

# POST-CONFLICT URBAN REDEVELOPMENT AND FLOOD-RESILIENT INFRASTRUCTURE IN MAIDUGURI: AN EVIDENCE-BASED ANALYSIS

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## ABSTRACT

This study examines post-conflict urban redevelopment and flood-resilient infrastructure development in Maiduguri, Nigeria, following over a decade of Boko Haram insurgency. The September 2024 Alau Dam collapse, which killed at least 37 people and displaced 414,000 residents, demonstrates the urgent need for integrated approaches combining post-conflict recovery with climate resilience. The analysis reveals that successful redevelopment requires coordinated implementation of structural measures (upgraded drainage systems, flood barriers), non-structural interventions (early warning systems, land-use planning), and institutional capacity building, while integrating the needs of approximately 300,000 internally displaced persons into sustainable urban planning frameworks.

**Keywords:** Post-conflict urban redevelopment, Flood-resilient infrastructure, Climate resilience, Alau Dam, Boko Haram, Internally Displaced Persons (IDPs)

## Introduction

This paper aims to examine effective strategies for urban redevelopment and flood-resilient infrastructure in Maiduguri in the aftermath of conflict and severe flood disasters, focusing on integrated approaches to rebuild, protect livelihoods, and enhance social stability. Maiduguri, the capital of Borno State in northeastern Nigeria, serves as a pivotal case for analyzing both post-conflict reconstruction and climate adaptation (ACAPS, 2024). As the largest city in northeastern Nigeria with an estimated population exceeding 1 million, the city has borne the largest burden of supporting those displaced by the 15-year Boko Haram insurgency, housing over

800,000 internally displaced persons (IDPs) at the crisis peak (Granville, 2017; African Cities Research Consortium, 2021).

The city faces dual challenges: rebuilding after extensive conflict-related infrastructure destruction while simultaneously addressing intensifying climate-induced flooding risks (Carnegie Endowment for International Peace, 2019). The September 10, 2024, collapse of the Alau Dam following heavy rains resulted in catastrophic flooding affecting over 40% of Maiduguri Municipal Council, killing at least 37 people, injuring 58, and displacing 414,000 people (Al Jazeera, 2024; ACAPS, 2024; ReliefWeb, 2024). This disaster, described by the UN refugee agency as the worst to hit the city in thirty years, illustrates the critical need for integrated post-conflict urban planning that incorporates flood resilience (The New York Times, 2024).

### Historical Context and Conflict Impact

#### The Boko Haram Insurgency and Infrastructure Destruction

The Boko Haram insurgency, which began in 2009, has fundamentally transformed Maiduguri's urban landscape and infrastructure systems (Granville, 2017). Since 2009, over 2.1 million people have been displaced in Borno State due to threats from the insurgency, with hundreds of thousands seeking refuge in Maiduguri (Carnegie Endowment for International Peace, 2019). The conflict has caused an estimated \$9 billion in economic losses across northeastern Nigeria, with Borno State suffering the highest losses at \$5.9 billion (Carnegie Endowment for International Peace, 2019). Infrastructure destruction has been extensive, with reports indicating that 45% of all health facilities in the region have been destroyed (Granville, 2017). The insurgency led to the collapse of large-scale industries, transport restrictions, and blockade of several roads to smaller towns, greatly restricting economic flows (Carnegie Endowment for International Peace, 2019). Educational infrastructure suffered particularly severe damage, with NEMA reporting that 254 schools were destroyed and 120,077 students forced out of school by the end of 2014 (Granville, 2017).

#### Demographic Transformation and Displacement Crisis

As of November 2020, approximately 300,000 IDPs still reside in Maiduguri (African Cities Research Consortium, 2021). This massive population influx has exacerbated pre-existing urban vulnerabilities, including weak local government capacities, poor service provision, and high youth unemployment (African Cities Research Consortium, 2021). The displacement crisis has created new patterns of urban settlement, with many IDPs occupying flood-prone areas due to limited affordable housing options (Carnegie Endowment for International Peace, 2019).

Since 2021, the Borno State government has begun shutting down displacement camps in Maiduguri, relocating over 200,000 people from eight camps (The New Humanitarian, 2024). This policy, while aimed at encouraging return to areas of origin, has pushed many displaced people deeper into destitution, with many resorting to self-constructed structures that provide inadequate shelter from flooding (The New Humanitarian, 2024).

### **Geographic and Climatic Vulnerabilities**

Maiduguri's location along the Ngadda River in the Chad Basin creates inherent flood vulnerabilities (Wikipedia, 2024). The Alau Dam, constructed in 1984-1986 to provide water for irrigation and flood control, has historically caused flooding events, including incidents in 1992, 1994, and 2012 (Wikipedia, 2024; Water Power Magazine, 2024). The dam's failure on September 10, 2024, triggered catastrophic flooding that affected over 400,000 individuals (Al Jazeera, 2024; ACAPS, 2024).

Climate change has intensified natural vulnerabilities through shifting rainfall patterns and increased precipitation intensity (Punch Nigeria, 2021). The 2024 flood event was preceded by weeks of torrential rainfall across the region, which caused severe structural damage to the dam before its eventual collapse (Water Power Magazine, 2024; The New York Times, 2024).

### **Infrastructure Deficits and Systemic Vulnerabilities**

Maiduguri's drainage infrastructure suffers from multiple interconnected deficits that compromise flood resilience (International Journal of Agriculture and Environmental Research, 2019; Uniprojects, 2025). Field assessments reveal that most drainage channels are constructed using bricks rather than concrete, with narrow widths that cannot accommodate increased water volumes during extreme rainfall events (International Journal of Agriculture and Environmental Research, 2019). The drainage systems are primarily open surface designs, making them susceptible to pollution and easily clogged by waste dumping (Uniprojects, 2025).

Transportation infrastructure remains particularly vulnerable to flood impacts (ReliefWeb, 2024). The September 2024 flood event caused the partial collapse of two major bridges (Lagos Street Bridge and Gwange Bridge), effectively isolating communities and hampering rescue efforts (ReliefWeb, 2024). These infrastructure failures demonstrate how aging systems, combined with extreme weather events, create cascade failures with devastating consequences (The New York Times, 2024).

### **The Borno State Development Plan (2020-2045)**

The Borno State Development Plan represents the most comprehensive post-conflict reconstruction framework, establishing a 25-year vision for sustainable development

(AIT, 2020; Vanguard Nigeria, 2020). The plan's vision is to transform the insurgency-ravaged society into a peaceful, stable and self-reliant society with over 70% productive population by 2030 (Borno State Government, 2020).

The plan is structured around nine strategic pillars: human capital development, leadership in agriculture, healthy citizenry, sustainable environment, regional trade hub, reconstruction/rehabilitation/resettlement, purposeful infrastructure, accountable governance, and peace & security (Borno State Government, 2020). The infrastructure pillar specifically calls for "good and secured connectivity and infrastructure network to support the economic development of key sectors" (Borno State Government, 2020).

A critical component is the commitment to achieving "voluntary resettlement of at least 50% of IDPs by 2022 and no IDP camps by 2026," requiring integrated urban planning that can accommodate displaced populations while building flood-resilient infrastructure (Borno State Government, 2020).

### **Institutional Coordination Challenges**

Effective post-conflict urban redevelopment requires coordination across multiple government agencies, a challenge that has historically hampered flood management efforts in Maiduguri (African Cities Research Consortium, 2021). The Borno State Urban Planning and Development Board, established in 2000, has primary responsibility for urban planning but has faced capacity constraints due to conflict and security challenges (African Cities Research Consortium, 2021).

Recent efforts include the World Bank's Sustainable Outcomes for Livelihoods and Inclusion Development (SOLID) project, which focuses on communities with protracted displacement and adopts a "People-in-Place" approach for concentrated investments (World Bank, 2024). The project requires a "whole-of-government" approach with multi-agency steering committees and clear operations and maintenance responsibilities (World Bank, 2024).

### **Structural Measures and Current Interventions**

Current flood management infrastructure requires comprehensive upgrading (International Journal of Agriculture and Environmental Research, 2019). Most existing drains are constructed using inadequate materials with narrow widths creating bottlenecks during high-flow events (International Journal of Agriculture and Environmental Research, 2019; Uniprjects, 2025). Successful structural interventions must incorporate climate-responsive design principles accounting for increased rainfall intensity and frequency (Punch Nigeria, 2021).

The recent flooding exposed critical vulnerabilities in water management infrastructure (The New York Times, 2024). The Alau Dam's collapse demonstrated how inadequate

maintenance and structural deficiencies can create catastrophic failures (The New York Times, 2024; Water Power Magazine, 2024). Government officials were aware of the dam's deteriorating condition but failed to undertake necessary repairs despite warnings from residents and engineers (The New York Times, 2024).

### **Non-Structural Measures and Early Warning Systems**

Nigeria has established several agencies responsible for flood forecasting and early warning, including the Nigeria Meteorological Agency (NiMet) and Nigeria Hydrological Services Agency (NIHSA) (Oke, 2023; The Centre for Journalism Innovation and Development, 2024). However, coordination challenges and limited resources have constrained effectiveness (The Centre for Journalism Innovation and Development, 2024).

The AWARE Platform, developed by the International Water Management Institute, represents an innovative approach to flood early warning that uses advanced remote sensing technologies and promotes multi-stakeholder coordination (Oke, 2023). Early warning systems have proven critical, with community-based approaches showing promise for reaching vulnerable populations including IDPs (ReliefWeb, 2025).

### **Green Infrastructure and Nature-Based Solutions**

Green infrastructure approaches offer potential for enhancing flood resilience while providing co-benefits (World Bank, 2022). However, implementation has been limited due to resource constraints and institutional capacity gaps (African Cities Research Consortium, 2021). Urban planning approaches that restrict development in flood-prone areas are essential, as demonstrated by current demolition campaigns targeting structures identified in flood zones (ReliefWeb, 2024).

### **Financial Constraints and Funding Mechanisms**

Implementation faces significant financial constraints (African Cities Research Consortium, 2021). Governor Babagana Zulum's recent supplementary budget request to address flood damage illustrates the scale of financial need relative to available resources (ACAPS, 2024). This request came after substantial budget allocations, revealing ongoing shortfalls in disaster preparedness and infrastructure maintenance (ACAPS, 2024).

International funding mechanisms offer opportunities through initiatives like the Nigeria Agro-Climatic Resilience in Semi-Arid Landscapes Project, which received \$700 million World Bank funding for climate resilience in northern Nigeria (Punch Nigeria, 2021). The World Bank's City Resilience Program also provides technical and financial services for urban resilience building (World Bank, 2022).

### Institutional Capacity and Community Engagement

Effective implementation requires addressing institutional capacity gaps and ensuring community participation (World Bank, 2024). Post-conflict environments require particular attention to social cohesion, ensuring infrastructure investments benefit both displaced and host populations (Carnegie Endowment for International Peace, 2019). The integration of IDPs into permanent settlements requires careful attention to social dynamics and potential sources of conflict over resources and services (The New Humanitarian, 2024).

Community-based approaches have shown promise, with organizations like the International Rescue Committee developing flood warning systems that provide early alerts to vulnerable communities (ReliefWeb, 2025). These initiatives demonstrate how local knowledge and social networks can enhance flood preparedness and response (ReliefWeb, 2025).

### Conclusion and Recommendations

The Maiduguri case demonstrates that post-conflict urban redevelopment provides opportunities to build more resilient urban systems, but success requires explicit attention to climate risks and deliberate integration of resilience considerations (Carnegie Endowment for International Peace, 2019; World Bank, 2022). Key recommendations include:

**Integrated Planning:** Establish unified coordination mechanisms bringing together urban planning, disaster management, and humanitarian agencies (World Bank, 2024).

**Infrastructure Upgrading:** Prioritize drainage system improvements using climate-responsive design principles and appropriate construction materials (International Journal of Agriculture and Environmental Research, 2019; Uniprojects, 2025).

**Early Warning Systems:** Strengthen multi-stakeholder early warning systems with particular attention to reaching vulnerable IDP populations (Oke, 2023; ReliefWeb, 2025).

**Institutional Capacity Building:** Invest in local capacity for infrastructure planning, design, construction, and maintenance (African Cities Research Consortium, 2021).

**Community Engagement:** Ensure participatory planning approaches that integrate both displaced and host communities (Carnegie Endowment for International Peace, 2019).

**Sustainable Financing:** Develop innovative financing mechanisms combining international funding with local resource mobilization (Punch Nigeria, 2021; World Bank, 2022).

The September 2024 flooding disaster underscores the urgent need for integrated approaches that address both post-conflict reconstruction and climate resilience (Al Jazeera, 2024; ACAPS, 2024; The New York Times, 2024). Success requires coordinated

action across multiple levels of government, sustained international support, and meaningful community participation in planning and implementation processes (World Bank, 2024).

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