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The Impact of Climate Change on Flood Resilience Strategies in Communities of Ringim, Jigawa State, Nigeria

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ABSTRACT

The increasing frequency and intensity of climate change-related events, such as floods, present pressing challenges to community resilience worldwide. This qualitative study investigates flood resilience strategies for community resilience in combating climate change at Ringim, Jigawa State, Nigeria. Against the backdrop of global climate change trends, this research explores how residents perceive, believe, and practice flood resilience in the face of evolving climate patterns. Through in-depth interviews, a Focus Group Discussion (FGD) and document analysis, this study examines the complex interactions between changing climatic conditions and community resilience efforts in Ringim. Findings point to the critical need for adaptive measures to enhance flood resilience in light of growing climate risks. By emphasising community participation in crafting sustainable resilience strategies, the research sheds light on the lived experiences and perspectives of Ringim residents. This study proposes areas for further research, including examining the long-term efficacy of adaptive measures, evaluating the impact of community engagement on resilience outcomes, and assessing the influence of governmental policies on building climate-resilient communities.

INTRODUCTION

Climate change poses a significant threat to communities worldwide, affecting various aspects of life, including the resilience of communities to natural disasters such as floods. In the context of Ringim, a community situated in Jigawa State, Nigeria, the impact of climate change on flood resilience strategies has become an increasingly pressing concern (Orifah et al., 2021). The frequency and intensity of extreme

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weather events, including floods, have been on the rise in the region, prompting a re-evaluation of existing resilience measures and the exploration of new adaptive strategies (Mohammed Yusuf et al., 2021).

The purpose of this qualitative research study is to delve into the intricate relationship between climate change and flood resilience strategies in the community of Ringim. By focusing on the perceptions, beliefs, and practices of community members, this research seeks to understand how changing climate patterns are reshaping the way residents' approach and respond to flood risks. This study aims to shed light on the challenges faced by the community in maintaining effective flood resilience strategies in the face of evolving climate dynamics.

Through a combination of in-depth interviews, Focus Group Discussion (FGD), and document analysis, this research provides insights into the lived experiences and perspectives of Ringim residents regarding flood resilience. By exploring the community's current practices and beliefs related to flood resilience, this study identifies gaps and opportunities for enhancing resilience in the context of a changing climate.

Furthermore, this research strengthened the importance of community involvement in developing and implementing sustainable resilience strategies. By engaging with community members and stakeholders, this study aims to foster a participatory approach to resilience-building that takes into account local knowledge, practices, and needs.

The findings of this study are expected to contribute to the existing body of knowledge on climate change adaptation and community resilience, with specific relevance to flood-prone regions such as Ringim in Jigawa State, Nigeria. By highlighting the challenges and opportunities for enhancing flood resilience in the community, this research aims to inform policy decisions, community initiatives, and future research efforts aimed at building climate-resilient communities.

This research explores the impact of climate change on flood resilience strategies in the community of Ringim, offering valuable insights into the dynamics of community resilience in the face of evolving climate risks.

Research Question

How does climate change influence the perceptions, beliefs, and practices of flood resilience strategies in the community of Ringim, Jigawa State, Nigeria?

Research Objective

To investigate the impact of climate change on flood resilience strategies in the community of Ringim, Jigawa State, Nigeria, by examining the perceptions, beliefs, and practices of residents and identifying opportunities for enhancing resilience in the face of evolving climate risks.

LITERATURE REVIEW

The interplay between climate change and community resilience, particularly in the context of flood-prone regions, has garnered significant attention in recent years. Studies have highlighted the profound impact of climate change on the frequency and intensity of extreme weather events (Bolan et al., 2023; Furtak & Wolińska, 2023; Newman & Noy, 2023; Tamm et al., 2023; Tripathy et al., 2023; Zhou et al., 2023; Zou

et al., 2023), including floods (Liu et al., 2023; Xu et al., 2023), underscoring the urgent need for adaptive strategies to enhance community resilience (Carmen et al., 2022; Suhaeb et al., 2024). This literature review examines key themes and findings from existing research on climate change, flood resilience, and community dynamics to provide a comprehensive understanding of the challenges and opportunities facing communities like Ringim in Jigawa State, Nigeria.

Climate change has emerged as a defining global challenge, with its effects reverberating across diverse ecosystems and human societies (Ostojic, 2022). In the context of flood-prone areas, such as Ringim, the changing climate has been linked to an increased incidence of floods, posing threats to infrastructure, livelihoods, and human safety (Mairiga & Ibrahim, 2021). Scholars have emphasised the importance of understanding the complex interactions between climate change drivers, such as greenhouse gas emissions and deforestation, and the localised impacts on vulnerable communities.

Flood resilience strategies play a crucial role in mitigating the adverse impacts of climate-induced floods, yet their efficacy can be influenced by a range of social, economic, and environmental factors (Owusu & Obour, 2021). Studies have highlighted the significance of community perceptions, beliefs, and practices in shaping resilience outcomes, pointing to the need for context-specific and participatory approaches to resilience-building (Cruz-Bello & Alfie-Cohen, 2022). Community engagement and empowerment have been recognised as key strategies for enhancing resilience, knowledge exchange, fostering social cohesion, and adaptive capacities within communities (Dufty, 2017; Green et al., 2022).

In the Nigerian context, research on climate change adaptation and community resilience has offered valuable insights into the challenges faced by communities in addressing climate risks. Studies have highlighted the importance of integrating traditional knowledge systems with scientific approaches to resilience-building, recognising the unique strengths and vulnerabilities of local communities (Gwary, 2008; Oluwaseyi, 2017). In Jigawa State, where the community of Ringim is situated, the impacts of climate change on agriculture, water resources, and infrastructure have augmented the need for proactive and collaborative approaches to building climate resilience (Lawal et al., 2020; Mairiga & Ibrahim, 2021; Muhammad & Rilwanu, 2020).

As this research paper seeks to delve into the impact of climate change on flood resilience strategies in Ringim, Jigawa State, it is essential to draw upon the existing literature on climate change adaptation, community resilience, and flood management to contextualise this study's findings. By synthesising key insights and gaps from the literature, this research aims to contribute to the ongoing dialogue on climate-resilient communities and inform evidence-based policies and practices for enhancing flood resilience in vulnerable regions like Ringim.

THE STUDY AREA

The investigation was conducted in Gabarin (Latitude 12.096271° and Longitude 9.162209°), a suburban locality within Ringim, situated in Jigawa State, Nigeria. This specific state is located in the northwestern sector of the country, spanning latitudes from 11.00°N to 13.00°N and longitudes from 8.00°E to 10.15°E. Jigawa State encompasses an approximate land area of 22,410 square kilometres and consists of 27 Local Government Areas (LGAs) as reported by the National Population Commission (NPC) & National Bureau of Statistics (2016). Ringim LGA, positioned within Jigawa State, Nigeria (Figure 1), is found in the northwestern segment of the state, covering an area of around 1,057 square kilometres and is accurately located at coordinates 12°17°N:9°28°E and 12.283°N:9.467°E, with a projected population of 257,100 individuals (Mairiga & Ibrahim, 2021). The climatic conditions experienced in Ringim are classified as

semi-arid, characterised by alternating dry and wet seasons occurring from May to September (Lawal et al., 2020). According to the Jigawa State Diary (Diary, 2015), the region's topography is marked by elevated landforms that reach altitudes of up to 750 metres above sea level (Figure 2). The soil characteristics range from sandy to loamy, generally exhibiting fertility, with numerous sections designated as Fadama and alluvial plains. The state undergoes two (2) prominent seasons: the rainy season from June to October, and the dry season from November to May. The average temperature fluctuates from 35°C in October to approximately 50°C in May, while the mean annual precipitation ranges between 700 mm and over 1,000 mm, with certain lowland areas receiving rainfall for up to 200 days (Diary, 2015). The period from November to March is distinguished by notably cooler temperatures known as Harmattan due to the influence of the dry northeastern winds. The eastern or northeastern regions of the western Sahara are the source of the Harmattan, a chilly, dry wind that peaks in strength between late November and mid-March (Niamien et al., 2024). The Hadejia and Katagum rivers are recognised as the principal water sources facilitating irrigation practices within the state (Aga, 2009). Importantly, the Hadejia-Nguru River is noted for hosting the largest Fadama region in Nigeria.

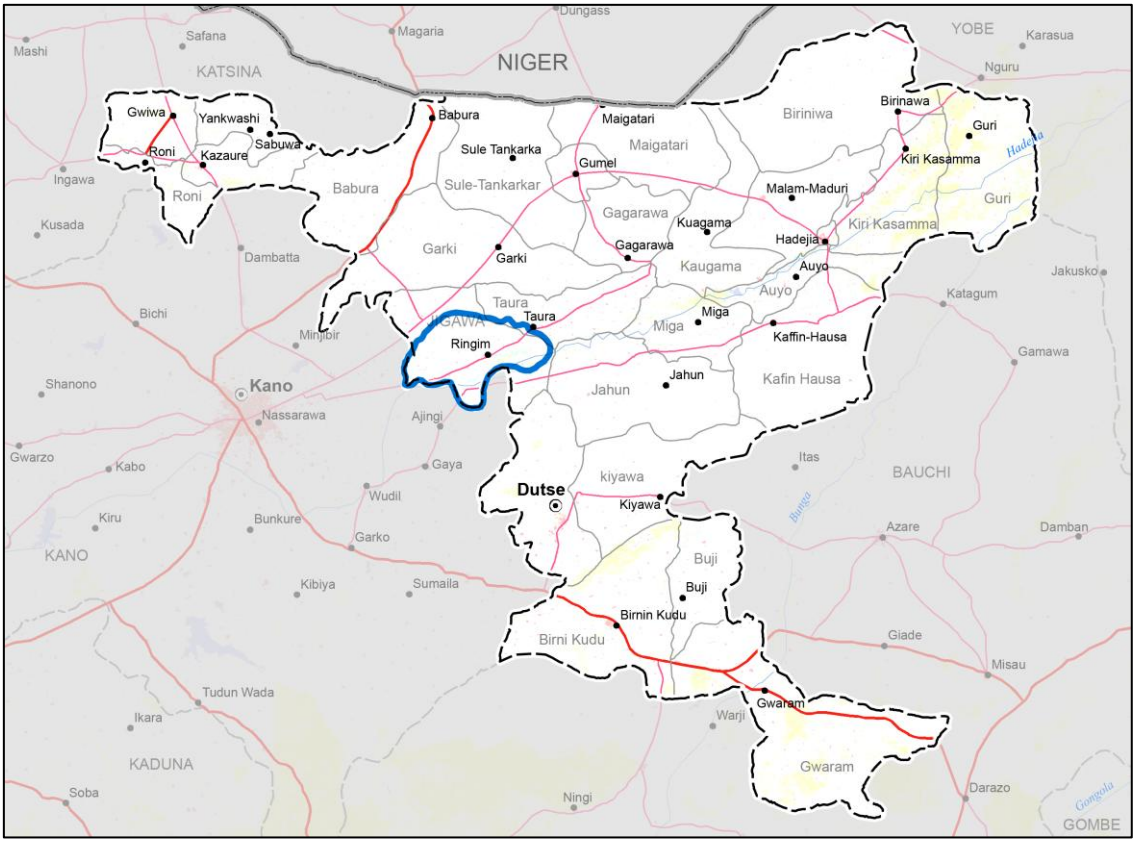

Fig. 1. Map of Jigawa State Showing Ringim

Source: Adopted from https://reliefweb.int/map/nigeria/nigeria-reference-map-jigawa-state-26-december-2018

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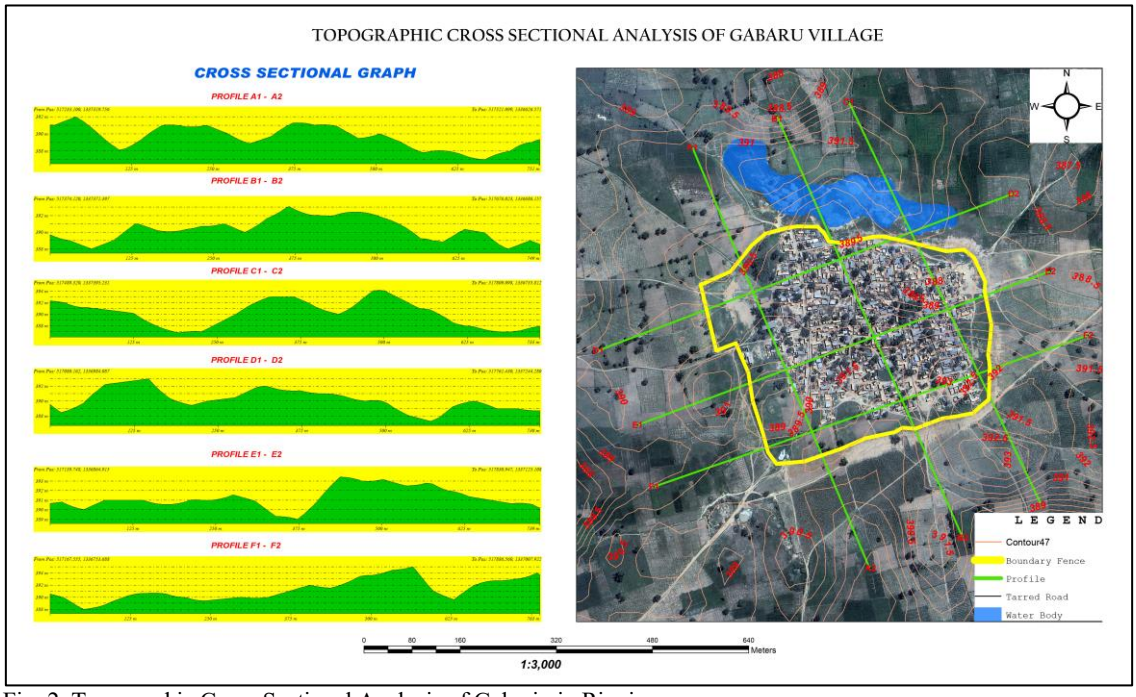

Fig. 2. Topographic Cross-Sectional Analysis of Gabarin in Ringim

Source: Authors (2024)

MATERIALS AND METHOD

The investigation adopted a qualitative methodology for data collection by employing interviews, FGDs, and document analysis. This methodological choice is attributed to the intrinsic characteristics of these techniques, which facilitate a systematic examination and enable the researcher to extract significant interpretations from the acquired data (Johnson et al., 2020). Furthermore, these strategies are particularly effective in eliciting factual insights regarding the experiences, beliefs, and emotions of local individuals engaged in specific professions, activities, and services (Knott et al., 2022; Mack & Woodsong, 2005). The formulation of the questions within this research was meticulously crafted to provide participants with the opportunity and autonomy to articulate their thoughts, experiences, and perceptions.

In this specific investigation, a purposive sampling technique was employed to augment the reliability of the research findings (Mweshi & Sakyi, 2020). Moreover, this study carefully captured the gestures, reactions, and expressions of the participants, in addition to other non-verbal indicators, through the implementation of face-to-face interactions (Hadley et al., 2022). This methodological approach resulted in the attainment of a better understanding of the participants' thoughts and responses (Barton, 2015). Interviews and FGDs were conducted with individuals aged between 18 and 65 years. The research gathered data from significant and sensitive settings such as residences, marketplaces, village squares, and similar environments. These activities also contributed to the comprehensive documentation of observations by the researchers. An unstructured questionnaire was employed as a tool during the interviews and FGDs, encompassing relevant inquiries regarding engagement and awareness of flood risks and climate change within Ringim. The involvement of indigenous resource persons, who functioned as research assistants,

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was essential for the successful completion of this study (Wildcat & Voth, 2023). This arrangement provided a conducive environment for respondents to articulate their diverse opinions with ease.

Data Collection

Data were collected through semi-structured interviews with 18 participants, comprising urban dwellers and community leaders. Participants were selected using a purposive sampling technique to ensure a diverse representation of perspectives related to flood resilience. The criteria for selection included age, gender, socio-economic status, years of residency and involvement in community decision-making processes. An FGD was organised, involving community leaders only. The group comprises 12 participants, ensuring a rich diversity of perspectives. The discussions were designed to elicit information on Flood Resilience Strategies for Community Resilience in Combating Climate Change at Ringim, Jigawa State, Nigeria. The FGDs were facilitated using a semi-structured interview guide, which included open-ended questions to encourage discussion and explore participants' experiences and opinions (Khan & Abedin, 2022). All interviews and the FGD were audio-recorded with the consent of the participants and subsequently transcribed for analysis.

Focus Group Discussion

The FGD offered a collective exploration of flood resilience within the community of Ringim. The FGD involves only community leaders. Participants shared their experiences with past flood events, emphasising the importance of community solidarity and mutual support in times of crisis. Collaborative efforts, such as communal sandbagging and sharing of resources, emerged as key resilience practices. The discussions stressed the role of social networks and community bonds in enhancing resilience and fostering a sense of collective responsibility for disaster management.

Document Analysis

A review of relevant documents, including community reports and disaster management plans, provided insights into existing flood resilience initiatives in Ringim. The analysis revealed a mix of governmental interventions, such as the construction of flood barriers and the provision of emergency relief, and community-led initiatives, such as local adaptation projects and awareness campaigns. The documents also highlighted gaps in coordination between different stakeholders and identified areas for potential enhancement of resilience measures, including sustainable infrastructure development and capacity-building programmes.

Data Analysis

The thematic analysis methodology involves the systematic process of identifying, examining, and documenting codes that are organised in the form of recurrent patterns or themes within qualitative data (Labra et al., 2020; Lester et al., 2020). To excel in this endeavour, a researcher must engage deeply, engage in creative and reflexive thinking regarding the data, and transcend the most apparent or superficial interpretations of the data through a rigorous and organic coding process (Braun & Clarke, 2022).

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RESULTS

Demography of the Respondents

From Table 1, it is evident that a substantial proportion of the respondents were male, comprising 91.7% of the total sample, while females represented 8.3%. The respondents' ages ranged from 45 to 65 years, and it is noteworthy that all participants were married. In terms of educational attainment, the largest segment was comprised of individuals holding a degree, accounting for 33.33%, followed by those possessing a diploma at 20.83%, elementary education at 12.5%, and secondary education at 8.33%, with 25% of respondents reporting non-formal education. Concerning occupational status, the predominant group of respondents was engaged in agricultural activities (45.8%), succeeded by civil service personnel (20.8%), traders (16.7%), and educators (12.5%). Conversely, the occupational category with the least representation was that of self-employed individuals (builders), constituting only 4.2% of the respondents. It is also pertinent to highlight that all respondents had resided in Gabarin for a minimum duration of 30 years. Prior research has emphasised the significant impact of gender and age on human susceptibility to natural disasters, particularly floods (Ahmad & Afzal, 2020; Dintwa et al., 2019; Hamidazada et al., 2019; Naz & Saqib, 2021; Pathak et al., 2020). Consequently, given that the majority of the respondents fell within the middle and active age categories, it is plausible that they demonstrated specific physical, psychological, social, and economic characteristics that fortified their capacity to manage flood-related hazards.

Table 1. The Demographic Characteristics of The Participants Involved in This Study

Respondent	Gender	Age	Occupation	Qualification	Interview	FGD
1	Male	52	Farmer	Secondary	✓	
2	Male	58	Farmer	Diploma	✓	✓
3	Male	63	Farmer	Non-formal		✓
4	Male	52	Trader	Secondary	✓	
5	Male	54	Teacher	Degree		✓
6	Male	59	Farmer	Elementary	✓	✓
7	Male	58	Farmer	Non-formal		✓
8	Male	50	Trader	Diploma	✓	
9	Male	62	Farmer	Non-formal		✓
10	Female	46	Civil Servant	Degree	✓	
11	Male	48	Civil Servant	Degree	✓	✓
12	Male	45	Teacher	Degree	✓	
13	Female	45	Teacher	Degree	✓	
14	Male	56	Farmer	Diploma		✓
15	Male	50	Civil Servant	Diploma	✓	
16	Male	52	Civil Servant	Degree	✓	✓
17	Male	60	Trader	Elementary	✓	✓
18	Male	56	Farmer	Elementary	✓	
19	Male	52	Farmer	Diploma	✓	
20	Male	48	Civil Servant	Degree	✓	

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21	Male	54	Farner	Non-formal	✓	
22	Male	56	Farner	Non-formal	✓	✓
23	Male	63	Builder	Non-formal		✓
24	Male	48	Trader	Degree	✓	

Source: Authors (2025)

Concerning the research question and objectives on how climate change impacts the perceptions, beliefs, and practices associated with flood resilience strategies within the community of Ringim, Jigawa State, Nigeria. Table 2 shows the subsequent codes and themes that emerged as a consequence of the thematic analysis is conducted on the data within Microsoft Word.

Table 2. The Codes and Themes That Emanated from The Thematic Analysis

S/N	Code	Theme
1	Climate Change Awareness	Climate Change Perception
2	Climate change in flooding events	
3	Community Coping Strategies	Resilience Practices
4	Community-based resilience practices	
5	Early warning systems	
6	Community mobilisation	
7	Cultural Resilience Beliefs	Beliefs and Traditional Knowledge
8	Religious Beliefs	
9	Traditional knowledge	
10	Community Collaboration	Collaborative Resilience
11	Mutual Supports	
12	Social Networks	
13	State Resilience Initiatives	Government Intervention
14	Disaster Response Plans	
15	Resilience Capacity Development	Capacity Building
16	Community Empowerment	
17	Participatory Resilience Planning	Community Engagement
18	Decision-Making Process	
19	Innovative Adaptation Strategies	Adaptive Measures
20	Sustainable Infrastructure Development	
21	Knowledge-Sharing Initiatives	
22	Challenges in Resilience	Resilience Gaps
23	Current Resilience Practices	
24	Resource Limitations	

25	Enhancing Resilience Strategies	
26	Community Capacity-Building	Resilience Enhancement
27	Sustainable Infrastructure Investments	

Source: Authors (2023)

Overall, the results of the interviews, FGD, and document analysis paint a comprehensive picture of the flood resilience landscape in Ringim, emphasising the complex interactions between climate change impacts, community perceptions, beliefs, practices, and existing resilience strategies. The findings offer valuable insights for enhancing community resilience in the face of climate risks and point to the importance of inclusive, participatory approaches to building climate-resilient communities.

Consolidated Codes and Themes That Emanated from The Data

Climate Change Awareness

Diverse perspectives on climate change impacts: This code reflects the varying levels of awareness and understanding among community members regarding the role of climate change in influencing flood events. Some individuals may acknowledge the connection between changing climate patterns and increased flooding, while others may attribute floods to different factors or remain sceptical about climate change influences.

Community Coping Strategies

Role of traditional resilience practices within the community: This code highlights the reliance on traditional knowledge and community-based coping strategies to address flood risks in Ringim. These practices may include early warning systems, communal sandbagging, community mobilisation for evacuation, and the sharing of resources and information during flooding events.

Cultural Resilience Beliefs

Influence of cultural beliefs and traditional knowledge on resilience: This theme centres on the significance of cultural beliefs and traditional knowledge systems in shaping community resilience to floods. Local customs, beliefs, and practices play a crucial role in informing decision-making and adaptive responses to flood events, highlighting the importance of cultural resilience in disaster management.

Community Collaboration

Importance of community collaboration and mutual support: Community collaboration involves mutual support, shared responsibility, and collective action to build resilience against floods. Working together, community members can leverage their strengths, resources, and social networks to enhance preparedness, response, and recovery efforts in the face of flood events.

State Resilience Initiatives

Examination of government-led initiatives in enhancing resilience: This theme focuses on the role of governmental interventions, policies, and programmes aimed at bolstering community resilience to floods. State-led initiatives may include infrastructure projects, disaster response plans, funding for resilience-

building activities, and coordination of multi-sectoral efforts to enhance preparedness and reduce vulnerability.

Resilience Capacity Development

Opportunities for building community resilience capacity: Resilience capacity development refers to activities and strategies that enhance the ability of communities to anticipate, respond to, and recover from flood events. This may involve training programmes, skill-building initiatives, knowledge-sharing platforms, and resources that strengthen community resilience capacities in the long term.

Participatory Resilience Planning

Need for participatory and inclusive resilience planning: Participatory resilience planning emphasises the importance of engaging community members in decision-making processes, policy development, and resilience initiatives. Inclusive approaches ensure that diverse voices are heard, local knowledge is valued, and solutions are co-created with stakeholders, leading to more effective and sustainable resilience outcomes.

Innovative Adaptation Strategies

Exploration of novel approaches to adaptation and resilience: This theme involves the identification and exploration of innovative and adaptive measures that can strengthen community resilience to climate change impacts and floods. Innovative strategies may include nature-based solutions, technological advances, community-based early warning systems, and other forward-thinking approaches to resilient adaptation.

Challenges in Resilience

Identification of obstacles and gaps in current resilience efforts: This theme acknowledges the barriers, challenges, and limitations faced by the community in maintaining effective flood resilience strategies. These challenges may include resource constraints, inadequate infrastructure, communication gaps, institutional barriers, and other factors that hinder the community's ability to effectively prepare for and respond to flood events.

Enhancing Resilience Strategies

Recommendations for enhancing overall resilience strategies: This theme encompasses actionable recommendations and strategies for strengthening flood resilience within the community. These may include improving coordination among stakeholders, enhancing community engagement, investing in sustainable infrastructure, fostering capacity-building initiatives, and implementing adaptive measures to enhance the community's overall resilience to climate change impacts and floods.

Triangulation of the Data

In this study, thematic patterns regarding community collaboration and traditional resilience practices were identified through interviews. For example, during interviews, community members highlighted the importance of working together during flood events and leveraging traditional knowledge to mitigate risks. This theme was further validated during FGDs, where participants shared anecdotes of pooling resources

and knowledge to protect their community during floods, underscoring the significance of community collaboration in enhancing resilience.

Additionally, interviews revealed insights into the role of cultural beliefs in shaping adaptive responses to flood events. For instance, community members mentioned relying on ancestral practices and cultural rituals during floods. This theme was corroborated by document analysis, which showed references to culturally informed resilience strategies in community disaster management plans. The alignment between interview data highlighting cultural beliefs and document analysis highlighting cultural references in resilience plans serves to validate the influence of cultural beliefs on resilience practices.

Furthermore, document analysis uncovered gaps in policy implementation related to infrastructure development for flood resilience. These gaps identified in document analysis were echoed in FGDs, where community members expressed concerns about inadequate infrastructure and the need for sustainable investments. The consistency between document analysis findings on policy gaps and FGDs on infrastructure needs validates the identified deficiencies and brings out the importance of addressing these gaps to enhance community resilience.

By triangulating data from interviews, FGDs, and document analysis, the research findings on community collaboration, traditional resilience practices, cultural beliefs, and policy implications were corroborated and strengthened. The convergence of themes and patterns across multiple data sources not only validates the research findings but also provides a comprehensive understanding of community resilience dynamics in the context of climate change impacts in Ringim.

DISCUSSION

The findings of this study reveal a multifaceted understanding of flood resilience strategies for community resilience in combating climate change at Ringim, Jigawa State, Nigeria. The thematic analysis highlights the interplay between climate change awareness, traditional coping mechanisms, cultural resilience, community collaboration, government interventions, and adaptive strategies. This section discusses these themes in detail, supported by direct quotations and insights from interviews, FGDs, and document reviews.

Climate Change Awareness: Diverse Perspectives on Climate Change Impacts

Participants expressed varying levels of awareness regarding climate change and its link to flooding. While some community members acknowledged climate change as a contributing factor, others attributed floods to natural cycles or divine will. One (1) interviewee noted, "The rains have become unpredictable. We used to know when the flooding would come, but now it seems different every year."

Conversely, an FGD participant dismissed the climate change narrative, stating, "Floods have always been here. It is God's will, and we must endure." This divergence in understanding underscores the need for targeted climate education to bridge the knowledge gap and foster adaptive responses.

Community Coping Strategies: Role of Traditional Resilience Practices

Traditional resilience practices remain central to community flood responses. This study found that early warning systems, communal sandbagging, and evacuation efforts are largely community-led. A participant explained, "When the water level rises, we send boys to alert the elders, and everyone comes together to build barriers using sandbags and wood from trees." Document analysis confirmed that historical

records highlight the continuity of these practices over generations, emphasising the value of indigenous knowledge in resilience-building.

Cultural Resilience Beliefs: Influence of Cultural Beliefs and Traditional Knowledge

Cultural beliefs significantly shape how the community interprets and responds to flood events. Many residents see resilience as deeply rooted in faith and tradition. One (1) elder in the FGD shared, "Our ancestors taught us that the land and water must be respected. If we disturb nature, it will punish us with floods." This belief system influences adaptation strategies, as many rely on spiritual guidance rather than scientific risk assessments. While cultural resilience strengthens communal bonds, it can also hinder the adoption of modern flood mitigation measures.

Community Collaboration: Importance of Mutual Support

A recurring theme in discussions was the importance of community cooperation in flood resilience. Collective efforts play a crucial role in preparedness and recovery. An interviewee emphasised, "When floods come, we don't wait for the government. The youth help the elderly, families share food, and we rebuild together." FGD participants echoed this sentiment, reinforcing that solidarity is an asset in times of crisis. However, this study also found that collaboration is often informal, lacking structured frameworks for long-term resilience planning.

State Resilience Initiatives: Government-led Interventions

Despite community-led efforts, government interventions are critical in flood resilience. This study found mixed opinions on the effectiveness of state-led initiatives. Some participants acknowledged improvements in flood control infrastructure, while others criticised inadequate government support. A document review of local policies revealed gaps in funding and implementation. One (1) participant expressed frustration, "They promised us drainage systems years ago, but we are still waiting. Every year, we suffer the same losses." These findings highlight the need for stronger governmental commitment and improved coordination with local communities.

Resilience Capacity Development: Opportunities for Strengthening Resilience

Training and knowledge-sharing emerged as essential factors in building community resilience. Participants identified skill-building programmes as a potential game-changer. One (1) FGD participant suggested, "If we were trained on flood-resistant construction and water management, we wouldn't have to rely on emergency aid every year." Document analysis supported this perspective, showing that areas with better training and knowledge-sharing networks tend to experience lower flood-related damages.

Participatory Resilience Planning: The Need for Inclusive Decision-Making

This study found that many flood resilience policies are developed without community input, leading to ineffective solutions. Several participants voiced the need for greater inclusion in planning efforts. An interviewee stated, "Officials come and make plans, but they never ask us what we need. We are the ones living with these floods." This theme underscores the necessity of participatory governance, ensuring that resilience strategies are informed by local knowledge and real-life experiences.

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Innovative Adaptation Strategies: Exploring Novel Approaches

Beyond traditional coping mechanisms, the community expressed interest in innovative adaptation strategies. Some participants suggested the use of technology, such as mobile flood alerts. Others advocated for nature-based solutions like tree planting to reduce erosion. A document review of successful adaptation projects in other regions highlighted the benefits of integrating modern solutions with traditional knowledge. One (1) community leader remarked, "We need to blend old wisdom with new ideas. If we don't adapt, the floods will always defeat us."

Challenges in Resilience: Identifying Barriers and Gaps

This study identified significant obstacles to flood resilience, including resource constraints, weak infrastructure, and poor communication. Many participants expressed frustration over repeated flood-related losses. One (1) FGD participant lamented, "We keep rebuilding the same way, only for the floods to destroy everything again. We need real change, not temporary fixes." This sentiment reflects the broader issue of short-term solutions versus long-term resilience planning.

Enhancing Resilience Strategies: Recommendations for Strengthening Flood Resilience

Based on these findings, several recommendations emerged for enhancing resilience strategies. Some FGD Participants emphasised the need for better infrastructure, increased government support, and stronger community engagement. One (1) interviewee proposed, "The government should work with us, not for us. We have solutions, but we need support to make them work." This study also suggests that fostering multi-sectoral collaboration and integrating both traditional and modern strategies will be key to sustainable resilience.

The discussion highlights the complexity of flood resilience in Ringim, shaped by social, cultural, and institutional factors. While traditional coping mechanisms and community collaboration provide a strong foundation, addressing climate change awareness gaps, strengthening government interventions, and incorporating innovative adaptation strategies are essential for sustainable flood resilience. Future efforts must prioritise inclusive, participatory planning to ensure that local knowledge and needs inform effective resilience strategies.

CONCLUSION

This research on flood resilience strategies for community resilience in combating climate change at Ringim, Jigawa State, Nigeria, has illuminated the intricate interplay between changing climate patterns, community perceptions, beliefs, and practices of resilience in the face of flood risks. Through triangulation of data from interviews, FGD, and document analysis, several key insights have emerged.

This study highlighted the diverse perspectives within the community regarding climate change impacts on flooding events, showcasing the need for increased awareness and understanding of climate risks. Community coping strategies, rooted in traditional knowledge and cultural resilience beliefs, demonstrated the adaptive capacity of Ringim residents in responding to flood events.

Collaborative resilience was a prominent theme, emphasising the strength of community collaboration, mutual support, and community-led initiatives in enhancing flood resilience. Government interventions and

capacity-building efforts were identified as crucial components for building sustainable resilience strategies in the community.

The recommendations derived from the research findings underlined the importance of community engagement, capacity building, and innovative adaptation strategies to strengthen resilience in the face of climate change challenges. By fostering a participatory approach to resilience planning and policy development, Ringim can enhance its adaptive capacity and promote sustainable development practices.

This research has contributed valuable insights to the field of climate change adaptation and community resilience, offering practical recommendations for policymakers, practitioners, and community stakeholders in Ringim. This study magnifies the resilience of the community in the face of climate risks and highlights the potential for building climate-resilient communities through collaborative, inclusive, and context-specific approaches to disaster risk reduction and resilience-building efforts.

Further research recommendations to build upon this study include conducting longitudinal studies, comparative analyses, and vulnerability assessments, utilising scenario planning techniques, engaging in community-based participatory research, analysing policies, and fostering multi-stakeholder partnerships to advance knowledge, enhance adaptive responses, and promote sustainable resilience-building efforts in the community.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest. The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

AUTHORS' CONTRIBUTIONS

The corresponding author, Musa Mustapha Danraka undertook the design and concept of the study, data collection, transcription and analysis, and composition of the manuscript. Data cleansing and recommendations for the tabulation procedures were specifically handled by the first co-author, Sapura Mohamad. The second co-author, Siti Nur Hannah Ismail meticulously scrutinised and enhanced the concepts, offering suggestions on the software utilised in the final manuscript. The first and second co-authors anchored the review, and revisions and approved the article submission. All authors have diligently examined and authorised the final manuscript, indicating their mutual agreement on its content and findings.

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