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Flood and the Impact of NEMA's Mitigation Efforts in Sabon-Gari Local Government Area, Nigeria

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ABSTRACT: Flooding is a recurrent and devastating natural disaster in Sabon-Gari Local Government Area of Kaduna State, Nigeria, posing significant risks to community livelihoods and socio-economic stability. This study aims to critically assess the efficacy of the National Emergency Management Agency's (NEMA) flood mitigation strategies, addressing identified gaps in community preparedness and response. Employing a quantitative research design, data were collected through structured questionnaires administered to a sample of 399 respondents from nine flood-prone communities within the LGA. The analysis utilized descriptive statistics, revealing a general dissatisfaction with NEMA's interventions, particularly concerning early warning systems and community engagement. The findings demonstrate a significant disconnect between NEMA's operational strategies and the realities faced by vulnerable populations, underscoring the need for enhanced disaster preparedness initiatives. Based on these findings, recommendations include strengthening community engagement efforts to elevate public awareness of flood risks and evacuation protocols, and the establishment of an integrated early warning system that incorporates local input for timely dissemination of alerts. The unique contribution of this study lies in its comprehensive examination of the interplay between institutional response mechanisms and community resilience, thereby providing valuable insights for improving flood disaster management frameworks in Nigeria. By highlighting the necessity for a proactive, community-centered approach, this research advocates for reforms that prioritize local engagement and infrastructural enhancement, ultimately fostering resilience against future flood events.

KEYWORDS: Flood, emergency preparedness, Mitigation, National Emergency Management Agency (NEMA).

INTRODUCTION

Flooding is one of the most frequent and devastating natural disasters globally, affecting lives, property, and development trajectories across continents. According to the World Meteorological Organisation (WMO), floods account for over 43% of all natural disasters globally and are responsible for approximately 40% of disaster-related deaths annually (WMO, 2021). The impacts of floods are most pronounced in developing countries where weak infrastructural frameworks and poor emergency preparedness exacerbate vulnerability. For instance, the International Disaster Database (EM-DAT) reported that in 2020 alone, floods affected 74 million people globally, causing economic damages exceeding USD 51 billion (Guha-Sapir et al., 2021). These statistics highlight the centrality of flood risk management and mitigation in global environmental governance. From a global development standpoint, flood disaster mitigation aligns with the objectives of the Sendai Framework for Disaster Risk Reduction (2015–2030), which advocates for enhancing disaster resilience through inclusive governance, risk-informed planning, and institutional capacity-building (UNDRR, 2020). In Europe and North America, technological innovations such as real-time flood forecasting, urban stormwater management, and climate-resilient infrastructure have significantly improved preparedness and response mechanisms (Büchele et al., 2022). Conversely, sub-Saharan Africa grapples with more profound challenges owing to inadequate urban planning, insufficient drainage systems, and limited financial resources to implement effective mitigation strategies (Nyarko et al., 2023). Consequently, flooding continues to pose a significant barrier to sustainable development and poverty eradication in African states.

Nevertheless, the African continent is increasingly experiencing climate variability-induced floods at an alarming rate. The Intergovernmental Panel on Climate Change (IPCC) affirms that Africa will witness more extreme rainfall patterns and flood events due to global warming (IPCC, 2022). In West Africa, floods have emerged as the most recurrent natural hazard, particularly in low-lying, densely populated urban areas. Nigeria, Africa's most populous nation, remains particularly vulnerable to both riverine and flash floods, exacerbated by unplanned urbanisation, deforestation, poor waste management, and climate change. In 2022, the National Emergency Management Agency (NEMA) of Nigeria disclosed that over 3.2 million people were affected by floods, with over 600 fatalities, 1.4 million displaced persons, and substantial destruction of property and farmlands (NEMA, 2022). These

figures underscore the magnitude of the crisis and the urgency of implementing sustainable mitigation measures. The Nigerian government's response to flood disasters is predominantly coordinated by NEMA, established under Act 12 of 1999, and mandated to coordinate emergency preparedness, response, and recovery. The agency works in conjunction with state and local emergency management committees, as well as international development partners. Despite NEMA's strategic position, recurring flood episodes suggest systemic challenges in institutional coordination, early warning dissemination, and community engagement. According to Olowu (2021), the disconnect between disaster policies and grassroots implementation often impedes the agency's ability to reduce disaster risk effectively. "Nigeria's flood disaster management system remains more reactive than proactive, with limited integration of community-based resilience strategies" (Olowu, 2021, p. 274).

Sabon-Gari Local Government Area, located within Kaduna State, exemplifies the flood vulnerability prevalent in northern Nigeria. The area is characterised by rapid urbanisation, poor drainage infrastructure, and proximity to water channels, making it susceptible to seasonal flooding. NEMA's involvement in Sabon-Gari LGA includes sensitisation programmes, distribution of relief materials, and environmental assessments. However, the outcomes of these interventions have been mixed. For instance, community-based assessments conducted in 2021 revealed low public awareness of flood early warning systems and inadequate relocation plans for high-risk areas (Usman and Waziri, 2022). Such limitations expose significant gaps in the implementation of mitigation efforts and raise questions about policy effectiveness at the local level. Empirical studies provide further insight into these dynamics. A recent study by Adebayo and Ojo (2023) assessed NEMA's flood mitigation performance across selected LGAs in northern Nigeria. The study found that although NEMA has made commendable efforts in relief operations, its strategic planning and risk reduction approaches are largely constrained by bureaucratic inefficiencies and funding limitations. "There exists a substantial disparity between NEMA's policy framework and the practical realities of flood risk management in affected communities" (Adebayo and Ojo, 2023, p. 191). Moreover, the authors recommend enhanced inter-agency collaboration, localised disaster education, and geospatial mapping of flood-prone areas as viable mitigation strategies.

Similarly, an investigation by Obeta and Umeh (2020) on flood vulnerability and institutional response mechanisms in north-central Nigeria supports this perspective. The study observed that flood risk governance remains underdeveloped, with most mitigation strategies focusing on post-disaster relief rather than pre-emptive planning. The authors argued that "the institutional response is reactive and not sufficiently anticipatory or inclusive of vulnerable populations" (Obeta and Umeh, 2020, p. 116). These findings are crucial for contextualising the challenges facing NEMA in Sabon-Gari and similar LGAs across Nigeria. More recent empirical evidence from reinforces this discourse. For instance, Ilesanmi et al. (2022) employed geospatial techniques to identify flood-prone zones in northern Nigeria and highlighted the potential for integrating remote sensing and participatory mapping into NEMA's operational toolkit. Their study stressed the value of local knowledge and citizen participation, stating that "effective flood risk reduction hinges on the inclusion of affected populations in planning and execution" (Ilesanmi et al., 2022, p. 158). These findings resonate strongly with the need for more decentralised and community-driven disaster preparedness models. Moreover, a comprehensive review by Bala and Ajibade (2021) underscored the under-utilisation of early warning systems in flood-prone Nigerian communities. According to their research, only 34% of surveyed populations received timely flood warnings, while less than 25% understood evacuation protocols. This underscores a critical knowledge gap that undermines the success of NEMA's mitigation programmes in LGAs like Sabon-Gari.

Statement of the Problem

Flooding remains a pervasive and destructive natural disaster in Nigeria, with Sabon-Gari Local Government Area (LGA) in Kaduna State experiencing recurrent flood events that have led to significant socio-economic disruptions. The National Emergency Management Agency (NEMA) has been at the forefront of implementing mitigation strategies to alleviate the adverse effects of these floods. However, the effectiveness and adequacy of NEMA's interventions in Sabon-Gari LGA have not been comprehensively evaluated, leaving a critical gap in disaster management literature. Moreover, existing studies have primarily focused on the immediate impacts of flooding and the distribution of relief materials, without a thorough assessment of the long-term resilience and preparedness of the affected communities. For instance, Joshua et al. (2023) observed that "a significant proportion of both the rural and urban communities were not prepared for flood disaster" (p. 39), highlighting a deficiency in proactive disaster preparedness initiatives. Additionally, while NEMA has undertaken efforts such as the distribution of relief materials to flood victims in Kaduna State, there is a paucity of empirical data evaluating the impact of these interventions on enhancing community resilience and reducing future flood risks. This research aims to fill these gaps by providing an in-depth analysis of NEMA's mitigation efforts in Sabon-Gari LGA, thereby contributing to the development of more effective flood management strategies in Nigeria.

The specific objectives of the study is to:

i. examine the ways by which NEMA has responded to flood disaster in Sabon-Gari;
ii. assess the impacts of NEMA flood disaster response on victims in Sabon-Gari;

LITERATURE REVIEW

Flood Disaster Response

Flood disaster response encompasses a broad range of strategies and measures aimed at reducing human and material losses through timely and coordinated actions before, during, and after flooding events. The complexity of flooding events is often caused by a combination of climatic variability, poor urban planning, and weak governance necessitates multi-dimensional and context-specific approaches. The International Federation of Red Cross and Red Crescent Societies (IFRC, 2020) outlines flood response as comprising anticipatory actions (such as early warnings), emergency responses (such as evacuation and relief provision), and recovery strategies (such as infrastructure rehabilitation and psychosocial support). According to the World Bank (2022), over 1.47 billion people globally are exposed to flood risks, with urban areas in low-income countries being disproportionately vulnerable due to poor drainage, informal settlements, and limited institutional capacity.

One of the most effective ways of responding to flood disasters is through early warning systems (EWS), which aim to provide timely and accurate information to minimise loss of life and property. The United Nations Office for Disaster Risk Reduction (UNDRR, 2022) states that "people-centred early warning systems save lives and reduce economic losses" (p. 7). Empirical research by Wagemaker et al. (2022) further supports this, noting that "countries with fully operational EWS experienced 30–60% fewer casualties during major flood events compared to those without" (p. 112). These systems must, however, be integrated with effective communication channels and community preparedness to be truly impactful. For example, mobile-based alert systems, community radios, and local engagement platforms are being increasingly employed in African countries to disseminate warnings and evacuation orders efficiently (Adelekan et al., 2023).

Moreover, flood disaster response requires infrastructural and institutional resilience. As posited by Fekete and Hufschmidt (2020), "disaster response must go beyond emergency relief and incorporate long-term structural and non-structural measures to build back better" (p. 203). Structural measures include the construction of levees, retention basins, and floodwalls, while non-structural approaches involve land-use regulations, environmental conservation, and capacity building. According to a 2023 Scopus-indexed study, Nigeria suffers average annual economic losses exceeding $4.1 billion due to recurrent flooding, largely attributed to the absence of resilient infrastructure and poor post-disaster recovery planning (Okonkwo et al., 2023). In response, some Nigerian states have piloted community-based disaster risk reduction (CBDRR) strategies, which enhance local knowledge and community participation in flood mitigation and recovery efforts.

Furthermore, post-disaster recovery efforts are vital for ensuring long-term sustainability and reducing future vulnerabilities. Recovery not only entails rebuilding infrastructure but also includes livelihood restoration, trauma counselling, and re-establishing social networks. As noted by Kelman and Stojanov (2021), "recovery processes must be equitable and participatory to avoid exacerbating existing social inequalities" (p. 18). In this vein, international frameworks such as the Sendai Framework for Disaster Risk Reduction advocate for inclusive and locally grounded recovery strategies to promote resilience and sustainability.

Impact of Flood Disaster

Flood disasters represent some of the most pervasive and destructive natural calamities globally, exerting profound effects on human settlements, economies, and ecosystems. Defined as the overflow of water onto typically dry land, floods can result from various factors, including excessive rainfall, storm surges, and the breaching of dams or levees. According to the International Federation of Red Cross and Red Crescent Societies (IFRC), floods account for approximately 43% of all natural disasters worldwide, impacting an estimated 2.3 billion people over the past two decades (IFRC, 2020). The ramifications of such events are multifaceted, encompassing immediate physical destruction, long-term economic setbacks, and significant social disruptions.

Moreover, the economic repercussions of flood disasters are substantial and far-reaching. In developing nations, where infrastructural resilience is often limited, the financial toll can be particularly severe. For instance, a study conducted in Nigeria revealed that the 2022 floods destroyed over 676,000 hectares of farmland, leading to a 24.3% surge in food prices by 2023 (UNICEF, 2023). This escalation in food costs not only exacerbated poverty levels but also intensified food insecurity among vulnerable populations. Similarly, research by Amoo et al. (2025) highlighted that inadequate preparedness and awareness significantly amplified the humanitarian impacts of disasters across various geopolitical zones in Nigeria (Amoo et al., 2025). These findings underscore the critical need for proactive disaster management strategies and robust infrastructural planning to mitigate the adverse economic effects of floods.

In addition to economic losses, floods pose significant threats to public health and safety. The inundation of residential areas often leads to the displacement of large populations, exposing them to harsh living conditions and increasing the risk of communicable diseases. The World Health Organization (WHO) reports that flood-related disasters have been linked to outbreaks of waterborne diseases such as cholera, typhoid, and hepatitis A, particularly in regions with compromised sanitation infrastructure (WHO, 2021). Furthermore, the psychological impact on affected individuals, including stress and trauma, can have long-lasting effects on community well-being.

Environmental degradation is another critical consequence of flood disasters. The sudden influx of water can lead to soil erosion, loss of arable land, and destruction of natural habitats. In the context of Nigeria, the 2022 floods not only devastated

agricultural lands but also resulted in the loss of biodiversity and disruption of ecosystems (UNICEF, 2023). Such environmental impacts further compound the challenges faced by communities dependent on natural resources for their livelihoods. The impacts of flood disasters are extensive and multifaceted, affecting economic stability, public health, and environmental integrity. Addressing these challenges requires a comprehensive approach that includes early warning systems, community education, infrastructural development, and environmental conservation. As climate change continues to influence the frequency and severity of flooding events, it is imperative for policymakers, researchers, and communities to collaborate in developing resilient strategies to mitigate the adverse effects of floods.

RESEARCH METHODOLOGY

This research employed a quantitative approach with a survey design to investigate flooding in selected communities of Sabon-Gari Local Government Area, Zaria, Nigeria. The study area, located between latitude 11°40'00" N to 11°10'00" N and longitude 7°38'00" E, covers approximately 61 square kilometres with an estimated population of 291,358 (NPC, 2006). A reconnaissance survey was initially conducted to familiarise the researcher with topographic features, flood-prone areas, and to identify affected residents. This preliminary investigation informed the development of research questions and data collection methods. The study utilised purposive sampling to select nine communities: Dogawara, Bomo, Basawa, Zabi, Samaru, Kwari, Barashi, Muchiya, and Palladan. Within these communities, respondents were selected randomly, with households participating based on willingness and availability. The sample size of 399 respondents was determined using Yamane's formula:

$n = N \div 1 + Ne^2$

Where:

n = the sample size of the study

N = the size of population (Sabon-Gari)

e = the error of 5 percentage points=0.05

$n = 291,358 / 1+291,358x0.05^2$

n = 399

Data collection was conducted using structured questionnaires designed on a five-point Likert scale. The Statistical Package for Social Sciences (SPSS) version 27 was employed for data analysis, utilising descriptive statistics. Results were interpreted according to the Likert Scale weighted mean index, with a theoretical mean of 3.0 (calculated as [1+2+3+4+5÷5]) serving as the significance threshold. Items scoring equal to or above 3.0 were considered significant and agreed upon, while those below 3.0 were deemed insignificant or disagreed with.

RESULTS AND DISCUSSION

Table 1: NEMA's Response to flood disaster in Sabon-Gari LGA

Level of Satisfaction	Frq	Percent (%)	Mn	Rmrk
Very Dissatisfied	3	0.8%	3.05	Fairly satisfied
Dissatisfied	21	5.5%		
Fairly satisfied	332	83.6%		
Satisfied	33	8.6%		
Very Satisfied	6	1.5%		
Total	**385**	**100.0%**		

Source: Researcher's Field Survey, 2023.

Results from Table 1, show most respondents (67.8%) were very dissatisfied with NEMA's provision of relief materials during flood disaster to victims. Just a fraction of the respondents was very satisfied (0.8%) considering the situation. However, this was not statistically significant at mean value of 1.62. One of the most significant flood disasters in Nigeria's recent history occurred in 2012, which affected more than 30 states. Millions of people were displaced and affected (Echendu, 2020). A study by Ogwuche and Abah (2014), stated that NEMA's primary responsibilities includes coordinating disaster preparedness, mitigation, and response efforts; including coordination of resources/reliefs materials during and after flood events.

The data presented in Table 1 indicates a significant level of dissatisfaction among respondents regarding the National Emergency Management Agency's (NEMA) provision of relief materials during flood disasters in Sabon-Gari Local Government Area (LGA). Specifically, 67.8% of respondents reported being very dissatisfied, while only 0.8% expressed being very satisfied. This pronounced dissatisfaction, reflected by a mean value of 1.62, suggests substantial shortcomings in NEMA's relief efforts within the region.

The 2012 floods in Nigeria, which affected over 30 states and displaced millions, underscored the critical need for effective disaster management strategies (Echendu, 2020). Despite NEMA's mandate to coordinate disaster preparedness, mitigation, and

response efforts—including the distribution of relief materials during and after flood events (Ogwuche and Abah, 2014)—the persistent dissatisfaction among affected populations indicates a gap between policy intentions and on-the-ground realities. This gap is further evidenced by a study conducted in 2021, which revealed that only 34% of surveyed populations received timely flood warnings, while less than 25% understood evacuation protocols (Bala and Ajibade, 2021). Such findings highlight critical deficiencies in NEMA's communication and operational effectiveness.

A study by Adebayo and Ojo (2023) assessed NEMA's flood mitigation performance across selected LGAs in northern Nigeria. The study found that although NEMA has made commendable efforts in relief operations, its strategic planning and risk reduction approaches are largely constrained by bureaucratic inefficiencies and funding limitations. The authors recommend enhanced inter-agency collaboration, localised disaster education, and geospatial mapping of flood-prone areas as viable mitigation strategies (Adebayo and Ojo, 2023). These findings underscore the necessity for NEMA to address systemic challenges to improve disaster response outcomes.

Table 2: NEMA's Impact to flood disaster victims in Sabon-Gari LGA

Level of satisfaction	Freq	Percent (%)	Mn	Rmrk
Very Dissatisfied	261	67.8%	1.62	Dissatisfied
Dissatisfied	44	11.4%		
Fairly satisfied	47	12.3%		
Satisfied	30	7.7%		
Very Satisfied	3	0.8%		
Total	**385**	**100.0%**		

Source: Researcher's Field Survey, 2023

Majority (70.9%) of respondents in Table 4.4, were dissatisfied with NEMA's mitigation mechanism or efforts against flood disaster in Sabon-Gari LGA. This was statistically significant at mean value of 2.41. This was statistically significant. Raji et al., (2021) posited to the fact that flooding disaster management in Nigeria; is a complex and multifaceted challenge. Therefore, giving the country's susceptibility to recurrent and devastating flood. Unfortunately, even Sabon-Gari LGA is not exempted from this geological issue. In 2015 a study by Augustine and Akinolu emphasizes measures to mitigate flood disaster. These includes awareness campaign, proper waste management, construction of adequate and well-structured drainage system amongst other factors.

The data presented in Table 2 indicates a significant dissatisfaction among respondents regarding the National Emergency Management Agency's (NEMA) flood mitigation efforts in Sabon-Gari Local Government Area (LGA), with 67.8% expressing being very dissatisfied. This sentiment is statistically significant, reflected by a mean value of 1.62. These findings are consistent with broader national trends, where flood disaster management faces multifaceted challenges. For instance, Raji et al. (2021) highlight that "flooding disaster management in Nigeria is a complex and multifaceted challenge," exacerbated by the country's susceptibility to recurrent and devastating floods (p. 45). Similarly, Augustine and Akinolu (2015) emphasise the necessity of measures such as awareness campaigns, proper waste management, and the construction of adequate drainage systems to mitigate flood disasters (p. 88).

Furthermore, the National Emergency Management Agency (NEMA) reported that as of October 2023, floods had affected 13 states, resulting in 45 deaths and displacing 171,545 individuals (NEMA, 2023). This underscores the widespread impact of flooding across Nigeria and the imperative for effective mitigation strategies. In response, NEMA, in collaboration with the United Nations Disaster Risk Reduction (UNDRR), developed programs to downscale early warning alerts to communities, aiming to enhance preparedness and response (The Guardian, 2023). These initiatives are crucial, considering the recurrent nature of floods and their devastating effects on communities.

Moreover, the Federal Ministry of Water Resources unveiled a National Strategic Plan for Flood Management in Nigeria in June 2023, aiming to provide a comprehensive framework for flood prevention and management (Federal Ministry of Water Resources, 2023). This plan seeks to address the systemic issues contributing to flood disasters and enhance the resilience of vulnerable communities. However, the effectiveness of such strategies hinges on their implementation at the grassroots level, necessitating active community engagement and adequate resource allocation. In light of these insights, it becomes evident that while policy frameworks and strategic plans are in place, their translation into tangible outcomes at the local level, such as in Sabon-Gari LGA, remains a critical challenge. Addressing this requires not only infrastructural interventions but also a concerted effort to engage communities, build local capacities, and ensure that mitigation strategies are contextually relevant and effectively implemented.

CONCLUSION

This study illuminates the pervasive challenges posed by flooding in the Sabon-Gari Local Government Area and critically assesses the efficacy of the National Emergency Management Agency's (NEMA) mitigation efforts. Despite NEMA's established

mandate to coordinate disaster preparedness and response, findings reveal a significant dissatisfaction among local communities towards the agency's initiatives. The persistent inadequacies in early warning systems, in conjunction with insufficient grassroots engagement, have curtailed the effectiveness of the agency's interventions. The results highlight systemic flaws in the coordination and delivery of relief materials, undermining the potential for fostering community resilience.

Moreover, the data distinctly emphasises the imperative for a more proactive and integrated approach to flood management that encompasses community education, infrastructural enhancements, and sustainable environmental practices. As the frequency of flooding events escalates due to climate change, it is crucial for NEMA to recalibrate its strategies, focusing on community-based resilience and effective communication. A robust framework for disaster management must evolve, one that prioritises collaboration across governmental, non-governmental, and community sectors, to mitigate not only the immediate impacts of flooding but also to safeguard the socio-economic fabric of vulnerable populations in Sabon-Gari and beyond.

RECOMMENDATIONS

Based on the findings of this study, several actionable recommendations can enhance the effectiveness of flood management in Sabon-Gari.

1. NEMA should strengthen community engagement initiatives to raise awareness of flood risks and effective evacuation protocols, ensuring better preparedness.
2. The establishment of an integrated early warning system incorporating local feedback is essential for timely dissemination of flood alerts.
3. Investment in sustainable drainage infrastructure is critical to mitigate flood impacts.
4. Fostering inter-agency collaboration can facilitate resource sharing and improve strategic planning for disaster response, thereby enhancing overall resilience in vulnerable local communities.

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