

Assessing Community Perspectives on Flood Preparedness and Mitigation Strategies in Nigeria

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Abstract— This study aims to assess the perspectives of 200 respondents in Makurdi town, Benue State, Nigeria, on flooding using a Likert scale questionnaire. Flooding is a recurring challenge in the area, impacting lives and properties and necessitating effective flood management and mitigation strategies. The questionnaire covers various aspects of flooding, including frequency, property damage, flood warning systems, government efforts, climate change impact, community preparedness, and community-based initiatives. The findings reveal that flooding frequently occurs in Makurdi, emphasizing the urgency for comprehensive flood management strategies. Respondents acknowledge the personal impact of flooding, highlighting the need for effective mitigation measures. Improvement is needed in flood warning systems and government efforts to prevent flooding. Climate change's role in increasing flooding is recognized, emphasizing the importance of climate-resilient strategies. Community awareness and education are essential for reducing flood impacts, while public-private partnerships offer opportunities for collaborative flood management initiatives. The media's role in disseminating flood-related information is crucial. Stricter enforcement of building codes in flood-prone areas and community-based initiatives can contribute significantly to effective flood management. The implications of this study underscore the importance of community engagement, climate-resilient measures, and improved communication. Policymakers and local authorities can use these findings to develop targeted interventions for building a more flood-resilient Makurdi. By adopting proactive measures and community involvement, the town can enhance preparedness and adaptability to future flood scenarios, fostering a safer and more sustainable environment.

Index Terms— Community, Flood, Mitigation Strategies, Nigeria

I. INTRODUCTION

FLOODING, a catastrophic natural phenomenon with the potential to wreak havoc on communities worldwide, has become an all too familiar and relentless adversary for the inhabitants of Makurdi town, nestled within the Benue State of Nigeria. Often leading to irreversible ramifications for human lives and property, the persistent threat of flooding has gravely jeopardized the prosperity and well-being of the residents and local infrastructure in this region [1].

Recognizing the urgent need for a comprehensive

understanding of the nuanced perspectives and experiential insights of the community members concerning the recurring menace of flooding, a rigorous investigation was initiated. This pivotal study, poised to delve deep into the intricate fabric of Makurdi's societal framework, endeavors to encapsulate the multifaceted dimensions of the flooding predicament, seeking to elucidate its far-reaching impacts and the complex challenges it presents [2].

Leveraging the potency of a meticulously constructed Likert scale questionnaire, meticulously designed to encapsulate the comprehensive scope of the flood-related conundrum, the study sought to glean the perceptions and sentiments of a diverse cross-section of 200 respondents within the Makurdi community. Through a comprehensive exploration of a multitude of critical themes, the questionnaire cast its net wide, embracing topics ranging from the haunting frequency of inundations to the devastating toll on personal properties, the efficacy of extant flood warning systems, the efficacy of governmental countermeasures, the looming specter of climate change, the tenacity of community preparedness, and the instrumental role of grassroots initiatives in fortifying the community's resilience against the ravages of flooding [3].

Amidst this labyrinth of perspectives and insights, the overarching aim of this study remained resolute – to unravel the intricate web of challenges and opportunities, thereby furnishing a compass for policymakers, local administrative bodies, and pertinent stakeholders to steer a concerted and strategic response to the unrelenting threat of flooding [4]. The insights gleaned from this study hold the promise of informing the formulation of targeted, data-driven interventions and policies, set to pave the way for the fortification of Makurdi's defenses against the perennial onslaught of flooding, with a collective aspiration of securing the safety and well-being of its populace [5].

Envisioned as a cornerstone of collective efforts aimed at assuaging the deleterious effects of flooding, fostering an environment of heightened communal awareness, and nurturing a robust culture of proactive engagement, the findings of this study are poised to serve as a linchpin in the relentless pursuit of a more resilient and flood-resilient Makurdi [5]. Fuelled by the conviction that knowledge is the most potent armor in the fight against natural calamities, this research endeavor holds the promise of catalyzing the metamorphosis of Makurdi into a bastion of resilience and sustainability, impervious to the capricious whims of flooding and primed to emerge triumphant in the face of adversity [5].

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II. METHODS

A. Study Location and Context

The research was conducted in Makurdi, the capital town of Benue State, Nigeria, in the North Central region (See Fig. 1). Makurdi experiences two distinct seasons: a rainy season spanning from April to October and a dry season from November to March. Its proximity to the Benue River renders the town susceptible to flooding, particularly during the rainy season, leading to potential disruptions and challenges for the community. With a diverse population and a prominent agricultural presence, Makurdi is a significant administrative, commercial, and educational hub within the state. Understanding residents' perspectives on flooding was imperative for formulating effective flood management strategies specific to the town's unique context.

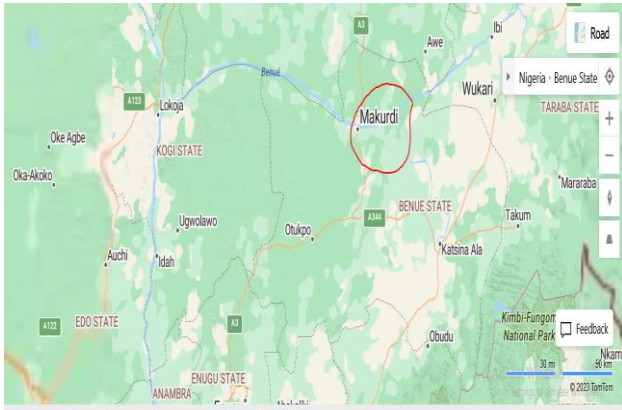


Fig. 1. Map of the study area. Source [11].

B. Research Design

A quantitative research approach was employed for this study, utilizing a structured Likert scale questionnaire to collect data from the residents of Makurdi systematically. The questionnaire was designed to capture a comprehensive spectrum of opinions and viewpoints regarding various aspects of flooding and its implications for the community. A Likert scale ranging from 1 to 5 enabled the respondents to express their agreement or disagreement with specific statements concerning flooding in the region.

C. Sampling Technique

A purposive sampling technique was utilized to select a diverse and representative sample of 200 respondents from various demographic and socio-economic backgrounds within the community. The model was carefully chosen to ensure a balanced representation of different perspectives and experiences related to flooding in Makurdi.

D. Data Collection

The data collection process involved the distribution of the standardized Likert scale questionnaire to the selected respondents. The respondents were instructed to rate their agreement with each statement based on their experiences and perceptions of flooding in Makurdi. The survey administration was conducted in person to facilitate a deeper understanding of the respondents' perspectives and to clarify any potential ambiguities in the questionnaire.

See Table I for the instrument's item.

TABLE I. QUESTIONNAIRE USED IN THE STUDY

Code	Items/ Questions
Q1	Flooding in Makurdi is a frequent occurrence.
Q2	Flooding has caused damage to my property in the past.
Q3	Adequate flood warning systems are in place in Makurdi.
Q4	The government has taken sufficient measures to prevent flooding in Makurdi.
Q5	Local communities are adequately prepared to handle flooding incidents.
Q6	Flooding has impacted the local economy negatively.
Q7	The drainage systems in Makurdi are well-maintained and effective in managing floods.
Q8	Climate change has contributed to the increased frequency of flooding in Makurdi.
Q9	I believe that afforestation and proper land use planning can mitigate flooding in the area.
Q10	Community awareness and education about flood risks are essential for reducing flood impacts.
Q11	Adequate financial support is provided to flood victims for recovery and rebuilding.
Q12	I am satisfied with the current efforts to address flooding issues in Makurdi.
Q13	I actively participate in flood preparedness and mitigation activities in my community.
Q14	I believe that public-private partnerships can play a role in minimizing flood risks.
Q15	The media plays a crucial role in disseminating flood-related information in Makurdi.
Q16	I have lost valuables or personal belongings due to flooding in Makurdi.
Q17	Climate-resilient infrastructure is essential for reducing flood impacts.
Q18	Early warning systems are effective in predicting floods in Makurdi.
Q19	There is a need for stricter enforcement of building codes and regulations in flood-prone areas.
Q20	I believe that community-based initiatives can significantly contribute to flood management.

Remark: Rate agreement with each statement on a scale from 1 to 5, where 1 indicates "Strongly Disagree," and 5 means "Strongly Agree."

E. Data Analysis

The data obtained from the questionnaire responses were analyzed using descriptive statistical techniques. Mean scores were computed for each question, and these scores were then interpreted using the predefined scale, which categorized responses into "Strongly Disagree," "Disagree," "Neutral," "Agree," and "Strongly Agree" based on the corresponding mean score ranges. Using these interpretative categories facilitated a comprehensive understanding of the predominant viewpoints and attitudes of the respondents toward various dimensions of flooding in Makurdi.

F. Interpretation and Implications

The interpreted data provided valuable insights into the prevailing sentiments and perceptions of the community regarding flooding in Makurdi. These insights were instrumental in identifying critical areas of concern and priority for policymakers and stakeholders, thereby facilitating the formulation of targeted flood management strategies and interventions tailored to the specific needs and challenges of the community. The research outcomes aimed to contribute to enhancing flood resilience and the overall well-being of the residents of Makurdi.

III. RESULTS

Table II is a tabular format presenting responses from 200 respondents in Makurdi town to the Likert scale questions.

TABLE II. FREQUENCY AND MEAN OF RESPONSES FOR EACH QUESTION (N=200)

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Means
Q1	12	28	42	78	40	3.53
Q2	45	35	22	54	44	3.085
Q3	14	50	60	60	16	3.07
Q4	62	42	24	54	18	2.62
Q5	25	40	48	70	17	3.07
Q6	52	46	42	42	18	2.64
Q7	28	38	44	60	30	3.13
Q8	15	40	58	68	19	3.18
Q9	48	40	38	50	24	2.81
Q10	18	50	54	60	18	3.05
Q11	36	48	54	44	18	2.8
Q12	20	38	54	70	18	3.14
Q13	45	60	30	45	20	2.675
Q14	20	55	40	55	30	3.1
Q15	30	35	50	65	20	3.05
Q16	52	48	32	58	10	2.63
Q17	18	52	45	60	25	3.11
Q18	30	55	42	58	15	2.865
Q19	58	40	45	50	7	2.54
Q20	15	35	48	80	22	3.295

Table II can analyze the distribution of respondents' statements for each question, and the results are shown in Fig. 2. From Fig. 2, it can be seen that the respondents responded differently.

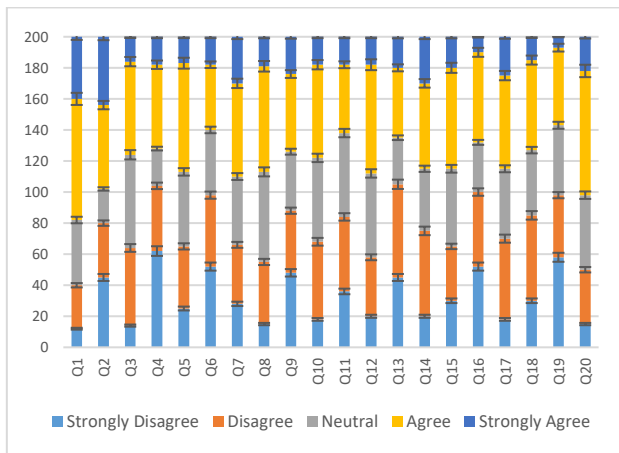


Fig. 2. Distribution of responses with Likert scale for each question

To get a more global picture of each question so that decisions can be made regarding its tendency, a graph that explains the average distribution of responses to each question can be analyzed by looking at the average distribution for each question shown in Fig. 3.

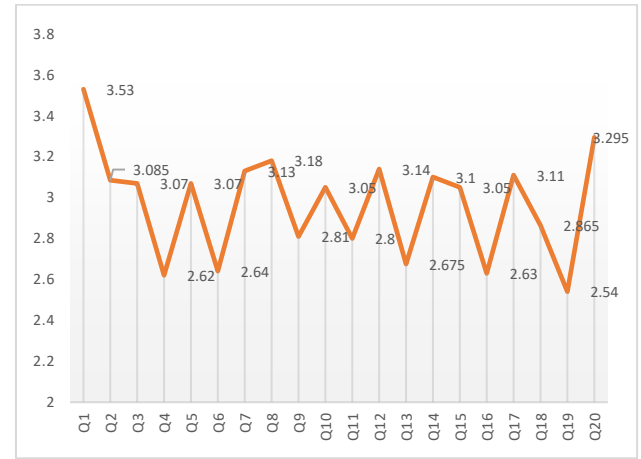


Fig. 3. Mean of responses distribution (1-5) for each question

IV. DISCUSSION

The study conducted in Makurdi town assessed the perspectives of 200 respondents on various aspects related to flooding using a Likert scale questionnaire. The findings revealed crucial insights into the community's perceptions and experiences with flooding. Overwhelmingly, respondents acknowledged the recurrent nature of floods, with a significant percentage agreeing that flooding is a frequent occurrence. This underscores the urgency for comprehensive flood management strategies to mitigate the impact of floods on the community. The study highlighted the personal impact of flooding, with many respondents reporting property damage due to past flood incidents. These findings emphasize the need for adequate flood mitigation measures to safeguard personal assets and infrastructure. Additionally, the study indicated that many respondents perceived flood warning systems and government efforts in flood prevention needed improvement. This calls for improved communication and more proactive strategies to address flood challenges effectively[6]. Community preparedness emerged as a critical factor, with mixed sentiments regarding the level of preparedness in handling flooding incidents. Community awareness and engagement in flood preparedness and response planning can contribute significantly to building a more flood-ready and adaptive society.

Climate change's role in increasing flooding was recognized by respondents, highlighting the importance of climate-resilient strategies in flood management and adaptation planning. The study underscored the value of nature-based flood mitigation strategies, such as afforestation and proper land use planning[7]. Community education and awareness programs can further promote these strategies. Respondents expressed dissatisfaction with the current financial support provided to flood victims for recovery and rebuilding, signifying the need for improved assistance and relief measures. Engaging stakeholders and addressing concerns effectively is essential to build a collective and satisfactory flood management approach. A notable portion of respondents reported active community participation in flood preparedness and mitigation activities, emphasizing the

potential for increased involvement in building disaster resilience [8].

The study also recognized the value of public-private partnerships in reducing flood risks, presenting an opportunity for collaboration between various stakeholders to implement effective flood management strategies. Effective communication, primarily through the media, was acknowledged as crucial during emergencies to ensure timely and accurate information reaches the community.

The personal impact of flooding was evident, with a significant percentage of respondents reporting losses of valuables or personal belongings. This underscores the need for effective flood management and safeguarding personal belongings during flood incidents [9].

The importance of climate-resilient infrastructure and effective early warning systems in reducing flood impacts was acknowledged by respondents, emphasizing the need for planning and implementing infrastructure that can withstand changing climatic conditions and extreme weather events. Stricter enforcement of building codes and regulations in flood-prone areas was deemed essential by respondents to mitigate risks and enhance flood resilience. Lastly, community-based initiatives were recognized as a significant contributor to flood management, emphasizing the potential of local actions and community engagement in building flood resilience [10]. Overall, the study's comprehensive exploration of these 20 questions provides valuable insights that can guide decision-makers and stakeholders in developing targeted flood management strategies. By addressing the concerns and incorporating community perspectives, Makurdi town can work towards becoming more flood-resilient, safeguarding the well-being of its residents, and minimizing the impact of recurring flood events.

V. IMPLICATIONS AND RECOMMENDATION

A. Implication

The findings of this study have several implications for flood management and preparedness in Makurdi town. The recurrent nature of flooding underscores the urgency for comprehensive flood management strategies, including infrastructure improvements, early warning systems, and effective community preparedness programs. The perceived inadequacy of government efforts highlights the need for more proactive and sustainable flood prevention measures and increased financial support for flood victims [12].

Addressing climate change as a contributing factor to increased flooding necessitates climate-resilient strategies in flood management planning. Afforestation and land use planning can be effective flood mitigation measures if promoted through community education and awareness. Engaging the community through awareness and education programs is crucial to building a more flood-resilient society [13].

Furthermore, public-private partnerships offer opportunities for collaborative flood management initiatives, and the media plays a vital role in disseminating timely flood-related information. Stricter enforcement of building codes and regulations is essential to reduce risks

in flood-prone areas. Community-based initiatives can significantly contribute to flood management efforts, fostering local ownership and empowerment in resilience-building processes [14].

In conclusion, the implications drawn from this study provide valuable insights for policymakers, local authorities, and stakeholders to develop targeted interventions and policies to address the specific concerns and needs of the community in managing and adapting to floods effectively. Collaborative efforts and community engagement are crucial in building a more flood-resilient Makurdi, where the impact of flooding can be minimized and the well-being of its residents safeguarded.

B. Recommendations

Based on the findings and future implications of the study, the following recommendations are proposed to enhance flood management and preparedness in Makurdi town:

1. **Comprehensive Flood Management Plan:** Develop and implement a comprehensive flood management plan addressing the recurrent flooding in Makurdi. The plan should include strategies for flood prevention, early warning systems, infrastructure improvements, and community engagement [14].
2. **Climate-Resilient Strategies:** Integrate climate-resilient strategies into flood management and adaptation planning. This includes promoting nature-based solutions such as afforestation, wetland restoration, and green infrastructure to enhance the town's resilience to changing climatic conditions [14].
3. **Enhanced Flood Warning Systems:** Strengthen flood warning systems to improve communication and timely dissemination of flood-related information to the community. This can help residents make informed decisions during emergencies and evacuate if necessary [15].
4. **Community Education and Awareness:** Conduct regular community education and awareness programs on flood risks, preparedness, and response. Empower residents with knowledge and skills to actively participate in flood management and reduce vulnerability [15].
5. **Public-Private Partnerships:** Foster collaborations between governmental bodies, private sectors, and NGOs to pool resources and expertise in implementing effective flood management strategies. Public-private partnerships can facilitate innovative approaches to complex flood challenges [16].
6. **Building Code Enforcement:** Strictly enforce building codes and regulations in flood-prone areas to reduce vulnerabilities and minimize property damage during flood events. This can be achieved through regular inspections and penalties for non-compliance.
7. **Community-Based Initiatives:** Promote and support community-based initiatives contributing to flood management and resilience. Encourage community-led projects for flood control, drainage

maintenance, and flood preparedness activities[16].

8. Investment in Flood Resilient Infrastructure: Invest in climate-resilient infrastructure that can withstand the impacts of flooding. This includes improved drainage systems, flood barriers, and elevation of critical infrastructure[17].
9. Continuous Monitoring and Evaluation: Implement a robust monitoring and evaluation system to assess the effectiveness of flood management measures. Regularly review and update strategies based on lessons learned and changing flood patterns [18].
10. Research and Innovation: Encourage research and innovation in flood management technologies and strategies. Embrace cutting-edge solutions that can enhance flood resilience and adaptability [19].
11. Collaborative Governance: Promote multi-stakeholder collaboration and participatory governance in flood management. Engage local communities, government agencies, NGOs, academia, and private sectors in decision-making processes [19].
12. Disaster Relief and Financial Support: Strengthen disaster relief measures and provide adequate financial support to flood victims for recovery and rebuilding. Ensure timely assistance to affected communities [20].

By implementing these recommendations, Makurdi town can take significant strides towards building a more flood-resilient community capable of effectively managing and adapting to recurring flood events. The collective effort of stakeholders, community engagement, and education will be crucial in achieving a safer and more sustainable environment for all residents in the face of future flood challenges.

VI. CONCLUSION

In conclusion, the study conducted in Makurdi town assessed the perspectives of 200 respondents on flooding using a Likert scale questionnaire. The findings revealed valuable insights into various aspects related to flooding and its management. The results indicated that flooding is a recurrent challenge in Makurdi, emphasizing the urgent need for comprehensive flood management strategies. Respondents recognized the personal impact of flooding on their properties, highlighting the significance of effective flood mitigation measures. The study also revealed room for improvement in flood warning systems and perceived inadequacy in government efforts to prevent flooding. Strengthening communication and adopting proactive flood prevention strategies are vital to enhance community preparedness and response. Climate change was acknowledged as contributing to increased flooding, emphasizing the importance of climate-resilient strategies in flood management and adaptation planning. Community engagement and awareness were recognized as critical elements in reducing flood impacts. Engaging the community in flood preparedness and mitigation activities can foster a more flood-resilient society.

Moreover, public-private partnerships were seen as valuable in reducing flood risks, providing an opportunity

for collaborative efforts in flood management initiatives. The study highlighted the media's crucial role in disseminating flood-related information, ensuring timely and accurate updates reach the community during emergencies. Overall, stricter enforcement of building codes in flood-prone areas and community-based initiatives were seen as potential contributors to effective flood management. In conclusion, the study's implications underscore the importance of comprehensive and collaborative flood management strategies driven by community engagement, climate-resilient measures, and improved communication. Policymakers, local authorities, and stakeholders must work together to implement these findings and develop targeted interventions to build a more flood-resilient Makurdi, safeguarding its residents and assets from the challenges of recurring flood events. The town can enhance its preparedness and adaptability to future flood scenarios through proactive measures and community involvement, fostering a safer and more sustainable environment.

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