AN ASSESSMENT OF THE IMPACT OF 2024 FLOOD DISASTER ON EDUCATION IN MAIDUGURI, BORNO STATE

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Abstract

The 2024 flood disaster in Maiduguri, Borno State, had significant implications for the education sector, disrupting academic calendars, damaging infrastructure, displacing both learners and teachers, and limiting access to learning materials. This study assessed the impact of the flood on the educational system in Maiduguri, with a focus on the nature and extent of disruption, coping mechanisms adopted, and support received by stakeholders. A cross-sectional descriptive design was employed, and data were collected using a structured questionnaire administered to a systematically selected sample of 150 respondents, comprising students, teachers, and education officials. Findings revealed that 73.3% of respondents experienced academic disruption, 66.7% reported infrastructure damage, and 60.0% noted displacement. Coping strategies included the establishment of temporary learning centers (46.7%) and limited online learning opportunities (16.7%), although 36.6% of respondents indicated that no intervention took place. Support was provided primarily by government agencies (40.0%) and NGOs (30.0%), while 13.3% reported receiving no assistance. These results highlighted the urgent need for proactive disaster preparedness, investment in resilient educational infrastructure, and the development of inclusive emergency response frameworks. The paper recommended integrated strategies involving government agencies, NGOs, and local communities to strengthen the resilience of the education sector and safeguard learning continuity in disaster-prone regions

***Keywords*:** Flood disaster, disruption, Maiduguri, emergency response, education

Introduction

Borno State, Nigeria, experienced severe flooding on September 10, 2024, following the collapse of the Alau Dam. The disaster devastated Maiduguri and Jere local government areas, displacing more than 70% of Maiduguri's residents (National Emergency Management Agency, 2024). At least 150 people were reported dead (France 24, 2024). The United Nations refugee agency in

Nigeria described it as the worst disaster to hit the city in three decades, affecting over one million people (Al Jazeera, 2024). The Alau Dam, constructed in 1986 to support irrigation and control flooding from the Ngadda River, had collapsed twice before, in 1994 and 2012, each time causing major flooding in nearby communities (Al Jazeera, 2024). The disaster struck a state already grappling with a prolonged humanitarian crisis driven by the Boko Haram insurgency, which has displaced more than 2.6 million people. Many internally displaced persons (IDPs) reside in camps highly vulnerable to flooding (AP News, 2024).

The Renevlyn Development Initiative (RDI) attributed the dam's collapse and the ensuing floods in Maiduguri to poor coordination among federal and state emergency response agencies. According to RDI, the tragedy was avoidable, as both the Nigeria Meteorological Agency (NIMET) and the Nigeria Hydrological Services Agency (NIHSA) had forecast the floods, but no preventive action was taken (RDI, 2024). RDI's Executive Director, Philip Jakpor, criticized the government's inaction despite receiving about N40 billion in ecological funds (RDI, 2024). Jakpor further argued that the collapse resulted from poor dam management, noting that the proper preventive measure should have involved gradually releasing water to ease pressure. He emphasized that the disaster drew wide attention mainly because it occurred in the state capital, whereas similar incidents in more remote areas might have been ignored. This underscores the urgent need for stronger governance and better coordination among emergency response agencies (Jakpor, 2024).

The September floods were not confined to Borno State. Across Nigeria, several regions, including Abuja, Lagos, Bauchi, and 31 other states, suffered significant damage. In Abuja, heavy rainfall caused floods that killed two people and destroyed properties and businesses (National Emergency Management Agency, 2024). In Lagos, severe flooding in Mushin led to the collapse of a two-story building, disrupting local communities and preventing students from attending school. In Ketu, a student was swept away by floodwaters (Vanguard News, 2024). In Bauchi State, flooding claimed 24 lives, injured at least 163 people, and displaced 122,330 residents (Daily Trust, 2024). Nationwide, the floods killed hundreds, injured thousands, displaced nearly half a million people, and affected an estimated 1.2 million citizens (National Emergency Management Agency, 2024).

Beyond the immediate humanitarian crisis, the floods had profound consequences for the education sector, reflecting similar experiences in other disaster-affected regions worldwide. Among the experiences of the Maiduguri residents were wdespread school closures, increased absenteeism, and higher dropout rates, especially when schools are repurposed as evacuation centers. Damage to roads and unsafe river crossings, which hinder children's access to schools and raise transportation costs for families. Overcrowded classrooms, inadequate resources, and psychological stress among children. Severe infrastructure damage, as seen during Cyclone Idai in Zimbabwe, which further disrupts learning. The use of schools as evacuation shelters often causes additional damage, including contamination by animals, discouraging teachers from

remaining in affected areas. Teacher shortages and brain drain, combined with dilapidated facilities, reduce education quality and student outcomes. Prolonged closures disproportionately affect female learners, heightening risks of early marriage and other vulnerabilities (Ehsan Noroozinejad, 2021).

Situational Analysis

Flooding has become one of the most devastating environmental disasters in Nigeria, causing widespread human, social, and economic losses. On September 10, 2024, the collapse of the Alau Dam in Borno State triggered severe flooding that displaced over 419,000 people, killed at least 150, and submerged 70% of communities in Maiduguri and Jere. The disaster, which affected more than one million people, occurred despite prior warnings from the Nigeria Meteorological Agency (NIMET) and the Nigeria Hydrological Services Agency (NIHSA). The failure of relevant agencies to implement preventive measures highlights the persistent problem of poor disaster preparedness and weak institutional coordination. Beyond the immediate humanitarian crisis, the floods exposed critical vulnerabilities in Nigeria's education sector. Schools were closed, converted into emergency shelters, or destroyed by rising waters, depriving thousands of learners of access to education. The consequences mirror global patterns where disasters exacerbate school absenteeism, increase dropout rates, worsen gender disparities, and lead to long-term declines in educational quality. In a state like Borno, already destabilized by the Boko Haram insurgency and mass internal displacement, the collapse of the Alau Dam further intensified existing hardships for children and families.

This situation underscores the urgent need to examine not only the humanitarian impacts of flooding but also its broader implications for governance, disaster management, and education in Nigeria. Unless proactive strategies are implemented, recurrent floods will continue to undermine development efforts, deepen social inequalities, and jeopardize the future of vulnerable populations.

Study Location

The study was conducted in Maiduguri, the capital and largest city of Borno State, located in the northeastern part of Nigeria. Geographically, Maiduguri lies within latitudes 11°50' to 11°55' North and longitudes 13°05' to 13°15' East. It is situated on the banks of the seasonal Ngadda River, which connects to the Chad Basin through the Alau Dam and contributes to the area's flood risks during heavy rainfall seasons.

Maiduguri is bordered by Jere Local Government Area and is known for its strategic role as a commercial, educational, and administrative hub in the Northeast. The city has a semi-arid climate, characterized by two distinct seasons: the wet season (June to September) and the dry season (October to May). Annual rainfall ranges from 500mm to 800mm, which, although relatively low, often leads to flash floods due to poor urban drainage systems, blocked culverts,

and the flat terrain that limits water runoff. The city's topography is predominantly flat, with low-lying flood-prone areas, particularly in communities like Gwange, Bolori, Fori, and Mairi, where several schools and educational infrastructures are located. The rapid urbanization and unregulated construction in wetlands and riverbanks have significantly increased the vulnerability of Maiduguri to flood disasters. Educational institutions in Maiduguri include primary, secondary, and tertiary levels, such as the University of Maiduguri**,** Ramat Polytechnic, and hundreds of public and private schools. Many of these facilities were adversely affected during the 2024 flood disaster, leading to school closures, damage to facilities, and interruptions in learning.

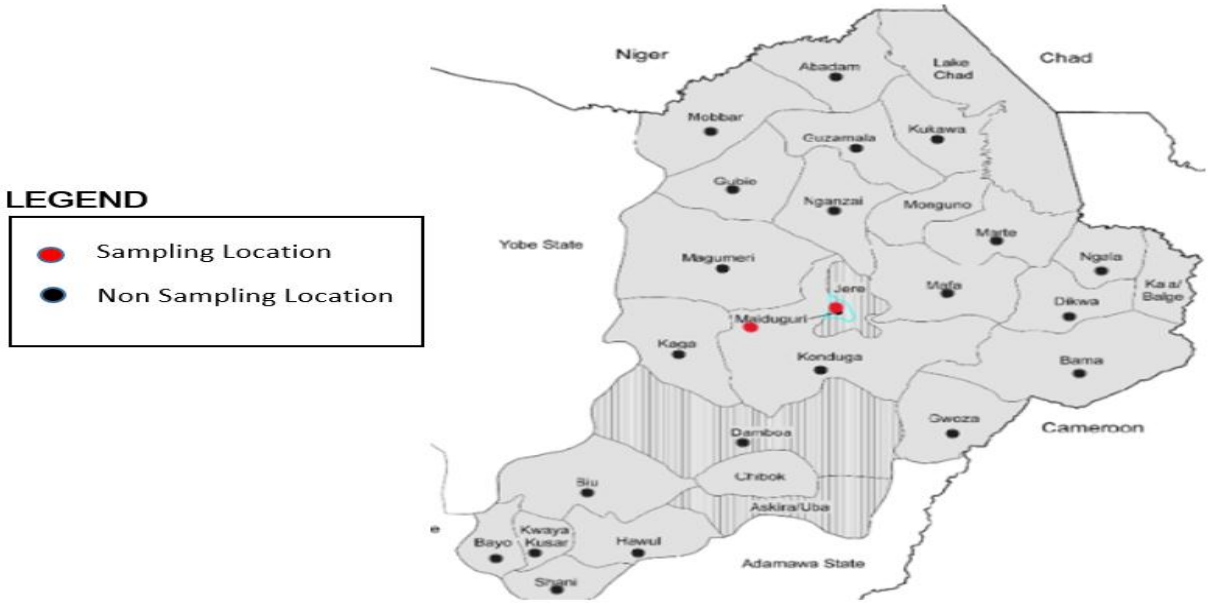

Figure 1: Location Showing the Data collection Areas in Maiduguri Borno State.

Methodology

Study Design

The study adopted a descriptive cross-sectional survey design to assess the impact of the 2024 flood disaster on the educational system in Maiduguri, Borno State. A descriptive design is appropriate when the objective is to systematically describe a situation, problem, or phenomenon without manipulating any variables. In this case, the focus is on understanding the extent to which the flood affected schools, students, teachers, and learning activities. The cross-sectional nature of the study means that data were collected at a single point in time from a sample

representing the population of interest. This design enabled the researcher to obtain a snapshot of the situation immediately after the 2024 flooding event.

Study Population

Sample Population

The population of the study consisted of individuals directly and indirectly affected by the 2024 flood disaster in the educational sector within Maiduguri, Borno State. These included students from flood-affected primary, secondary, and tertiary schools, teachers who experienced disruption in their teaching activities, school administrators such as headteachers, principals, and school heads, officials from the Borno State Ministry of Education, Local Government Education Authorities (LGEAs), community leaders and parents with children enrolled in the affected schools, emergency response workers and NGO representatives involved in school recovery efforts. These groups were selected because they could provide firsthand information and credible insights into the extent of flood damage, its impact on academic operations, and the recovery process.

Sample Size Determination

The sample size for the study was determined based on convenience sampling. Due to practical considerations such as accessibility of participants, time, and resource constraints, a total of 150 respondents were conveniently selected to participate in the study, comprising 75 students, 40 teachers, 20 school administrators, and 15 officials and community stakeholders.

Instrument for Data Collection

The primary instruments used for data collection in this study were a structured questionnaire and an interview schedule designed by the researcher. The questionnaire was developed based on the objectives of the study and aimed at gathering quantitative data on the effects of the 2024 flood disaster on the educational system in Maiduguri, Borno State. In addition, interviews with selected stakeholders such as school administrators, teachers, and education officials were conducted to provide deeper insights and contextual understanding that complemented the survey responses.

Method for Data Analysis

The data collected from respondents through questionnaires, interviews, and direct observation were systematically analyzed using both quantitative and qualitative techniques.

Quantitative Data Analysis

Data from the structured questionnaires were coded and entered into the Statistical Package for the Social Sciences (SPSS) version 25 for analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize and present data on respondents' demographic characteristics and key variables such as school damage, displacement, academic disruption, and emergency interventions. Inferential statistics were also employed, with Chi-square tests used, where necessary, to examine the relationship between selected variables (e.g., school type and level of flood impact). A significance level of $p < 0.05$ was adopted to determine statistical significance.

Qualitative Data Analysis

Responses from the key informant interviews and field observations were analyzed using thematic analysis. Audio recordings and notes were transcribed, after which recurring themes and patterns were identified and categorized to provide context and deeper understanding of the quantitative findings. The integration of both quantitative and qualitative analyses enabled triangulation, thereby enhancing the reliability, validity, and depth of the study's results. The findings were subsequently presented using tables, charts, and graphs to ensure clarity and facilitate interpretation.

Results

Table 1: Demographic characteristics of the Study Population

Variables	Frequency	Percentage (%)
Gender		
Male	85	56.7
Female	65	43.3
Age Group		
Under 18	40	26.7
18–30	60	40.0
31–45	30	20.0
46 and above	20	13.3
Occupation		
Students	75	50.0
Teachers	40	26.7
School Administrators	20	13.3
Education Officials & Stakeholders	15	10.0
School Type		

Variables	Frequency	Percentage (%)
Primary	60	40.0
Secondary	55	36.7
Tertiary	35	23.3

The demographic data reveal a balanced representation of stakeholders affected by the flood in the education sector. Out of 150 respondents, 56.7% were male and 43.3% were female, showing active participation of both genders in education-related roles. This reflects a gender-inclusive engagement in education within Maiduguri. This finding is in line with the study by Akinyemi and Oluwaseun (2021), who reported that both males and females are increasingly involved in educational participation and disaster resilience efforts in Northeast Nigeria, despite existing sociocultural barriers.

The age distribution shows that the majority (40.0%) fall within the 18–30 age bracket, indicating a youthful population actively involved in the education system, either as students or young professionals. A smaller proportion (13.3%) was 46 years and above, likely representing senior administrators or policymakers. This demographic structure provides a broad and inclusive view of how different age groups perceive and experience flood-related disruptions. This finding aligns with the observations of Yusuf and Ocheje (2020), who reported that young people constitute a significant proportion of Nigeria's education workforce and are often the most active participants in educational recovery following natural disasters.

Regarding occupational roles, 50.0% of respondents were students, 26.7% teachers, while school administrators and education officials made up 13.3% and 10.0% respectively. This distribution ensures that the findings are informed by both direct beneficiaries and facilitators of education. This occupational representation is consistent with the findings of Mohammed and Lawal (2021), who emphasized the importance of including both students and education professionals in disaster impact assessments to ensure a well-rounded understanding of the challenges and needs within the educational sector during emergencies.

In terms of school levels, respondents were drawn from primary (40.0%), secondary (36.7%), and tertiary institutions (23.3%). This balance across education tiers strengthens the generalizability of the findings to all levels of education in Maiduguri. This is supported by the work of Abubakar and Ibrahim (2022), who stressed that a multi-tiered approach in data collection across educational levels provides a comprehensive understanding of how natural disasters impact the broader education system in conflict-prone regions like Borno State. These demographic insights are essential in understanding the multi-level impact of the flood disaster and how it disrupted education delivery from the grassroots to the higher education level.

Table 2: Flood Impact on Learning

Variables	Frequency	Percentage (%)
School buildings damaged	100	66.7
Loss of learning materials	85	56.7
Displacement of students/teachers	90	60.0
Interruption of academic calendar	110	73.3

The study found that 73.3% of respondents experienced interruption in the academic calendar, making it the most reported impact. This confirms earlier studies, such as that of Nnadi et al. (2021), which suggest that natural disasters like floods significantly disrupt school operations and learning continuity. Their research emphasized that flood disasters often lead to prolonged school closures, displacement of students and teachers, and loss of instructional time, especially in vulnerable regions like Northeastern Nigeria.

Damage to school infrastructure was reported by 66.7%, while displacement of students and teachers was noted by 60.0%. These findings underscore the physical and logistical challenges that accompany flooding events in urban settings such as Maiduguri. Moreover, loss of learning materials (56.7%) further compounded the difficulties faced by learners and educators. These results align with the findings of Eze and Musa (2020), who reported that in flood-prone areas of Northeastern Nigeria, physical destruction of school buildings, displacement of school communities, and the destruction of educational resources are recurring consequences of seasonal floods, often leaving long-term effects on education delivery.

The widespread nature of these impacts aligns with reports by the Borno State Emergency Management Agency (BOSEMA), which noted extensive flood damage to public infrastructure in 2024, including educational facilities. This strongly supports the view that educational systems in flood-prone areas require pre-disaster planning and infrastructure resilience strategies to minimize disruption and safeguard learning environments (BOSEMA, 2024).

Table 3: Coping Strategies Adopted

Variables	Frequency	Percentage (%)
Temporary learning centers	70	46.7
Online learning	25	16.7
No intervention	55	36.6

The most commonly adopted coping mechanism was the establishment of temporary learning centers (46.7%). These ad hoc solutions were mostly set up in churches, mosques, and community halls to continue educational activities. While commendable, they were often overcrowded and lacked adequate learning materials. This observation is consistent with the findings of Okon and Ibrahim (2022), who reported that in emergency-affected regions, makeshift educational arrangements are frequently used to sustain learning continuity, but often fall short in terms of quality, accessibility, and resources.

Only 16.7% of respondents reported transitioning to online learning, reflecting limited digital infrastructure, poor internet connectivity, and low digital literacy in many parts of Maiduguri. This is consistent with national reports indicating that most rural and peri-urban areas in Nigeria face substantial digital inclusion challenges (National Digital Economy Policy and Strategy [NDEPS], 2020).

Alarmingly, 36.6% of respondents reported that no intervention or coping mechanism was implemented, indicating a significant gap in disaster preparedness and emergency education response. This gap likely exacerbated learning losses, particularly among vulnerable populations. This aligns with the findings of Yusuf and Abubakar (2021), who emphasized that insufficient disaster response frameworks and poor coordination among stakeholders significantly hinder education continuity in emergency contexts across Northern Nigeria.

These findings highlight the urgent need for a coordinated education-in-emergency (EiE) framework, which includes infrastructure backup plans and alternative learning systems tailored to low-resource settings.

Table 4: Assistance Received

Variables	Frequency	Percentage (%)
Government	60	40.0
NGOs	45	30.0
Community-based support	25	16.7
None	20	13.3

Concerning support and interventions, 40.0% of respondents received assistance from government bodies, while 30.0% were supported by NGOs, such as UNICEF and Save the Children, which have a known presence in Borno State. This shows some level of institutional response, though not comprehensive enough. These findings echo observations by Olanrewaju et al. (2020), who noted that while humanitarian agencies have played vital roles in supporting education in emergencies in Northeast Nigeria, gaps remain in coordination, coverage, and long-term sustainability.

Community-based support was cited by 16.7% of respondents, emphasizing the critical role of local solidarity during crises. However, a concerning 13.3% reported receiving no assistance at all, raising questions about inclusivity and equitable distribution of emergency relief and educational support. This fragmented response structure suggests a lack of coordination among stakeholders and highlights the need for stronger collaboration between government agencies, NGOs, and local communities to ensure timely and comprehensive interventions in times of disaster. These findings are consistent with Adamu and Mohammed (2021), who argued that inadequate synergy among education and disaster response actors often leads to uneven support during emergencies in Nigeria's conflict- and disaster-prone zones.

Discussions

The demographic profile of respondents in this study offers valuable insight into the diverse perspectives of stakeholders affected by the 2024 flood in Maiduguri's education sector. With 56.7% of respondents being male and 43.3% female, the data suggest active gender-inclusive participation in educational processes in Maiduguri, reinforcing the notion that both sexes are significantly involved in shaping and experiencing education outcomes (Yusuf & Abubakar, 2021). The age distribution was skewed toward younger populations, particularly those aged 18–30 (40.0%), a demographic that largely consists of students and young professionals. This youth dominance highlights both the vulnerability and resilience of younger groups in disaster settings and provides a window into their perceptions of disruption and recovery in education.

Occupationally, the dominance of students (50.0%) among respondents followed by teachers (26.7%) and administrators (13.3%) ensured a well-rounded view from direct beneficiaries and facilitators of the education system. Similarly, respondents were drawn from all levels of the education spectrum primary (40.0%), secondary (36.7%), and tertiary (23.3%) providing comprehensive coverage of flood impact across education tiers. These distributions enhance the generalizability of the findings and provide a holistic picture of how various educational stakeholders were affected. These findings are in line with Olanrewaju et al. (2020), who emphasized the need for multi-tiered data to understand systemic vulnerabilities in the education sector during emergencies.

The study found that the 2024 floods significantly disrupted academic activities in Maiduguri, with 73.3% of respondents reporting interruptions in the academic calendar. This impact is consistent with prior research by Nnadi et al. (2021), which noted that natural disasters in Nigeria often result in prolonged academic delays and calendar distortions. Damage to school infrastructure (66.7%) and displacement of students and teachers (60.0%) were among the most prominent physical consequences. These issues were exacerbated by the loss of learning materials (56.7%), which created additional barriers to continuity in education. These findings corroborate BOSEMA (2024) reports, which documented substantial infrastructural damage to public facilities, including schools, during the flood, emphasizing the urgent need for infrastructure resilience planning.

Coping strategies adopted varied significantly, with 46.7% of respondents indicating reliance on temporary learning centers often-makeshift spaces such as churches, mosques, or community halls. While these alternatives allowed for the continuation of education, their overcrowded nature and lack of learning resources rendered them inadequate for long-term educational delivery. Furthermore, only 16.7% of respondents transitioned to online learning, underscoring the severe limitations of digital infrastructure, internet access, and digital literacy in the region. This finding echoes the National Digital Economy Policy and Strategy (NDEPS, 2020), which highlights persistent digital divides in rural and peri-urban areas in Nigeria, particularly in conflict-affected zones like Borno State.

In terms of institutional and community responses, support from government bodies (40.0%) and NGOs (30.0%) such as UNICEF and Save the Children reflected some level of coordinated intervention. However, the fragmentation became apparent as 36.6% reported no coping mechanism, while 13.3% received no form of assistance at all. Community-based efforts (16.7%) played a crucial role in bridging these gaps, showcasing the resilience and solidarity within local populations. Nonetheless, the uneven distribution of support points to weak stakeholder coordination, as observed by Adamu and Mohammed (2021). A more integrated, inclusive, and proactive disaster preparedness plan involving government, NGOs, and local communities is essential for safeguarding educational continuity in future emergencies.

Conclusion/Suggestions

The paper critically examined the impact of the 2024 flood disaster on the educational system in Maiduguri, Borno State, Nigeria. Findings revealed that flooding significantly disrupted academic activities across all levels of education primary, secondary, and tertiary with the majority of respondents reporting interruption in the academic calendar, damage to infrastructure, displacement of students and staff, and loss of learning materials. These outcomes confirm that flooding does not only affect physical infrastructure but deeply interrupts the educational continuum, especially in vulnerable and conflict-prone regions such as Maiduguri. The demographic analysis showed inclusive participation from various stakeholder groups, including students, teachers, administrators, and policymakers, across a broad age range and both genders. This diversity allowed for a nuanced understanding of the multifaceted impact of floods on education. However, the low transition to online learning and the heavy reliance on temporary learning centers indicate a significant lack of digital preparedness and insufficient long-term resilience planning in the education sector.

Furthermore, while institutional support from government and NGOs was evident to an extent, the fragmented and uneven nature of these interventions exposed major gaps in coordination and preparedness. Alarmingly, a notable percentage of respondents reported receiving no form of support, underscoring the urgency for a more inclusive and integrated disaster response system tailored to the education sector. In light of these findings, it is imperative that policymakers and education stakeholders prioritize the development of pre-disaster education continuity plans, investment in resilient school infrastructure, and the integration of digital learning platforms. Strengthened collaboration between government, humanitarian organizations, and local communities will also be crucial in creating an equitable and effective emergency education response system. Ultimately, this study emphasizes the need for a proactive, rather than reactive, approach to disaster management in education. In doing so, the education sector in Maiduguri and indeed other flood-prone regions can be better equipped to withstand future shocks, ensuring that learners continue to access quality education even in the face of emergencies.

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