust, and collective action in facilitating community efforts to achieve common objectives despite numerous constraints (Amoako and Asamoah, 2024). The theory differentiates between bonding social capital that emphasises strong ties in homogenous groups, bridging social capital that highlights ties between different groups in a community, and linking social capital that demonstrates ties between a community and outside institutions like government agencies or NGOs (Okunola and Adeaga, 2023). This paper adopts the social capital theory to analyse the influence of social organisation on the design, coordination, and perception of flood adaptation indigenous strategies. In particular, the analysis provides comparison between bonding capital that supports collective activities like drain clearing in neighbourhoods, bridging capital that promotes greater mobilization of communities, and linking capital that limits access to formal support in the three slums.

The Resilience Theory adds to this view by addressing how systems react to emergencies without taking away essential functions. Based on modern literature on resilience, the study follows a three-step conceptualisation of resilience, namely absorptive capacity (considering short-term coping strategies that mitigate the impact of floods); adaptive capacity (considering gradual adjustments to livelihoods, housing, or practices); and transformative capacity (considering fundamental changes to structures, spatial arrangements, or systems of governance) (Goyal et al., 2024; Amoako and Asamoah, 2024). It is based on this framework that the spectrum of community-led responses witnessed in the study areas is classified and interpreted.

3. Methodology

3.1 Study Area: Lagos and Its Coastal Slums

Lagos State (Figure 1) is in southwestern Nigeria, bordered by Ogun State to the north and east, the Atlantic Ocean to the south, and the Republic of Benin to the west. Spanning approximately 3,577 square kilometers, it is Nigeria's smallest state by land area but the most populous (Afolabi, 2020). As of 2025, Lagos State's population is estimated at 17.1 million, with a density of approximately 6,871 persons per square kilometer, among the highest globally (World Population Review, 2025). The annual growth rate is 7.5%, driven by rural-urban migration and high birth rates (United Nations, 2024). Lagos' coastal slums are among the most flood-prone areas in Nigeria, with floods occurring 3–5 times a year (Ogunlesi & Afolabi, 2021). Climate change worsens the situation, with sea-

level rise to 3–7 mm/year and stronger storms inundating the slums (Lossouarn et al, 2016).

The study areas, Ajegunle, Makoko, and Ijora-Badia, are located along the coastal fringes and the Lagos Lagoon. Ajegunle has its local government in the Ajegunle (LGA) of Lagos, on the western mainland, near the Lagos lagoon. It shares a border with Apapa to the south, Amukoko to the west, and the lagoon's edge to the east. This slum is characterized by flat, low-lying proximity, of this slum spanning 10 square kilometers to the coastal fringes of making it prone to tidal surges and flooding. Ajegunle is densely populated with an estimation of 42,938 persons of diverse cultures, Igbo, Yoruba, and Hausa per square kilometer.

 Ijora-Badia is located in the Apapa Iganmu local government area, south of Ijora-Oloye and north of Apapa. It is covered with train rails and borders the Lagos lagoon. The proximity to industrial Apapa and its coastal edge makes it a flood-prone area, yet a strategic location. It is a low-lying land 1-3 meters above sea level and a tropical climate. The homes are built on reclaimed lands or canals with wood and roofing sheets. This slum is predominant with Awori, Hausa, and other ethnic groups in Nigeria sharing single rooms with an average number of five to six occupants in each room. With a population density of 25,000 to 35,000 dwellers per square kilometer, the population ranges from 50,000 to 70,000. These residents range from the middle belt of Nigeria, resulting in the yearly growth of this slum. Makoko, located in the Yaba mainland local government area, spreads into the Lagos lagoon. The slum covers almost 1.5 square kilometers with floating homes built on stilts over the shallow waters of the lagoon lying between 1 and 2 meters above sea level.

The selected study areas were selected due to extreme vulnerability to flood hazards, driven by coastal location, low elevations, and inadequate infrastructural facilities. Ajegunle's ethnic networks, Makoko's aquatic culture, and Ijora-Badia's canal communities will help to influence research by looking into context-specific strategies, thereby ensuring sustainable results that will be useful to many coastal slums in Nigeria.
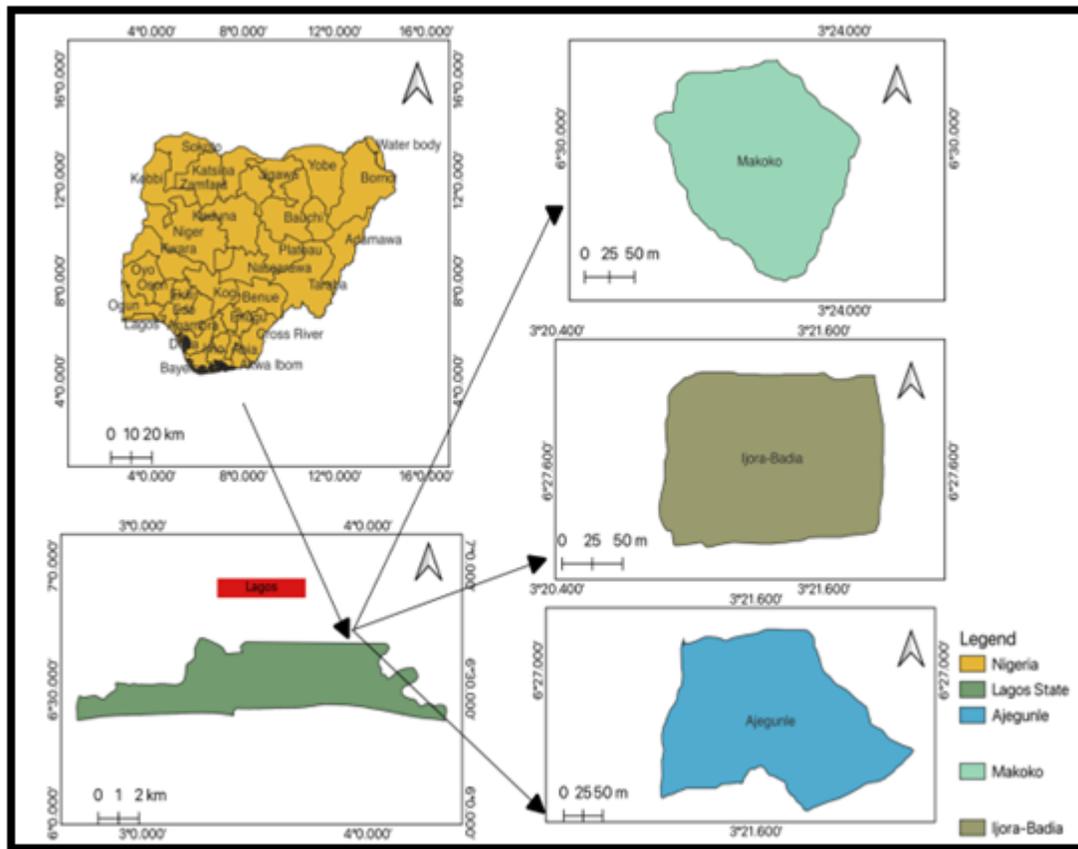
Figure 1: Map Showing Details of the Study Area
Source: Author's work, 2025

3.2   Research Philosophy and Framework

This study is guided by pragmatic thinking, aiming to build workable, solution-oriented knowledge that applies to the daily reality of the dwellers in Lagos's coastal slums. Pragmatism values objective evidence (e.g., flood frequency, extent of damage) and subjective narratives (e.g., coping narratives by residents), making synthesis across multiple data sources possible (Ogunlesi & Afolabi, 2021; Adelekan & Asiyanbi, 2020). Based on this thinking, we adopted the transdisciplinary mixed-method approach, informed by pre-field-work consultations with residents, NGOs, and relevant government agencies whose contributions were utilized to co-develop and improve data collection instruments, including household surveys, structured interviews, and focus group discussions. This is to enable contextual relevance, cultural sensitivity, to capture the complexities of experiences and responses to flooding. Hence, it interlopes qualitative (e.g., interviews, FGDs, observations), quantitative (e.g., surveys) evidence within the feedback loop of inquiry, reflection, and feedback.

The research was conducted between March and September 2025. We commenced the process with community consultations, where we worked together with residents, community leaders, and civil society organizations (specifically Nigerian Slum/Informal Settlements Federation (NSISF) and Shantytown Empowerment Foundation (SHEF)). These stakeholders assisted in delineating research priorities and codesigning data collection tools to make them culturally and contextually sensitive. Data were collected using a hybrid surveying method – using a combination of Kobo Collect and hard copies of the questionnaire. The choice of this hybrid method is to accommodate the collection of data in areas where the network reception is limited to ensure smooth data collection. The data were subsequently reviewed and deliberated with the communities to ensure ownership of information, as well as basing the recommendation on their reality. The research participatory loop is compatible with the humanitarian mission of bolstering resilience and enhancing social inclusion among flood-prone communities.

The research methodological framework (Figure 2) reflects the pragmatic and participatory research activity flow by embracing the survey, the focus group discussion, as well as observations from the field within an adaptation loop led by the community. It reflects the coproduction between residents, researchers, and institutional partners on the flood resilience in the coastal slums of Lagos.
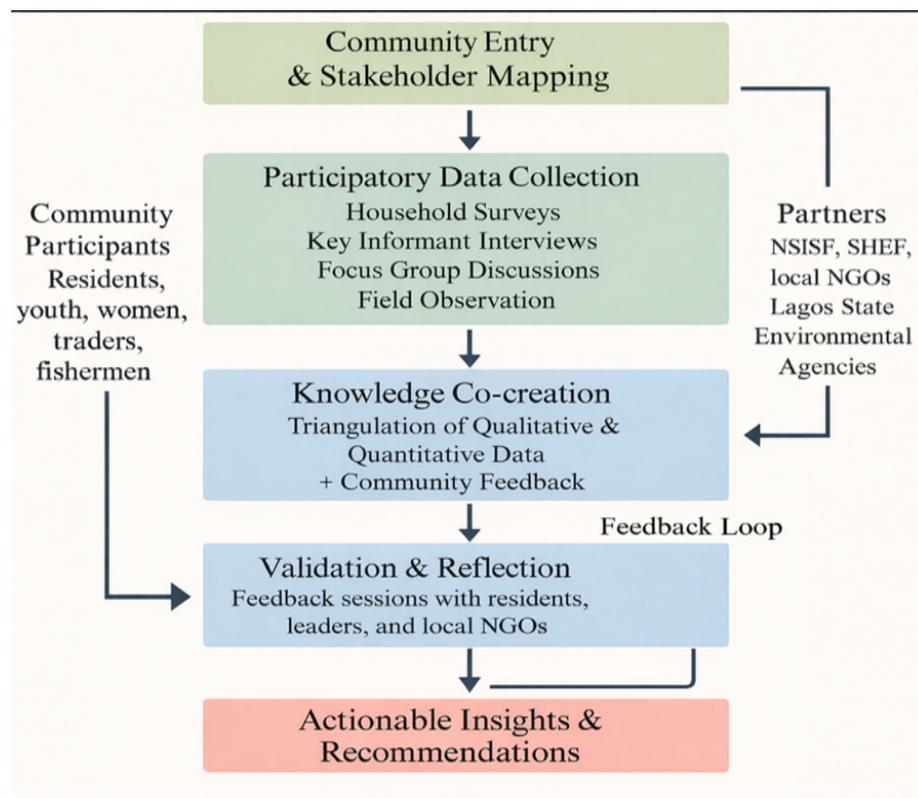

Figure 2: Research Methodological Framework

3.3 Data Sources and Methods of Data Collection

For this study, we utilized both secondary and primary data. The secondary data provided the context and validation for the study. We obtained secondary data from credible, recent sources, including documents from the Lagos State Government, like the Lagos State Climate Change Policy or reports from the Lagos State Emergency Management Agency, to understand official flood mitigation efforts and gaps in slum areas. Peer-reviewed articles on Lagos' flooding, slum vulnerability, and adaptation strategies were accessed from online databases like Google Scholar and JSTOR to provide a scholarly context. Official publications from international organizations such as the World Bank and UN-Habitat on urban flooding and informal settlements were also utilized. For the first two months of the study (i.e., March and April 2025), we systematically collected secondary data using a structured approach: searching academic databases and government websites for reports and studies focusing on keywords like "Lagos flooding," "coastal slums," and "flood adaptation" to ensure relevance and recency. We also created a database to organize key information, such as flood frequency (e.g., 3–5 events/year in Lagos), adaptation policies (e.g., lagoon dredging), and slum demographics (e.g., Makoko's 100,000 residents). This was categorized thematically (e.g., environment, economy, policy) for easy access.

Primary data was collected through Semi-structured interviews, focus group discussions, field observation, and household surveys. We also engaged and trained a small team of local researchers, consisting of 3 people, to assist in data collection and ensure the accuracy of observations. This is to ensure the credibility of the study. Observation was used as a key part of data collection. This is to enable us to understand how residents deal with flooding. The study was conducted during the rainy season, which is the typical season when flooding is usually experienced in the slums. Each of the slums was visited at four different times to see and note the situation of things in the communities, and to understand how residents deal with flooding. Each visit lasted an average of 5-7 hours. In each slum, key areas, including residential zones, floating sections, and canal areas, were visited.   This allowed us to have a firsthand experience of flooding in the areas. The observation focused on experiences of flooding, physical and social adaptation to the challenge, and responses to flooding. Two types of observation were used: structured observation (following a checklist) and unstructured observation (watching and noting anything interesting related to flooding and adaptation). We combined these approaches to enable us to discover new ideas, fitting the complex reality of the slums. Small Notes, photos, and sketches were used to document adaptations and environmental conditions.

We utilized key informant interviews (KIIs) to probe into stakeholders lived experience of flooding in the slums. Selection was done through purposive sampling and supported by snowball recommendations to incorporate long-term residents, community heads, youth and women leaders, local advocacy groups, and relevant government agencies. Potential selection bias was mitigated by capturing diverse stakeholders across gender, age, livelihoods, and neighborhood areas. During the interview, we used open-ended questions to allow the Key informant to share their views freely, but with a loose structure to ensure that we cover key topics like adaptation strategies, challenges, and community efforts. This method, which complements surveys and observations, provided additional depth and personal context to the study. The interview guide has three sections: 1) Flood Experiences (e.g., "Can you describe the last time your home flooded? What happened?"); 2) Adaptation Strategies (e.g., "What do you do to protect your home or business from floods? Why did you choose that method?"); and 3) Challenges and Support (e.g., "What stops you from using better flood protection? What help do you need?"). Probing questions like "Can you tell me more about that?" allowed the key informants to dig deeper. Questions were tailored slightly for each group of residents, focusing on personal actions, leaders on community efforts, and officials on policies to ensure relevance. The key informants that we sampled are representatives of men, women, youth, and elders from diverse ethnic groups like Yoruba, Egun, and Hausa. Community leaders, including traditional chiefs, youth leaders, and women's group heads, were also interviewed to learn about collective efforts that are in practice in the communities.

Focus Group Discussions were done with the residents of the slums, where they shared their experiences and ideas, helping us understand community perspectives on flooding. Three FGDs were conducted, one in each slum, over three months. Each session lasted 60–90 minutes and was held in a neutral, accessible community space. For Makoko, it was held in the orphanage school; for Ajegunle, it was held at a community meeting space; and for Ijora was held in one of the classes of a flood-impacted plank-made school. Trained local facilitators, fluent in Yoruba and Hausa – which are the predominant local languages - guided discussions to ensure clarity and cultural sensitivity. Each FGD had 8 participants, totaling 24 across the three slums. Efforts were made to ensure that participants were selected in a way that all samples are represented, i.e., participants with direct flood experience or roles in community efforts, ensuring diversity in gender, age, and ethnicity. Community leaders were liaised to help identify suitable participants. In preparation for the FGD, facilitators were trained to manage group dynamics, encourage shy participants, and handle dominant voices. Provisions were made for refreshments and to cover transport costs to encourage attendance. Recordings of the FGDs were transcribed, and notes were organized for thematic analysis, cross-checking with other data like surveys to ensure accuracy (Adelekan & Asiyanbi, 2020).

Throughout the study, community leaders' and participants' consent and approval were sought. The consent includes participation in the study, collection of data, snapping of pictures and other pictorial evidence, and transmission of findings exclusively for research purposes. Plates 1 – 5 cover the pictorial (Please note: all pictures were taken for inclusion in the research report with the consent of the participants).

Plate 1: Key Informant Interview with the leadership of the Eye Impaired Association at the Ajegunle Slum community
Source: Author's work, 2025

Plate 2: Participants at the Focus Group Discussion at Makoko Community
Source: Author's work, 2025

Plate 3: Participants at the Focus Group Discussion at Ajegunle Community
Source: Author's work, 2025

Plate 4: Participants at the Focus Group Discussion at Ijora- Badia Community
Source: Author's work, 2025

Plate 5: Physical Observation at Ajegunle Community
Source: Author's work, 2025

3.4 Sample size, Sampling procedure and Questionnaire Administration

The study population consists of slum dwellers and key stakeholders, including long-term residents, community heads, youth and women leaders, local advocacy groups, and relevant government officials in three key Lagos coastal slums of Ajegunle, Makoko, and Ijora-Badia. This population is targeted because they are directly affected by or influence flood governance in these communities, making their insights essential for understanding and improving resilience strategies (Lawanson & Fadare, 2022). Projecting the population of the communities using the 2006 national census figures as baseline, Ajegunle has an estimated population of 1,022,690, Ijora-Badia has 625,535, while Makoko has 336,490 (see table 1). From this aggregate population, a total sample of 1983 respondents were selected, representing 0.1% of the projected population in these communities. The original sample of 1,983 was estimated to provide a margin of error of ±2.2% to the overall population estimates at 95% confidence level (assuming that the proportion of the entire population is P= 0.5). Additionally, post-hoc power analysis was carried out to guarantee sufficient power for group comparisons. Based on the distribution of the sample in the 3 communities and considering a design effect of 1.2 (to correct any effect of the cluster

sampling in each of the communities), the effective sample size remains above 1,650. This provides over 80% power (β= 0.20) to identify a medium sized effect (e.g., a 10-percentage-point difference in key proportions between communities) at a significant level of α= 0.05. In addition to household surveys, semi-structured interviews were conducted for 47 key informants, including 30 residents (10 per slum), 9 community leaders (3 per slum), and 5 government officials. This smaller, purposive sample allows in-depth qualitative insights into diverse experiences and roles (Olajide & Lawanson, 2021). Also, 3 Focus Group Discussions (FGDs) (one per slum) were held with youth groups, women organizations and government officials to capture collective perspectives (Adelekan & Asiyanbi, 2020).

Table 1: Distribution of Questionnaires in the Study Area

Area	2006 Population	2025 Projected Population @7.5% growth rate	0.1% Sample
Ajegunle	429,381	1,022,690	1022
Ijora-Badia	262,633	625,535	625
Makoko	141,277	336,490	336
Total			1983

Source: Author's Computation (2025), NPC (2006)

A multistage sampling procedure was employed to guarantee equal representation in the study area. In the first stage, three coastal slum communities were purposively selected due to their proximity to Lagos's coastal floodplain and dominance in prior flood vulnerability studies. In the second stage, the population in each community was stratified into residential clusters, highlighting spatial variations in flood exposure. For each residential cluster, a random systematic sampling was used to select households. A sampling interval was determined by dividing the total estimated number of households in the communities by the number of respondents to be surveyed. The first household was randomly selected across the neighborhood, after which every 10th household was selected until the required sample was achieved. For qualitative data collection, purposive sampling was adopted to identify key informants, including community leaders, youth leaders, women's group heads, and government officials. This selection was premised on their knowledge, roles and engagement in flood risk governance and adaptation strategies with the communities.

While the sampling approach enhanced geographic spread within clusters, it may not include informal sub-tenancies or households temporarily absent during field surveys. To mitigate this, repeated visits were made at different times in the day (morning and evening) and replacement was only done following non-response.

3.5 Method of Data Analysis

The integration of both qualitative and quantitative data obtained from the field was analyzed to give a detailed analysis. The study combined qualitative and quantitative findings to build a full picture. For instance, if surveys show 70% of Makoko households use stilted homes, interviews were used to explain why and how effective the adaptation measure is. Interviews and FGDs was transcribed, while NVivo was used to code responses and identify themes. To make sense of our data, we utilized thematic analysis for qualitative data, while descriptive statistical analysis was used for quantitative data.

Table 2: Methodological Log Frame

S/N	Objectives	Sources of Data	Data Collection Approach	Statistical Analysis	Application of Data Analysis
1	Identify community-led flood adaptation strategies in Ajegunle, Makoko, and Ijora-Badia.	Primary data	Primary data was collected through the administration of a semi-structured questionnaire, key informant interviews, and focus group discussions.	Descriptive statistics were used to calculate frequencies and means using SPSS/Excel.	To identify and categorize community –led strategies and their prevalence across the slums.
2	Appraise the role of stakeholders in formulating, implementing, and appraising these strategies.	Primary and secondary data	Primary data collection was through semi-structured interviews and focus group discussions. Secondary data was collected through government /NGO reports on stakeholder involvement.	The method of data analysis was thematic analysis and content analysis.	To understand how stakeholders contribute to strategy development and implementation.
3	Evaluate the success or failure of these strategies.	Primary data	Household surveys, semi-structured interviews, filed observations	Method of data analysis to be employed is thematic analysis, descriptive statistics using SPSS/Excel	To assess how well strategies, work and what influence their success or failure.
4	Provide recommendations for strengthening community-led flood adaptation initiatives	Primary and secondary data	All primary data sources: surveys, interviews, focus group discussions, observations, and secondary data was used to synthesise findings.	Thematic synthesis was used to integrate qualitative themes and quantitative results using NVivo	To develop practical evidence-based recommendations to enhance flood adaptation.

4. Results And Data Analysis

4.1 Introduction

This section presents the findings that were made during the study. It presents background information concerning the socio-economic profile of the respondents, analyzes the community-based strategies in response to flooding, assesses the role played by different stakeholders and highlights the enabling and constraining factors of the community-led measures.

4.2 Socio-economic Characteristics of Respondents

A total of 1983 respondents were sampled for this study, with 51.5%, 31.5%, and 16.9% of them in Ajegunle, Ijora-badia, and Makoko coastal slum communities, respectively (Figure 4). Variables examined include gender, highest educational attainment, average monthly income, marital status, occupation, length of residence in the community, and household size.
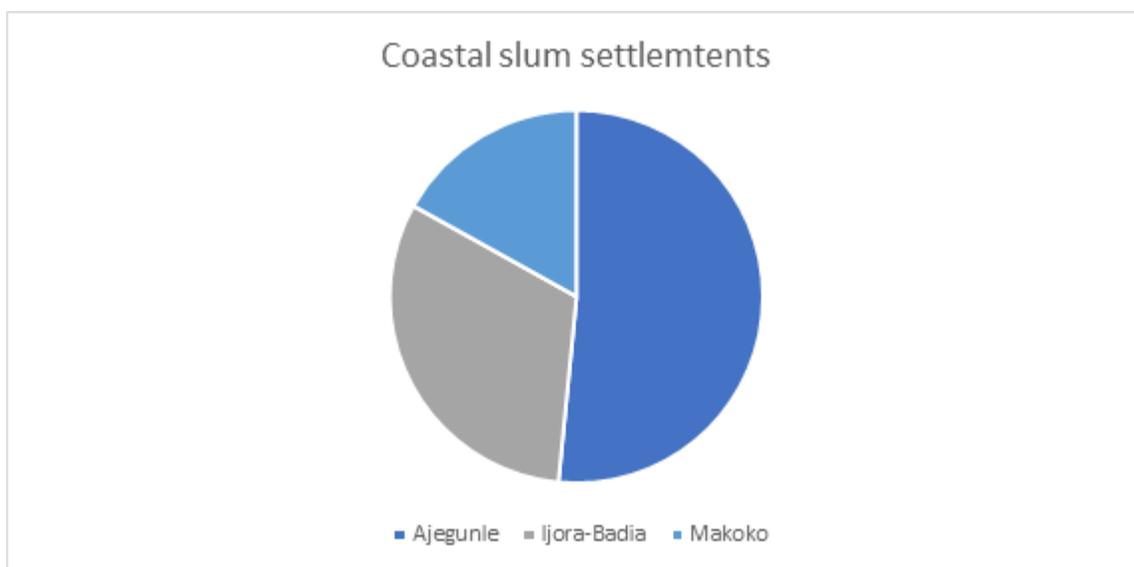
Figure 4: Distribution of respondents across study locations

As Table 4 shows, there were slightly more males (53.2%) than females (46.8% in the coastal slums, except Makoko who had more women (57.7%). The population was comparatively young: almost three-fifths (59.4%) were 25–34 years old, with Ajegunle having the highest percentage of the age group (67.5%). This reflects that the largest number of respondents were in their prime and active working ages, an age group capable of undertaking physical flood adaptation measures and community mobilization. Also, the largest number of respondents were married (82.2%), with very few separated (0.2%) or widowed (1.1%).

Educational qualifications ranged substantially among and within the coastal communities. Ajegunle was best educated with more than half (54.7%) having HND/BSc and almost a tenth (9.6%) having postgraduate qualifications, a pattern that may be due to longer settlement history and closeness to key employment hubs such as Apapa. This reveals a pool of formally trained people who may be able to offer technical services and lead community initiatives in their communities. In contrast, Ijora-Badia and Makoko are characterized by lesser qualifications, with 35.7% and 30.7% respectively having SSCE, and 20.2% and 40.2% respectively having informal or "other" schooling.

Household incomes were low in all the communities: more than half (55.3%) were below ₦50,000 per month, with hardly anyone earning above ₦300,000 except in Makoko (4.5%). This indicates low disposable incomes to finance permanent flood-proofing, with the consequent implication of needing external finance or community-based low-cost protection. Occupation in these areas was primarily informal; more than half (57.1%) were traders/artisans, while formal civil service was minimal (11.6%). Household stability was also observed to be high, particularly in Makoko (77.7% of them having lived more than 10 years there), compared with Ajegunle (23.7%) and Ijora-Badia (56.6%). Makoko also recorded the highest extended households with 21.4% having more than 10 people, compared with 4.9% in Ajegunle.

Table 3: Socio-economic Characteristics of Respondents

Characteristic	Variable	Ajegunle n (%)	Ijora-Badia n (%)	Makoko n (%)
Gender	Female	462 (45.2)	273 (43.7)	194 (57.7)
	Male	560 (54.8)	352 (56.3)	142 (42.3)
Age (years)	15–24	155 (15.2)	85 (13.6)	45 (13.4)
	25–34	690 (67.5)	316 (50.6)	172 (51.2)
	35–44	148 (14.5)	84 (13.4)	30 (8.9)
	45–54	75 (7.3)	62 (9.9)	17 (5.1)
	55+	27 (2.6)	62 (9.9)	11 (3.3)
Marital Status	Married	840 (82.2)	521 (83.4)	270 (80.4)
	Separated	0 (0.0)	0 (0.0)	3 (0.9)
	Single	182 (17.8)	100 (16.0)	46 (13.7)
	Widowed	0 (0.0)	4 (0.6)	17 (5.1)
Education	Primary	35 (3.4)	81 (13.0)	75 (22.3)
	Senior School Certificate Examination (SSCE)	192 (18.8)	223 (35.7)	103 (30.7)
	National Certificate of Education (NCE)/Ordinary National Diploma (OND)	104 (10.2)	58 (9.3)	6 (1.8)
	Higher National Diploma (HND)/Bachelor's Degree	559 (54.7)	110 (17.6)	14 (4.2)

	Postgraduate	98 (9.6)	27 (4.3)	3 (0.9)
	Others	34 (3.3)	126 (20.2)	135 (40.2)
Monthly Income (₦)	0 – 49,999	393 (38.4)	442 (43.2)	261 (77.6)
	50,000 – 149,999	591 (73.0)	175 (21.6)	44 (13.1)
	150,000 – 299,999	38 (61.3)	8 (12.9)	16 (4.8)
	≥300,000	0 (0.0)	0 (0.0)	15 (4.5)
Occupation	Civil Servant	134 (13.1)	86 (13.8)	11 (3.3)
	Fishery/Aquaculture	40 (3.9)	15 (2.4)	38 (11.3)
	Informal Sector	93 (9.1)	48 (7.7)	20 (6.0)
	Others	66 (6.5)	48 (7.7)	25 (7.4)
	Trader/Artisan	586 (57.3)	337 (53.9)	210 (62.5)
	Unemployed	103 (10.1)	91 (14.6)	32 (9.5)
Length of Stay	<1 year	34 (3.3)	6 (1.0)	3 (0.9)
	1–5 years	198 (19.4)	102 (16.3)	25 (7.4)
	6–10 years	548 (53.6)	163 (26.1)	47 (14.0)
	>10 years	242 (23.7)	354 (56.6)	261 (77.7)
Household Size	1–3	116 (11.4)	86 (13.8)	89 (26.5)
	4–6	606 (59.3)	318 (50.9)	129 (38.4)
	7–10	250 (24.5)	181 (29.0)	46 (13.7)
	>10	50 (4.9)	40 (6.4)	72 (21.4)

4.3 Residents' Flood Experience and Perception
4.3.1 Community Experience of Flooding in the Past Five Years

As illustrated in Figure 5, flood exposure was encountered by 87.1% of the residents of Ajegunle, in comparison to Ijora-Badia's 93.6% and Makoko's 98.2%. Nonetheless, there was an indication of no flood experience from around 12.9% in Ajegunle, 6.4% in Ijora-Badia, and 1.8% in Makoko. This indicates flooding is common to these coastal slums, with Makoko being the most threatened because of its exposure to the lagoon edge and a large absence of drainage.
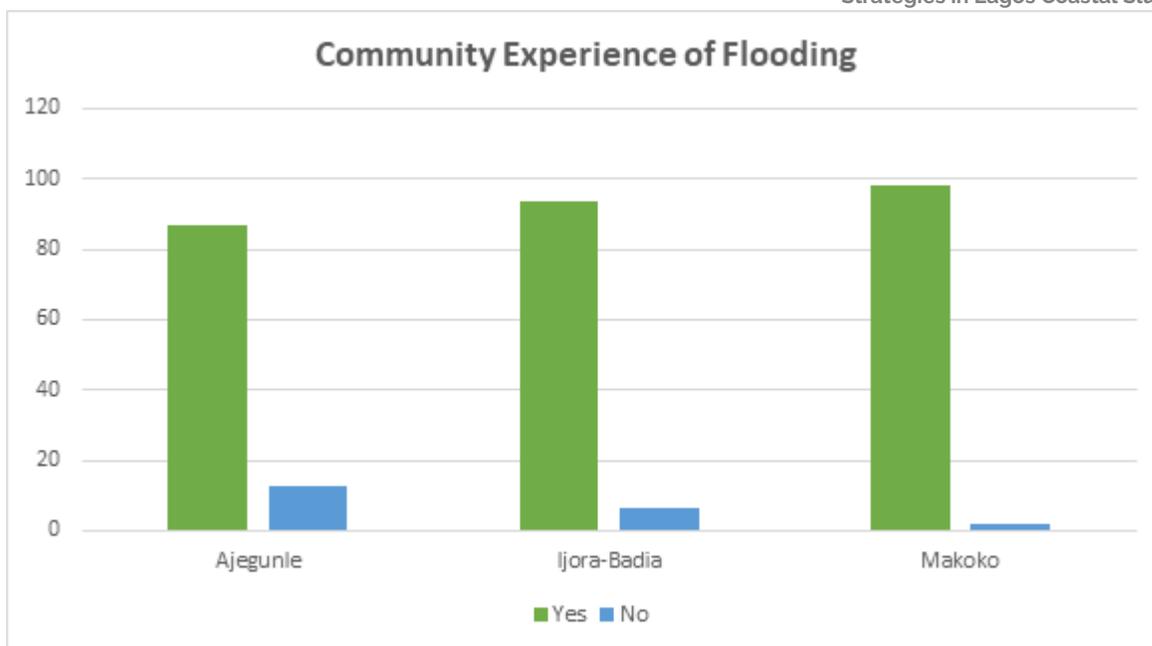
Figure 5: Community Experience of Flooding

4.3.2 Frequency of Flooding in the Community

Flooding is frequent in the three coastal communities (Figure 6). In Ajegunle, the majority of the respondents reported that floods are very frequent (61.3%), and frequent (25.9%). This indicates that flooding is a persistent hazard in the area, which may be linked to poor urban infrastructure and drainage in the area. In Ijora-Badia, 51.0% of the respondents reported that flooding is very frequent, while 35.5% of them claimed that it is frequent. Flooding was mostly described in Makoko as being frequent (51.5%) and very frequent (31.3%), while 17.3% stated it was occasional, and hence its normalization within this waterfront community.

The data generally confirms that flooding is a persistent hazard in the Lagos coastal slums, thus demanding consistent intervention. In Ajegunle, one of the respondents in the FGD stated that:

"We do not wait long before the next flood; it may come two or three times within a single rainy season. The gutters are always blocked, and the water gets in through the houses" (Personal communication, Ajegunle FGD04 participant, August 2025).
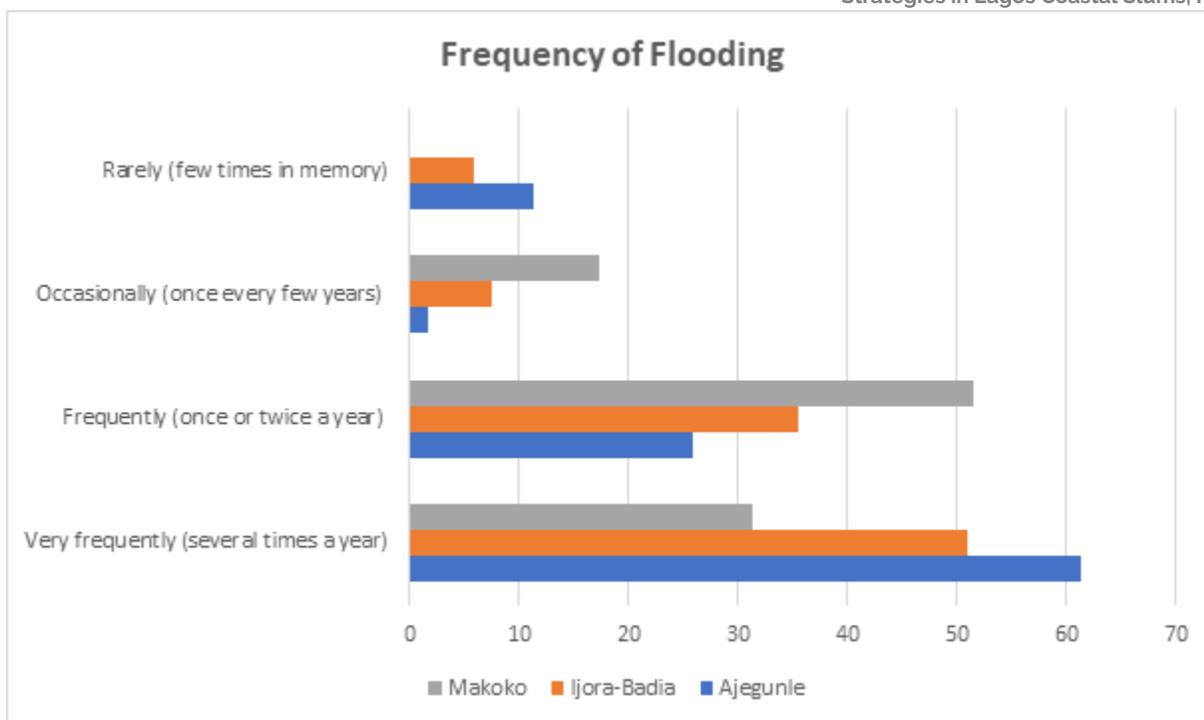
Figure 6: Frequency of Flooding in the Community

4.3.3 Perceived Causes of Flooding by Respondents

As depicted in Figure 7, respondents of the coastal communities revealed that heavy rainfall is the dominant inducer of flood, 93.2% in Ajegunle, 97.3% in Ijora-Badia, and 98.5% in Makoko, which affirms this. This highlights the exposure to Lagos's heavy tropical downpour. Respondents also significantly associate floods with inadequate drainage systems (92.1%, 95.5%, and 95.8% respectively) and choked gutters/canals (91.8%, 94.7%, and 85.7%), citing a common perception that infrastructure failure enhances rainfall effects. Another significant influencer was waste disposal. About half of the Ajegunle respondents (55.8%), and majorities of Ijora-Badia respondents (76.8%), and respondents from Makoko (81.0%) claimed that indiscriminate waste dumping aggravates flooding because it impedes flow.

 In Ijora-Badia, an FGD stated that:

Rain alone is not the only cause of flooding, but dirt and choked drains cause the water to stagnate and flow through houses. (Personal communication, Ijora-Badia FGD06 participant, August 2025).

An observation of the communities shows that poor waste disposal exacerbates flooding, as poorly disposed wastes clog canals, drains, and gutters, thus hindering the flow of water during rain. For instance, the canal (15 meters in width and 1.5 meters in depth) that

traverses the Ajegunle and Ijora communities is compactly filled with waste (Plates 6 and 7). Aside from dumping of waste and open defecation, the clogged canal is currently used for different purposes, including the spreading of tanned clothes by tanners, rearing cows, and farming of vegetables. Meanwhile, by design, water from other parts of Lagos is channeled to flow through this canal to the Atlantic Ocean. Hence, as the water gets blocked in these communities, it finds its way into available spaces, thus causing a flood. The flooded water also carries debris with it, including waste and feces, causing a serious environmental health crisis in the slum communities.

Geographical exposure also shaped perceptions. Living close to the coast/lagoon was attributed more to Ijora-Badia (38.7%) and Makoko (35.7%) than to Ajegunle (26.6%). Likewise, sea-level rise and high tides were blamed by 28.9% in Makoko and 15.7% in Ijora-Badia but only 5.3% in Ajegunle, signaling rising tidal exposure of waterfront communities. A negligible percentage blamed "other causes" (≤5%), such as sand mining or inadequate layouts of homes.
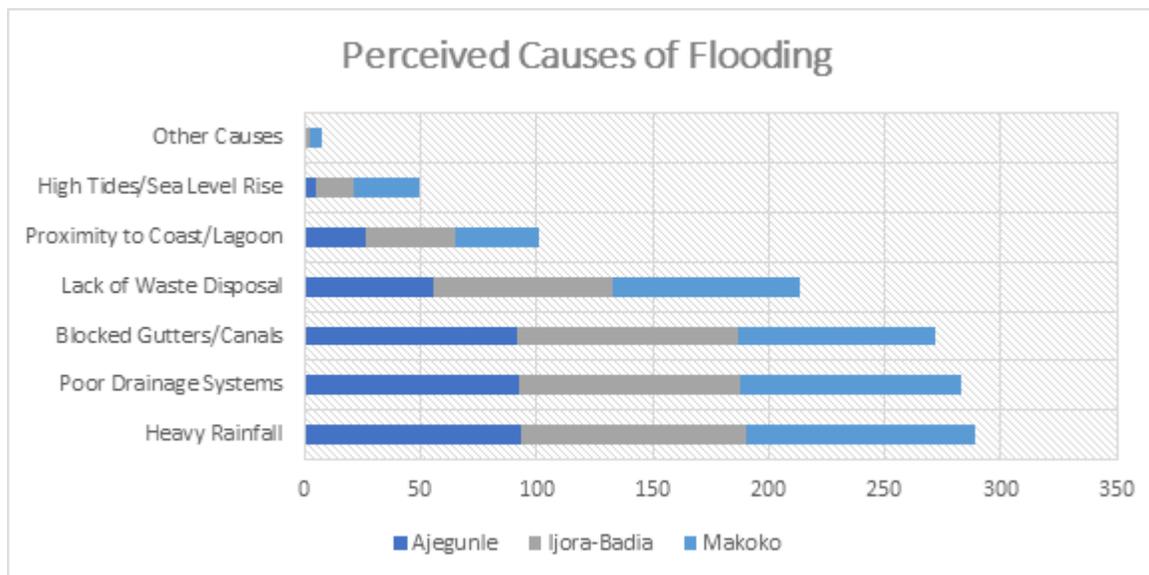

Figure 7: Perceived Causes of Flooding

Plate 6: Blocked Canal at Ajegunle Community
Source: Author's work, 2025

Plate 7: Blocked Canal at Ijora Community
Source: Author's work, 2025

4.3.4 Severity of Flooding

Flood severity perceptions differed across communities (Fig. 6). In Ajegunle, most residents described floods as very severe (44.6%) or severe (37.7%), showing frequent destructive impacts. Ijora-Badia was dominated by severe (67.2%) and some very severe (16.3%) reports, indicating serious but slightly less catastrophic damage. Makoko reported mostly severe (48.5%) and moderately severe (25.3%) floods, reflecting its long-standing adaptation to recurrent water events. Ajegunle faces the harshest impacts, Ijora-Badia experiences frequent but slightly less extreme events, while Makoko's housing adaptations may lessen destruction.

Perceptions of flood severity varied between communities (Fig. 4.4). In Ajegunle, most of the respondents reported floods as very severe (44.6%) or severe (37.7%), exhibiting regular destructive effects. Ijora-Badia was characterized by severe (67.2%) and a few very severe (16.3%) accounts, suggesting high but less disastrous destruction. Makoko accounted for mostly severe (48.5%) and moderate-severity (25.3%) floods, consistent with its long history of adaptability to repeated flood occurrences.
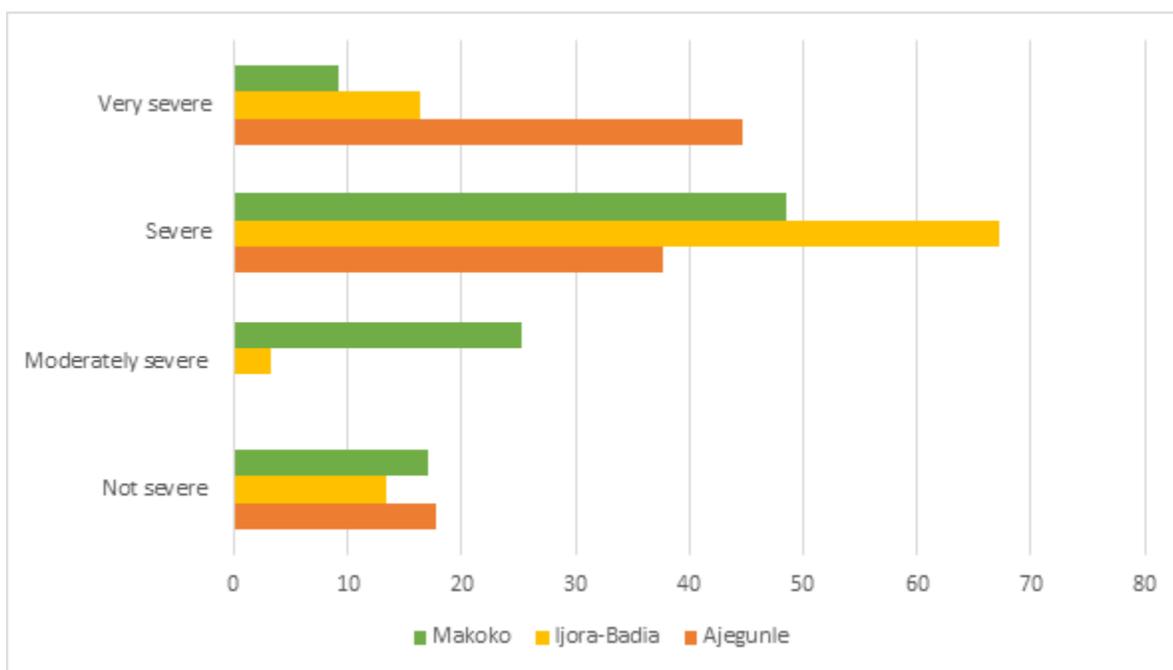

Figure 6: Severity of Flooding

4.3.5 Most Common Impacts of Flooding

Flooding in the coastal slums of Lagos is usually associated with wide-scale disruption (see Fig. 7). Property loss was generally common, with 84.2% in Ajegunle, 93.0% in Ijora-Badia,

and 92.0% in Makoko claiming it. This highlights the consequences of weak buildings and inadequate infrastructure in the slums. The livelihoods of residents are more impacted in Ijora-Badia (88.5%) and Makoko (89.0%) than in Ajegunle (59.3%), due to the informal, daily-wages characteristic of the former. Health impacts were experienced by 62.8% in Ajegunle, 85.9% in Ijora-Badia, and 83.9% in Makoko, demonstrating the unsafe water, sanitation, and high disease exposure. Other local losses, such as diminished cultural spaces, fishing tools, etc., were mostly reported in Makoko (8.9%).

Displacement was considerably less in Ijora-Badia (77.6%) and Makoko (71.4%) than in Ajegunle (41.8%), indicating higher housing resilience or scarce relocation space in Ajegunle. Disruption of schooling was also claimed by 21.3% in Ajegunle, 60.0% in Ijora-Badia, and 62.5% in Makoko.

One FGD participant in Ijora-Badia explained:

When the water comes, it stops all activities; we sell nothing, we do no work, and the children stay back home since the school is underwater. (Personal communication, Ijora-Badia FGD02 participant, August 2025).

Common to the three slums is the damage to properties. In the Ijora Badia community, houses continue to sink in water, with many currently sinking between the range of 1.5 meters and 2.3 meters above the ground level, against the minimum 3.0 meters (See Plate 8).
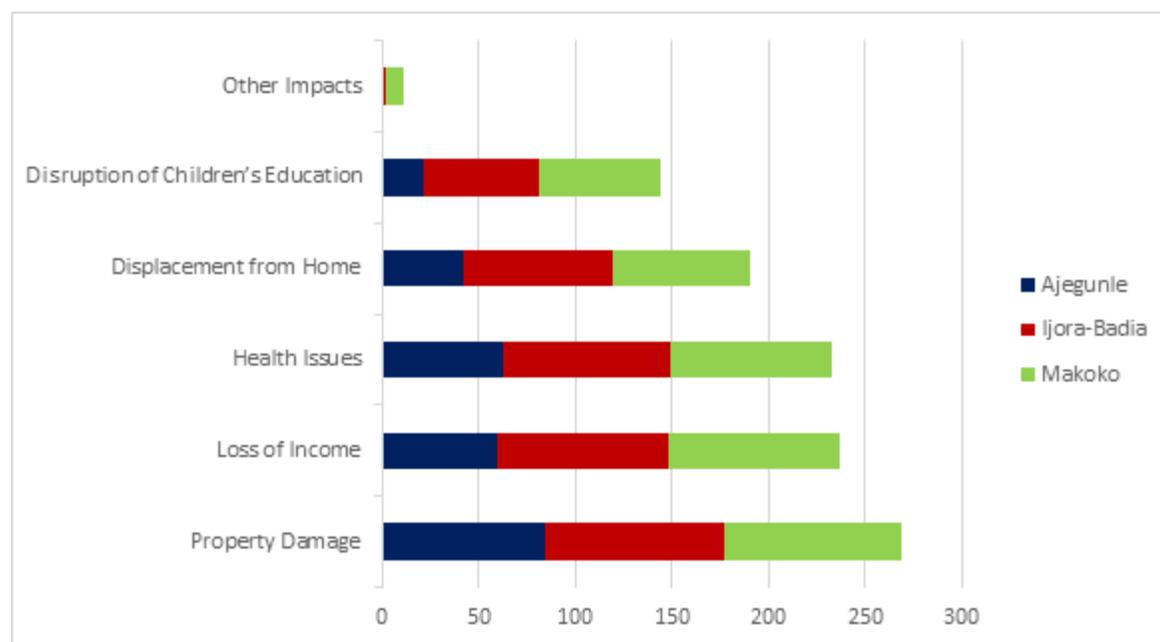

Figure 7: Most Common Impacts of Flooding

Plate 8: Waterlogged Building in Ijora Community
Source: Author's work, 2025

4.4 Community-Led Flood Adaptation Strategies

This section presents an overview of community actions used to adapt to or mitigate flooding in the coastal communities. These actions are critical to the resilience of vulnerable communities, particularly in areas with limited formal infrastructure.

As shown in Figure 8, all the coastal communities engage in self-help measures to adapt to flooding, albeit with different approaches for different cases. Cleaning of drainage was dominant in Ajegunle (77.4%), reflecting the dependence of the settlement on partially built but silted drainage systems. Respondents also raised foundations of buildings (55.6%), built temporary barriers (51.3%), and maintained stocks of essentials (40.8%). However, formal early warning systems (25.2%) and community savings/insurance groups (8.8%) remained negligible, showing poor institutional reinforcement of preparedness.

A community leader during an FGD in Ajegunle described: *We ourselves clear the gutters because if we wait for the government, the entire street will be flooding* (Personal communication, Ajegunle FGD01 participant, August 2025).

Ijora-Badia respondents reported drainage clearance (63.7%), temporary resettlement (51.7%), and moderate application of saving/insurance groups (18.1%) and innovative practices of floating structures (6.9%) as practices.

During an FGD, Ijora-Badia participants stated: *When it rains, and the water is rising, we relocate to friends' homes or corridors so as to be safe* (Personal communication, Ijora-Badia FGD01 participant, August 2025).

Makoko's unique adaptation profile was the strongest: almost all respondents employed coping efforts in the form of relocation (53.0%) and maintenance of drainages (49.7%), supplemented by floating homes/infrastructures (20.2%), and possessed an adaptive response to its lagoon environment. Occupants also raised foundations (40.8%) and built barriers (38.7%). A focus group participant in Makoko said: *Here, we live along with water." Some build houses to float or use planks to keep above water during flooding* (Personal communication, MakokoFGD01 participant, August 2025).
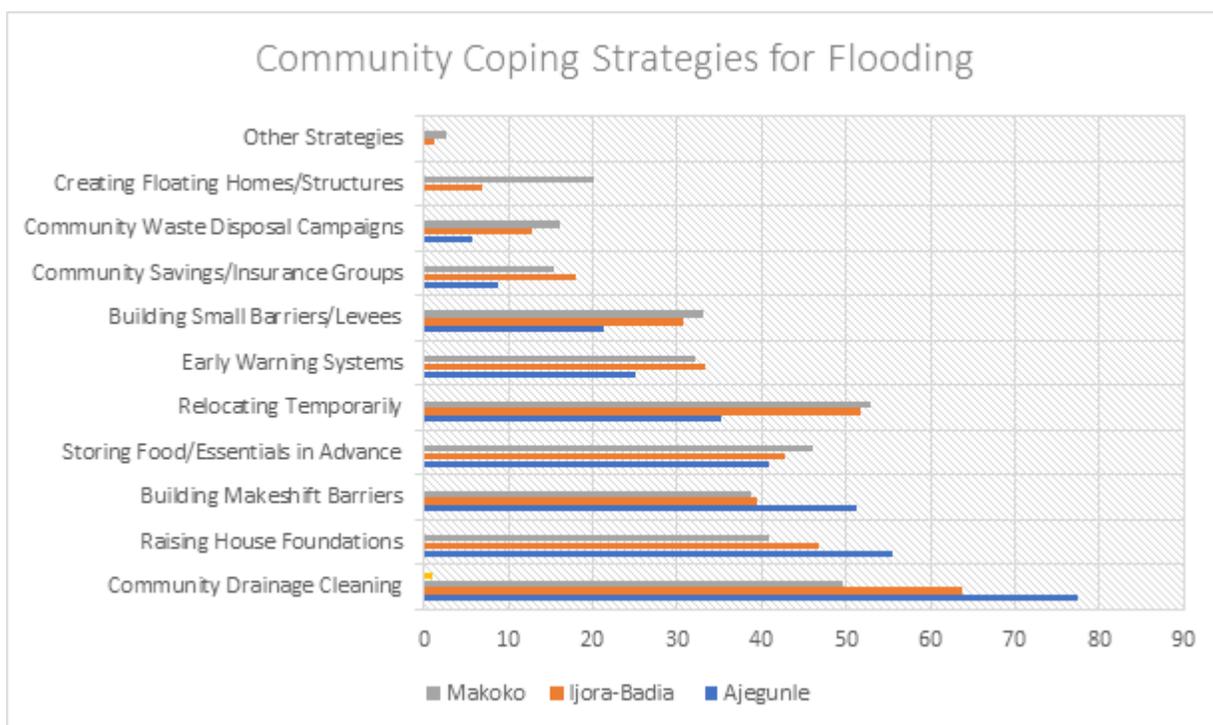
Figure 8: Community Coping Strategies for Flooding

4.4.1 Socio-Economic Determinants of Selected Flood Coping Strategies

This section highlights the findings of binary logistic regression models which tested the socio-economic and demographic variables related to the implementation of two key flood coping strategies (1) raising house foundations and (2) temporary relocation. The choice of these strategies was based on the fact that they were different in terms of prevalence across communities and had varying policy implications. The analysis establishes the household and contextual attributes that significantly forecast the probability of adopting either of the measures.

The regression analysis indicates that there are evident socio-economic and spatial disparities in flood coping measures across the coastal slums of Lagos. Household resources and settlement stability strongly relate to structural adaptation in terms of elevating house foundations. Households with higher incomes (earning NM300,000 and above monthly) were 3.40 more likely to raise foundations than the low-income households (AOR = 3.40; 95% CI: 2.552.92), while postgraduate educated households hav more than twice the odds of using the strategy than less educated ones (AOR = 2.15; 95% CI: 1.582.92). The long-term residents (>10 years) also had a high tendency to invest in foundation-raising (AOR = 2.33; 95% CI: 1.842.95).

The community setting strongly determined adaptation pathways. Compared to Ajegunle, there was less propensity of households in Makoko to raise foundations (AOR = 0.62; 95% CI: 0.453-0.85) but almost three times higher propensity of households to temporarily relocate during floods (AOR = 2.87; 95% CI: 2.12389). This was also evident in Ijora-Badia where odds of the relocation were much greater (AOR= 3.45; 95% CI: 2.55-4.67) than at Ajegunle, highlighting physical constraints which restrict in-situ adaptation.

Coping responses were also differentiated by socio-demographic factors. The male respondents were more inclined toward raising foundations (AOR = 1.45; 95% CI: 1.201.75), whereas larger households were much more inclined toward relocation, and households with 10 or more members had more than twice the odds of relocating (AOR = 2.05: 95% CI: 1.562.70). The older respondents (55+) presented more likelihood of structural adaptation (AOR = 1.50; 95% CI: 1.102.05) and less likelihood of relocating (AOR = 0.71; 95% CI: 0.540.94).

Overall, the results show that there is two-fold pattern of adaptation whereby households with high socio-economic status prefer in-place structural responses, while poorer, larger and spatially restricted households depend on short term relocation. This highlights the fact that community-based flood adaptation in informal settlements is not balanced and influenced by structural factors as opposed to being consistent in its effectiveness.

Table 4: Binary Logistic Regression Results for Determinants of Flood Coping Strategy Adoption

Characteristic	Predictors	Raising House Foundations AOR (95% CI)	Temporary Relocation AOR (95% CI)
Community	Ajegunle	1.00	1.00
	Makoko	0.62** (0.45–0.85)	2.87*** (2.12–3.89)
	Ijora-Badia	0.78 (0.58–1.05)	3.45*** (2.55–4.67)
Gender	Female	1.00	1.00
	Male	1.45*** (1.20–1.75)	0.85* (0.72–1.00)
Age (years)	15–24	1.00	1.00
	25–34	1.15 (0.87–1.52)	1.08 (0.84–1.39)
	35–44	1.32* (1.00–1.74)	1.12 (0.87–1.44)

	45–54	1.41* (1.05–1.90)	0.97 (0.74–1.27)
	55+	1.50** (1.10–2.05)	0.71** (0.54–0.94)
Education	Primary	1.00	1.00
	SSCE	1.18 (0.93–1.49)	1.05 (0.85–1.30)
	NCE/OND	1.28* (1.01–1.62)	1.05 (0.85–1.30)
	HND/BSc	1.89*** (1.49–2.40)	0.80* (0.65–0.99)
	Postgraduate	2.15*** (1.58–2.92)	0.72* (0.54–0.96)
Monthly Income (₦)	0–49,999	1.00	1.00
	50,000–149,999	2.05*** (1.66–2.53)	0.77** (0.64–0.93)
	150,000–299,999	2.85*** (2.18–3.73)	0.65*** (0.51–0.83)
	≥300,000	3.40*** (2.55–4.54)	0.51*** (0.39–0.66)
Length of Stay	<1 year	1.00	1.00
	1–5 years	1.42* (1.05–1.92)	1.15 (0.88–1.50)
	6–10 years	1.85*** (1.42–2.41)	1.22 (0.96–1.55)
	>10 years	2.33*** (1.84–2.95)	1.58*** (1.28–1.95)
Household Size	1–3	1.00	1.00
	4–6	1.07 (0.87–1.32)	1.42*** (1.17–1.72)
	7–10	0.92 (0.73–1.17)	1.89*** (1.52–2.35)
	>10	0.85 (0.62–1.16)	2.05*** (1.56–2.70)

Nagelkerke R^2 = 0.18 (Foundations), 0.16 (Relocation)

*Hosmer–Lemeshow p > 0.05 for both models. N = 1,983; Significance: ***p < 0.001; **p < 0.01; *p < 0.05*

4.5 Stakeholder Roles in Flood Adaptation

This section examines stakeholder participation in the designing, planning, and implementation of flood adaptation measures in the three coastal slums.

4.5.1 Stakeholders Involved in Flood Adaptation

Figure 9 indicates the dominance of community-based organizations (CBOs) as leaders of local-led flood adaptation, as claimed by 89.0%,75.0% and 85.1% of Ajegunle, Ijora-Badia and Makoko respondents. This may be due to the strength of neighborhood networks in pooling labor, coordinating actions, and closing operational deficits in areas with limited functional systems. Local government authorities were recognized by 61.2% of respondents, with comparable proportions in Ajegunle (62.8%), Ijora-Badia (60.8%), and Makoko (57.1%).

Religious organizations also feature in Makoko (67.9%), to a smaller extent in Ajegunle (50.8%), and Ijora-Badia (44.5%), and this indicates religious networks' impact on reaching waterfront communities who are deprived through aid. State authorities were referenced by 53.4% of Ajegunle, 46.1% of Ijora-Badia, and 31.0% of Makoko, while federal authorities were least active (42.9% Ajegunle compared to just 15.5% Makoko).

This indicates a vertical disparity, with higher levels of government being more prominent in institutionalized urban slums but less in extremely informal areas. The private sector was involved in Makoko (22.6%) relative to Ajegunle (11.9%), mirroring company outreach and community alliances in areas of flooding.

A key informant interview (KII) conducted in Ajegunle affirmed that:

Community associations are normally in charge of building drainages, dredging water courses and building temporary barriers of sandbags and woods to avert seasonal flooding (Personal communication, Ajegunle KII01 participant, August 2025).
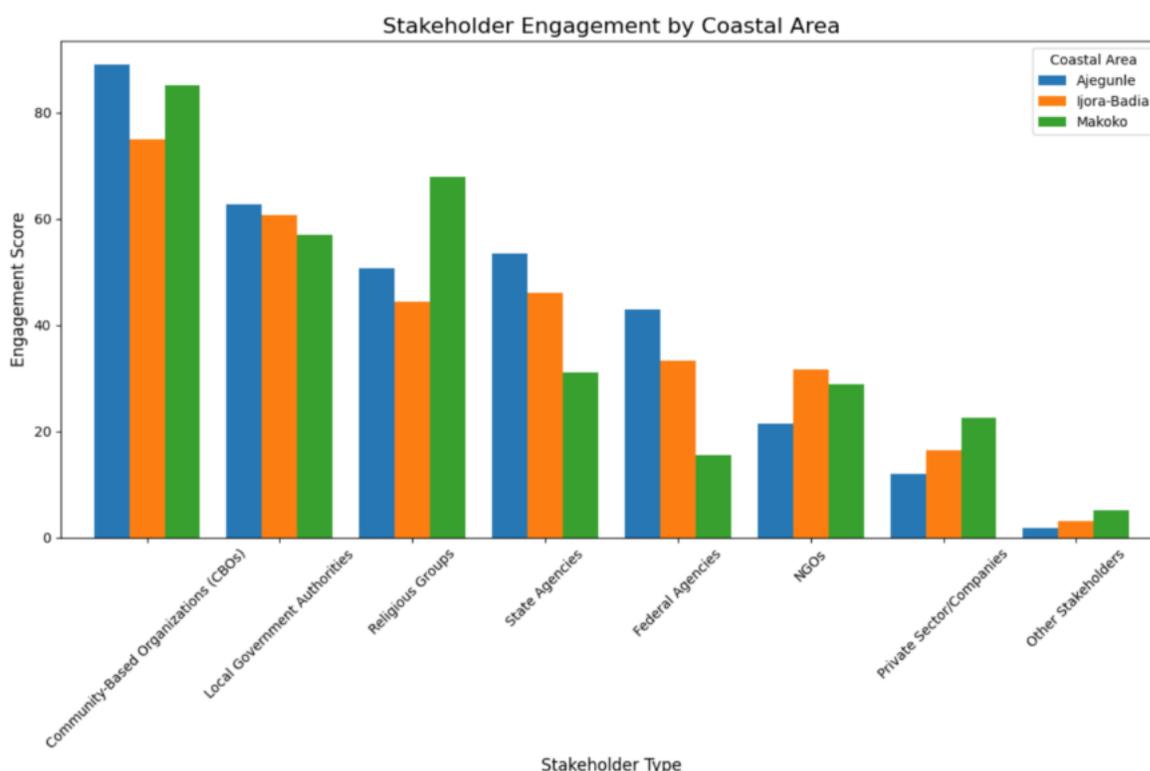
Figure 9: Stakeholders Involved in Flood Adaptation

4.5.2 Perceived Involvement of Stakeholders in Formulating Flood Adaptation Strategies

Respondents from the three coastal communities were asked to rate the involvement of different stakeholders in formulating flood adaptation measures on a 1-5 scale, where 1 = Not Involved and 5 = Highly Involved. Community-based organizations (CBOs) received the rank for maximum involvement from respondents (M = 3.85 ± 1.27), indicating the greatest interest of grassroot groups in flood adaptation planning. The local government authorities (M = 3.09 ± 1.40) and the state authorities (M = 2.89 ± 1.39) were rated as somewhat involved, whereas federal authorities (M = 2.69 ± 1.45) and NGOs (M = 2.54

± 1.40) were also less so. Respondents claimed that the private sector showed the least participation (M = 1.88 ± 1.23), and religious organizations also ranked low (M = 2.48 ± 1.28).

The outcome reveals that flood adaptation planning is largely community-centric, with participation of governments mostly at the local levels, but considerably less at the state and federal levels. The external stakeholders, such as NGOs and private businesses hold a limited and uneven influence, whereas religious networks, although with considerable social influence, are not highly active in official strategy formulation.

Table 5: Ranking of Stakeholders' Perceived Involvement in Formulating Flood Adaptation Strategies

Stakeholder Group	N	Min	Max	Mean	Std. Dev
Community-Based Organizations (CBOs)	1,983	1	5	**3.85**	1.27
Local Government Authorities (LGAs)	1,983	1	5	**3.09**	1.40
State Agencies	1,983	1	5	**2.89**	1.39
Federal Agencies	1,983	1	5	**2.69**	1.45
NGOs	1,983	1	5	**2.54**	1.40
Private Sector/Companies	1,983	1	5	**1.88**	1.23
Religious Groups	1,983	1	5	**2.48**	1.28

4.5.3 Perceived Involvement of Stakeholders in Implementing and Monitoring Flood Adaptation Strategies

Respondents from the three coastal communities were asked to rate the involvement of various stakeholders in implementing and monitoring flood adaptation strategies on a 1–5-point scale (1 = Not Involved, 5 = Highly Involved). Table 4.3 reveals that community-based associations (CBOs) are the major promoters of flood adaptation, with a mean score (M = 3.60). Government authorities at the local level hold a prominent but comparatively efficient position (M = 3.02), whereas the state (M = 2.94) and federal authorities (M = 2.74) are less involved at the community domain. Non-governmental organizations provide supporting assistance but are occasionally present (M = 2.60), whereas the private sector (M = 2.11) and religious groups (M = 2.30) are marginal participants. This data shows that community-level adaptation to flooding is prevalent, and there are supporting roles for external organization and formal institutions. Enhanced linkages between community-level organizations, governmental organization, and external stakeholders may thus reduce the existing shortfall in resources and enhance long-term resilience.

Table 6: Ranking of Stakeholders' Perceived Involvement in Implementing and Monitoring Flood Adaptation Strategies

Stakeholder Group	N	Min	Max	Mean	Std. Dev
Community-Based Organizations (CBOs)	1,983	1	5	3.60	1.11
Local Government Authorities (LGAs)	1,983	1	5	3.02	1.32
State Agencies	1,983	1	5	2.94	1.34
Federal Agencies	1,983	1	5	2.74	1.42
NGOs	1,983	1	5	2.60	1.38
Private Sector/Companies	1,983	1	5	2.11	1.34
Religious Groups	1,983	1	5	2.30	1.31

4.6 Effectiveness and Challenges of Flood Adaptation Strategies

This section examines how respondents perceive the performance of current community-led flood adaptation practices and discusses major challenges to sustaining them.

4.6.1 Overall Success of Community-Led Flood Adaptation Strategies

Across the coastal communities, a plurality of respondents assessed their adaptation measures as moderately or very successful, albeit with areas of clear weakness (Figure 9). In Ajegunle, the majority of the respondents (51.3%) claimed that the measures are moderately successful, while 28.3% stated they are very successful, with few assessing them as unsuccessful (7.3% not very successful; 11.4% not successful at all). In Ijora-Badia, it was a split picture with 44.3% assessing measures as moderately successful and 23.7% as very successful, but almost a third assessing them negatively (17.4% not very successful; 13.3% not successful at all).

Makoko was the most polarized: while 39.6% assessed efforts moderately successful and 19.9% highly successful, nearly 37% found them unsuccessful (18.2% not highly successful; 18.5% not successful at all). In particular, 1.5% indicated extremely successful efforts, probably anecdotally representing localized innovation such as on-water structures. In general, these findings imply community-led efforts are operational but uneven, with respondents in Ajegunle exhibiting the greatest confidence, Ijora-Badia exhibiting mixed results, and Makoko exhibiting successful creativity and fundamental systemic challenges.

An Ajegunle FGD participant thus stated: *We clear blockages from drains and elevate houses, but the flooding still happens. At least, it keeps the water from causing complete destruction every time.* (Personal communication, participant from Ajegunle FGD03, August 2025).

A community leader from Ijora-Badia in a KII also claimed that: *We coordinate the sandbags and evacuate when its flood, but occasionally the floodwaters are too powerful for us, and there is no backup from the council.* (Personal communication, Ijora-Badia KII01 participant, August 2025).

For the eyes-impaired residents in Ajegunle, flooding represents another form of precarity, as these individuals are forced to stay in their residences during flooding events. They are usually affected by thieves who steal their money and items whenever they leave, so they have decided to stay in their respective places. Claiming exclusion, they noted that communities often exclude them from flood alleviation plans, forcing them to organize themselves into savings clusters. These clusters operate with daily savings under the Slum Dwellers Federation Savings program, which makes them save enough to sandfill their homes in case of a flooding event. Annually, these impaired residents, who live in a cluster, spend as much as #500,000 (equivalent of 333USD) to sandfill their homes. During a flood, residents come together and live in the houses of their neighbors who are not affected by the flood. In many cases, for residents in Ajegunle, mosques and churches are used as muster points during flooding events, with many of them residing in these places until the flood is over. For those in Ijora, the muster points are nearby schools, which are relatively in high locations.

Political mobilization is another effort that is used by residents in the slums, particularly in Ajegunle. These residents organize themselves and negotiate with their local government officials. They intentionally join the party in government and vocal forces to negotiate for interventions in the flood-prone areas. In many cases, due to their large population, they insist that representatives at the local council should come from among them. This effort has yielded some results, for instance, the channeling of drainage to the Ajeromi road (Plate 1) was influenced by the Honorable representing their area in the state house of Assembly. Also, the cleaning of their drainage and other areas was informed by the local council, which the area is effectively represented through its community development Association. Hence, community-led efforts in the area are not only influenced by involvement but by active engagement of the community in local governance. This situation, however, is not the same in the Makoko community, where despite their political involvement they have not witnessed transformation in their area. The community reported a post-election disconnect between the communities and political leaders. Meanwhile, general community efforts towards flood management in the three slums are reportedly high during the electioneering period. This situation signals the political dynamics associated with disasters.
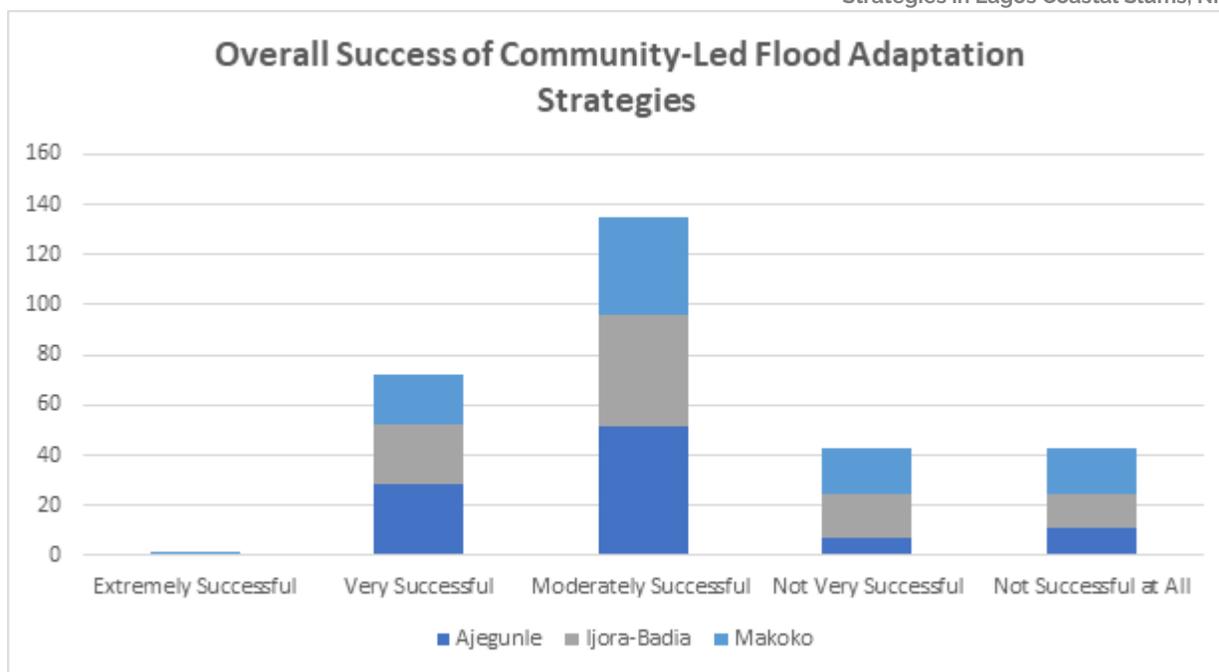
Figure 10: Overall Success of Community-Led Flood Adaptation Strategies

4.6.2 Factors Responsible for Successful Community-Led Flood Adaptation

As shown in Figure 10, community-led flood responses are ultimately successful due to internal leadership and community solidarity but with significant contextual differences between the three settlements. Success was most reliant on co-operation and unity (69.3%), good leadership (56.8%), as well as good planning and organization (55.6%), while fewer respondents claimed contributions of money (40.8%), external help (35.2%) as success factors. Very few (4.9%) referred to the provision of material or of manual work, indicating a community relying less on outside contribution than on organization of its own.

In Ijora-Badia, respondents again emphasized good leadership (73.0%), good planning (61.0%), and unity (62.1%), but less so on financial contributions (52.0%) and on outside stakeholder help (44.5%) than in Ajegunle. This indicates an interpretation of success relying on help from outside to complement local efforts. In Makoko, almost all factors were rated highly: good leadership (83.3%), group cohesion (71.4%), and planning (65.5%) stood out especially, as did funding assistance (59.5%) and external help (53.0%). Notably, material and manpower (26.2%) were much more central than in the other settlements, highlighting Makoko's major infrastructural and material needs.

An FGD from Makoko said:

We can coordinate ourselves; but if we are not going to procure supplies like timber, sandbags, and boats, we'll not be able to protect our homes. There is good leadership here; but we are lacking in the area of resources. (Personal communication, Makoko FGD03 participant, August 2025).
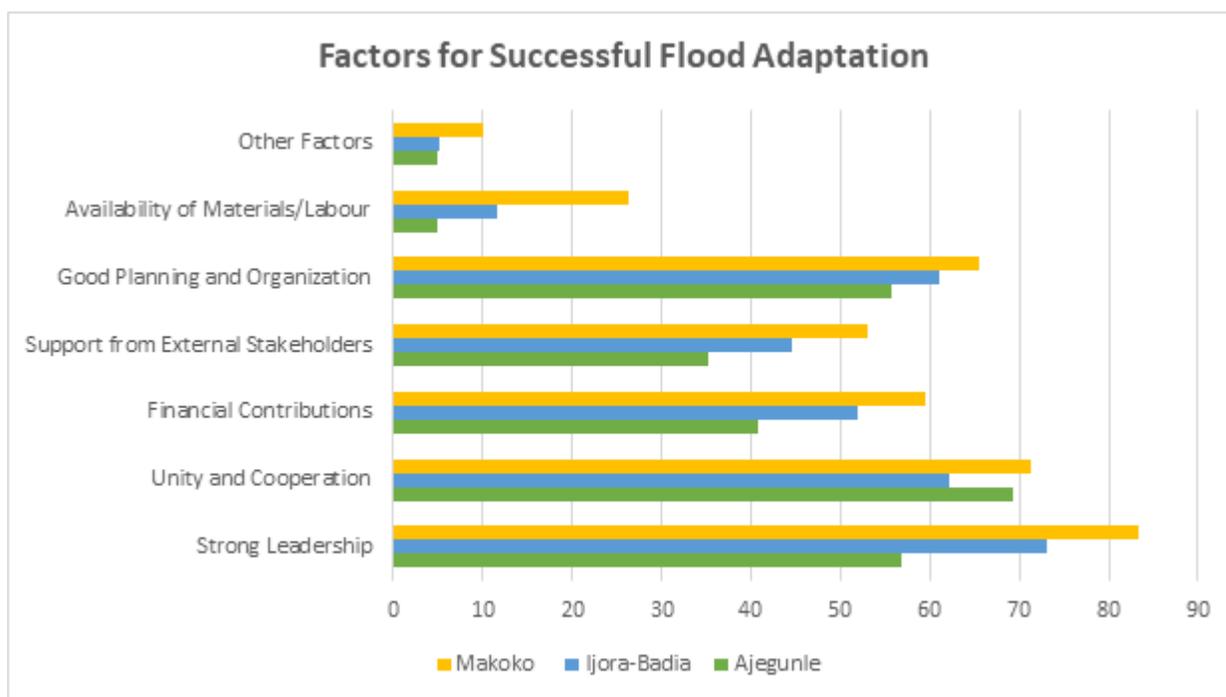
Figure 11: Factors Responsible for Successful Community-Led Flood Adaptation

4.6.3 Major Challenges in Implementing Flood Adaptation

Figure 12 shows that across the three communities, inadequate funds/resource base and supportive governance were noted as the major barrier to local-led flood adaptation: Ajegunle 71.3%/64.8%; Ijora-Badia 76.0%/70.4%; Makoko 83.3%/75.6%). Internal issues such as a scarcity of technical expertise, erratic participation, and conflict at the social domain, were most dominant in Ijora-Badia and considerably in Makoko, which also have to grapple with serious land constraint and a scarcity of supportive NGO assistance. Ajegunle was comparatively well-organized and positioned, but still struggle with poor funding and lack of institutional framework.

During an FGD, a Makoko resident noted:

"We organize and help each other, but without money, skills, and government backing, we can't do much." (Personal communication, Makoko FGD04 participant, August 2025).
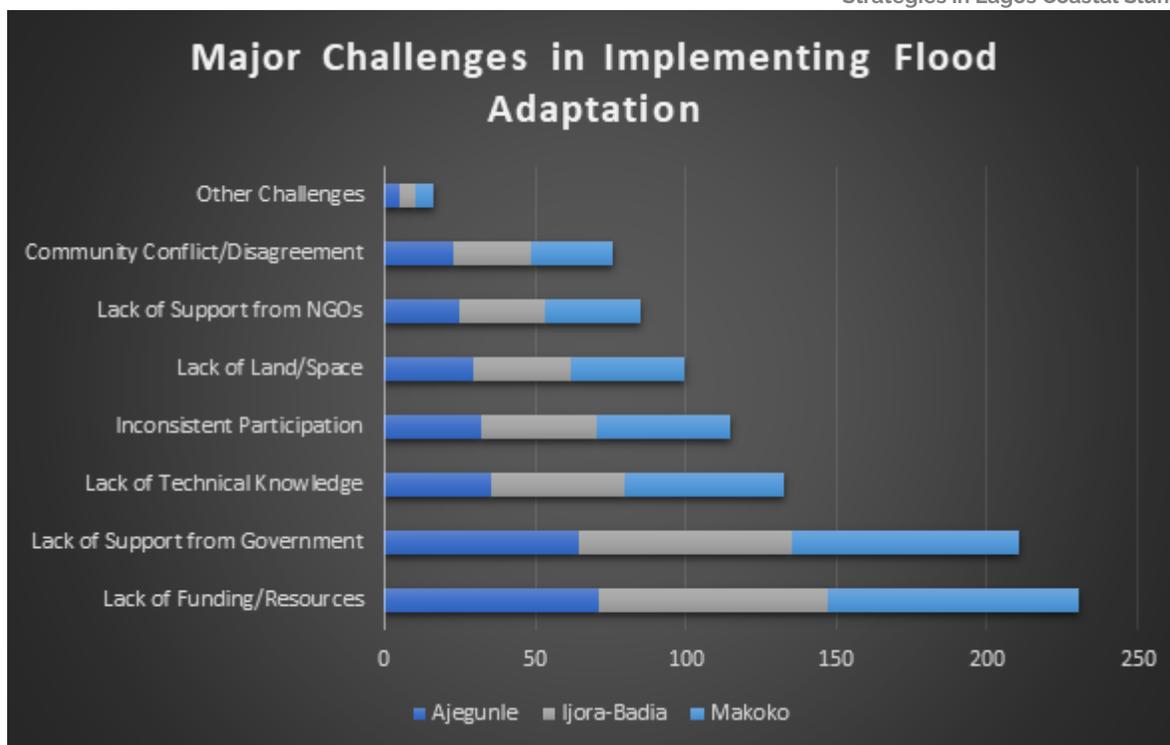
Figure 12: Major Challenges in Implementing Flood Adaptation

5. Discussion And Implications

This study examined how three Lagos coastal informal settlements (Ajegunle, Ijora-Badia and Makoko) experience flooding, react to it, and engage with formal and informal agents in shaping adaptation. The study established that residents in all three communities co-exist with flooding as a normal environmental danger and not an unusual threat. This fact bears witness to previous studies depicting Lagos coastal slums as areas of persistent waterlogging and frequent inundation triggered by rapid urbanization, poor drainage, and heavy rainfall (Adelekan, 2016; Ajibade & McBean, 2014). Its exposure is especially extreme for Makoko due to tidal influence and ecology of the lagoon edge, whereas Ajegunle and Ijora-Badia confront mostly blocked drainages and storm overflow.

However, these communities have robust place-based knowledge of flood causes, noting how closed canals, improper waste disposal and uncontrolled constructions can aggravate natural hazards. Such experiential knowledge comes in handy but is not well connected to formal planning. A noteworthy fact is the resilience of bottom-up measures of coping. Residents plan bi-annual drainage clearance, raise or fortify housing foundation, create temporary barriers, and stock essential items, and in a few instances temporarily move or try to use floating structures. They represent what Satterthwaite et al. (2020) refer to as "everyday risk management" being practical low-cost measures implemented where the

state does not supply infrastructure. However, they are mostly reactive and limited by financial means and technical expertise. Very few households have early warning systems, formal insurance, or engineered protection. Over-dependence on community savings and ad-hoc relocation puts households at risk of successive loss. This resonates with universal evidence that whereas social capital confers resilience, it will not replace systemic investment or risk avoidance infrastructure (Aldrich & Meyer, 2015). For professionals in the bult environment, this highlights the necessity to formalize and improve local initiatives through acknowledgement of existing networks, delivery of training on safe house renovation, and integration of community groups in early-warning and response systems.

Additionally, there is a strong governance of flood management at the grassroots level in the slum communities. In these communities, Community-based organizations (CBOs) are always the first and most trusted actors, coordinating clean-ups, pooling resources, and brokering assistance. Local government authorities are passive, reactive and poorly funding flood management projects in the slums. Religious organizations and the private sector also hold supportive and sporadic roles, providing comfort or a moral boost rather than regular risk prevention. This trend highlights the institutional imbalance observed in the literature on urban climate governance: sub-local actors have knowledge and will but have no official authority and means, while upper levels of government plan across the city but ignore informal areas (Nkwunonwo et al., 2020). Without closing this gap, adaptability stays confined and precarious.

 Where initiatives to reduce flood vulnerability hold promise in the Lagos coastal slums, they are founded on community solidarity, credible leadership and participatory organization. These social capitals are consistent with frameworks of resilience in which bonding social capital acts as a protective factor. Nonetheless, these communities identify the challenges of resource scarcity, inadequate government support and limited technical skills. Scarce land and periodic conflict also compromise long-term solutions, particularly for space-challenged Makoko. The implication is that social will alone is not enough as communities also need predictable funding streams, technical expertise and assured land rights to scale and sustain adaptation. Strategies that add to existing structures of leadership but complement them with external assistance such as micro-finance for resilient shelter or alliances for waste and drainage management are thus able to bridge this gap. Nonetheless, this research is constrained by mirroring context-specific realities, which may not encapsulate the experiences of other coastal communities prone to flood within Lagos or elsewhere. Also, data relied mostly on self-reported questionnaires, key informant interviews and focus group discussions, rich in community-wide perspectives, but liable to recall bias or social desirability. Cross-sectional study also constricts the capacity to evaluate shifts in adaptation capacity longitudinally.

Future studies can also employ ethnographic or longitudinal study designs to follow the progression of community-based approaches and to analyze long-term intervention impact. Comparative analyses of various informal and formal settlements can also shed light on how security of tenure, institutional arrangements and upgrading of cities influence resilience. Deeper technical analysis of the construction of houses, drainage and early warning systems adoption would also provide a solid base for engineering and policy interventions.

Overall, this study reveals resilient but overburdened communities: people innovate and cooperate, but long-term exposure and institutional abandonment leave them exposed. Enhanced resilience requires going from survival to supported, technically defensible, and institutionally recognized adaptation. Incorporating local understanding within official planning and securing continuous flow of resources might change flood management in Lagos' coastal slums from reactive coping to proactive building of resilience.

6. Conclusion

This study has shown that flooding in Lagos' coastal informal areas of Ajegunle, Ijora-Badia, and Makoko remain a recurrent, intense, and highly disruptive threat, fueled by a confluence of heavy rainfall, weak drainage infrastructure, poor waste disposal, and coastal location. In the context of such systemic threats, residents have developed community-led adaptation strategies such as drainage clearance, elevation of houses, temporary resettlement, and innovative solutions such as floating houses in Makoko. These strategies are spearheaded by community-based organizations (CBOs), to a lesser degree involving local governments, religious organizations, NGOs, while state and federal authorities remain inconsistently involved. The study concludes that social cohesion, efficient local leadership, and local organization are all key to resilience, but are restrained in their effect by limitations of funds and institutional back-up weakness. Overall, what the study reveals is the urgent value of inclusive flood risk governance which identifies, funds, and collaborates with local agents and bridges systemic infrastructural gaps.

6.1 Practical Application for Humanitarian Work and Recommendations

This research provides valuable lessons for both humanitarian and development agents operating in flood-prone and informal settlements. A major insight is the dominance of community-led resilience through Community-based groups (CBOs) who are in charge of drainage clearance, elevating houses, relocation assistance, and rallying of residents. Humanitarian programs should, therefore, capitalize on these structures by incorporating a provision for technical training, grant assistance, and basic equipment that can amplify their interventions and shore up local ownership of flood adaptation.

The research also identifies the significance of faith and customary institutions as credible community entry points and flood management. Religious groups and community leaders are highly entrenched in the social network and are likely to mobilize resources and provide moral assistance in the event of a flood crisis, particularly in highly exposed communities such as Makoko. Humanitarian agents can also capitalize on the networks to access marginalized homes, advocate for group action, and achieve participation in adaptation measures. Additional implication is the value of participatory planning and risk mapping. Engaging residents to map areas of flooding, clogged drainage systems, and corridors of safety for evacuation ensure localized and contextually relevant interventions. Also, innovative measures of coping exemplified in Makoko, such as floating structures, provide value to local adaptation technology to garner insights for shelter and housing solutions in humanitarian contexts.

To translate the above results to action, humanitarian organizations should give first emphasis to enhancing local capacity and leadership via training on flood hazard assessment, early flooding warning systems, and maintenance of sustainable drainage. To tackle the long-standing resource shortfall, there is the need for innovative financing along with micro-grants and community-based resilience funding or micro-insurance plans to facilitate quick bounce back following flooding events.

At a broader level, multi-stakeholder coordination needs to be institutionalized via periodic dialogue involving local governments, state agencies, NGOs, private sector players, and residents for planning and tracking interventions. Humanitarian assistance also needs to interweave emergency response and long-term urban development by calling for climate-resilient infrastructure, inclusive waste management, and safer forms of accommodation. These are also aligned with international commitments such as SDG 11 and 13, requiring inclusive, safe, and resilient cities as well as actions for immediate adaptation on climate change. Also, there is a particular need to invest in research and innovation, particularly in locally adaptable building material technologies, design for floating accommodation, and community-based flood insurance schemes, to mitigate exposure and create long-term resilience in high-exposure areas.

References

Adama, O. (2020). Slum upgrading in the era of World-Class city construction: the case of Lagos, Nigeria. *International Journal of Urban Sustainable Development*, *12*(2), 219-235.

Adedeji, J. A., Olusola, A. O., & Adetoro, A. A. (2023). Assessing urban flood vulnerability in Lagos: A geospatial approach. *Journal of Environmental Planning and Management*, *66*(5), 1023–1042.

Adegun, O. B. (2022). Climatic disasters within a flood-prone coastal slum in Lagos: Coping capacities and adaptation prospects. *International Journal of Disaster Resilience in the Built Environment*, *14*(2), 212–228.

Adegun, O. B. (2023). Flood-related challenges and impacts within coastal informal settlements: a case from Lagos, Nigeria. *International Journal of Urban Sustainable Development*, *15*(1), 1-13.

Adegun, O. B. (2023). Climatic disasters within a flood-prone coastal slum in Lagos: coping capacities and adaptation prospects. *International journal of disaster resilience in the built environment*, *14*(2), 212-228.

Adelekan, I. O. (2010). Vulnerability of poor urban coastal communities to flooding in Lagos, Nigeria. *Environment and Urbanization*, *22*(2), 433–450.

Adelekan, I. O. (2016). Flood risk management in the coastal city of Lagos, Nigeria. *Journal of Flood Risk Management*, *9*(3), 255-264.

Adelekan, I. O., & Asiyanbi, A. P. (2020). Urban flood risks and coping strategies in Lagos, Nigeria: A socio-ecological perspective. *Climate and Development*, *12*(7), 618–629.

Afolabi, O. J. (2020). Urbanization and flood risk in Lagos State, Nigeria: A review. *Journal of Sustainable Development*, *13*(4), 45–56.

Ajaero, U. (2024). *Eko Resilience (Re) Designing Residential Communities that Are Resilient for the Urban Poor in Lagos, The Coastal City* (Master's thesis, University of Maryland, College Park).

Ajibade, I., & McBean, G. (2014). Climate extremes and housing rights: A political ecology of impacts, early warning and adaptation constraints in Lagos slum communities. *Geoforum*, *55*, 76-86.

Ajibade, I., McBean, G., & Bezner-Kerr, R. (2013). Urban flooding in Lagos, Nigeria: Patterns of vulnerability and resilience among women. *Global Environmental Change*, *23*(6), 1714–1725.

Akpabio, E. M., Wilson, G., & Inyang, A. E. (2021). Environmental degradation and sustainable livelihoods in the Niger Delta: Implications for flood vulnerability. *Journal of Environmental Planning and Management*, *64*(10), 1789–1810.

Aldrich, D. P., & Meyer, M. A. (2015). Social capital and community resilience. *American Behavioral Scientist*, *59*(2), 254-269.

Aliu, I. R., Akoteyon, I. S., & Soladoye, O. (2021). Living on the margins: Socio-spatial characterization of residential and water deprivations in Lagos informal settlements, Nigeria. *Habitat International*, *107*, 102293.

Amankwaa, E. F., Boafo, Y. A., Spataru, C., & Carvalho, P. (2024). 'Don't call us vulnerable!': Rethinking flood vulnerability and community-led governance. *Journal of Urban Affairs*, 1-16.

Amoako, C., & Asamoah, B. (2024). Social capital and urban flood resilience: Lessons from informal settlements in Accra, Ghana. *Cities*, *146*, 104756.

Amoako, C., & Frimpong, P. D. (2021). Flood vulnerabilities and adaptation in Accra's informal settlements: The case of Agbogbloshie. *Urban Studies*, *58*(14), 2903–2920.

Anwana, E. O., & Owojori, O. M. (2023). Analysis of flooding vulnerability in informal settlements literature: mapping and research agenda. *Social Sciences*, *12*(1), 40.

Asaju, K., & Onwemele, A. (2021). Community-based adaptation to flooding in Lagos slums: Lessons for urban resilience. *African Journal of Environmental Science and Technology*, *15*(10), 412–422.

Barau, A., & Wada, A. S. (2021). Do-it-yourself flood risk adaptation strategies in the neighbourhoods of Kano City, Nigeria. In *African handbook of climate change adaptation* (pp. 1353-1380). Cham: Springer International Publishing.

Bhanye, J. (2025). A review study on community-based flood adaptation in informal settlements in the Global South. *Discover Sustainability*, *6*(1), 595.

Carrasco, S., & Dangol, N. (2019). Citizen-government negotiation: Cases of in riverside informal settlements at flood risk. *International Journal of Disaster Risk Reduction, 38,* 101195.

Chang, H., & Ross, A. R. (2024). Lagos, Nigeria. In *Climate Change, Urbanization, and Water Resources: Towards Resilient Urban Water Resource Management* (pp. 83-95). Cham: Springer International Publishing.

Chatterjee, M., & Sharma, R. (2023). Urban flood vulnerability and adaptation in Indian megacities: A case study of Mumbai's informal settlements. *Urban Climate, 49,* 101532.

Datta, R., Kairy, B., & Hurlbert, M. (2024). Addressing Wetland Flood Disasters Through Community-led Strategies in Bangladesh. *Asia-Pacific Journal of Rural Development, 34*(1), 98-112.

Diagne, M., & Sy, B. (2023). Community resilience to flooding in Dakar's informal settlements: Lessons from Pikine. *African Geographical Review, 42*(2), 215–230.

Dodman, D., Archer, D., & Satterthwaite, D. (2022). Responding to climate change in informal settlements: Lessons from the global South. *Environment and Urbanization, 34*(1), 3–20.

Echendu, A. J. (2022). Flooding, food security, and the role of local knowledge in urban adaptation: Lessons from Lagos, Nigeria. *Urban Climate, 41,* 101082.

Echendu, A. J. (2024). Applicability of indigenous knowledge and methods in flood risk management in a Nigerian city. *Natural Hazards Research, 4*(2), 239-245.

Ekoh, S. S., & Teron, L. (2023). Vulnerable spaces, unequal responses: Lessons for transformative climate resilience in Lagos. *Frontiers in Sustainable Cities, 5,* Article 929121.

Eshiet, I. (2018). Flooding and Adaptation: Coping Strategies of Slum Dwellers in Lagos, Nigeria. *Benin Journal of Social Sciences, 24*(1), 108-126. Faculty of Social Sciences, University of Benin, Benin, Nigeria.

Ezeibe, C. C., Oguonu, C. N., & Nwatu, S. I. (2024). Social capital and community resilience to flooding in informal settlements: Evidence from Nigeria's urban slums. *Journal of Urban Affairs,* 1–18.

Goyal, A., et al. (2024). Lessons from coastal slums of Global South toward flood resilience. In *Sustainable urban futures* (pp. 123–145). Springer.

Hossain, M. A., & Rahman, M. (2022). Community-based adaptation to urban flooding: Evidence from Dhaka's slums. *Journal of Environmental Management*, *305*, 114413. Huebner, S. (2025). Floating and stilted structures as strategies in coastal climate adaptation: local monsoon adaptation practices and implications for flood risk management. *Climate Risk Management*, 100719.

IPCC. (2021). *Climate change 2021: The physical science basis*. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.

James, S. (2024, March 27). Climate change: Lagos govt alerts residents in vulnerable location of possible flooding. *ThisDayLive*.

Klenk, N., Fiume, A., Meehan, K., & Gibbes, C. (2017). Local knowledge in climate adaptation research: moving knowledge frameworks from extraction to co-production. *Wiley Interdisciplinary Reviews: Climate Change*, *8*(5), e475.

Kundzewicz, Z. W., Kanae, S., Seneviratne, S. I., Handmer, J., Nicholls, N., Peduzzi, P., ... & Sherstyukov, B. (2014). Flood risk and climate change: global and regional perspectives. *Hydrological Sciences Journal*, *59*(1), 1-28.

Lawanson, O. I., Proverbs, D., & Ibrahim, R. L. (2023). The impact of flooding on poor communities in Lagos State, Nigeria: The case of the Makoko urban settlement. *Journal of Flood Risk Management*, *16*(1), e12838.

Lawanson, T., & Fadare, S. (2022). Urban governance and flood resilience in Lagos: Insights from informal settlements. *Cities, 120*, 103467.

Lee, J., Perera, D., Glickman, T., & Taing, L. (2020). Water-related disasters and their health impacts: A global review. *Progress in Disaster Science*, *8*, 100123.

Lee, N. (2024). Key Themes in Climate Adaptation: A Literature Review of Global and Regional Climate Change Policies. *환경정책, 32*(특별 2), 39-76.

Lossouarn, C., Pangare, V., Fenghua, S., Lentini, E. J., Loftus, T., Dickinson, M. A., ... & Daigo, Y. (2016). *Water, Megacities and Global Change*.

Mogaji, E. (2020). Population dynamics and urban growth in Lagos, Nigeria. *Journal of Urban Studies*, *12*(3), 45–60.

National Bureau of Statistics. (2023). *Demographic statistics bulletin 2023*. Abuja: NBS.

Nicholls, R. J., Hanson, S., Herweijer, C., Patmore, N., Hallegatte, S., Corfee-Morlot, J., Château, J., & Muir-Wood, R. (2008). Ranking port cities with high exposure and vulnerability to climate extremes: Exposure estimates. *OECD Environment Working Papers*, *1*.

Nkwunonwo, U. C., Whitworth, M., & Baily, B. J. S. A. (2020). A review of the current status of flood modelling for urban flood risk management in developing countries. *Scientific African*, *7*, e00269.

Ogbonda, U. J., & Okoli, C. G. (2023). Urban flooding and vulnerability of Port Harcourt's waterfront communities. *Journal of African Urban Studies*, *5*(1), 33–49.

Ogie, R. I., Adam, C., & Perez, P. (2020). A review of structural approach to flood management in coastal megacities of developing nations: Current research and future directions. *Journal of Environmental Planning and Management*, *63*(2), 127-147.

Ogunlesi, T., & Afolabi, O. (2021). Urban flooding and slum vulnerability in Lagos: A case study of adaptation in informal settlements. *Journal of African Cities*, *3*(2), 45–60.

Okoye, C. O., & Onwuzuligbo, C. (2022). Flood vulnerability and adaptation in Anambra's riverine communities. *Environmental Development*, *44*, 100732.

Okunola, O. H., & Adeaga, O. A. (2023). Social capital as a tool for flood risk management in Lagos, Nigeria: A community perspective. *Environmental Hazards*, *22*(5), 456–473. Oladunjoye, A. (2011). Lagos flood: 100 feared dead, property worth billions destroyed. *The Nation Newspaper*. Retrieved from https://thenationonlineng.net/

Olajide, O. A., & Lawanson, T. (2021). Climate change adaptation in Lagos: Lessons from informal settlements. *Environment and Urbanization*, *33*(1), 173–192.

Olokesusi, F. (2016). Lagos slum settlements and flood vulnerability: The case of Makoko. *Journal of Environmental Management*, *12*(3), 112–123.

Onifade, V. A., Yoade, A. O., Olatunji, S. A., & Husseni, M. A. (2023). Effects of flooding on urban lives and properties in Lagos, Nigeria. *International Journal of Infrastructure Research and Management*, *11*(2), 46-62.

Oni-Jimoh, T., & Liyanage, C. (2020). Urbanization and flood risk management in Lagos: A socio-technical perspective. *International Journal of Disaster Risk Reduction*, *49*, 101732.

Ouma, P., & Otieno, J. (2022). Flood risks and community resilience in Mombasa's informal settlements. *Climate and Development*, *14*(6), 567–580.

Ringo, J., Sabai, S., & Mahenge, A. (2024). Performance of early warning systems in mitigating flood effects. A review. *Journal of African Earth Sciences*, *210*, 105134.

Saad, R. (2021). Women and DRR in urban slums–building resilience through development. *International Journal of Disaster Risk Reduction*, *60*, 102264.

Satterthwaite, D., Archer, D., Colenbrander, S., Dodman, D., Hardoy, J., Mitlin, D., & Patel, S. (2020). Building resilience to climate change in informal settlements. *One Earth*, *2*(2), 143-156.

Simon, K., Diprose, G., & Thomas, A. C. (2020). Community-led initiatives for climate adaptation and mitigation. *Kōtuitui: New Zealand Journal of Social Sciences Online*, *15*(1), 93-105.

Sultana, R. (2020). *Greening the slums: Urban green infrastructure in Dhaka, Bangladesh* (Doctoral dissertation, University of Wollongong).

Syed, M. A. (2025). *Assessing climate vulnerability and resilience among urban female adolescents: a study in Dhaka's Korail slum* (Doctoral dissertation, Brac University).

UN-Habitat. (2020). *World cities report 2020: The value of sustainable urbanization*. United Nations Human Settlements Programme.

United Nations Environmental Programme (2024). Nigeria. Available at: https://www.unep.org/nigeria-0
World Population Review. (2025). Population of Nigeria. Available at: https://worldpopulationreview.com/countries/nigeria

Appendices

Appendix 1- Survey Sample

ASSESSMENT OF COMMUNITY-LED FLOOD ADAPTION STRATEGIES IN LAGOS COASTAL SLUM

Dear Respondent,

This questionnaire is strictly for academic purposes, aimed at obtaining information regarding "A Study on Assessment of Community-Led Flood Adaption Strategies in Lagos Coastal Slums, Nigeria". It will be appreciated if all the questions are answered sincerely as the information provided will be treated with the utmost sense of confidentiality.

Thank you.

Section A: Information on Socioeconomic Characteristics of Respondents
Coastal Area...
Local Government Area ....
Gender: (a) Male [   ] (b) Female [   ]
Age ....years
Highest educational level attained. (a) Primary School [   ] SSCE [   ] (b) N.C.E/OND [   ] (c). HND/BSc [   ] (d) Postgraduate [   ] (e). Others (specify)...........................
Average monthly income is ....
Marital status (a). Married [   ] (b) Single [   ] (c). Widowed [   ] (d) Separated [   ]
Nationality ....
Ethnicity (a) Yoruba [   ] (b) Hausa [   ] (c). Igbo [   ] (d) Others (specify)...........................
Religion (a) Islam [   ] (b) Christianity [   ] (c). Traditional [   ] (d) Others (specify)...........................
Occupation (a) Civil Servant [   ] (b) Trader/Artisan [   ] (c). Fishery/Aquaculture [   ] (d) Informal Sector Worker (e.g., casual labour) [   ] (e) Unemployed [   ] (f) Others (specify)...........................
How long have you lived in this community (a). Less than 1 year [   ] (b) 1-5 years [   ] (c). 6-10 years [   ] (d). More than 10 years
Household size (a). 1-3 [   ] (b) 4-6 years [   ] (c). 7-10 years [   ] (d). More than 10

Section B: Flood Experience and Perception
Has your community experienced flooding in the past 5 years? (a). Yes [   ] (b) No [   ]
If yes, how often do floods occur in this community? (a) Very frequently (several times a year) [   ] (b) Frequently (once or twice a year) [   ] (c). Occasionally (once every few years) [   ] (d) Rarely (very few times in my memory) [   ]
What are the major causes of flooding in your area? (Select all that apply) (a) Poor drainage systems [   ] (b) Heavy rainfall [   ] (c). Overflow from nearby water bodies [   ] (d) Blocked waterways due to waste (f). Lack of proper urban planning [   ] (g). Others (specify)...........................
How severe are the floods when they occur? (a) Not severe (minor water logging) [   ] (b) Moderately severe (some damage, disrupt movement) [   ] (c). Severe (significant property damage, requires temporary relocation) [   ] (d) Very severe (widespread destruction, dangerous) [   ]

What are the most common impacts of flooding on your household? (Select all that apply) (a) Property damage [   ] (b) Loss of income [   ] (c). Health issues (e.g., waterborne diseases) [   ] (d) Displacement from home (f). Disruption of children's education [   ] (g). Others (specify)...........................

What do you believe are the main causes of flooding in your community? (Tick all that apply)

Heavy rainfall	
Poor drainage systems	
Blocked gutters and canals	
Proximity to the coast/lagoon	
Lack of waste disposal	
High tides/sea level rise	
Other (please specify)	

Section C: Community-Led Flood Adaptation Strategies

Are there community-driven initiatives or strategies currently used to manage or adapt to flooding? (a). Yes [   ] (b) No [   ]

If yes, what strategies has your community adopted to cope with flooding? (Tick all that apply)

Raising house foundations	
Building makeshift barriers (sandbags, wood)	
Community drainage cleaning	
Relocating temporarily during floods	
Storing food and essentials in advance	
Early warning systems (e.g., community alerts)	
Building small temporary barriers or levees	
Creating floating homes or structures	
Community savings/insurance groups for flood losses	
Community-wide campaigns to discourage waste disposal in drains	
Other (Specify) _____	

Who typically organizes these community-led efforts? (Tick all that apply) (a) Community leaders (e.g., Baale, youth leaders) [   ] (b) Religious groups [   ] (c). Resident associations [   ] (d) Informal groups of neighbors (f). Local NGOs [   ] (g). Government agencies (h). International organizations (i) Others (specify)...........................

How effective are these community-led strategies in reducing flood impacts? a) Very effective [   ] (b) Somewhat effective [   ] (c). Not effective [   ] (d) Makes no difference

Section D: Stakeholder Roles in Flood Adaptation

Which stakeholders are involved in flood adaptation efforts in your community? (Tick all that apply)

Community-based organizations	
Local government authorities	
State agencies	
Federal agencies	
NGOs	
Private sector/companies	
Religious groups	
Other (Specify) _____	

Please rate the involvement of these stakeholders in formulating flood adaptation strategies (1 = Not Involved, 5 = Highly Involved):

S/N	Stakeholder Group	1	2	3	4	5
i.	Community-based organizations					
ii	Local government authorities					
iii	State agencies					
iv	Federal agencies					
v	NGOs					
vi	Private sector/companies					
vii	Religious groups					

Please rate their involvement in implementing and monitoring flood adaptation strategies (1 = Not Involved, 5 = Highly Involved):

S/N	Stakeholder Group	1	2	3	4	5
i.	Community-based organizations					
ii	Local government authorities					
iii	State agencies					
iv	Federal agencies					
v	NGOs					
vi	Private sector/companies					
vii	Religious groups					

What specific roles do community leaders play in flood adaptation efforts? (a) Mobilizing community members [   ] (b) Leading drainage and waste cleanup [   ] (c). Negotiating with government [   ] (d) Raising funds/resources [   ] (e). Others (specify)..........................

Section E: Effectiveness and Challenges of Flood Adaptation Strategies
Overall, how successful would you rate the community-led strategies in mitigating flood impacts? (a) Extremely successful [   ] (b) Very successful [   ] (c). Moderately successful [   ] (d) ot very successful [   ] (e). Not successful at all
What factors contribute to the success of these strategies? (Tick all that apply)

Strong leadership	
Unity and cooperation within the community	
Financial contributions from community members	
Support from external stakeholders	
Good planning and organization	
Availability of materials/labor	
Other (Specify) _____	

 What are the major challenges or obstacles in implementing these strategies? (Tick all that apply)

Lack of funding/resources	
Lack of technical knowledge	

Disagreement or conflict within the community	
Lack of support from government	
Lack of support from NGOs	
Lack of land/space to build solutions	
Inconsistent participation from community members	
Other (Specify) _____	

Section F: Recommendations

What recommendations do you have to strengthen community-led flood adaptation initiatives?...

What kind of support, if any, do you think the government should provide to your community to help with flooding?..

What kind of support is needed from NGOs or other groups to improve your flood adaptation efforts?...

Would you be willing to participate in future community flood management initiatives? (a). Yes [   ] (b) No [   ]

Thank you for your time and for sharing your valuable experiences with us. Your responses will be very helpful for our study.

Appendix II- Key Informant Interview Guide

Target Audience: Community Leaders (e.g., Baale, CDA chairman), NGO representatives, or a Local Government Official Working in The Community.
Interview Duration: 45-60 minutes
Interviewer's Name: _____
Community: _____
Date: _____

Part 1: Introduction and Context (5 minutes)
Introduction: "Good morning/afternoon. Thank you for your time. My name is [Interviewer's Name], and I am conducting a research study on community-led flood adaptation in Lagos coastal slums. Given your position as a leader/expert in this community, your insights are extremely valuable. The interview will be confidential and your responses will only be used for research purposes."
Consent: "Do you agree to participate in this interview?" [ ] Yes [ ] No

Part 2: Background and Flood Experience (10 minutes)
Could you please describe your role in the community and how you have been involved in responding to flooding over the years?
From your perspective, what are the primary causes of flooding in Ajegunle/Makoko/Ijora-Badia, and how has this problem evolved?

Part 3: Adaptation Strategies and Stakeholder Roles (15 minutes)
Objective: To explore strategies and stakeholder dynamics from an expert/leadership perspective
What are the key formal and informal community-led flood adaptation strategies that you have observed or been directly involved in?
Probe: Can you give a specific example of a strategy? What was its objective?
Can you describe the roles and responsibilities of the various stakeholders (e.g., community members, local government, NGOs, resident associations) in these initiatives?
What has been the most significant challenge in coordinating these stakeholders and their efforts?
How does the community's social structure and leadership influence its ability to respond to flooding?

Part 4: Evaluation and Factors of Success (15 minutes)
Objective: To evaluate success and the factors associated with it from an expert perspective
From your perspective, how would you evaluate the overall success of the community-led strategies? What defines success in this context?
What are the key factors that you believe determine whether a community-led strategy is successful or not?
Probe: Is it about resources, leadership, technical know-how, or external support?
Can you share an example of a particularly successful strategy and what made it so effective? What about an unsuccessful one?

Part 5: Recommendations (10 minutes)
Objective: To get recommendations for strengthening adaptation initiatives (RQ4 & Obj. 4).
What are the most critical recommendations you would make to strengthen community-led flood adaptation initiatives in Lagos's slums?
How can lessons learned from this community be shared with others facing similar challenges?
What kind of policy, funding, or technical support from external bodies would be most impactful for these initiatives?

Part 6: Wrap-up

Thank you: "Thank you again for your time and for sharing your valuable knowledge and experience."

Next Steps: "We will be using the information from this interview and others to complete our research and provide recommendations. Would you be interested in receiving a summary of our findings?"

Appendix III- Focus Group Discussion (FGD) Guide

Target Audience: A diverse group of 6-8 community members from Ajegunle, Makoko, or Ijora-Badia (mix of genders, age, and occupations).
FGD Duration: 60-90 minutes
Facilitator's Name: _____
Community: _____
Date: _____

Part 1: Introduction and Ground Rules (10 minutes)
Welcome: "Good morning/afternoon, everyone. Thank you for taking the time to be here today."
Introduction: My name is Dr Olanrewaju Samson and I am working on a research study about how communities here in Lagos manage and adapt to flooding. We are here to listen to your experiences and ideas. The purpose of this discussion is to understand the things you do to cope with flooding and what you think works and doesn't work.
Confidentiality: "Your participation is completely voluntary. Everything we say here is confidential—it will only be used for our research, and your names will not be mentioned anywhere. Please feel free to speak openly."
Ground Rules: "To ensure we have a good discussion, let's agree on a few rules:
Everyone's opinion is valuable.
Please let one person speak at a time.
You don't have to agree with others, but please respect their views."

Part 2: General Experiences and Perceptions of Flooding (15 minutes)
Objective: To get participants comfortable and establish a shared understanding of the problem.
To start, could each of you briefly share your most memorable experience with flooding in this community?
Probe: What was the biggest impact on your family or home?
In your own words, what do you think are the main reasons why this community floods so often?
Probe: Is it just heavy rain, or are there other factors?
How has flooding changed over the years? Is it more frequent or severe now than before?

Part 3: Community-Led Adaptation Strategies (20 minutes)
Objective: To identify and describe existing community-led strategies (RQ1 & Obj. 1).
Let's talk about how you all cope with this. What are some of the things you have seen people or groups in this community do on their own, without outside help, to deal with or prepare for flooding?
Probe: Can you describe a specific strategy? For example, raising your house foundations, using sandbags, or cleaning drains.
How did these ideas or strategies start? Who were the first people to come up with them?
Probe: Was it a community leader, a group of friends, or a resident association?
Are there any strategies that everyone in the community does, or are they done by just a few households?

Part 4: Stakeholder Roles and Collaboration (15 minutes)
Objective: To appraise the roles of different stakeholders (RQ2 & Obj. 2).
Beyond the residents, what other groups or people (e.g., government, NGOs, community leaders) have been involved in the efforts to fight flooding here?
What specific roles have these different groups played?
Probe: Did they provide money, materials, advice, or just moral support?

In your opinion, what has been the most helpful contribution from a stakeholder? And what has been the least helpful?

Part 5: Effectiveness, Success, and Challenges (15 minutes)
Objective: To evaluate success and the factors associated with it (RQ3 & Obj. 3).
Thinking about all the strategies you have mentioned, which ones do you think are the most successful in preventing or reducing flood damage? Why do you think they work so well?
What are the biggest challenges or obstacles that make it difficult for your community to implement these strategies?
Probe: Is it about money? Lack of agreement? Lack of support from the government?
How does the level of unity or conflict within this community affect your ability to cope with flooding?

Part 6: Recommendations (10 minutes)
Objective: To get recommendations for strengthening adaptation initiatives (RQ4 & Obj. 4).
If you were given a chance to make recommendations, what would be the first thing you'd suggest to improve how this community deals with flooding?
What kind of support, if any, do you think the government should provide to make your local strategies better and more sustainable? What about NGOs?

Part 7: Wrap-up
Thank you: "Thank you all for your time and for sharing your knowledge. Your perspectives are very important to our research."
Next Steps: "We will use your insights to help us understand how to better support communities like yours in adapting to flooding."