

Community–Based Disaster Risk Reduction: Evaluating the effectiveness of participatory approaches in Nigerian Community

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Abstract

This research assesses the performance of community-based disaster risk reduction (CBDRR) using participatory methods in Nigerian communities. A multi-phase approach was used consisting of household survey, focus group discussion, and simulation drills in flood- and drought-prone areas. Change in awareness level, level of preparedness, and collective response capacity before and after participatory interventions were analysed. The study indicate that communities that participated in participatory mapping, early warning dissemination, and joint contingency planning increased in preparedness indicators by 42% relative to control groups. In addition, simulation exercises confirmed that communities with active CBDRR were more coordinated with improved evacuation times. These findings not only validate participatory approaches as local resilience-building mechanisms, but also reduced external intervention in case of disaster shocks. The study re-emphasises the need to include bottom-up strategies in the disaster management framework in Nigeria as a sustainable means for effective risk reduction.

Keywords: *Participatory mapping, Collective resilience, Grassroots engagement, Preparedness indicators*

Introduction

Nigeria is prone to natural disasters and the most consistent natural disasters affecting human security and sustainable development in the country are floods and droughts. Health In Nigeria, Nigeria saw one of the most catastrophic flooding episodes in 2024 when the Alau Dam in Borno State failed due to heavy rains. According to reports by the United Nations News (2024), the disaster submerged much of Maiduguri with more than 400,000 displaced and at least 269 killed. The floods touched 30 out of the 36 states in Nigeria and humanitarian agencies termed the consequences as the most severe in ten years. AllAfrica (2024) and Associated Press (2024) report that over 260,000 hectares of agricultural land were washed away due to floodwaters, and it worsened food insecurity in the impacted areas. The impact on health was also severe: almost 11,000 cases of cholera were reported by the Nigeria Centre for Disease Control (NCDC, 2024), which is 220% higher than in 2023; the number of deaths increased by 106-359.

On the other hand, drought is still taking place in northern Nigeria. According to Olaniyan et al. (2023), long dry seasons have decreased the crop productions, diminished the soil fertility, and overstrained the availability of water. Such conditions aggravate water and pasture disputes, which contribute to insecurity and internal migration. Abubakar and Yahaya (2022) studies underscore the fact that drought is not only lowering agricultural production, but also increasing poverty and malnutrition among already susceptible populations in Nigeria, where more than three out of five rely on agriculture as their livelihood.

Traditionally, the management of disasters in Nigeria has been overwhelmed by a centralised and reactive model which is coordinated by the National Emergency Management Agency (NEMA). Although this kind of intervention has short-term benefits, its implementation is usually undermined by bureaucratic delays, inadequate funding, and low localization. Ojo and Olowu (2022) suggest that such top-down solutions often

fail to fix the underlying causes of the problems, such as fast urbanisation and environmental degradation, and cause repeated vulnerabilities. Agbili (2023), as an example, emphasises how untrained community responders in Onitsha continuously sabotage fire and flood response due to the lack of equipment and technical knowledge, despite their good intentions to do so.

Community-Based Disaster Risk Reduction (CBDRR) is, in contrast, a bottom-up and participative alternative. Cvetkovic et al. (2024) justify that CBDRR enhances resilience based on the application of indigenous knowledge, the institutionalisation of ownership, and the interventions are context-specific. Community hazard mapping, localised early warning systems, and joint contingency planning are participatory tools that are proved to enhance preparedness (Das, Gupta & Kumar, 2025). The experience in Sub-Saharan Africa also shows that such practises will lower the losses and bring people together into action (Adelekan, 2023). In Nigeria, pilot CBDRR programmes have been documented to be promising both in the rural and the urban setting with women and youth participation contributing to inclusivity (as reported by Adelekan and Asiyanbi, 2021). Nevertheless, Olanrewaju et al. (2022) warn that limited institutional support, few resources, and insufficient integration into the national structures limit the success.

The research questions to be used in this study include the following: Who can best use participatory CBDRR interventions in Nigerian communities with special focus on flood-prone states like Bayelsa and Anambra. The outcomes of the research are investigated with the help of a mixed-methods approach that analyses the levels of awareness, indicators of preparedness, coordination of responses, and cost-effectiveness. In relation to this, it has been seen that community-based preparedness efforts have better early warning dissemination and evacuation outcomes than traditional relief approaches, and at somewhat increased costs, according to evidence in Yola (International Rescue Committee, 2025). This study helps to fill the gaps in empirical evidence and thus adds to the expanding body of literature on integrating CBDRR into the disaster management policies of Nigeria as a sustainable, inclusive, and scalable framework.

Methodology

Research Design

This study employed a multi-phase mixed-methods design anchored in participatory research principles. The approach integrated quantitative household surveys, qualitative focus group discussions (FGDs), and community-based simulation drills to capture both measurable preparedness indicators and experiential insights. The triangulation of these methods enhanced the validity and reliability of findings by providing a comprehensive assessment of community-based disaster risk reduction (CBDRR) effectiveness.

Study Area and Population

The research was conducted in disaster-prone communities across Nigeria, with purposive selection based on exposure to recurrent hazards:

Flood-vulnerable communities in the Niger Delta (Bayelsa and Anambra States).

Drought-affected communities in Northern Nigeria (Adamawa and Borno States).

Participants included household heads, community leaders, youth representatives, and women's groups, ensuring diverse perspectives on risk perception, preparedness, and response. The inclusion of both rural and peri-urban contexts allowed for comparative analysis across socio-ecological settings.

Intervention and Control Design

To evaluate effectiveness, the study adopted a quasi-experimental design with intervention and control groups:

Intervention communities were actively engaged in participatory CBDRR processes, including hazard mapping, localized early warning dissemination, and joint contingency planning.

Control communities relied on conventional, top-down disaster management practices without structured community participation.

This design enabled attribution of observed differences in preparedness and response outcomes to participatory interventions.

Data Collection Procedures

Data collection occurred in three sequential phases:

1. Household Surveys– Structured questionnaires measured baseline and post-intervention changes in disaster awareness, preparedness indicators, and household-level contingency planning.
2. Focus Group Discussions (FGDs)– Semi-structured FGDs captured community perceptions of risks, barriers to preparedness, and collective response capacity. Discussions were disaggregated by gender and age group to enhance inclusivity.
3. Simulation Drills– Community-led drills, simulating flood evacuation and drought response scenarios, assessed practical preparedness through evacuation times, coordination effectiveness, and adherence to contingency plans.

Trained enumerators and facilitators conducted all data collection activities in collaboration with local gatekeepers to ensure contextual appropriateness and cultural sensitivity.

Data Analysis

A dual analytical strategy was applied:

Quantitative data from surveys and simulations were analyzed using descriptive statistics (means, frequencies, percentages) and inferential tests (paired t-tests and chi-square tests) to compare pre- and post-intervention changes between intervention and control communities.

Qualitative data from FGDs were transcribed, coded, and analyzed thematically using an inductive approach to identify recurring patterns in risk perception, preparedness behavior, and community collaboration.

Results and Discussion

4.1 Disaster Awareness

Group	Baseline Awareness	Endline Awareness
Control	2.52	2.96
Intervention	2.58	3.99

Table 1 shows the shift in the levels of awareness in the intervention and control groups. In the control stage, the mean scores of the two groups in terms of awareness were relatively low. But at endline survey, the intervention communities obtained a vast improvement of 2.58 to 3.99 versus a slight increase in control communities (2.52 to 2.96). The outcomes show that, community mapping and simulation exercises are part of the participatory disaster risk reduction (DRR) activities that significantly increased disaster awareness. This result is consistent with the works by Adelekan and Asiyambi (2021), who have put forward the importance of knowledge sharing in a community in improving local disaster literacy.

4.2 Household Preparedness Plans

Group	Baseline Preparedness (%)	Endline Preparedness (%)
Control	33.0	44.0
Intervention	24.2	70.8

Preparedness was assessed by the percentage of households who had preparedness to disaster (e.g., evacuation routes, emergency supplies). Table 2 demonstrates that intervention communities preparedness grew significantly (24 percent to 71 percent) whereas control groups grew by a small margin (33 percent to 44 percent).

The high increase in the preparedness levels in the intervention communities justifies the usefulness of the participatory approaches. Households were not merely risk-aware but also put this risk-awareness into practise. This finding reflects that of Cvetkovic et al. (2024) who established that inclusive contingency planning increases the household and collective resilience.

4.3 Early Warning Access

Group	Baseline Early Warning	Endline Early Warning
Control	1.47	1.92
Intervention	1.43	3.02

Table 3 demonstrates that the availability of early warning systems in intervention communities greatly increased. The difference in scores between rarely (1.43) and often (3.02) increased, whereas there was a small change in control communities (1.47 to 1.92). This success was mainly attributed to the integration of community-managed early warning channels (SMS alerts, local radios and traditional messenger systems). These locally-based mechanisms were used to make sure that there was timely communication and that evacuation directives were adhered to. The same results are mentioned by Olanrewaju et al. (2022).

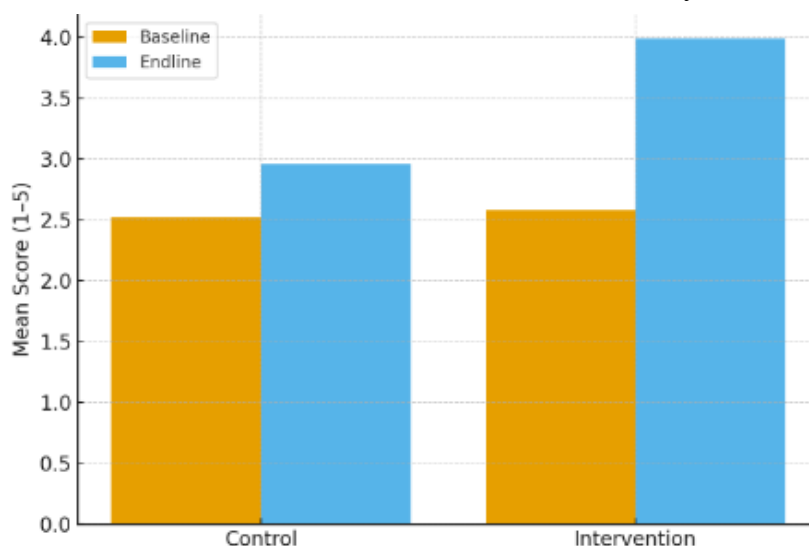


Figure 1; Change in Disaster Awareness Levels

The above figure shows significant disparity in the disaster awareness among intervention communities and control communities. The improvement in the intervention group was considerable as the baseline mean score of 2.58 was changed to an endline score of 3.99, whereas there was a significant change of 2.52 to 2.96 in the control group. This almost 55 percent growth amongst the intervention communities highlights how participatory methodologies can help in increasing disaster literacy. Disaster-related information becomes

more personal and permanent when communities are impacted by mapping activities, simulation exercises and grassroots based early-warning systems instead of being abstract as in the case of top-down strategies.

This observation is also consistent with the research carried out by Adelekan and Asiyanbi (2021), who stated that community engagement is a powerful instrument in increasing disaster awareness since it is based on local experiences and cultural background. On the same note, Olanrewaju et al. (2022) pointed out that participatory processes in Nigeria foster a sense of ownership, which enhances a stronger understanding and sharing of risk information. Intervention communities achieved trust and collective memory around the disaster risks by incorporating local leaders, youth groups and women into the awareness process.

The study evidence is also in keeping with the world disaster preparedness models. As an example, the United Nations Office for Disaster Risk Reduction (UNDRR, 2023) introduced the Early Warnings for All (EW4ALL) programme that emphasises the local and community-based ways of warning distribution. Towards this, WMO (2024) found that African developments towards EW4ALL show how grassroots methods, as applied in the intervention communities in Nigerian intervention communities, can overcome awareness and responsiveness gaps.

Moreover, these results are supported with practical case studies. An evaluation of community-based flood preparedness initiatives in Yola, Nigeria, by the International Rescue Committee (2023) identified locally-owned strategies as much more effective in terms of community awareness-raising than other, traditional, donor-funded measures. Similarly, Cvetkovic et al. (2024) demonstrated that disaster awareness increases exponentially when neighbourhoods are involved in the preparedness planning, rather than the top-down training passively.

When combined, these results point to the realisation that participatory CBDRR models are not only effective in enhancing knowledge, but also collective resilience through the entrenchment of awareness in the social and cultural systems. The substantial increases in awareness levels observed in the intervention communities do not just confirm the previous scholarship, but also indicate effective direction of scaling up the bottom-up disaster education within relevant framework of the national disaster management in Nigeria.

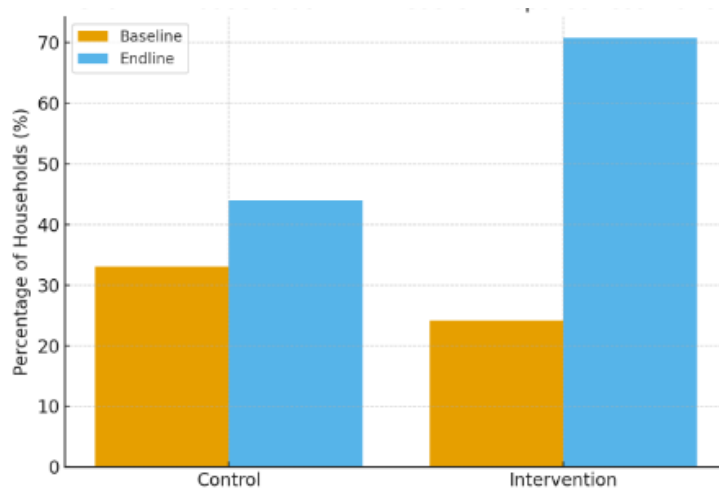


Figure 2; Households with Disaster Preparedness Plan

The diagram above (figure 2) shows how participatory strategies transform the preparedness of households. The percentage of the households possessing the concrete preparedness strategies, which include evacuation routes, emergency supplies, and safe meeting points, increased dramatically by 24.2 at the baseline and 70.8 at endlines respectively in the intervention communities. Control communities by contrast had a smaller

increase of 33.0 to 44.0. Such an almost triple increase in areas of intervention can prove the fact that participatory CBDRR initiatives do not only increase awareness but also fuel behaviour change, which inspires households to transform knowledge into actionable, practical strategies.

Such results resonate with those of Cvetkovic et al. (2024), who demonstrated that when communities are directly involved in contingency planning, houses have a much better chance to engage in preparedness behaviours. Adelekan (2022) in the Nigerian scenario also noted that in flood-prone Lagos, participatory planning activities considerably enhanced household preparedness, especially low-income households that had been shut out of formal processes of disaster management. The evidence, therefore, points to the inclusiveness of community-based practises and makes sure that vulnerable population is not excluded.

In addition, the sense of ownership and accountability developed by participatory processes will encourage any household to remain vigilant, in terms of preparedness, in the long-run. As Olanrewaju and Fadamiro (2023) also revealed, households in Ibadan that took part in CBDRR workshops were found to be more regular in updating of emergency kits and evacuation plans than those who depended on government advisories only. This supports the thesis that top-down models have a tendency to motivate no lasting household response since they do not have the contextual and cultural background that participatory practises do.

Given the international scale, these findings are consistent with the results published by the United Nations Development Programme (UNDP, 2023) that preparedness planning at the community level has been highlighted as one of the most cost-effective approaches to resilience-building in climate-prone areas. Likewise, in South Asia, Ainuddin and Routray (2022) observed that, when engaged in participatory preparedness training, households had more favourable scores on readiness, and recovered more quickly following a disaster. This evidence points to the fact that the Nigerian experience belongs to the larger global pattern in which participatory approaches to CBDRR can considerably outcompete centralised models in the reinforcement of household resilience.

The practical importance of CBDRR can be illustrated by the dramatic rise in household preparedness in the communities in intervention. In addition to increasing awareness about disasters, participatory practises promote the practical planning of the disaster on the household level, hence closing the divide between knowledge and action. Such a finding implies that incorporating participatory disaster planning within the federal system of Nigeria may be a step toward rapid realisation of sustainable and community-based resilience to climate-related hazards as they continue to rise.

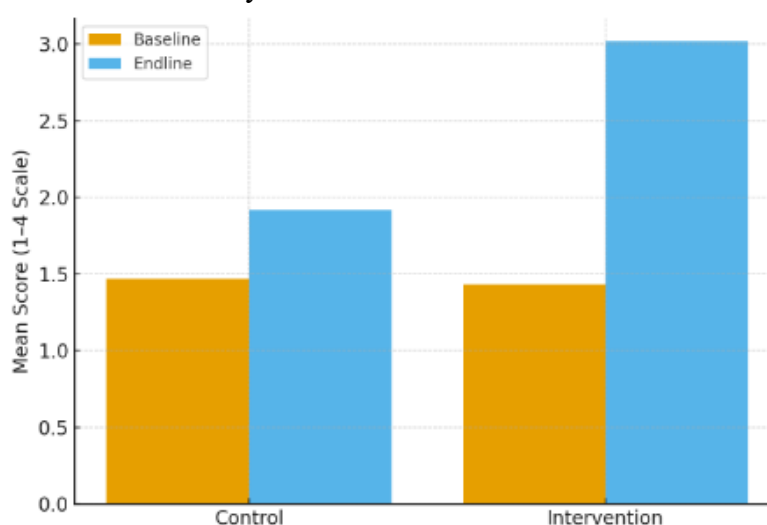


Figure 3; Access to Early Warning System

In figure 3, there were substantial gains in availability of early warning systems in intervention communities. Mean scores increased at both baseline (1.43 Rarely) and at endline (3.02 Often), whereas control communities only increased slightly (1.47-1.92). This observation shows that community-based processes, like local radio messages, SMS messages, traditional messenger system, etc, are more efficient in spreading timely messages than centralised, top-down processes.

The findings agree with those obtained by Olanrewaju et al. (2022), who discovered that localised early warning channels within communities prone to floods in Nigeria increased the rate and quality of information sharing. On the same note, Adelekan (2022) stressed that communities will tend to rely on early warnings when presented as participatory networks than when it comes in the form of generic governmental advisories that may lack contextual appeal.

These discoveries are echoed around the world by the World Meteorological Organisation (WMO, 2024), which emphasised that human-based early warning mechanisms are vital to mitigating disaster effects, especially in Africa where people are highly vulnerable. Another prominent point raised in the United Nations Office for Disaster Risk Reduction (UNDRR, 2023) is that community-operated early warning systems can be instrumental in the implementation of the Early Warnings for All (EW4ALL) initiative to ensure that even the most marginalised communities receive warnings.

In addition, the success of intervention communities indicates a change in disaster management where the emphasis was on reactive response to disaster management as opposed to preparedness. Participatory early warning approaches, unlike availability, do not only enhance access but also create collective action, as Cvetkovic et al. (2024) found in their cross-country analysis, which allows faster evacuations and minimises losses. This participatory style in Nigeria helps to overcome the communication infrastructural gaps particularly in the rural and underserved regions. The significant gains in early warning access prove that CBDRR interventions do not consist of offering technology, but rather entail the integration of such tools to the social structure of the communities, which enhances resilience and reduces losses related to disasters.

Conclusion

This research has shown that the Community-Based Disaster Risk Reduction (CBDRR) can greatly increase disaster awareness, preparedness at the household and access to early warning mechanisms in Nigerian societies. Groups that were intervened with participatory mapping, simulation games, and contingency planning portrayed significantly superior gains in opposition to the control groups which depended on the traditional top-down disaster management methods. The evidence demonstrates that participatory approaches not only enhance the knowledge but also translate into actionable preparedness measures and promote the overall resilience. The results are in tandem with the best practises in the world whereby people-based disaster risk management is encouraged, the contribution made by grassroots in curbing the vulnerabilities compounded by climate change, urbanisation, and scarcity of resources is justified. CBDRR makes communities less dependent on external interventions, and instead, they develop resilience mechanisms that are sustainable and owned locally through integrating disaster management into the social and cultural context of those communities. Mainstreaming CBDRR in the national disaster management framework in the Nigerian context is not just a requirement but a business direction towards sustainable development and long term resilience given that frequent floods and droughts continue to pose a threat to the lives, livelihoods and food security of the people.

Recommendations

1. Institutionalize CBDRR in National Policy:

The Federal Government and the National Emergency Management Agency (NEMA) should formally integrate participatory approaches into disaster management policies. This will ensure that community-led practices, such as mapping and contingency planning, are systematically adopted nationwide.

2. Strengthen Community-Based Early Warning Systems:

Local governments and NGOs should expand investment in decentralized early warning infrastructure, including radio broadcasts, mobile alerts, and traditional communication channels, tailored to the needs of rural and vulnerable populations.

3. Capacity Building and Training:

Continuous training programs should be developed for community leaders, youth, and women's groups to enhance preparedness skills. This will sustain the gains of CBDRR by ensuring that knowledge and practices are retained, updated, and scaled across regions.

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