DETAILED
SHELTER RESPONSE PROFILE

NIGERIA NORTHEAST

LOCAL BUILDING CULTURES FOR SUSTAINABLE AND RESILIENT HABITATS

1ST EDITION
NOVEMBER 2024

GLOBAL SHELTER CLUSTER
Coordinating Humanitarian Shelter and Settlements

Shelter Response Profiles (SRP)

BACKGROUND

The organisations backing this document (see back cover) have been working for several years on the elaboration and dissemination of methods for the assessment of local building cultures (LBC), especially regarding their potential to contribute to Disaster Risk Reduction (DRR), and to shelter and housing responses in conflict and post-conflict situations. The aim is to facilitate the identification of the strengths and weaknesses of LBC and the opportunities they offer – in an adapted version if necessary – in housing reconstruction, retrofitting or improvement projects.

In doing so, it is essential to consider that families and communities often live in changing environments due to factors such as conflict, climate change, urbanization, globalization, and transforming socio-cultural attitudes. Thus, even if local practices are meaningful, they are challenged, and it is still advisable to find locally manageable solutions and limit innovations so that they can be adopted toward sustainable development and increased local resilience capacity.

SRPs are part of a broader set of tools and documents developed and used to facilitate contextualization of responses. They are one of the proposed activities of the Protocol "Informing choice for better shelter" in its step 1 "Understanding the context", developed by the "Promoting Safer Building Working Group" (now evolved towards Recovery CoP) of the Global Shelter Cluster.

OBJECTIVES

SRPs have several complementary objectives:

- To help recognise the importance of a better understanding of a context before proposing any action or project, offering a non-exhaustive overview of a country or territory with demographics, cultural, social, and economic data; hazards, environment, and climate change impacts; impacts of crises in the population; legal and institutional framework; HLP issues; construction sector, etc., in order to help orient practitioners with a global understanding of new contexts.
- Help to better consider the existing construction sector, the available natural resources and the cultural ones, such as the local knowledge, the skills and know-how, understanding and respecting the existing good practices and DRR techniques at various scales (materials, building systems, house, compound, settlement organisation).
- To favour the development of shelter and human settlements responses more focused on localization, reduction of climate change and environmental impacts, and promotion of self-recovery strategies.
- To eventually become an advocacy tool for the shelter sector/cluster members, agencies, donors, or local authorities for more localized actions, facilitating self-recovery and communities' resilience.

↘ FOR MORE INFORMATION

SHELTER RESPONSE PROFILES
https://www.sheltercluster.org/promoting-safer-building-working-group/library/shelter-response-profiles

ONLINE TRAINING: PARTICIPATORY ASSESSMENT OF LOCAL BUILDING CULTURES
https://ifrc.csod.com/ui/lms-learning-details/app/curriculum/8ca39ca8-d8b2-4f6c-8273-7211a14f98b3

Cover photos (from top to bottom):

Adobe constructions of Bulabulin Community in Dikwa, Borno State - © UniMaid
Earth constructions in Buniyadi, Yobe State - © UniMaid
Kitchen in a Higgi compound in Michika, Adama State - © UniMaid

CONTENT AND SUGGESTIONS FOR USE

This document introduces reference data on local building cultures and sociocultural practices that result in people's resilience. It also provides evaluation criteria that can help in elaborating locally adapted project strategies.

Context and details differ from place to place, so the collected data of this SRP can help stakeholders take more adapted decisions. Nevertheless, SRPs should not be considered exhaustive. They are a first level of information that needs to be deepened through field analysis of the specific intervention context.

Therefore, it remains essential to organize field surveys that will allow exchanges with local actors and inhabitants on the constraints and potentials of territories in terms of access to land, lifestyles, material and human resources, practices, knowledge, and construction capacities.

TARGET AUDIENCE

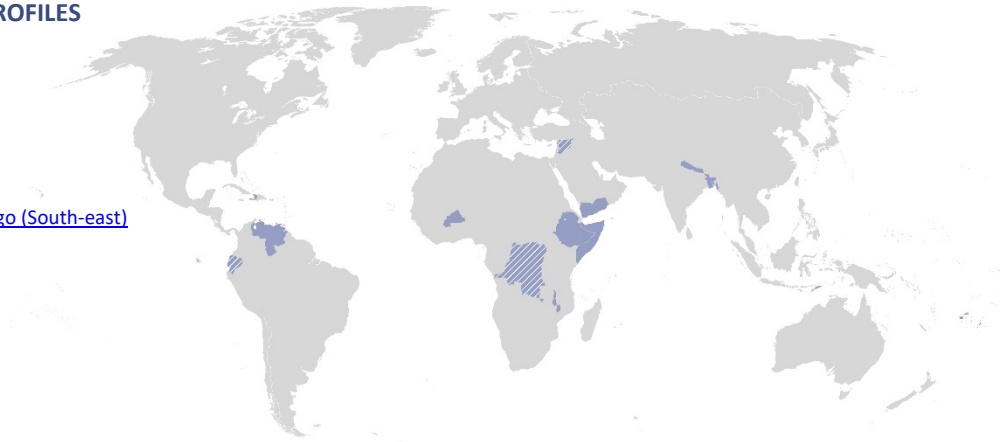
Local, national, international, governmental, non-governmental and civil society actors involved in the prevention, preparedness, and response to humanitarian crises (disasters or conflicts) in the shelter, housing, and human settlements sectors.

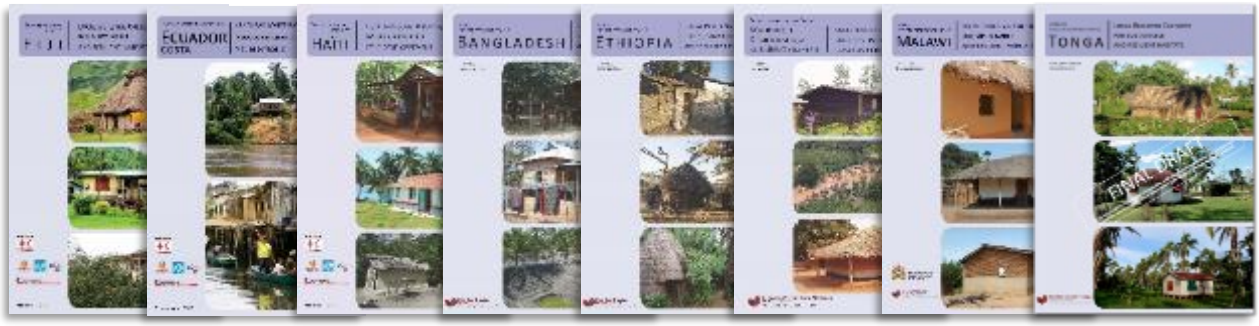
HISTORY OF THE SERIES OF SRP

This publication is part of the series of documents "Local Building Cultures for sustainable and resilient habitats" launched in 2016. Several profiles have been produced after a disaster or before a disaster strikes as a preparedness tool. However, most profiles have been elaborated for conflict and disaster contexts, often in situations of protracted crises.

SHELTER RESPONSE PROFILES

Fiji
Ecuador (Coast)
Haiti
Bangladesh
Ethiopia
Democratic Republic of Congo (South-east)
Malawi
Tonga
Burkina Faso
Yemen
Venezuela
Somalia
Nepal
Syria (North-west)
Nigeria (North-east)





Foreword

HUMANITARIAN CONTEXT

Nigeria is the third most terrorist affected country in the world, a position Nigeria has retained since 2015 (GTI, 2019). The Boko Haram insurgency has continued to displace settlements thereby increasing the number of internally displaced and impoverished people. Other security challenges, including kidnapping for ransom, armed robbery and banditry, and the farmer herder conflicts have compounded the security situation, especially in the northern parts of Nigeria (United Nations Nigeria, 2022).

Displacement and the destruction of homes and infrastructure have caused significant shelter needs, with about 3 million people requiring shelter assistance in 2024 (UNOCHA, 2024). Most of the displaced populations are in Borno State, where nearly half live in formal and informal camps, often in congested conditions because of the continuous influx of new arrivals and returnees. Access to land to build shelters for vulnerable people living in host communities is also a concern.

HIGH VULNERABILITIES

According to WBG in the Climate Risk Country Profile Nigeria, changes in rainfall with increased temperature produce floods and droughts, which impact on food security and water availability. Increased incidence of extreme rainfall also results in soil erosion and water logging of crops, thus decreasing yields and increasing food insecurity. This result in significant economic losses, damage to agricultural lands and infrastructure as well as human casualties (USAID, 2018). This degrading environment, especially in the semi-arid areas of the country, is resulting into conflicts between communities.

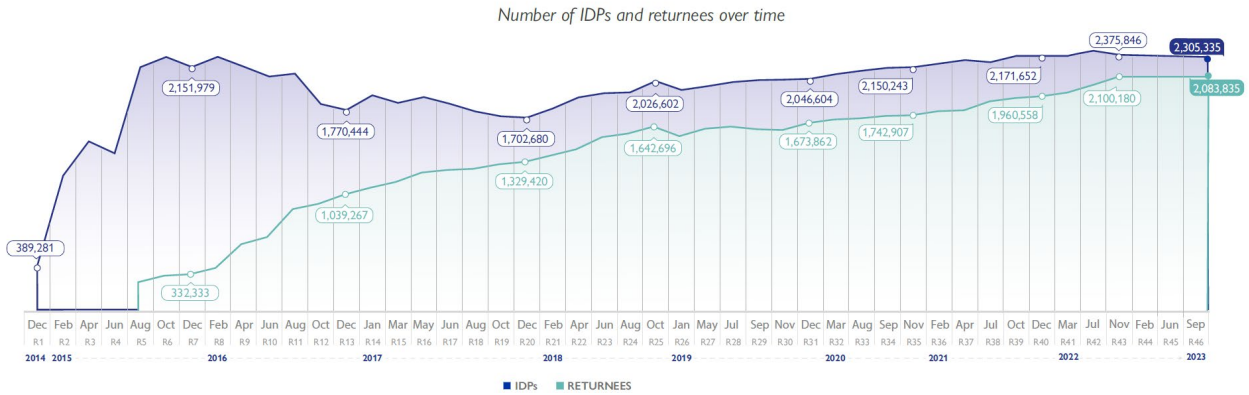
Details of the 2020/2021 UNEP-IOM reports from Northern Nigeria covering areas affected by the humanitarian crisis, conflicts associated with climatic pressures, among other causes, have led to displacement and migration, resulting to adverse impacts on food security in Adamawa, Borno and Yobe states, also named as the BAY States, which host considerable IDP populations (United Nations Nigeria, 2022).

ADAPTED LOCAL BUILDING CULTURES

IOM and other partners have identified several challenges in providing durable shelter solutions, including concerns about the durability of local materials, limited focus on long-term solutions, or the adaptability of basic housing to seasonal changes and weather conditions.

While challenges exist, this Shelter Response Profile aims to provide a basic understanding of the context and key issues related to shelter sector operations, and in particular to support housing projects that make best use of and evolve existing good practices in Local Building Cultures.

Emphasis is placed on local building practices and materials that enable better building, rebuilding rebuild or rehabilitate, and which lend themselves to the possibility of the ability of those affected to better shelter themselves. To this end, the strengths of local construction and practices, knowledge and experience developed by local local communities were identified, analyzed and, in many cases, validated over the years.



Displacement Tracking Matrix - IDP and returnees' population trends in Northeast Nigeria (2014-2023) © IOM – DTM (Displacement Tracking Matrix)

Table of content

1. Introduction

WHY LOCAL BUILDING CULTURES[1] ARE IMPORTANT TODAY

All over the world, societies have managed to produce, adapt and develop their habitat according to their needs, interests, aspirations, preferences, availability, affordability and abilities, making the best use of locally available materials. Strategies developed take advantage of natural resources to protect against the destructive forces of nature and have always generated rich and varied knowledges at local levels.

(Re)discovering the intelligence of local architectures and analyzing their associated practices is often very useful in the process of designing disaster-resistant architectures in line with build-back-safer principles, but also to adapt to contemporary lifestyles and their evolution, respect the local environment and culture and conform to the technical and economic capacities of local populations.

Relying on, or at least getting inspiration from local knowledge, know-how, construction processes, culture, ways of life and traditional means of organization has proven to be very effective, as it favors:

- The implementation of solutions well adapted to local ways of life and the suggestion of viable improvements.
- The possibility to shelter many people quickly and cost-effectively while considering seasonality effects as well as factors like religious festivals and livelihood activities.
- Large-scale reproducibility of the improvements designed in continuity with local building cultures and an easy access, both financially and technically, to the promoted solutions for non-beneficiaries.
- A positive impact on local economies as local skills and materials are fully promoted while also considering environmental concerns linked to the construction industry.
- Extensive short and long-term ownership by the beneficiaries through their participation in decision-making and project implementation processes.
- Empowerment of local populations through the recognition of the value of their existing capacities for building and the improvement of their resilience.

To develop a disaster-resistant architecture adapted to the local lifestyle, it is crucial to involve the beneficiaries, the local professionals, and decision-makers from the very beginning of the recovery phase. Also, rebuilding is often necessary and can be very demonstrative and convincing; therefore, promoting appropriate repairs may help achieve this goal. This way, the link between relief, recovery and development is enabled, and the long-term benefit of a shelter project is ensured.

↘ FOR MORE INFORMATION

SHELTER DMS-CCCM CLUSTER NIGERIA. (2023). *SHELTER/NFI 2023 HRP GUIDANCE NOTE*. https://shorturl.at/I2f7L

IDP Camp Borno with displaced households living in plastic sheet shelters and locally made covered spaces– © European Union - Samuel OCHAI

[1] Key terms are defined in Section Key concepts (page 86)

ARTICULATION OF THE PROFILE WITH THE NIGERIA CCCM/SHELTER/NFI CLUSTER STRATEGY

The Camp Coordination and Camp Management (CCCM), Shelter, and Non-Food Items (NFI) Sector in Nigeria was activated in 2016 and is led by UNHCR and IOM. The sector operates through a national coordination team in Maiduguri and subnational platforms in areas with high concentrations of camps, camp-like setups, and host communities hosting IDPs, such as Monguno, Bama, Dikwa, etc. Government counterpart agencies include the National Emergency Management Agency (NEMA) and State Emergency Management Agency (SEMA). The Strategic Advisory Group (SAG) in Maiduguri provides annual guidance, and Technical Working Groups (TWiG) for CCCM and Shelter/NFI address various issues, including contingency planning, strategy elaboration, adapting guidance to the national context, HPC, HRP, HNO, etc.

The main objectives of the sector are to support Humanitarian Coordination Teams (HCTs) in sector-specific decision-making, advocate for funding and coverage of identified needs or gaps, provide technical support to sector partners and the government, act as providers of last resort, establish continuous a coordination mechanism to facilitate partner engagement and minimize duplication, and monitor ongoing sector responses. The sector prioritizes people living in substandard shelter conditions, including those with no shelter, in makeshift shelters or in damaged shelters (partially or fully). This includes cash for shelter, voucher assistance for shelter, transitional solution designs, site planning for decongestion strategy and review of specifications, use, availability, quality and affordability of construction materials.

The sector aims to ensure that Age, Gender, and Diversity aspects are considered in shelter designs and NFI packages, recommending the incorporation of local cultural preferences to promote opportunities for local capacity building and the use of alternative building technologies to ensure environmental sustainability. The key issues for IDPs camps in northeast Nigeria include HLP, humanitarian access, and overcrowding in camps. Monitoring, evaluation, and addressing beneficiary complaints and feedback on provided shelter and NFI responses, sector partners conduct needs assessments and post-construction/distribution monitoring.

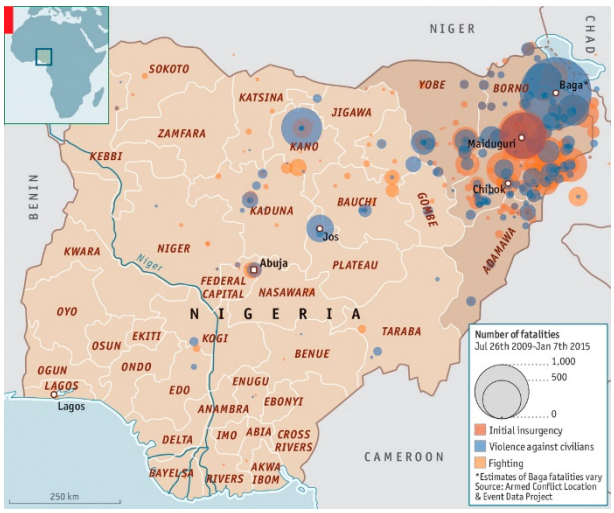
NORTHEAST NIGERIA SRP: INFORMATION, DATA COLLECTION AND PRODUCTION

This Profile was produced from May 2023 to November 2024. The process was codirected by IOM Nigeria, UNIMAID (University of Maiduguri), and CRAterre, with the tight collaboration of the Shelter – DMS/CCCM Cluster in Nigeria.

The core of data collection has been achieved thanks to Participatory assessments of local habitat conducted by UNIMAID and IOM in 23 locations in the three BAY States, thanks to the active participation of communities, students and professors at UNIMAID, and shelter practitioners, with remote support of CRAterre. The urban areas analyzed in the study are: the center of State capitals (Maiduguri, Yola and Damaturu), and major towns (Monguno); and the edges of these cities, such as the fringes of Maiduguri, Yola and Damaturu (Lambu, Malakyariri, Bulabulin ward). On top of that, the rural areas analyzed in the study are: towns, mostly LGAs (Local Government Area) capitals, but not only (Pulka, Banki, Damboa, Ngala, Monguno, Gashua, Potiskum, Mubi, Lamurde, Yola South, Fufore, Michika); and also, villages and hamlets (Buniyadi, Opalo, Mbamba, Daware).

Apart from assessments and local contributions, a dedicated literature review of more than 70 documents (see Sources consulted to produce this document) was achieved. The profile was revised by academics and shelter and housing actors in Nigeria, and by several Nigerian and international experts.

This document summarizes and disseminates strengths of local building cultures. These aspects have been identified, analyzed and many of them validated over the years. The document is intended to be a living one, and new contributions will be highly appreciated (please contact secretariat@craterre.org and IOM Nigeria).



Boko Haram fatalities between 2009 and 2015 © The Economist

2. Country profile

2.1. GENERAL DESCRIPTION

LOCATION, PHYSICAL AND TOPOGRAPHICAL DATA

Nigeria is a sovereign country located in West Africa bordering on the Gulf of Guinea. The country has a total area of 923,769 sq. km.

CC Wikipedia Commons

Nigeria is bordered with 809km on the West by the Republic of Benin, 1,608 km on the North by Niger Republic, 85 km on the East by the Republic of Chad, and 853 km the Republic of Cameroon, and on the south by the Atlantic Ocean (Onah, 2014). The territory included in this SRP considers the North-Eastern Nigeria states of Borno, Yobe and Adamawa.

The country's terrain consists of the lowlands in the South with mountainous formations in the South-East (Highest point: Chappal Waddi with 2,419 m), which merge into the hills and plateaus of the Central belt and the plains of the far north. Mean elevation is 380 m. Its longest river is the Niger River with 4,200 km, entering the country in the North-West and flowing southward through tropical rain forests and swamps to its delta in the Gulf of Guinea.

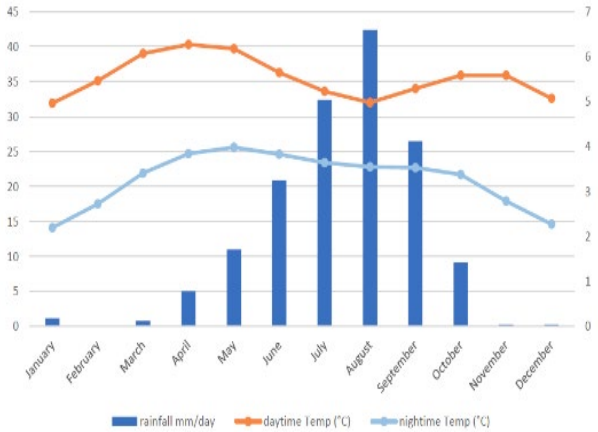
Nigeria relief map © Uwe Dedering, Wikimedia Commons (CC BY-SA 3.0)

CLIMATE

North Nigeria encompasses some of the highlands and desert regions, with the strong influence of the wind pattern causing sandstorms. The **hot-dry climate** is characterized by high temperatures during the day with a sharp drop at night and sunshine all year round. Especially in the summer humidity is low, with rapid evaporation of low rainfall. Temperature has an annual average of 36 °C degrees and winds with average speeds ranging from 14 to 25 km/h.

In the North-East region, a **long dry season** extends from November to March and is characterized by the **Harmattan**, a dry and dusty wind from the Sahara Desert that blows SW, causes relative humidity fall below 30 per cent, leading to dryness and aridity. This vast amount of suspended dust creates a hazy atmosphere, reduces visibility, and causes high temperatures during the day and cool nights. This is the period of little or no cloud cover.

The **wet season is short** covering a period of four months, from June to September. Rains are generally conventional, heavy and short in duration, often characterized by frequent storms. This results in flash floods and in some places also in sheet or gully erosion. Increased rainfall is expected towards the end of the rainy season and the beginning of the dry season (September to December).



Average temperature and rainfall in North-East Nigeria
© Worlddata.info (accessed on 1/7/2023)

Nigeria climate classification based on climatic division						
		Hot-Dry	Temperate Dry	Temperate Dry with Cool Climate	Temperate Humid	Hot-Humid
Mean average values of dry bulb temperature	Min.	25–31	18–24	13–20	23–30	20–37
	Max.	31–45	29–35	25–30	26–28	20–37
Average of relative humidity (min-max) (%)		25–60	40–80	40–80	60–90	70–100
Precipitation (mm)		50–155	1500	1100–2000	2000	2000–4000
Sky conditions		Clear	Clear	Clear	Fair cloudy	Fog, cloudy
Solar radiation		Direct, strong	Strong, direct	Strong	Strong, direct	Painful glare
Winds		Hot, dusty	Coastal winds	Coastal winds	Trade winds	Low velocity, calm
Vegetation		Sparse	Sparse	Green	Very luxuriant	Luxuriant
Special Conditions		Dust sand storms, termites	Dust and sand storms	Heavy dew, fog, hail, thunder-storm	Fog	Fog, thunder-storms

Mobolade, Pourvahidi (2020)

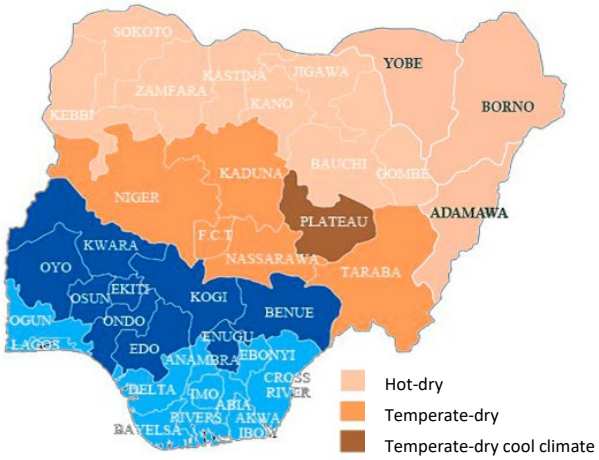
VEGETATION

All the ecological zones found in the tropics are also found in Nigeria (Mobolade, Pourvahidi, 2020). These ecological zones are classified in:

- Mangrove: 9,723 km2
- Tropical Rainforest, which comprises of: Freshwater Swamp: 21,135 km2 & Rain Forest: 190,053 km2
- Guinea Savannah belt: 175,000 km2, with: Montana & Woodland and Tall Grass Savannah
- Sudan Short Grass Savannah: about 192,000 km2
- Sahel Marginal Savannah: about 67,000 km2

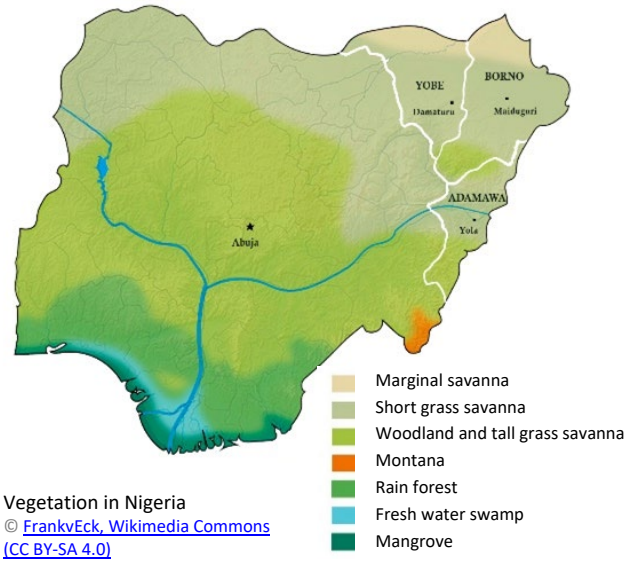
According to Oluleye, vegetation cover is dominantly forested in the South (Oluleye, Adeyewa, 2016), ranging from mangrove at the coast to evergreen, deciduous tall trees in the rain forest.

Meanwhile, the North is covered by long grasses in the Guinea Savannah, and short grasses in the Sudan Savannah, and fringe of Sahel Savannah (Central Bank of Nigeria, 1999).



Climate classification of Nigeria

© Mobolade & Pourvahidi



Vegetation in Nigeria

© FrankvEck, Wikimedia Commons (CC BY-SA 4.0)

ADMINISTRATIVE DATA

Nigeria is a federal Republic. The Nigerian federation has three tiers: the federal, State, and local governments. The federation is made up of 36 States and 774 local government areas (LGAs) and the Abuja Federal Capital Territory. The Federal government has powers over banking and currency, external relations, national security and police, customs and excise, immigration, airports and seaports. The Federal and State governments can act on: revenue allocation, mineral oil and natural gas, taxes, elections, education and health.

At the 1998 National Constitutional Conference, a new 6-zone structure was proposed. Although it was not put into constitutional effect, the zones have become a central part of the geopolitics of the country (Onah, 2014).

The governance structure incorporates both traditional and local administrative models.

Local administration governance models:

- L.G.A head: Chairman
- Ward head: Councillors and secretaries

The **traditional leadership** is based on heredity, and goes through different hierarchy levels [2]:

- Senior customary leader: Supreme Emir, *Shehu*.
- Emir, *Mai*, *Hamma bachama*, *Sarking*.
- District head (position inserted during British colonial rule): *Hakimi, Wakili*, *Kpana rigadi*, *Aja*.
- Village head: *Lawan, Nzuwade, Mai-Jumilla*.
- Ward heads: *Bulama*, *Jauro*, *Ardo* and *Mai-Anguwa*.

PROTECTED AREAS AND WORLD HERITAGE SITES

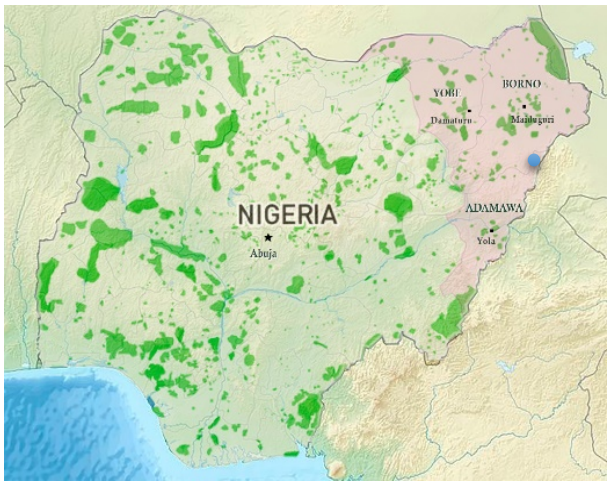
This section aims to highlight the territory as a place with a history and an environment worthy of protection.

The World Database on Protected Areas (WDPA) cites 1001 protected areas in Nigeria covering almost 14 % of the territory. Most of them are National Forest Reserves, with exception of 35 Game Reserves, 12 National Parks, 5 Strict Nature Reserves, 2 Wildlife Sanctuaries, 1 Conservation Area and 1 Community Forest. There are as well 11 Wetlands of International Importance, and 1 UNESCO-MAB Biosphere Reserve.

The largest protected area of Borno State is Lake Chad Wetlands, with more than 6 thousand sq. km. It is designed a Ramsar Site, Wetland of International Importance in 2008, with a transboundary governance shared with Cameroon, Chad and Niger. There is no management plan implemented (UNEP-WCMC, 2023).

Nigeria has two properties inscribed in the World Heritage List: Osun-Osogbo Sacred Grove, on the outskirts of the city of Osogbo, the capital city of Osun State, and Sukur Cultural Landscape (inscribed in 1999) in Madagali, Adamawa State along Nigeria and Cameroon border, and about 290 km from Yola. The Sukur Cultural Landscape, with the Palace of the Hidi (Chief) on a hill dominating the villages below, the terraced fields and their sacred symbols, and the extensive remains of a former flourishing iron industry, is a remarkably intact physical expression of a society and its spiritual and material culture.

Administrative regions in Nigeria © Burmesedays. SelfieCity – based on the Perry-Castañeda Library Map Collection Nigeria Maps and United Nations Cartographic Section Nigeria Map. CC BY-SA 3.0



Protected areas in Nigeria © WDPA / WDOECM

[2] Words in local languages are written in italics

2.2. KEY DEMOGRAPHIC, CULTURAL, SOCIAL AND ECONOMIC DATA

DEMOGRAPHIC DATA

(CIA World Factbook)

Nigeria is the most populous country in Africa with a population of more than 236 million (2024 census), and a population growth rate estimate of 2,52%. Nigeria's population is projected to grow to 392 million in 2050, becoming the world's fourth most populous country.

Age structure (median age: 19,3 years):

- 0-14 years: 40.4%
- 15-64 years: 56.2%
- 65 years and over: 3.4%

Sex ratio population: 1.02 male(s)/female

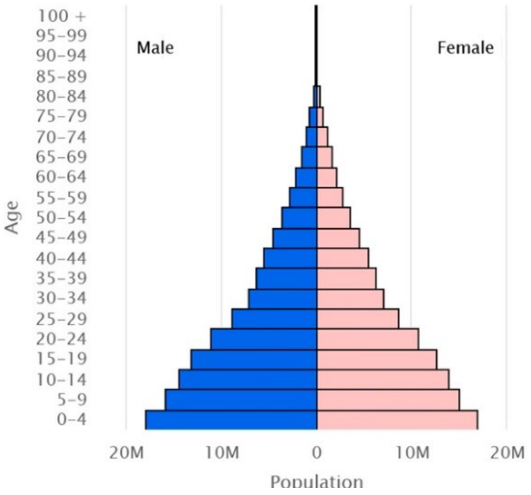
Life expectancy at birth: 62.2 years

Fertility rate: 4,52 children born/woman

Death rate: 8.4 deaths/1,000 population

Net migration rate: -0.2 migrant(s)/1,000 population

Urban population: 54.3% of total population



Population in Nigeria © U.S. Census Bureau, International Database

ETHNIC GROUPS, LANGUAGES AND RELIGION

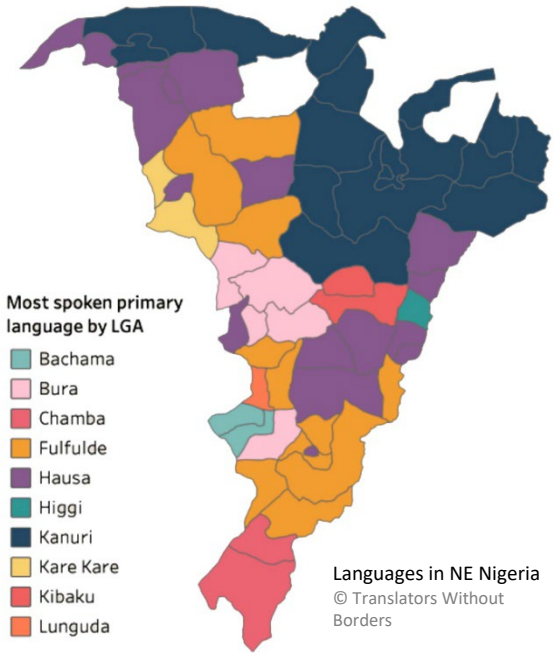
(CIA World Factbook)

Nigeria is composed of more than 250 ethnic groups and over 500 additional indigenous languages: Hausa 30%, Yoruba 15.5%, Igbo 15.2%, Fulani 6%, Tiv 2.4%, Kanuri/Beriberi 2.4%, Ibibio 1.8%, Ijaw/Izon 1.8%, other groups 24.9%.

The official language is English, but Hausa, Yoruba, Igbo and Fulani are also spoken, among others.

Some ethnic groups in the BAY States are:

- The **Kanuri** are the largest ethnic group in Borno State. Known for their fishing and farming skills.
- The **Hausa** people are largely involved in trade. Known for their weaving and dyeing of textiles.
- The **Fulbe** are the pastoral Fulani who occupy the northern area of Nigeria, known for their nomadic lifestyle and are involved in livestock farming. They speak Fulfulde.
- The **Shuwa Arabs**, nomadic people of mixed Arab and Arabized indigenous African ancestry, inhabiting a portion of the Lake Chad.
- The **Marghi** people, estimated 360,000 people, migrated from the Mandara mountains.
- The **Kotoko** people engage in fishing and in agriculture. Most are Sunni Muslims, with traditional practices incorporated to the Islam
- The **Mafa** people migrated from Cameroon, engage in agriculture with a wide assortment of soil fertility procedures, including an intensive livestock-raising system.
- The **Chamba**, a significant ethnic group in Adamawa State, engage in farming.
- The **Lunguda**, which traditional ruler is sited in Guyuk are the only matriarchal tribe in Nigeria.



Languages in NE Nigeria © Translators Without Borders

- The **Buduma** people inhabit many islands of Lake Chad. They are fishermen/women and cattle-herders.
- The **Kilba** people, various clan-based mountain communities who live in Hong, Adamawa.
- Other groups are the **Kapsiki**, living in isolated habitats in the mountains, and the **Bana** people.

Ethnic groups and languages declared in the interviews made in the studied locations are:

- Borno: Kanuri, Hausa, Marghi, Mandara, Lamu, Glafda, Shuwa-Arabs, Bura, Fulfulde, Gamargu, Mulgai, Babur, Gwazo, Bana, and Igbo.
- Yobe: Kanuri, Hausa, Bade, Bolawa, Kare-Kare, Fulfulde, Sokotawa, Buzu, Shuwa-Arabs, Babur, Chibok, Marghi, Michika, Gamu, Manga, Ngzim, Ngamawa, Yoruba, and Igbo.
- Adamawa: Gude, Kabsiki, Daba, Fali, Fulfude, Njenyi, Gra, Bachama, Bula, Jukun, Yungar, Beurawa, Mumawa, Marghi, and Higgi.

This list responds to indigenous ethnic groups, but also to others that have been recently displaced because of insurgency. IDPs are mostly living in camps, although there are many hosted within the community.

Most practiced religions

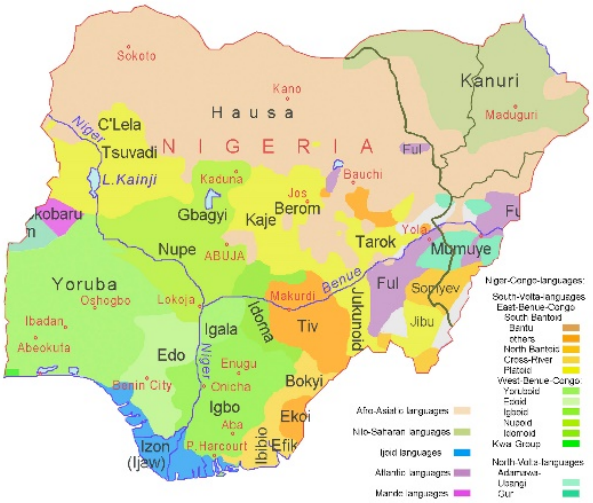
Muslim 53.5%, Christian 35.3%, Roman Catholic 10.6% and other religions or traditional worshipers 0.6% (religious syncretism is very common). But this statistic varies from North to South, moving from a majority of Muslims living in Banki to a majority of Christians living in Lamurde.

EDUCATION

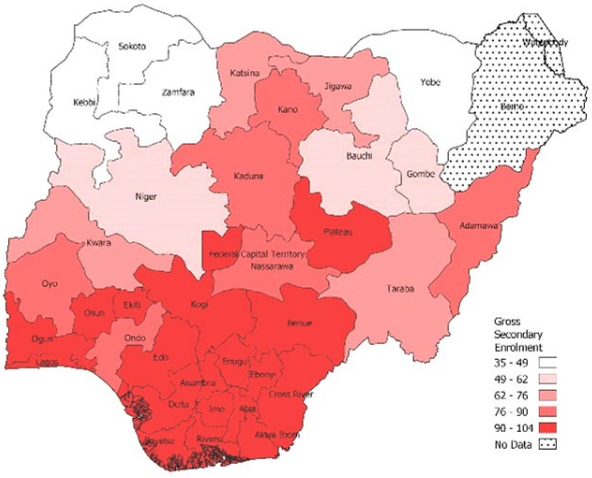
The number of out-of-school children was estimated to have increased from 10.5 million to 13.2 million (2018), with the conflict in the North-East a major driver. Attendance in school for males and females between the ages of 5 and 14 stood at 78% (Nigeria General Household Survey 2018/2019). Enrolment rates in primary school were 87.1%, junior secondary school 67.6%, and senior secondary school 63%. The gender gap in enrolment also remained with a constant 3-4 % gap between males and females at all three levels.

The conflict in the North East is likely taking a toll on attendance rates in schools. An evaluation funded by UNICEF, investigated schooling patterns for IDPs in 2017. Of the 3.2 million IDPs and returnees, school-aged children between the ages of 6 and 17 made up 33% (15% girls and 18% boys). The limited data available showed that in the three States in the North East, 54% of primary and secondary school children who were internally displaced were out of school (UNICEF, 2019). The kidnappings in the North West, where by June 2021 over 800 students had been kidnapped from schools, is likely to have longer term impacts on willingness to attend schools (Reuters, June 17th 2021).

Literacy rate: 62% (age 15 and over). Male: 71.3%. Female: 52.7% (2018).



Languages in Nigeria © Worldofmaps.net



Secondary school enrolment © National Bureau of Statistics / Nigeria Living Standards Survey

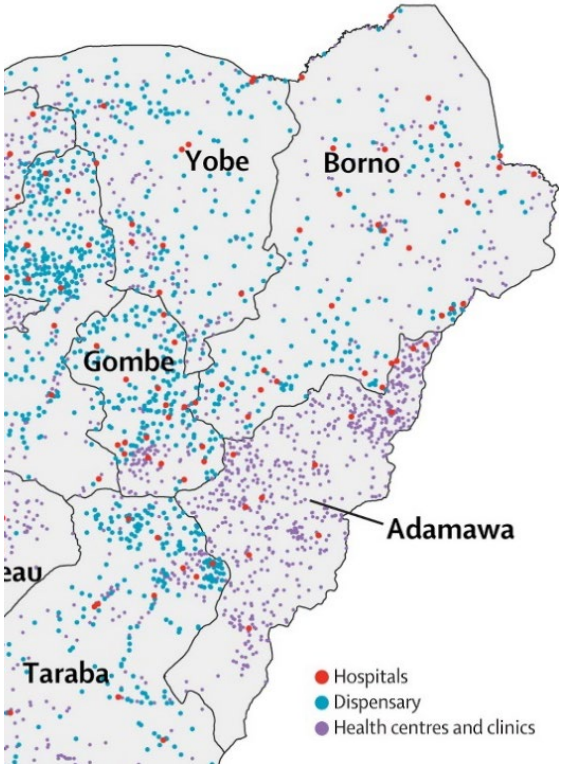
HEALTH

General data for Nigeria

- **Physicians' density**: 0.38 physicians/1,000 population (The World Factbook, 2018).
- **Major infectious diseases**: Food or waterborne diseases (diarrhoea, hepatitis A and E, and typhoid fever); vectorborne diseases (malaria, dengue fever, and yellow fever); water contact diseases (schistosomiasis); animal contact diseases (rabies); respiratory diseases (meningococcal meningitis); aerosolized dust or soil contact diseases (Lassa fever). In 2022 and 2023, the Centres for Disease Control and Prevention issued a Travel Health Alert for Yellow Fever, polio and diphtheria outbreaks in several States.
- **HIV prevalence**: 1.4% (aged 15-49). Prevalence among females is almost double of the male.

Data for the BAY States

In the studied locations across the BAY States problems related to health are: Malaria, typhoid fever, diarrhoea, headache, stomach-ache, ulcer, conjunctivitis, cancer, kidney stone and respiratory disorders.



Distribution of public hospitals, health centres/clinics and dispensaries in Nigeria (2019)

ECONOMY

Nigeria, one of the largest economies in Africa, is heavily reliant on oil-dependent exports, revenues, and credit. However, the nation's growth has been significantly hampered by the dual impact of the COVID-19 pandemic and fluctuating oil prices, leading to high inflation and rising unemployment. Additionally, frequent disruptions caused by political instability continue to pose challenges to Nigeria's economic stability and development.

Real GDP growth rate: 3.65% (2021 est.)

Real GDP per capita: $4,900 (2021 est.)

GDP - by sector of origin: Agriculture: 21.1%; Industry: 22.5%; Services: 56.4% (2017 est.)

Labour force - by occupation: Agriculture: 70%; industry: 10%; services: 20% (1999 est.)

Population below poverty line: 40.1% (2018 est.)

Inflation rate: 16.95% (2021 est.)

Youth unemployment rate: 19.6% (ages 15-24)

Agricultural products: cassava, yams, maize, oil palm fruit, rice, vegetables, sorghum, groundnuts, fruit, sweet potatoes.

Industries: crude oil, coal, tin, columbite; rubber products, wood; hides, skins, textiles, cement and other construction materials, food, footwear, chemicals, fertilizer, printing, ceramics, steel.

Major sources of livelihood in the three States studied (BAY States): In rural areas the main source of income is farming. Second major activity is trading, whether it consists of selling locally processed products, charcoal or pure water, commerce goes from petty trading to import, export and transport. Rearing animals is quite common, but cattle are only for those financially buoyant.

Fishing complements the economy of those living close to rivers and lakes (Gashua, Lamurde, Fufore, etc.), although fish-hunting can be illegal where there is a need to protect aquatic life. Regarding craftspeople, Hausas are known for cap knitting and tailoring (Banki, Bulabulin), and Gwoza is reputed for its skilled carpenters, but the usual jobs are such as labourers, diggers, bricklayers, carpenters, iron benders, mechanics, tricycle drivers, etc. There also are teachers and other State officials with a salary.

Since Boko-harm arrived, there is a big challenge with the lack of jobs, especially among youth and widows.

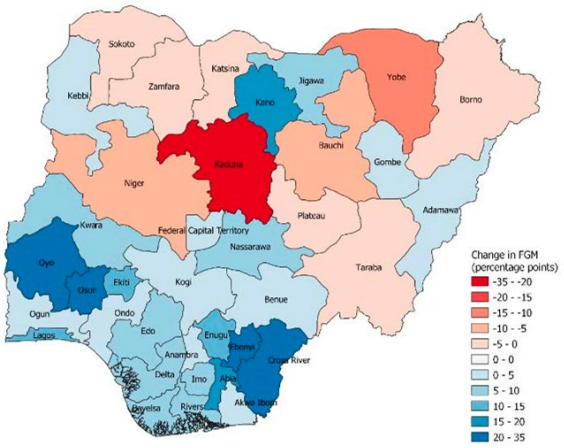
GENDER

Nigeria is dealing with the challenges that affect women across multiple streams, such as on unemployment, where it is currently higher for women compared to men. Access to important assets such as land are also still skewed against women, and there are still significant gender gaps in education and health, which have been exacerbated by the COVID-19 pandemic.

Gender Based Violence remains high and have increased since the last 2018. The proportion of ever-partnered women and girls aged 15 years and older who had been subjected to physical violence by a current or former intimate partner in the 12 months preceding the survey, increased from 28% in 2013 to 31% in 2018 (UNFPA, 2013 and 2018).

Female Genital Mutilation: Regardless the prevalence of FGM is also on the decrease, Nigeria still accounts for the third highest number of women that have undergone female genital mutilation reported at 20% prevalence. Harmful practices still occur in the context of limited knowledge and access to sexual and reproductive health and rights information. An estimated 20,000 new cases of obstetric fistula occur every year. There have been reductions in most of the highly prevalent States although with two outliers, Kaduna and Yobe, where the prevalence rose between 2013 and 2018.

Women in Governance: The proportion of seats held by women in national parliaments and local governments has decreased from 6.9% in 2015 to 4.4% in 2019, placing Nigeria towards the very bottom of the world's ranking. Women still are facing resistance regarding their political and managerial participation due to gender stereotypes, social norms, and cultural barriers. Indeed, women are constrained by gender roles which place the responsibility of household chores and childrearing on them, with little support from spouses.



Decline of prevalence of FGM at women aged 15 to 49 - © Nigeria Demographic and Health Survey 2013 and 2018

Early Marriage: Globally, Nigeria has the 11th highest prevalence of child marriage with 43% of girls married by age 18 and 18% married before the age of 15 (although this proportion has decreased from 12% to 8% compared five years before).

Female-headed households: In Nigeria: 17% (urban areas 18%, rural areas: 14%). In North-East Nigeria: 7%.

Situation of women in the studied locations: The situation of women from the interviews in the studied locations is that they are theoretically free to do anything, but in practice, the only role of women is to take care of the household and children, and to participate in farming. Some have little money engaged in petty trading and cap making. They say they are fully represented by their leaders within women groups, through which they raise awareness and share information of community concerns. But still, the major role of women is to oversee community support activities such as sanitating the whole village. For instance, in Yola South, they are responsible for sandbagging, sweeping the central church every Sunday, or cooking during the festival day. In Mubi, women have access to leadership roles and traditional titles. In Michika, a woman can replace her leader husband when he is sick. Apart from these cases, women are in evident exclusion for decision making process. They also have lack of job opportunities and suffer hard financial challenges for providing for their families, especially widows. They also have difficulties at child birth and care, as many localities have no nearby clinic / hospital and schools. Finally, in Michika they declared to suffer violence from their husbands, or to be neglected by their partners.

LGBTQI+ individuals: Nigeria has laws that actively criminalise homosexuality by law and by death in some States. People "suspected" of being gay or lesbian are subjected to evictions and even sexual assault.

INFORMATION AND COMMUNICATION

Telephones: Nigeria is one of the larger telecom markets in Africa, but still, it is subject to sporadic access to electricity and vandalism of infrastructure. Majority of adults has access to mobile phones, although its reliability depends on network.

Fixed-line subscribership remains less than 1 per 100 persons

Mobile-cellular subscribership is 91 per 100 persons (2021).

Radio: Majority of adults has access to the radio.

Radio stations are (in the visited areas): Gotel, Nas FM, Poly FM, DW, RFI, BBC and VOA.

Television and Internet users (2021 est.): Very few people have access to television, although some access private and government stations. Most people lack good network and battery power.

Internet connections are via mobile networks.

Total: 115.5 million (55% of population)

The Emergency Telecommunications Sector (ETS) provided data connectivity to 1,625 users from 16 UN agencies and 86 NGOs in the BAY States.

Communication in the studied areas:

In a typical Kanuri community, people are informed through daily conversations and phone calls (depending on the network). When a message needs to be spread to the whole community, traditional leaders play an essential role (information goes from the Emir to the district head who gathers *lawans* and *bulamas* (traditional leaders), who inform at social and religious gatherings). There can also be group meetings, where women and youth leaders inform their group. To receive the information they prefer in person, through a sender from the *bulama*.

In most locations, town criers are very often a common way of communicating information. For emergencies, in Bachama communities they can use bell striking or drumbeat, and for hunter funeral sign, horn blowing. The challenge they face is reaching distant locations and people in the farms. Another challenge is lack of accuracy and how to avoid self-prioritization and personal selfish interest.

Bicycle transportation at Banki, Adamawa State – © UniMaid

Canoe transportation at Opalo, Lamurde, Adamawa State – © UniMaid

TRANSPORT

Nigeria Roadways (2017)

- Paved: 60,000 km
- Unpaved: 135,000 km

Nigeria Railways (2014): as of the end of 2018, there were only six operational locomotives in Nigeria primarily used for passenger service; but the majority of the rail lines are in a severe state.

Nigeria Waterways (2011): 8,600 km. Niger and Benue Rivers and smaller rivers and creeks.

Transport in the studied areas:

In the studied locations, favourite road transportation means are motorcycles, bicycles, tricycles, and cars. For rivers, boats and canoes are preferred. But very often, access is restricted to dirt roads, which in some cases are not accessible during the rainy season as they become mud. Travel to main neighbouring localities can take one hour, and they are not always secured. There has been a noticeable decline in road quality due to the impact of insurgency. The use of explosive tools, such as bombs, during periods of unrest has contributed to the deterioration of the road system. In some locations, there is no good vehicular road within the community, although some foot paths have now been widened to allow access for motorcycles and cars.

In some locations security measures have been implemented, with security personnel stationed along most high roads, ensuring the safety of travellers. Some flat localities suffer from poor natural drainage systems, and the slow flow of surface runoff causes stagnant water making the situation worse. Not all places within the communities are accessible for Persons with disabilities (PWD).

↘ TO FIND OUT MORE

WORLD-BANK
https://data.worldbank.org/country/NG

UNDP
https://www.undp.org/nigeria

OCHA
https://www.unocha.org/nigeria

UN-HABITAT
https://unhabitat.org/nigeria

CIA WORLD FACTBOOK
https://www.cia.gov/the-world-factbook/countries/nigeria/

2.3. ENVIRONMENT AND CLIMATE CHANGE IMPACTS

↘ Nigeria is classified as one of the ten most vulnerable countries to the impacts of climate change.

TEMPERATURE TRENDS

Temperatures across Nigeria are expected to increase by 2.9°C to as much as 5.7°C by end of the century. Temperature will increase much more rapidly in the interior and northern areas. It has been observed a gradual drying of Lake Chad over the last 40 years, from a land area of over 40,000 km2 to 1,300 km2 (other studies stay 17,000 km2) as well as an advance of the Sahara Desert, which reduces arable lands by 1-10km a year.

PRECIPITATION TRENDS

The Sahel region receives an annual rainfall less than 600 mm. In the study of the data between 1901 and 2005 (Oamen and Erhagbe), it was observed in Nigeria that rainfall amount dropped by 81mm. Heavy rainfall is projected to intensify, with precipitation events and extreme rainfall resulting in flood events impacting rivers and surface water runoff during the rainy seasons. The short-dry-season popularly known as August break is currently being experienced more in the month of July as against August. A shift in crops from long to short duration is also noticed (Akpodiogaga-A and Odjugo, 2010).

TOTAL WATER WITHDRAWAL (2020 est.)

- Municipal: 5 billion cubic meters.
- Agricultural: 5.51 billion cubic meters.
- Industrial: 1.97 billion cubic meters.

TOTAL RENEWABLE WATER RESOURCES: 286.2 billion cubic meters.

CARBON DIOXIDE EMISSIONS

104,494 million metric tons of CO2 (2019 est.)

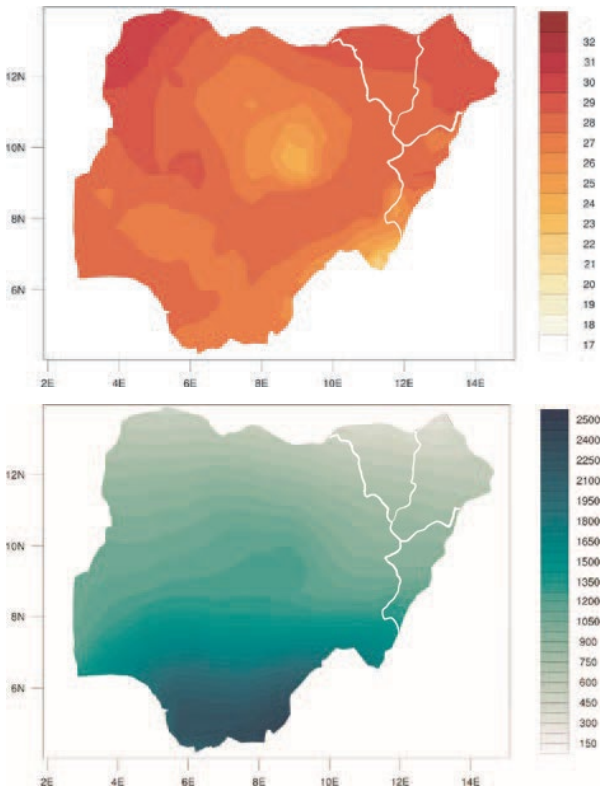
- From petroleum and other liquids: 67,406 million metric tons of CO2
- From consumed natural gas: 36,856 million metric tons of CO2
- From coal and metallurgical coke: 231,000 metric tons of CO2

ENVIRONMENTAL ISSUES

Currently, Nigeria is dealing with a wide range of environmental challenges, some of which are exacerbated by climate change.

Serious overpopulation and rapid urbanization for the last decades led to numerous environmental problems:

- Deforestation and de-vegetation, causing biodiversity loss and land degradation
- Floods, erosion, drought and desertification which are degrading the environment resulting in conflicts, especially in the semi-arid areas of the country
- Environmental pollution: air, water, land (which have suffered serious damage from oil spills), noise, and waste generation.
- Mineral exploration and exploitation and the accompanying environmental degradation.
- Limited access to safe water and poor sanitation.



Average annual temperature and Annual precipitation

2.4. DISASTERS AND NATURAL HAZARDS

↘ Communities in most areas in the BAY States face very hot climates for two thirds of the year and risk of flooding, windstorm and heavy rainfall for one third of the year.

- ☑ **Flood**
- ☑ **Drought**
- ☑ **Extreme heat**
- ☑ **Landslide**
- ☑ **Erosion**
- ☑ **Wildfire**
- ☑ **Pest infestations**
- ☑ **Livestock disease**

GENERALITIES

> Water scarcity

The rough alternation of rainy and dry season causes more problems for local populations who need to deal with a lack of water in the dry season, and with contaminated water during the wetter months. Only 30 per cent of people in the North-East have access to safe drinking water and sanitation.

> Food insecurity

Furthermore, floods combined with persistent civil conflict and high food prices intensify food insecurity.

> Diseases

Constant humidity during the rainy season generates major infectious diseases which have a very high degree of risk, such as malaria, dengue fever, and yellow fever as main vector-borne diseases, and diarrhoea, hepatitis A or E, and typhoid fever as main food or water-borne diseases. In this scenario, termite infestations, whose colonies attack and damage fibre structures and crops. Meanwhile, dry conditions during the Harmattan and the inhalation of dust particles lead to respiratory and cardiovascular diseases.

> Natural hazards in the studied locations

In the studied locations, the most named hazards are, by order of occurrence: Floods, heavy winds, insect infestations, droughts and sandstorms. Examples of some of the consequences from theses hazards, as described in the interviews are:

- Banki flooding in 2022: Some casualties. Flooding in Michika causes damage or collapse of buildings, and erosion, which washes away crops reducing arable land size. In Lamurde, it causes collapse of houses, ponds and roads, and promotes diseases such as cholera and malaria. Also, it produces erosion and land sliding, and wall cracking by differential settlement.
- In Mubi heavy rainfall during 2 moths, every year, causing flooding, erosion, building collapses and road damages.
- Lamurde fire outbreaks in 2022: Burnt roofs, fences, farms and trees.
- Michika: Snakes' infestation, causing restriction of movement and sleeping outside, as they bite people and livestock to death. Also in Lamurde, there was insect infestation such as termites.

FLOODS

> Low-lying lands

In terms of topography, the availability of areas suitable for settlement may be limited. Most human settlements are established on lower-lying lands with little to no slope (0-2%) or outskirts of urban areas, which are more prone to flooding.

> Devastating effects of flooding

Floods are a recurring event in Nigeria. For instance, 2012 flooding in Nigeria reputed as the worst in 40 years (Nkwunonwo, and al., 2015). In October 2022, the flood disaster disrupted many communities across Nigeria's 36 States, with hundreds of villages and urban centres submerged in water. The disaster unsettled over 2.4 million people and over 600 fatalities were recorded. In addition, large hectares of agricultural land were devastated in all affected states (Babangida and Mojeed, 2022).

	Disaster occurrence in the BAY States		
State	1st Major	2nd Major	Others
Adamawa	Flood	Erosion	Gully erosion, Rainstorm, Windstorm
Borno	Drought	Desertification	Flood, Dust storm, Windstorm
Yobe	Drought	Desertification	Flood, Windstorm, Dust storm

Mashi et al, 2019

In September 2024, a major flooding event happened throughout different States, particularly those in the North. As of September 19, heavy rainfall continued to affect most of the States of Nigeria, the humanitarian impact kept worsening, notably in those areas already severely impacted by conflict, insecurity and food and nutrition crisis such as Borno State. 757 lives had been lost, 6,917 people were injured, 487,124 were displaced, of which around 245,500 people evacuated in shelters or in IDP camps (ECHO, 2024). Overall, more than 1,355,205 people were affected across the area.

The effects of floods collected during the field interviews include:

- Destruction of human and animal lives.
- Damage and destruction of buildings, bridges, dams, embankments, roads, railways, etc.
- Disruption of services.
- Fire outbreaks.
- Cause and aggravation of water-borne diseases.
- Destruction of farms, food and cash crops.
- Pollution of soil and water with chemicals.
- Soil infertility through leaching and erosion of rich topsoil.

Watersheds in Benue River drainage Basin © Kmusser, Wikimedia Commons, CC BY-SA 3.0

DISASTER RISK REDUCTION MECHANISMS (DRR)

The 2012 flood was a key turning point in national strategy to invest and support long-term disaster resilience efforts, with the establishment of functional Disaster Risk Management (DRM) institutions, the coordination between government agencies to share data and develop plans for disaster preparedness, including conflict and epidemics. Efforts are also to enhance awareness, coping capacity and resilience at community levels (GFDRR, 2019).

> Agriculture

The government has committed to focus on agricultural impacts in the Savannah zones, particularly the Sahel areas that are likely to be most affected by the impacts of climate change. To increase sectoral productivity, key adaptation strategies include (WBG, 2021):

- Expanding and optimizing irrigation infrastructure, with national investment schemes and private sector companies taking a lead on procurement opportunities.
- Introducing drought-tolerant and early maturing crop varieties.
- Increasing and upgrading the country's storage facilities to reduce loss.
- Providing agricultural insurance and enhancing the country's agricultural extension services and promoting alternatives to livestock production.
- Diversify livestock and improve range management.
- Increase access to drought resistant crops and livestock feeds.
- Adopt better soil management practices.
- Provide early warning/meteorological forecasts and related information.
- Increase planting of native vegetation cover and promotion of re-greening efforts.
- Intensify crop and livestock production in place of slash and burn practices.

> Water resources

To address the concerns of the country's water resources sector, Nigeria is empowering the National Institute for Water Resources and other agencies to focus on strategies to optimize use to the country's water resources such as (Downie, 2017):

- Adopting and implementing more efficient irrigation systems across the country.
- Enhancing storage of water in reservoirs to support vegetating the wetlands.
- Recycling of wastewater improve agriculture in peri-urban areas.
- Transferring water; however, this is expensive and requires political understanding especially when multiple communities are involved (Abubakar, 2019).
- Nigeria's National Emergency Management Agency (NEMA) advised that water bodies across some States be desilted and dredged regularly to make water available (Nseyen, 2022).

> Energy

While the current grid is unable to reliably serve the existing industrial and urban customer base, Nigeria has committed to increasing energy supply through (WBG, 2021):

- Gas-powered generation, using the associated gas currently flared for oil and gas operations.
- Expansion of off-grid electrification through solar energy usage, fuel-efficient cookstoves and improvements in its transit system through CNG (Compressed Natural Gas) retrofitting.
- Improved energy efficiency building regulations are being developed and implemented with the National Building Energy Efficiency Code (BEEC).
- The government is also looking to diversify its secure energy backup systems and has committed to expanding sustainable energy sources and decentralize transmission to reduce vulnerability of energy infrastructure to expected climate impacts.

Water supply in Rann, Borno State © Roberto Saltori

2.5. HUMANITARIAN CRISIS AND SHELTER SECTOR RESPONSE

↘ According to the Displacement Tracking Matrix of IOM, over 2.3 million people were displaced in the Northeast States in December 2023, mainly in the BAY States (IOM, 2024). They were largely living in inadequate shelter conditions and/or underserved settlements. Also, nearly 2.1 million people had returned to their areas of origin (IOM, 2024).

IDPS, REFUGEES, RETURNEES

Since 2015, the North-East of Nigeria has witnessed an increase in **violence perpetrated by Non-State Armed Groups**, causing a **major humanitarian crisis**. The intensification of attacks has resulted in prolonged insecurity, exacerbating the plight of vulnerable civilians and forced displacement, as well as violation of human rights.

Most of the displaced populations are in Borno State, where nearly half live in formal and informal camps, often in congested conditions because of the **continuous influx of new arrivals and returnees**. Access to land to construct shelters for vulnerable people living in host communities is also a concern. Limited access to land for displaced persons in need is seriously curtailing shelter partners from providing sustainable shelter assistance and protection to a population that fled their homes. As such, dignified living in acceptable shelter living spaces with privacy is being compromised to create more room for other IDPs with nowhere to stay. In most of the highly congested Local Government Areas in Borno State, the most suitable land is often outside of established security perimeters. Adamawa State has experienced pockets of relative stability in areas initially affected by the insurgency.

OTHER PROBLEMS AGGRAVATING THE CRISIS

Due to persistent civil conflict in the northern areas, floods, high food prices, and an economic slowdown, about 25.3 million people are projected to face acute food insecurity, which would be a significant deterioration compared to previous year (19.45 million people). Acute food insecurity is mostly driven by the deterioration of security conditions in northern States, which are constraining farmers' access to their lands. Widespread flooding in 2022, affecting about 4.5 million people across the country, has further compounded conditions. High food prices and the expected slowdown in economic growth are additional drivers of acute food insecurity.

In the studied locations, the safety issues declared in most of the households, a part of possible disasters, are related to moderate crime, such as stealing (40% theft of phones and food items, in Banki), youth's conflicts (Bulabulin), drugs, human trafficking (Michika), gender-based violence (Michika), burglary, or even fear of food intoxication (Fufore). Areas considered insecure are mostly farmlands (Pulka, Lamurde, Yola South), and roads to Maiduguri (Damboa).

There are localities where residents feel a high crime rate such as Yola Sur, Buniyadi, Lamurde, Mubi, with kidnappings on the outskirts of the settlement (last time, 3 months ago, in May 2024). With the exemption of Pulka and Ngala, they consider their home and community a safe place from the armed conflict, although many declared that because of the conflict they cannot go to the farm.

Adobe constructions in Dikwa, Borno State – © UniMaid

HUMANITARIAN RESPONSE

> The Sector response

The Sector focuses the response on the following interventions: (i) provide emergency/transitional shelters through in-kind kits or cash or vouchers, (ii) rehabilitate existing buildings and establish rental strategies, and (iii) distribute shelter repair kits.

The response cost has increased in 2024 compared to the previous year due to currency fluctuations, a rise in the price of materials and transportation, insecurity, and access challenges.

The large gap in the Sector's response is due to the constant flow of IDPs, including newcomers and returnees, as well as new and secondary displacements caused by climate change shocks. Leveraging strengthened collaboration with the Government, the Sector prioritized promoting evidence-based, protection-oriented, community-led solutions in the provision of shelter and NFI responses, while facilitating pathways towards sustainable solutions.

The Sector works together with the Government on the decongestion of overcrowded sites and the adoption of well-integrated site plans. The Sector's responses create linkages to long-term, sustainable solutions that benefit both IDPs and host communities. Specifically, fostering social cohesion, reducing pressure on resources, and relevant stakeholders' capacity to manage displacement more effectively while emphasizing on innovative, cost-effective shelter solutions, locally available construction materials and local labour engagement empower beneficiaries for long-term sustainability and income generation.

Localisation and HLP support are key principles for offering secure, long-term shelter solutions and tenure, ensuring safety during transitions. The Sector monitors the situation along with partners to identify needs and assess risk factors. Anticipatory action was triggered through analysis and early warning systems to respond to potential crises. The Shelter/Sector conduct risk analysis for the affected population and vulnerable individuals. The tools used for monitoring are such as site trackers, DTM assessments, field assessments and site visits, market assessments to update rental rates and the cost of shelter materials and NFIs. Additionally, the Sector carry out quarterly fund mapping, pre- and post-construction or distribution monitoring reports, joint monitoring exercises by the technical working group and annual reviews to evaluate the response's performance, technical quality and efficiency.

The sector and its partners continue working towards a coordinated approach and ensuring that vulnerable displaced populations in need of Shelter and NFI benefit from the responses aimed at improving the physical protection and dignity of vulnerable households in need. They focused on enhancing shelter and NFI support in 45 most affected LGAs, addressing living conditions and supporting vulnerable groups. In 2023, the Shelter/NFI Sector targeted 1.85 million individuals and promoted the inclusion of disaster risk reduction measures in the design and construction of shelters and settlements. Protection mainstreaming and risk analysis in the shelter response contributed to protection outcomes by promoting peaceful coexistence and/or reducing gender-based violence.

Shelters and traditional huts in Rann, Borno State – © Roberto Saltori

> Research for durable solutions

Some Cluster partners such as IOM, in line with the relevant State governments' plans, have started pilot projects with the durable solutions approach. The projects aim to provide immediate safety and security, climate protection, privacy and dignity, access to additional services, and integration of the IDPs and Returnees into the community through multi-sectoral approaches. Shelter and settlements assistance also intends to stimulate economic activity through the injection of resources into the local community, including providing opportunities for skills enhancement and livelihoods.

Some of these projects have built shelters with locally moulded mudbricks for IDPs and Returnees in Borno and Adamawa States.

> Stakeholders when implementing a shelter project

The stakeholders for implementing housing or shelter programmes in the North-East States are:

Affected population: Protracted IDPs (in and out of sites) / New arrivals / Host families / Urban poor / Returnees.

Civil society: Traditional leaders: Emir (where applicable), District Head, Village Head and community leaders) / Religious leaders.

Government and administration: State Governor's office / LGA officers and chairmen are mostly political figures and are not always available / Ministry of Reconstruction, Rehabilitation and Resettlement (MRRR) / National/State Emergency Management Agency (NEMA/SEMA) / North-East Development Commission (NEDC) / Ministry of lands and survey /Urban Planning and Development Board / Other relevant ministries (such as Min. of Works and Housing, Min. of Environment).

International community: Humanitarian actors: sector leads and main agencies involved in the response / Development actors: UNDP, UN-Habitat, etc. / Donors: both traditional humanitarian donors and development donors.

Private sector / investors: Contractors / Vocational training centers / etc.

Academia: The Urban and Regional Planning Departments of UniMaid / MAUtech / Ramat Polytechnic.

STAKEHOLDERS TO BE CONSIDERED FOR A SHELTER PROJECT

Borno State

Regarding housing and urban planning, the Borno State Urban Planning and Development Board (BOSUPDB) is the government agency responsible for providing approvals/permits for any new permanent building or expansion/modification of existing buildings. A certificate of occupancy or its equivalent, design drawings and other relevant documents is required for the permit to be issued.

To go further, interviewed inhabitants in the studied locations noted that the following stakeholders should be considered in the event of a construction project:

- District, village and ward heads, should be engaged before starting the construction, from the beginning, for witness and transparency's sake, and community engagement for accountability. They give permission to demarcate boundaries and to start construction. Also, they have influence on the Town Planning and Land agreements officers.
- Land & Survey have to be contacted to obtain an accurately measuring and recording the dimensional features of a land, although sometimes it is difficult to reach them.
- Neighbouring land owners should be considered, as witnesses, from the beginning.
- Skilled labour: To execute the construction, should be considered during the whole process, from the concept to the conclusion.

3. Access to land, housing, and basic services

3.1. OVERVIEW OF ACCESS TO HOUSING, LAND AND PROPERTY

LEGAL FRAMEWORK ON LAND

After independence, Nigeria reformed HLP rights combining different co-existing systems: mainly customary, Islamic Law and British based laws (NRC/Hartman, 2019).

Access to land in Nigeria is governed by the Land Use Act (LUA), which vests all land in the State Governor. People cannot own land in Nigeria, only rights of occupancy are granted. The LUA recognises Governors' powers to expropriate, revoking people's rights on land, according to the law (IOM/Webber Wentzel, 2020).

In the studied areas, policies related to property go directly from the local government down to village and district heads. Traditional rulers and the land officer must serve as witness, and a written document is issued out and signed by all once the land is purchased.

Theorically, men and women have the same right to inherit land and property under Islamic law. But in practice, as interviewees said, if the land belongs to her husband, a woman does not have the right to decide. If a woman is the first daughter of the family, she can inherit the land when the father dies. When the husband died with no children, she would get ¼ of the land, but if there are children, it would be 1/8 (as said in Damboa). Others say women cannot inherit lands from their fathers, husbands or sons, but they can inherit from other female relatives, or buy it. Nevertheless, men and women have equal purchase rights. Legally, there are different conventions, charters, laws and norms with an influence on HLP issues in Nigeria.

> International and regional conventions and charters

- ICESCR (International Covenant on Economic, Social and Cultural Rights)
- ICCPR (International Covenant on Civil and Political Rights)
- CERD (International Convention on the Elimination of all forms of Racial Discrimination)
- The Pinheiro Principles
- African Charter for Human and Peoples' Rights (Banjul Charter) & the Protocol on the Rights of Women in Africa (Maputo Protocol)
- African Union Convention for the Protection and Assistance of Internally Displaced Persons in Africa (Kampala Convention)
- International human rights law (IHRL) provides standards to which all actors must adhere (NRC, 2018).

> National and Northeast States framework

- The 1978 Land Use Act
- The 1999 Nigerian Constitution
- The 2004 Land Use Act, Chapter L5, Laws of the Federation of Nigeria
- Borno State Recovery of Premises Law 1994
- Adamawa State Protection of Women and Children's Right to Inheritance Law 2002

Collective interview at Pulka, Borno State – © UniMaid

> Shari'a law

Shari'a law remains a key source of law for settlement of disputes, particularly in the northeast of the country. Some pieces of domestic legislation provide for the use of Islamic legal principles:

- The 1968 Area Court Act
- The 1971 Area Court Civil Procedure Rules
- The 1999 Nigerian Constitution (260 and 275)
- The 2000 Borno State Shari'a Administration Justice Act

CUSTOMARY PRACTICES REGARDING LAND ISSUES

The 1978 LUA provides customary institutions with a key role in HLP rights, designating "leaders of the community". Once property matters move outside the family unit, the *Bulama* and *Lawan* are the most important customary leaders involved in housing, land and property rights issues.

In the locations visited, some customary practices regarding the access to land are to be taken into account. Most of these practices are very localized and there is a need to assess them beforehand in the event of a shelter or housing project. Also, some of the practices of accessing land and housing are no longer obtainable because of money disputes, modernity and population increase.

The main practices identified in the visits are below:

- In Lamurde it was explained that land must be purchased legally with the consent of the village authorities, who ensure that encroachments into other properties or street are avoided and toilets properly sock away. It is not allowed to build in reserved traditional places.
- The community leaders have to be present before the construction begins (most of locations).
- In Ngala, they declared that Elders usually help decide the best place for construction. In flood prone areas, these places are often the highest points available in the community. If there are no high points left, an artificial elevated ground is made before the construction begins.
- In Mubi, they said that there is a need to respect cultural standards, ensuring that the building is located and built based on the cultural methods of plan and construction (e.g., provision of the traditional zaure).
- The *jauro* solves the disputes regarding land issues, but they can also be solved by *bulamas* (as clarified in Mubi). If not, the *lawan* would intervene. If still it is not solved, the police officer would intervene.

TYPES OF LAND TENURE IN NIGERIA

The types of land tenure in Nigeria must be viewed within the prism of occupancy rights, with an understanding that all land in Nigeria is under the control of the State and that access to land rights flow from the State, either from State Governors, or local governments. The types of tenure are:

- **Individual tenure**: People can apply for a right of occupancy in respect of urban and rural land. Upon receipt of a right of occupancy, a person binds himself to paying the Governor for any unexhausted improvements existing on the land at the date of receipt of the occupancy certificate.
- **Communal tenure**: The Land Use Act recognises communal rights to land and customary rights to land. A community may occupy rural land for the benefit of the community where it has customarily had this right.
- **Leasehold**: The Act recognises the right of the holder of occupancy rights to alienate, mortgage, transfer and sublease her/his right of occupancy subject to the consent of the Governor in the case of urban land and from the local government in respect of customary rights of occupancy.
- **Inheritance**: Section 24 of the Act recognises that rights of occupancy may be inherited where customary laws apply to the devolution of the property of the deceased.

In the studied locations, a great majority are private ownerships or co-ownerships (properties that have not been shared) by inheritance, or by purchasing. Rental is estimated for about 10-20% of the population, through agreements between tenants and owner. Some noticed advantages and disadvantages of land tenure modalities are:

- **Private ownership**: No tax to be paid, but responsibility for maintenance cost charges. It prevents disputes, but there is a risk of being scammed.
- **Private co-ownership**: No tax is paid, and it is easier to acquire, but sharing rooms can be uncomfortable, and there is no right to decide on changing its use.

SECURITY OF TENURE OF VULNERABLE GROUPS

> Women

The Land Use Act and the 1999 Constitution of Nigeria, allow individuals regardless of gender to own property in any location so long as they have complied with the requirement of the law. The challenge usually faced is that some States have not adopted these laws and end up relying on customary laws which give restrictions to women.

> Persons with disabilities (PWD)

Despite the existence of protective legislation (Discrimination Against Persons with Disabilities -Prohibition- Act of 2018 / Nigerians with Disability Act) PWD are subjected to various forms of discrimination, including access to HLP rights.

> IDPs

The National Policy on Internally Displaced Persons in Nigeria mandates government agencies to oversee the resettlement of **Internally Displaced Persons** (IDPs).

↘ TO FIND OUT MORE

IOM NIGERIA & WEBBER WENTZEL (2020)
NIGERIA HLP PROFILE
https://sheltercluster.s3.eu-central-1.amazonaws.com/public/docs/iom_nigeria_hlp.docx

HARTMAN, A. (2019)
HOUSING, LAND AND PROPERTY RIGHTS FACING RETURNEES IN NORTHEAST NIGERIA
https://www.humanitarianlibrary.org/sites/default/files/2020/11/nigeria_returns_report_final_print.pdf

Physically challenged refugee in Mubi, Adamawa State – © UNOCHA/Damilola Onafuwa.

OCHA, 2024. "Nigeria". In: Humanitarian response plan [online]. April 2024, 84 p. Available in: < https://www.unocha.org/publications/report/nigeria/nigeria-humanitarian-response-plan-2024 >

CONSTRUCTION TRADES AND LAWS

Nigeria's building and construction standards date from 2006, when the National Housing Council and Urban Development department started evolving the National Building Code, with the view to provide a minimum standard for pre-design, design, construction and post construction activity. Its implementation remained a challenge (Esezobor, 2016).

The **public sector handles construction projects** in two separate phases by two separate teams:

- Design team: architects, quantity surveyors, structural and service engineers
- Construction team: major contractors and sub-contractors

But the practice of not integrating the experience of constructors in the design phase creates a gap between the design and the finished project (Mbamali and Okotie, 2012).

Prevailing environmental regulations in Nigeria are administered and enforced by the Federal Ministry of Environment, and they include:

- Federal Environmental Protection Agency (FEPA) Act of 1988.
- National Policy on Environment (NPE) in 1989.
- Environmental Impact Assessment (EIA) Act in 1992.

The main aim of these laws is to ensure that the potential environmental impact of construction projects is foreseen and addressed before project initiation. It involves a systematic process of identifying, predicting and evaluating potential environmental impact of development projects. These laws have not yet evolved satisfactorily, despite the comprehensive guidelines and the sound legal bases for these regulations. In particular, the EIA system operated by the town planner will need restructuring if it is to evolve towards a positive direction as in other system elsewhere (Esezobor, 2016).

Regulations with reference to **Health & Safety** are:

- Occupation and Safety Act of 1970.
- Personal Protection Equipment and work Regulation of 1992.
- Management of Health and Safety at Work Regulations of 1999.
- Manual Handling Operation Regulation.
- Construction Design and Management Regulation of 1994.

EVICTION, EXPROPRIATION AND RELOCATION

When the 1978 Land Use Act was passed and all land became vested, the people of Nigeria were deprived of their property. It is within this context that the expropriation of land in Nigeria must be understood. The Act was intended to reduce land speculation, and to make land accessible to Nigerians and, through the use of occupancy certificates (statutory and customary), to ensure security of tenure. However, the Act deprived individuals, families, villages and whole ethnic groups of their ancestral lands.

Evictions, expropriations and relocations are common:

- **Eviction**: Evictions in Nigeria are common and often these evictions are done under the guise of urban renewal projects.
- **Expropriation**: The Land Use Act gives Governors the power to revoke occupancy rights to land. This power is to be exercised strictly in accordance with the Land Use Act for an overriding public purpose. Holders and occupiers of the land are supposed to be either compensated for the value of improvements on the land at the date of such revocation or offered resettlement in any other place or area by way of a reasonable alternative accommodation. In some cases, as it is happening in the resettlement schemes for displaced people in Borno, the government allocates housing units to the original landowners as compensation.
- **Relocation**: The National Disaster Management Framework establishes a framework for disaster response in Nigeria. The Responsibility to oversee this response lies with NEMA at the federal level, SEMA at the state level and LEMA at the local level. These agencies are also tasked with overseeing the relocation of people affected by disasters.

FINANCIAL CHALLENGES IN ACCESS TO HOUSING

In Nigeria, there are 23 dwellings for every 1,000 inhabitants. In November 2022 the estimated housing deficit was 25 million units. Housing challenges include:

- Bureaucratic procedures to obtain land ownership make it difficult to receive funds from the National Housing Fund.
- High cost of building materials, which constitute 50-60% of the total cost of construction" (Nigerian National Housing Policy, 1991).
- High inflation and interest rates in the country.

A new National Housing Policy was enacted in 2012 to meet the challenges of housing delivery through more public-private partnership, encourage participation of all the three tiers of government (Federal, State and Local), to reduce the cost of producing houses by promoting the use of locally made building materials and to improve the quantity and quality of rural housing (National Housing Policy of Nigeria, 2012). Despite the numerous programs put in action by various governments, they were poorly managed and financed to the extent that the targeted low-income segment of the population never benefited from the scheme. In addition to this, the government of Nigeria seems to favour urban over rural development (Obi and Ubani, 2014).

FINANCING OPTIONS

Housing financing is divided into:

- **Formal**: financial institutions such as commercial banks, Federal Mortgage Bank of Nigeria (FMBN), and Development Banks.
- **Informal sources**: long-term personal savings, housing drives, credit union organizations such as *adashe* and individual money lenders (Ezeanah, 2022).

In the studied locations the most recurrently options mentioned are, by frequency: Own funds, loans, NGO / International agencies funding, and Government assistance, credit and loans for materials, labour, land or rent.

Credit can be given through:

- Vendors, traders, and shop owners: for materials at instalment. Repayment after harvest season (with no interest) or monthly in the case of cash loans (with 0 to 20% interest).
- Masons and labourers: in instalments, cash or trade by barter. They are refund when the money is available, normally at an agreement date. Builders can also provide labour.
- Land owners and traditional leaders: on the payment of a land, based on an agreement.
- Friends, relatives or a trader can give credit with no interest, based on an agreement to purchase materials or to rent.
- Micro-finance banks provide credit for rental purpose, although at high cost.

CASE STUDY: *ADASHE*

Adashe is an informal savings association, where a group of individuals meet and agree to contribute a fixed amount of money usually on a monthly basis. The total amount contributed is given to a single member of the group, the next month is given to another member, till every member receive the contribution. Before starting the saving process, the group would agree on who will be given the contribution first, who is next, up to the last person.

3.2. ACCESS TO WATER, SANITATION, AND BASIC SERVICES

↘ According to the HRP 2024 (UNOCHA, 2024), in the BAY States, WASH needs have surged due to armed conflict, displacement, flooding, food insecurity, and cholera outbreaks. Many displaced persons lack adequate WASH facilities, exacerbating health risks, especially waterborne diseases like cholera.

WATER

ACCESS TO AN IMPROVED WATER SOURCE (2020 EST.)

Findings from the 2021 WASHNORM surveys (Federal Ministry of Water Resources et al, 2022) showed that only **32% of the population had access to basic water supply services**, while **27% depended on unsafe water sources** such as rivers, unprotected wells, springs, and ponds.

Data about improved water sources indicate that **82.6%** of population have access to these sources (CIA World Factbook, 2020): **95.3% in urban areas, and 68.8% in rural areas.** Access rates decrease from the south to the north of the country.

First, it is necessary to highlight the depletion of aquifers in lake Chad Basin. Main water access systems are for a great majority of community boreholes (hand-pump boreholes are called *tuka-tuka*). Many are not properly functioning, waiting takes too long and there are disputes in the queues. There are also wells and taps built by the community, mosques or NGOs. Most of them do not need to pay, but some people note a cost of N100 per standard bucket. Women and children are mainly responsible for fetching water. Supply comes from head tanks or government pipes (MODA CAD in Bulabulin), or from natural sources such as stream channels or rivers. During each rainy season the water is too dirty to be used and access is difficult. The presence of internally displaced persons and returnees exacerbates the issue. Drinkable water is not available in all villages. There are water vendors. Most interviewees declare that they don't treat the water they collect.

Well in the Wuroahi Community of Fufore, Adamawa State © UniMaid

SANITATION

ACCESS TO AN IMPROVED SANITATION FACILITY (Federal Ministry of Water Resources et al, 2022)

46 % of the population were found to have access to basic sanitation services in 2021.

However, **only 13 % of the population use improved sanitation facilities with a proper handwashing station** that has running water and soap.

Regarding sanitation, open defecation constitutes a drawback as 23 % of the population (48 million people) still defecate in the open (Federal Ministry of Water Resources et al, 2022). Barely 10% of country is serviced by on grid sewerage schemes. 91% of the families consume faecal-contaminated drinking water at home. 81% of Nigerians do not have access to sanitation facilities with proper sewerage systems.

In the BAY States, the WASH Sector prioritizes areas with high concentrations of IDPs and recurrent cholera outbreaks, focusing on repairing infrastructure, providing emergency water, and ensuring gender-sensitive and inclusive interventions (UNOCHA, 2024). In the locations visited, there are collective toilets done by NGOs, but the great majority have individual toilets, mostly pit latrines. Some are aware that they can cause bacterial infections due to discarding refuses into the drainage. There are locations (Opalo, Potiskum), where the drainage system blocks almost every year mainly because of lack of maintenance.

In some locations such as Bulabulin (Yobe) there is a government monthly sanitation system, and sanitation systems collected by commercial scavengers.

Water tank, community tap and drainage system, Ngala, Borno State © UniMaid

WASTE MANAGEMENT

Nigeria is considered one of the biggest producers of waste in Africa, 45% of which is from housing construction waste (Oladipo and Oni, 2012).

Over 1,000 tonnes per day of material waste was disposed of at landfills, roughly 10% of total housing solid waste in 2005 (UNEP, 2005).

Waste management is mostly done at the individual or household level, usually as open disposal in refuse pits or containers. Many burn the waste, especially during the dry season, but a majority declare to do land filling. Some learnt to use waste composting in the farms.

On a different note, some communities confront mosquito issues derived from the abondance of stagnant and polluted water. In Potiskum, they used to conduct weekly community sanitation of waste.

CASE STUDY: WASTE MANAGEMENT

Monguno. Borno State

An example of good practice in the studied locations is presented here. In the aftermaths of the crisis, with the active involvement of humanitarian partners, the introduction of a proper waste management system in Monguno brought a structured approach to handling and controlling waste products, ensuring that they are collected, disposed of, and managed in an organized and environmentally friendly manner.

ELECTRICITY

Electricity access: total population: 62% (CIA World Factbook, 2019): Urban areas: 91% / Rural areas: 30%

Electricity generation sources (2020 est.):

- Fossil fuels: 78.1%
- Hydroelectricity: 21.7%
- Solar: 0.2%
- Biomass and waste: 0.1%

Most of the locations visited do not have access to any source of electricity, so a great majority use torches, phone light, candles, kerosene lamps and locally made lanterns. Some people have cell batteries, solar panels and generators, but the cost is high. Some urban locations have access to hydroelectric power thro ugh the National grid. A few locations have access to hydroelectric power, but current voltage is sometimes low, and it has an average monthly cost of NGN 1,300 for a single room.

Challenges are great. For instance, in Michika, there used to be electricity before Boko Haram attacks.

SOURCE OF ENERGY FOR COOKING

Firewood and sticks are the most common source of energy for cooking, although it is not easily accessible everywhere. The alternative is charcoal. For both options, air pollution is a problem. In the past, sourcing firewood was easier and more accessible, but the current insecurity challenges have made it difficult. In addition, Monguno faces the issue of deforestation without replanting. This is made worse by the ongoing crisis.

Toilet in the court, Damboa, Borno State – © UniMaid

Open air kitchen, Fufore, Adamawa State – © UniMaid

ACCESS TO FACILITIES

> Education: Primary and secondary schools. Islamic and informal schools (sangaya) are accessible, and they increased in number because populations have increased and they requested for it.

Nigeria has the Universal Basic Education Programme (UBE), which aims to give free and compulsory education to all Nigerians from primary to junior secondary school. Still, difficulties are many: the standard education system is poor, and it lacks of qualified teachers. Also, physical access to schools is difficult during rainy season.

> Health: There are primary healthcare centres, and maternities but the lack of reliable electricity, medical personnel and medications, make them not always operational. Also, there is a problem of accessibility, particularly during rainy season.

> Commerce: Some locations have markets, but many can only access small shops.

> Religious facilities: Mosques are more prevalent in most of the locations visited. There are also churches and some shrines (*mere*) as in Michika.

> Burial places: Some locations have a graveyard, but many households in rural areas bury the deceased within the family compound.

> Social interaction spaces: The front of the Emir's palace is a common place for special activities (festival, community gathering, congregation centre, etc.). Some locations have a football field or even a recreational hub in Mubi.

Other common daily activities happen in sites that become popular places for social interaction, like *majalisa*, the mill for grinding grains, and boreholes and tree shades.

> Government facilities: they include government lodges, government secretariats, agricultural centres, or police stations.

Mosque in Malakyariri, Borno State – © UniMaid

Primary Health Centre in Dikwa, Borno State – © UniMaid

School class in Ngala, Borno State – © UniMaid

Open market in Ngala, Borno State – © UniMaid

4. Description of local housing and settlements

4.1. HOUSEHOLDS' DESCRIPTION

TYPES OF RESIDENTIAL UNITS

A household or residential unit in Northeast Nigeria is a unit of members who live under the same roof and feed from the same resources. Some extended families may not be considered the same unit because of having different sources of income. There are large household sizes due to the common extended household practice and the influence of Islam which permits polygamy with up to four wives' marriage (Auwalu, 2019).

Residential units can be of several types:

- **Nuclear households** (either monogamous or polygamous) where one man and one or up to four women coexist together with the children of all.
- **Extended households** where different generations live together in the same compound. In fact, it is not uncommon for members of an extended family to live together in one large homestead which is sub-divided into units, each unit belonging to a married male member of the family (Lodson et al, 2018).

Apart from the previous types of households, the practice of **collective housing** where different families live together, also exists but is not predominant.

SIZE OF HOUSEHOLDS

The size of a Nigerian average household is 5.3 persons, but it varies across population groups (The Demographic Health Surveys Program, 2021):

- 5.5 persons in rural households.
- 5.0 persons in urban ones.
- 5.9 persons in North-East Nigeria.
- 5 persons in IDP households, where 82% live in host communities (UN Nigeria, 2022).

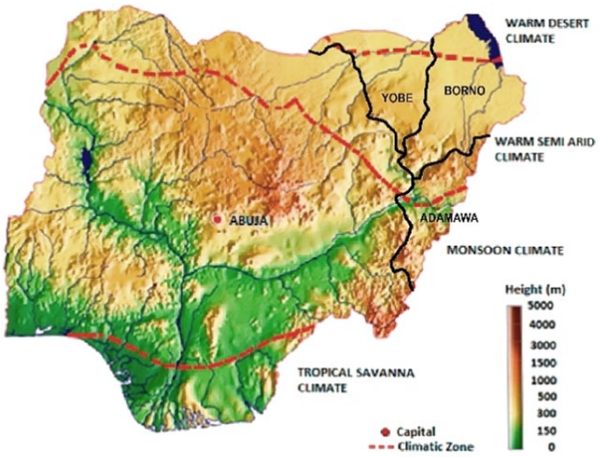
Besides the official data, the wide range underscores the diversity in household composition, with a diverse presence of extended family members, children, and other individuals sharing the same space. The average number of people living in the same compound for the studied locations would be 6.75 persons per household if we only considered the monogamous households. However, the assessments have shown that there is a great variety of number of people living in the same residential unit depending on the type of residential unit:

- Polygamous nuclear households: 12-50 persons per household (pph).
- Monogamous nuclear households: 2-15 pph.
- Extended households: 30 pph and above.
- Collective housing (rent): Up to 70 pph.

Women of a household in Fufore-Daware, Adamawa State – © UniMaid

4.2. LANDSCAPES

Landscapes in North-East Nigeria are very diverse, with the Mandara mountains acting as a natural barrier between Nigeria and Cameroon. There are important differences depending on the proximity to mountains or water bodies, on topography, geology and climatic conditions, but also on agricultural, livestock practices, and settlement or housing practices.



Topography in Nigeria © SHIRU, M.S., SHAHID, S., ALIAS, N., CHUNG, E.-S., 2018. "Trend Analysis of Droughts during Crop Growing Seasons of Nigeria". In: Sustainability [online]. March 2018. Vol. 10, n° 3, 13 p. DOI 10.3390/su10030871. (CC BY)

ADAMAWA STATE

Adamawa features diverse landscapes, including mountainous regions like the Mandara Mountains, river valleys, and fertile plains, with lush vegetation along the Benue River. Fufore is settled close to a large water valley, as basic source for fishing and irrigation. Although there is minimal vegetation, there are some gardens for agriculture. Michika has a rocky topography, but it lacks water.

In Lamurde there is a hot spring named Ruwan Zafi, with a water temperature reaching above 50C°. It is part of the world's popular Sukur Cultural Landscape, designated a UNESCO World Heritage site in 1999. Locals believe the hot springs possess healing powers that can cure illnesses and are proud of their ancient spring

BORNO STATE

The landscape of Borno State is mostly arid and semi-arid, with vast stretches of savannah, desert areas, and the expansive Lake Chad in the northeast. Locations near the border with Cameroon, such as Pulka, are rocky towns overlooking the Mandara Mountains. Banki, once a thriving commercial area with cross-border trade, is now almost deserted of trees. Inland Borno State, people are fleeing away from the conflict and searching for security in bigger towns such as Dikwa or Damboa. Due to insurgency, government is cutting most of the trees to avoid ambushes. Since then, they get windstorms every year.

Urban areas as Maiduguri with dense wards such as Lambu or Malakyariri, there is no vegetation or agriculture due to a lack of space available. With average plots of 15 by 32 feet (4,57 m 9,75 = 44,6 sqm), people try to raise some trees to prevent them against wind and the impact of erosion, or still do some horticulture and flowers to improve their thermal comfort.

Around the structural depression of Chad Basin, vegetation is moderate. The river Ngadda, the only one passing through the area, lays on vast fertile lands of sandy loam to clay soil types, where crops like wheat, rice, and vegetables grow under irrigated conditions. There are towns like Ngala with plains covered by a superficial deposit of sand and clay due to the action of the prevailing winds in blowing the Sahara sand.

YOBE STATE

Yobe State's landscape is largely semi-arid, dominated by savannah and desert-like areas, with sand dunes and seasonal rivers that shape the terrain. Topography is very uniform, with very little bit slope, so locations are concentrated along large stream water valleys.

For example, Gashua is at the side of river Komandugu, which links up to Chad river, meanwhile Buniyadi and Potiskum are part of the Benue Basin. In all of them, vegetation is almost reduced to some trees around the streets.

Rocky Mountains in Gwoza Wakane, Borno State – © UniMaid

River Benue in Opalo, Lamurde, Adamawa State – © UniMaid

4.3. SETTLEMENTS

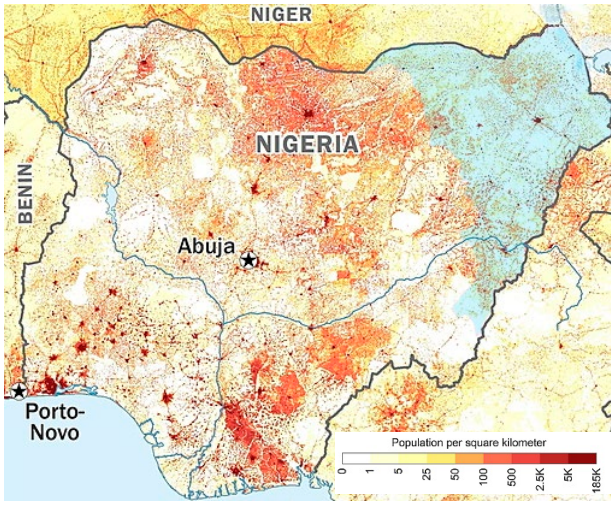
↘ Urban population: 54.3 % (2023)

↘ Rural population: 45.7 % (2023)

↘ Rate of urbanization: 3.92 % annual rate of change (2020-25 est.)

CIA World Factbook

Although it does not apply to the North-East, Nigeria is a country where urban population has surpassed the rural one and where the rate of urbanization is increasing fast. This section will briefly explore the characteristics of urban and rural areas in the BAY States.



Nigeria population density (2022) – © Nigeria atlas. CIA World Factbook

Some factors modelling the spatial organization of settlements are assessed in a study comparing traditional and new settlements patterns, both in urban and rural areas (Bikam & Chakwizira, 2020):

- Both designs look for areas free from floods.
- To determine orientations, both consider heat, precipitation, and wind.
- Traditional patterns place buildings around existing trees, keeping them to provide shade, while modern design would plant trees where necessary.
- Allocation of building spaces in tradition is based on extended family size, while in new design, allocation of dwelling units is based on business proposals.
- Traditional residential compounds are gradually clustered together, while modern urbanization is based on zoning when starting new towns.

URBAN AREAS

> History and development of cities

First evidence of pre-colonial urbanization in Nigeria was in the savanna region, where early contacts with the Arabs occurred due to the trans-Saharan trade. Urbanization was promoted and developed in the north with Sudanese empires such as Ghana in 800 A.D., Mali about 1500 A.D., and Songhai in the 17th century. The development of urban areas in North-East Nigeria was also linked to the military Jihad led by Uthman dan Fodio (Mabogunje, 1969). The emergence of traditional cities like Kano dates from the expedition of the Hausa Kingdoms and Kanem-Bornu Empire.

In the South of the country, British missionary activities came along with the Royal Niger Company, establishing colonial towns (Lagos, Kaduna, Port Harcourt, for administration; Jos and Enugu as industrial mining). The construction of the first rail line in 1895 linking Lagos and Kano, and to Kaduna, encouraged speedy evacuation of raw materials for export to European industries, facilitating the emergence of new towns, and the movement of people from the hinterland to the towns linked by the rail lines, which later became centers of commerce and administration (Aduwo et al., 2016).

When Nigeria gained political independence in 1960, 133 settlements had populations of over 10,000 people (UN-Habitat, 2010). In 2015, there were more than 1,200 localities of more than 10000 inhabitants (africapolis.org).

Historically, assignment of space in towns is generally not determined by land value, but by order, proportion, and maintenance of traditional practices. However, the highly commercialised urban land markets, the high cost of land in cities, and the high cost of servicing at low densities call for frugality on the use of this scarce resource (Okeke et al, 2021).

Moving on to administrative divisions, there are 774 Local Government Areas (LGAs) in Nigeria. Each LGA can have more than one urban area. Every local government headquarters is classified as urban center, regardless of the population.

> Types of urban settlements

Urban settlements can generally be classified as:

- **Planned settlements**: they often present the form of a grid and are deserved in infrastructure and services.
- **Unplanned settlements**: they are densely populated residential zones, where homes are constructed closely together without a previous plan. This is the case of the settlement urban pattern of Monguno LGA. Here, throughout the town, one can find small shops, and a central market serving as the focal point for most economic activities. While a few streets in the town are paved, the majority remain unpaved, consisting of dirt roads.

RURAL AREAS

> Overall description of rural settlements

Rural settlements in the BAY States are generally dominated by nucleated villages, with the possibility of some expansion of compounds. Compounds are generally inhabited by extended families and usually sub-divided into units and each containing nuclear family. Villages are essentially a collection of matrilineal family groups in a nucleated homestead planned for agriculture, and followed by the farmland.

As an example, Kanuri villages are comprised of walled compounds, made up of different constructions, while farms extend in a circle from the settlement, with scattered farms, pastures, and free land beyond (Malone & Skoggard, 1998).

Dense unplanned urban fabric in Yola, Adamawa State – © Bing Maps

Nucleated village of Opalo, Adamawa State – © Google Maps

Planned settlement layout in Damaturu, Yobe State – © Bing Maps

Nomadic compounds close to Nasari in Yobe State – © Google Maps

Mostly unplanned layout of Monguno, Borno State – © Google Maps

Auno village growing alongside the road, Borno State – © Google Maps

Additionally, there seem to be only a thin line between urban and rural settlements, for instance among Hausa land and some scholars see the urban settlement as part of the rural community (*anguwani*) (Okeke et al, 2021). These authors state that, in fact, residential land use patterns in rural areas and the traditional core of cities are often characterised by low-density indigenous structures mostly due to the customary land tenure systems operating in such areas.

The nomadic settlement

Apart from sedentary settlements, there are also nomadic settlements. In the BAY States, Fulani and Shuwa Arabs are the main nomadic groups.

The Fulani nomadic herders constantly move with their cattle, sheep, and goats in search of grazing land. According to Daramola (2006) their homes, called *wuro* vary in size and are only considered such if a woman lives there. A *wuro* consists of at least one hut owned by a woman, and communities are organized into small units led by a man. The space organization follows an east-west orientation for protection, and a north-south arrangement signifies social hierarchy, with the most senior members occupying the northernmost positions.

IDPS SETTLEMENTS

Displacement and the destruction of homes and infrastructure have caused significant shelter needs, with 3 million people requiring shelter/NFI assistance in 2024 (UNOCHA, 2024).

According to UNOCHA (2024), an estimated 53 per cent of IDPs live in overcrowded camps or sub-standard shelters with limited access to NFIs. Congested conditions in camps are due to the continuous influx of new arrivals and returnees. Access to land to build shelters for vulnerable people living in host communities is also a concern.

According to IDMC (2023), the government has "resumed its plan to close displacement camps, and although some IDPs were able to return or relocate, basic service provision and security were not always conducive to durable solutions".

During Round 46 of the Displacement Tracking Matrix (DTM) of IOM (February 2024), 2,305,335 Internally Displaced Persons (IDPs) were identified in 472,239 households. IDP assessments were conducted in 2,333 locations across the six States of northeast Nigeria. 273 camps and camp-like settlements and 2,060 locations where internally displaced persons lived among host communities were recorded.

According to this source, 929,453 IDPs lived in camps and 1,375,882 in host communities (in December 2023).

Coexistence of IDP formal sites and host communities in Pulka, Borno State – © Google Maps

IDPs settling within a host community in Dikwa, Borno State. Small shelters covered with thatch or tarpaulin are those inhabited by the IDPs within and around existing compounds – © Google Maps

4.4. CULTURAL ASPECTS IN HOUSING & COMPOUND LAYOUT

SHARED CULTURAL ASPECTS

Traditional architecture considers cultural factors, with compounds arrangement of dwelling spaces based on clan, marital status and needs; also, the size of building depends on function and use (Bikam & Chakwizira, 2020).

Despite ethnic and local specificities, there are some similarities in the traditional Nigerian compound layout:

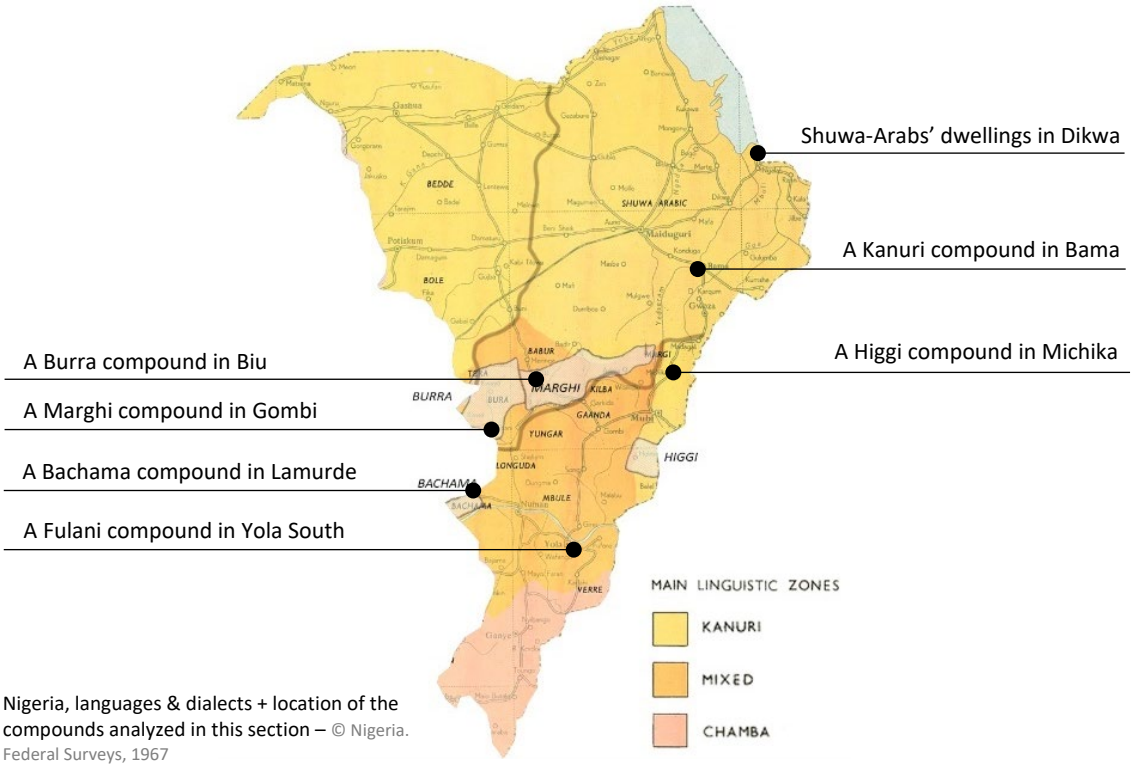
- **Filtering spaces at the entrance** of the compound. This space is called *zaure* in Hausa (Olotuah, 1997), and it exists in several ethnic groups in Northeast Nigeria.
- **Courtyards**, including impluvia and patios. The traditional compound house is built on the courtyard principle, as a social response to the extended family organization as more rooms can always be added, and it is particularly suitable for mutual care and communal lifestyle.
- The **nature and organization of spaces**, with living spaces, service and utility spaces, and circulation spaces. The dining area is in the parlour or open area, while the kitchen is located away from it. Latrines are generally placed at the end of the compound.
- The other features of traditional housing which cut across all sub-species include the **dynamism of traditional spaces and forms**, plasticity of architectural forms, and the persistent impact of the **extended family**.
- The propensity for outdoors activities in tropical climatic conditions makes the availability of exterior spaces a factor in the satisfaction of occupants. **Open spaces** are meant to breed little livestock and reserved for future developments as the need arises (Okeke, 2021).

The compounds of different ethnic groups presented below are those of the main sedentary populations of the BAY states.

Kanuri is the predominant ethnic group in the northern half of BAY States, but the other half is a mix of numerous ethnic groups. This area is marked by the Mandara Mountains, with heights from 500 m to over 1,500 m at the Bagale Hills overlooking the Benue Valley. This area can be referred to as the Yedseram Basin and it is inhabited by groups of people who migrated from the Mandara Highlands in the recent past. The indigenous architecture of these minorities is linked to four peoples: Higgi, Marghi, Burra and Bachama.

↘ TO FIND OUT MORE

SAAD, H.T. (1991)
FOLK CULTURE AND ARCHITECTURE IN NORTH-EASTERN NIGERIA
https://www.jstor.org/stable/40341634?seq=2



Nigeria, languages & dialects + location of the compounds analyzed in this section – © Nigeria. Federal Surveys, 1967

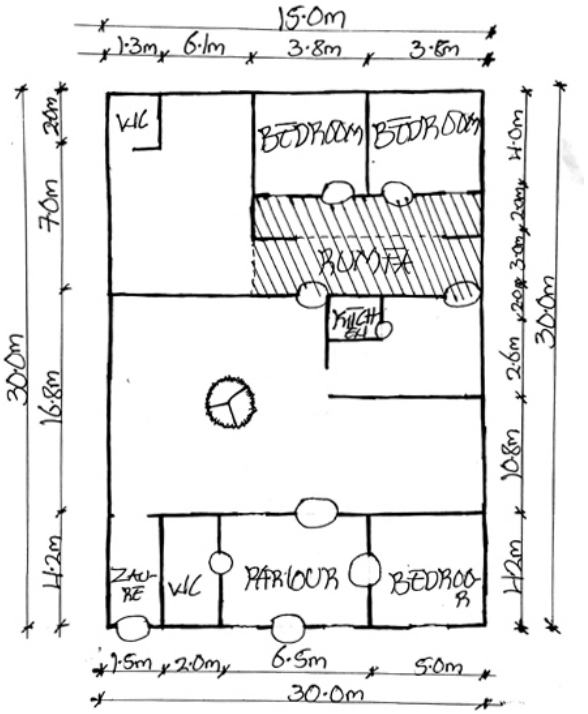
KANURI COMPOUND

As regards the compound setting, this architecture is influenced by the separation of women with **part of the house kept for men**, and **a private part traditionally meant for women**. Women quarters constitute a large part of the compound. Their facilities are the sleeping quarters (for the women, their young children and female visitors or relatives), the children play area, kitchens, storage, granaries, chicken coops, bathrooms and toilet.

A *zaure* is a **multi-functional entrance lobby** which is used by the family head for relaxation, entertaining and share meals with visitors, practice crafts, etc. It also acts as a foyer and sets limits that cannot be exceeded. Women stay within the inner compound which is veiled from view. Privacy is further encouraged by the absence of windows on exterior walls and with non-alignment of outer and inner doors. Only highly-favoured males, or those who constitute family, ever get to go beyond the *zaure*. Rather than be just a space for social interactions, the *zaure* is thus a socio-religiously symbolic space, defining level of social acceptance (Osasona, 2007).

The **compound wall** height is raised high enough to ensure privacy and prevent passers-by from seeing what is going on inside the interior space.

Open spaces are also provided in front of homesteads and serve as relaxation spots for the family head. Providing relatively large space in the vicinity of the neighbourhood is necessary for congregational assembly to celebrate social functions such as appointments, weddings and naming ceremony, and a children's playground and others.



Kanuri compound layout in Bama, Borno State– © UniMaid

Parlour in a Kanuri compound in Bama, Borno State – © UniMaid

Court in a Kanuri compound in Bama, Borno State – © UniMaid

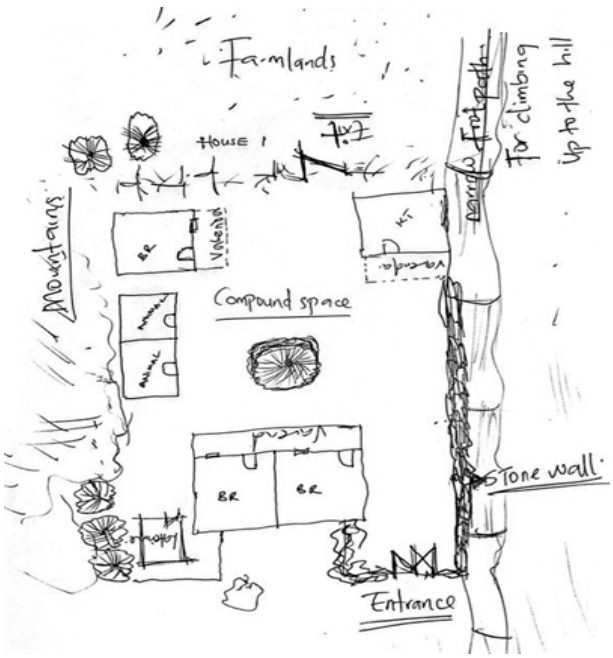
HIGGI COMPOUND

Higgi people refer to themselves as “the people of the hills”. Their smallest unit is the family, which cultivates land together and keeps produce in communal granaries. **Various compounds in proximity with members of the same lineage constitute a neighbourhood** (*girive*). Most of Higgi are engaged in farming on terraces on the hills and irrigated crops in the valleys. They keep animals such as sheep, cattle, donkeys, pigs and dogs.

A Higgi compound consists of **several rooms** (*dakuna*) around a **courtyard**, the whole **surrounded by a pile stone fence**. The **main entrance** is marked by two pillars, which size and decoration express the status of the compound head. They believe that a compound should not be approached from below, so some compounds have their **entrances against the slope or on the sides**. At the entrance is a forecourt (*dha*) where visitors are received under a shed of thatch supported on forked sticks (*glinka*). A stone enclosure at the entrance of the compound contains the fireplace.

A Higgi compound is always **divided into male and female zones**. The male section occupies the upper levels of the slope and contains a common room (*kambale*). Each room is usually protected by an entrance porch of thatch on forked sticks. A wife with children would also have a kitchen, a living space and her own granary, the whole enclosed within a fence of thatch grass. Granaries are often kept behind men’s huts.

A very **large compound would be terraced** on several levels. Large rock boulders are employed for drying farm produce, for sitting, as part of the fence wall or to provide sentry points against attack.



Higgi compound layout in Michika, Adamawa – © UniMaid

Concerning **construction materials**, sun-dried mud with cut straw and thatch grass are the basic materials required. The thatch roof is often crowned with a plaited straw cap. Various type of sticks are used in construction the roof, as well as in furniture. The Higgi achieve harmony between house and hill from few basic materials: stone, laterite, sticks and grass (Saad, 1991).

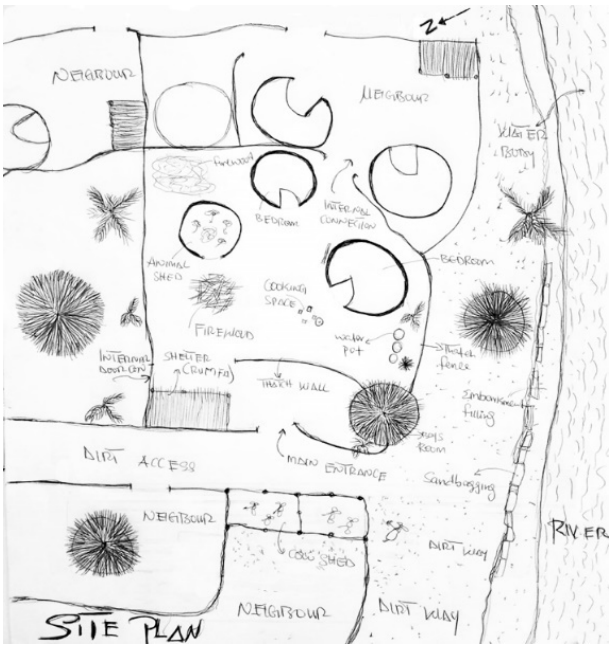
Higgi compound in Michika, Adamawa State – © UniMaid

BACHAMA COMPOUND

Bachama religion is centred on rites associated with the River Benue. Bachama family is patrilineal, and the compound is inhabited by the large **extended family** with a **man as a head** of the family. **His hut is at the entrance**, as a reception place for visitors. **Grown-up male children** have their **sleeping huts** very close to the reception hut.

The main **courtyard beyond this male domain contains wives' huts**. Each woman has a sleeping room and a kitchen to herself. Bachama compound is often surrou**nded by a plaited grass wall**, and demarcation of areas within the compound are achieved with the same material.

Regarding **construction materials**, huts have circular mud walls with grass thatch roofs with its head pointed upwards, as is common with most tribes in Northern Nigeria. This technique gives a much neater appearance but requires more thatching material to achieve sufficient waterproofing. It is supported by a bell-shaped dome of plaited grass matting in addition to rafters, as the Fulani and Jukun do in some of their huts. Clay mixed with vegetable extracts is used as finishing for both walls and floors. Portals are often decorated with human and animal figurines (Saad, 1991).



Bachama compound layout in Opalo, Lamurde, Adamawa State – © UniMaid

The Benue Valley is inhabited by a number of riverine people including the Bachama and the Jukun. In addition to farming in the alluvial plains, these riverine peoples engage in fishing and ferrying people across the river. The Bachama have lived under centralised chiefdoms for centuries before the emergence of Fulani political hegemony in the area. They have not lived in urban centres until the emergence of Numan, but in villages, hamlets and scattered homesteads.

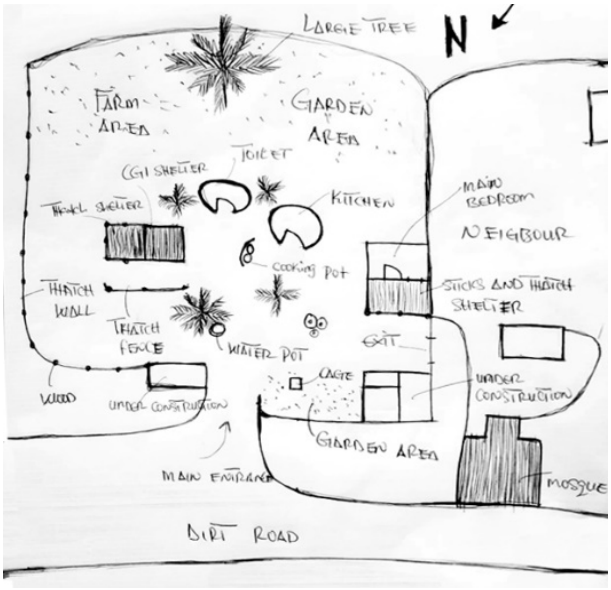
Bachama compound in Opalo, Lamurde, Adamawa State – © UniMaid

FULANI COMPOUND

Rooms are built with mud walls and thatch roof. They can reach 4m diameter and 1.7m tall when they are round, and 4 by 4m and 4m high, when square. The **veranda** is built with sticks and thatch in front of the bedrooms. The **kitchen** is **located at the main entrance door, for welcoming guests with food**. The latrine is at the back and has no roof. Storage areas and vegetable gardens are surrounded with shrubs. The animal shed, also made with sticks and thatch, is positioned at the side of the house.

The **whole is fenced with sticks and thatch**. They use vegetation as a wind breaker, but also to have a shade for sleeping and sitting to chat.

Critical aspects on compound are to **keep the gender balance**, the **privacy** in the distribution, and the **availability of space**. **Orientating the house to avoid sun exposure and rainfall** (strong winds come from the West) are also considered very important. Nevertheless, they plant trees to prevent wind from wiping away roofs, which they firmly tie to the head course of the wall. Roof is well braced diagonally and horizontally with wood and sticks. They sometimes use stone foundations but usually the ground has a good bearing capacity to receive load without moving.



Fulani compound layout in Mbamba, Yola South, Adamawa – © UniMaid

Mbamba village has a long history. Despite it was developed by Fulani people almost a hundred years ago, today it is also inhabited by Beurawa, Mumawa and Hausa. Rearing animals, such as goats, cows, chickens, ducks and sheep, is the Fulani main source of income there, although they do some farming and petty trading in the village. There are many virgin farms and stones as valued resources for living. T

Fulani compound in Mbamba, Yola South, Adamawa State – © UniMaid

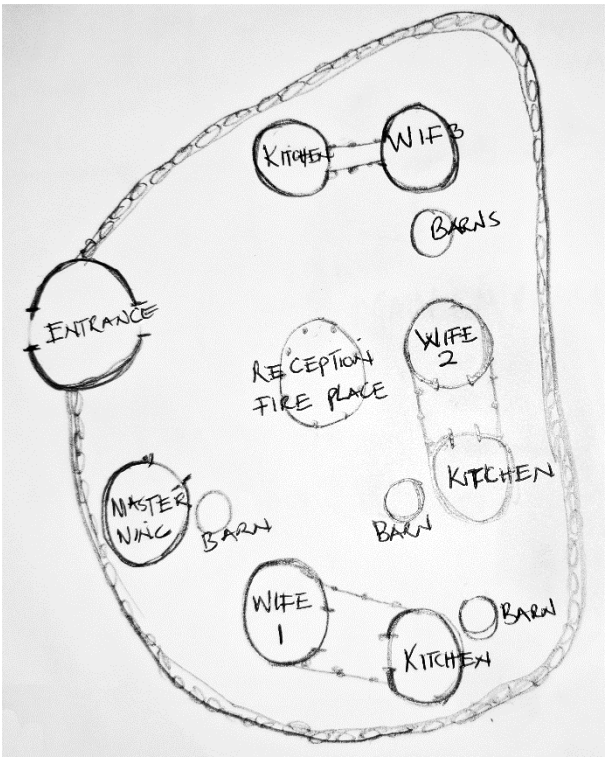
MARGHI COMPOUND

Marghi compounds are **surrounded by a circular pile stone wall** of 1 to 1.6 m high. They are divided into a number of sub-compounds, being the basic unit of a woman and her children, and each one consisting of a bedroom, a kitchen, and a resting area enclosed with a mud or grass wall.

But Marghi **do not conceive space in terms of dichotomy between male and female**, although it can be a result of functional requirements. The headman's hut is often the first one meets on entering the compound, but it can be located either on the right or the left. They are **more flexible with respect to topography**.

The traditional Marghi bedstead is a wooden plank laid across wooden pillars or mud pillars. Grass mats serve as mattresses. Flat stones or mud platform are used for seating.

Among the Marghi, the **granary** is an object of economic importance and symbolic significance: The fruit of the annual labour of the whole work-group is stored in granaries, reflecting the viability of the compound as a socio-economic unit. Surplus grains stored in the barns are often sold or bartered with other essential commodities. While the Higgi build their granaries within huts, the Marghi locate them in the courtyard. Both build granaries of woven straw, but the Marghi do not smear theirs with puddled mud on the outside (Saad, 1991).



Marghi compound layout – © UniMaid

Household in Gombi, Adamawa State – © UniMaid

BURRA COMPOUND

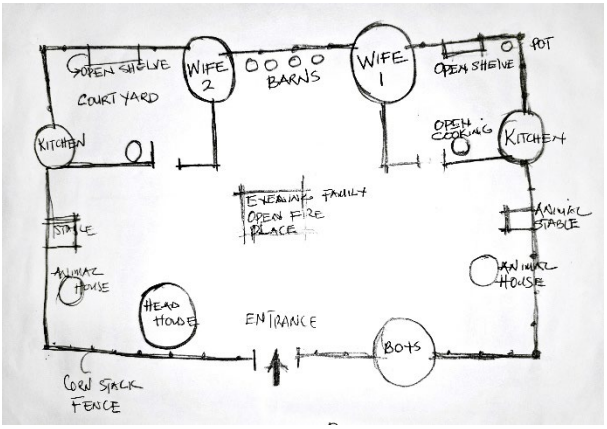
The choice of site for a new Burra settlement, the siting of individual dwellings, and the orientation of main entrances of compounds, were a matter of ritual significance. Death, epidemic, and other misfortune befalling members of a community would automatically lead to wholesale emigration of inhabitants of the village.

In the typical Burra compound, the **head of the compound and his guests are encountered first** on entering the dwelling, at the **reception hut** (*tutu*); the **middle zone is occupied by his male children or relatives**, while the **innermost part is the female domain**. These sections are demarcated with grass matting partition walls. Within the compound, the husband has a hut of his own (*cham*), and each wife has a sleeping hut (*mbawawala*) in front of which a stack of firewood is usually piled. Granaries of both mud and straw and smaller bins (*bindiwa*) for the storage of seasoning crops, are built by women and dotted all over the compound.

Despite the abundance of rocks, the Burra can also use **grass or cornstalk fence** (*kindla*) for walling purposes.

Building materials are roughly the same for the Higgi and Burra as they all inhabit the same region. Traditional construction of huts is of circular plaited straw walls plastered internally with mud and finished with cow dung, with conical thatch roof. In the olden days, this was the main type of construction, and mud walls were reserved for the royalty. But in recent times the rectangular mud hut with thatch roof seems to be the dominant house for the Burra and the Pabir, to the north. Circular huts are reserved only for kitchens, animal sheds and storage structures.

Concerning **furniture**, the traditional Burra bedstead was a mud platform with a hollow underneath, but the Burra did not build fire earthen beds unlike most other plateau dwellers in Nigeria. Mud screens built parallel to the walls of the hut served as shelves for pots and calabashes. The grinding mill is built out from the wall on the hut in the form of a mud platform. At the lower ends of the stones there are wells for the reception of the flour (Saad, 1991).



Burra-Pabir compound layout – © UniMaid

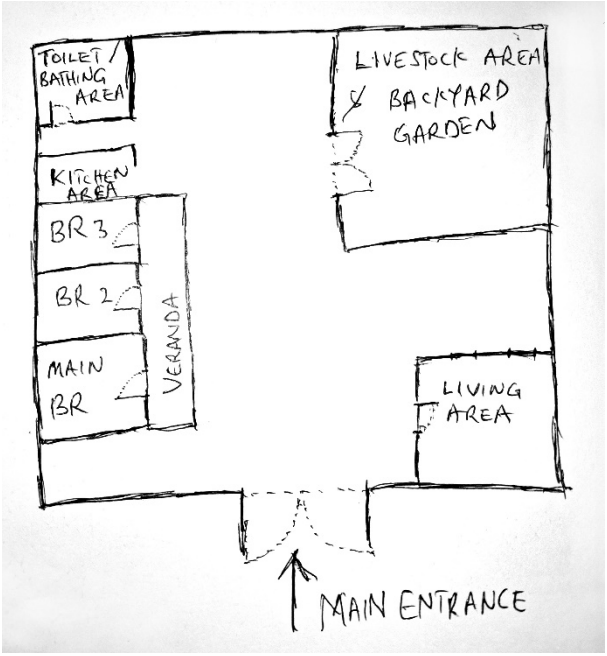
Burra compound in Biu LGA, Borno State – © UniMaid

SHUWA-ARABS' DWELLINGS

While the Emir and his family lived in mud brick walls and earth roofs palaces (Zoronguwa), local people were similarly building their houses (Shoro). Many earth roofs are currently replaced with metal sheets roofs. This evolution is explained later, in the chapter "Typologies resulting from transformations of vernacular models".

The Emir palaces were built by at least ten skilled selected **workers** who commit themselves for royal service. Before starting the **construction**, a certain traditional ritual was made for the site preparation. Then the ground was dug to about 3-foot depth and about 1m wide trenches. Foundations and walls are made of mud bricks bonded with mud mortar. The wall is built to a certain height and allowed to set and dry to avoid bending. A pile of wood is gathered and the room is set on fire in order to improve its durability. Finally, roof timbers are closely laid and reinforced, and a neatly kneaded earth mix of mud, water and cow dung is laid on top of the thatch mat and allowed to dry. A final layer is laid with a bit of slope, and a parapet wall is built at the edge with drainage pipes, which are locally made from baked clay. The whole is completed with a mud and fibres mixture applied in layers onto the floor and walls.

Furniture such as chairs or beds are crafted by skilful individuals. Shelters are also built and decorated with handmade fabrics and beautiful mats, usually made by women.



Shuwa-Arabs' compound layout – © UniMaid

Dikwa was part of the old Bornu Empire, which collapsed in 1893, when the Shuwa-Arabs seized power and transferred the capital to Dikwa. The Dikwa Emirate was established in 1901 and the Emir moved in 1902 first to Monguno and later to Maiduguri. In 2010 the Borno State Governor split the old Dikwa Emirate into the Bama Emirate and the new Dikwa Emirate, which was made up of three LGAs: Ngala, Dikwa and Kala Balge (Gusau and Dauda, 2010).

Earth compound in Dikwa, Borno State – © UniMaid

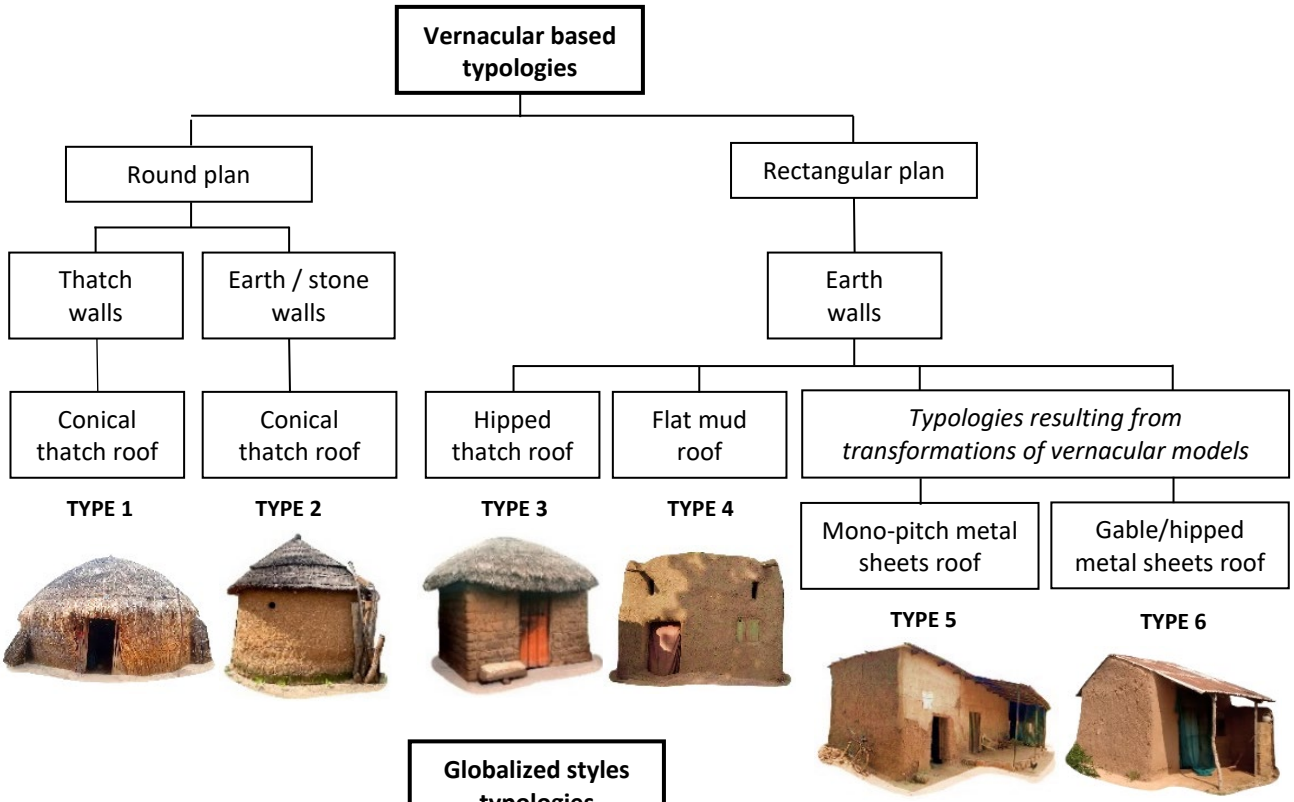
4.5. LOCAL AFFORDABLE CONSTRUCTION TYPES

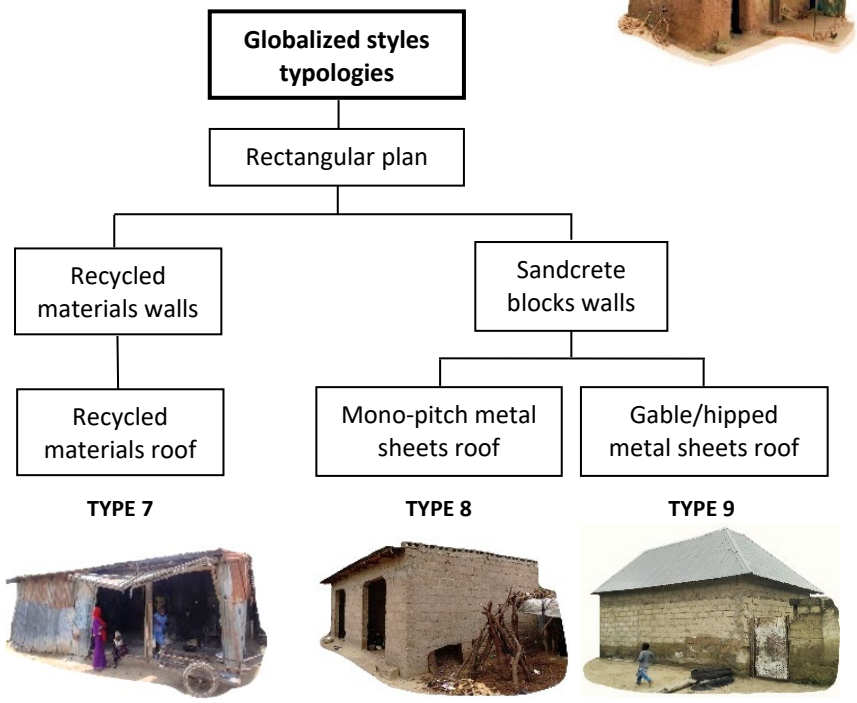
↘ In this section, different types of local affordable housing typologies are presented. The typologies have been identified through assessments in more than twenty locations in the BAY States in 2023.

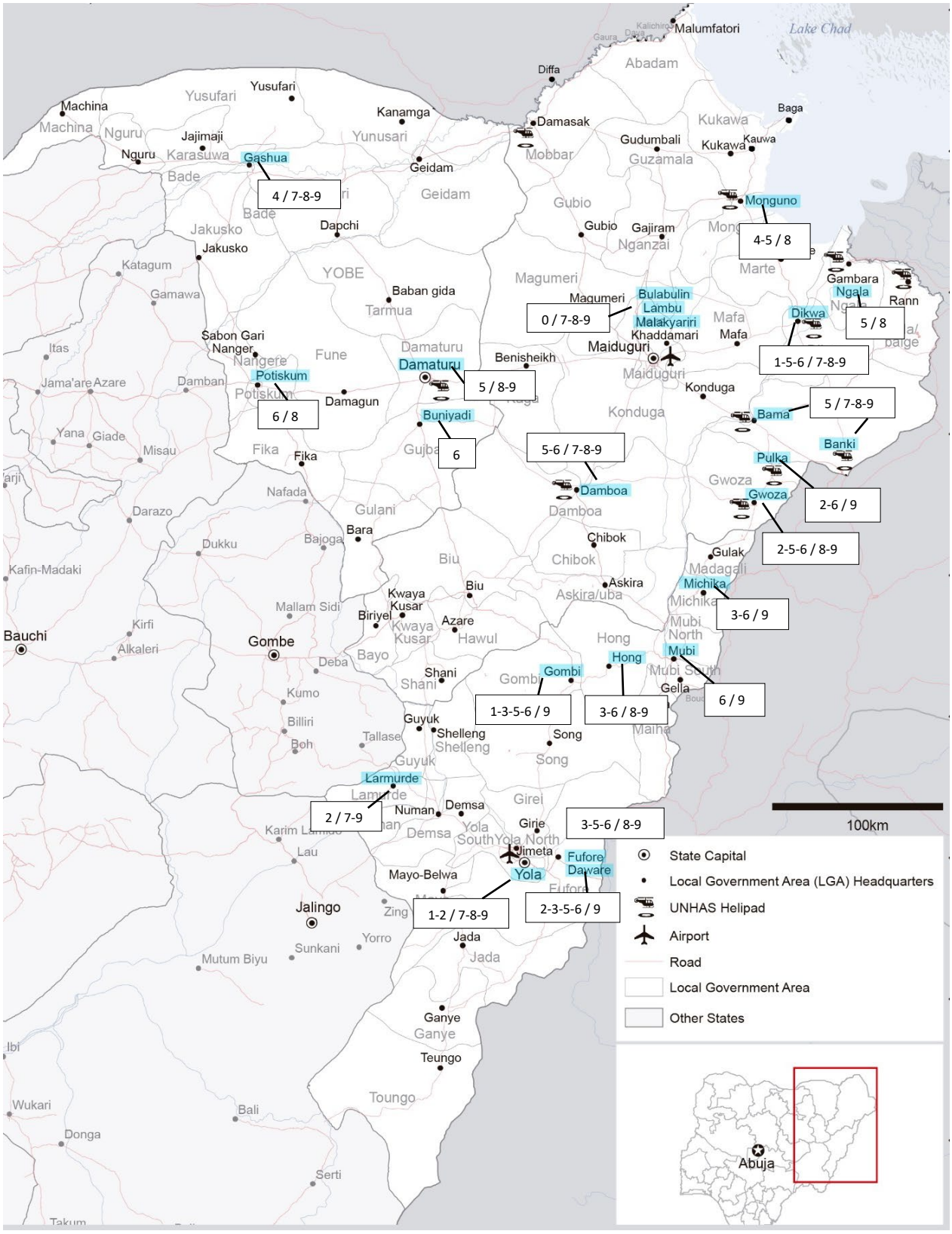
The study results in a classification of nine different typologies, considering: the origin of the typology, the plan shape, the materials used to build the walls, and the shape and materials used for the roof. All the typologies described exist, and are inhabited nowadays. They can be divided into two main categories and one subcategory (definitions in next pages):

> Vernacular based typologies (*subcategory: Typologies resulting from transformations of vernacular models*).

> Globalized styles typologies.







Map of the three states with the studied locations. The numbers refer to the existing construction typologies in each location.

COMMON TYPOLOGIES BY STATE

> Main typologies in Borno

In the locations visited in Borno, the most common vernacular typology is number 5, with rectangular mud bricks walls and mono-pitch metal sheets roofs, followed by number 6 (same as 5 with gable or hipped roof). Two eastern locations (Pulka and Gwoza) have what it is called a *Bongo*, rooms with round earth walls and conical thatch roofs (typology 2). In Dikwa, thatch is used both for walls and roof to build round huts (typology 1). In Monguno, there are buildings named *Shoro*, all built with earth, both walls and roofs, which are flat.

Apart from vernacular typologies, all locations visited by the study were observed to have the presence of sandcrete block walls and metal sheets roof covering (simple slope, gable, or hipped). Many houses have rooms made of recycled materials, especially CGI (Corrugated Galvanized Iron) sheets.

	BORNO TYPOLOGIES								
	Vernacular						Globalised		
LOCATION	1	2	3	4	5	6	7	8	9
Pulka		■				■			■
Gwoza		■			■	■		■	■
Banki					■		■	■	■
Bama					■		■	■	■
Damboa					■	■	■	■	■
Bulabulin								■	■
Lambu								■	■
Malakyariri							■	■	
Dikwa	■				■	■	■	■	■
Ngala					■			■	
Monguno				■	■			■	

> Main typologies in Adamawa

The locations visited in the Adamawa State have a rich variety of vernacular typologies, going from round huts of all thatch or thatch roofs with earthen walls to very popular rectangular earthen houses. The latter are either covered with thatch of with metal sheets, with shapes that can be flat or sloped.

Again, globalized styles typologies are very common and are present in all the locations visited in Adamawa.

	ADAMAWA TYPOLOGIES								
	Vernacular						Globalised		
LOCATION	1	2	3	4	5	6	7	8	9
Mubi						■			■
Lamurde		■					■		■
Yola South	■	■					■	■	■
Fufore			■		■	■		■	■
Daware		■	■		■	■			■
Gombi	■		■		■	■			■
Hong			■			■		■	■
Michika			■			■			■

> Main typologies in Yobe

Vernacular typologies found by the study in Yobe are all made of earth walls. Sometimes they are covered with mud flat roofs, as in Gashua, and sometimes with metal sheets roofs. These last can be flat (Damaturu), gable or hipped (Buniyadi and Potiskum).

Globalized styles typologies are very common also in the locations visited in Yobe, except in Buniyadi, where they were not identified.

	YOBE TYPOLOGIES								
	Vernacular						Globalised		
LOCATION	1	2	3	4	5	6	7	8	9
Gashua				■			■	■	■
Buniyadi						■			
Damaturu					■			■	■
Potiskum						■		■	

VERNACULAR TYPOLOGIES

A vernacular habitat is characterised by using local resources to respond to people's needs, way of life and local climate. It results from reproductions, improvements and ongoing adjustments or adaptations over time and often includes external inputs and imported solutions, though rather parsimoniously. Such constructions often rely on strong links between the inhabitants, their families and neighbours, and their persistence facilitates housing accessibility, pride and feelings of belonging within the community.

Many of the original people of the studied regions began building thatch or mud round huts covered with thatch roofs using sticks as rafters (*Bongo*). Later, mud round walls evolved to rectangular plans, allowing a flat mud covering (*Shoro*), very efficient to protect them from hot weather. Although they have a poor thermal behaviour, many of these roofs are currently replaced with metal sheets because they are affordable and easily available in local markets, and possibly, because they require less frequent maintenance.

There are four vernacular typologies that are completely made out of local materials (1, 2, 3 and 4) presented hereafter.

> Typology 1: Round thatch walls + Conical thatch roofs

Regardelss if they are used for the walls, for the roof, or both, this typology is completely built with materials of vegetal origin, such as wood sticks (gofa), cornstalks, grasses (zana), which are usually weaved forming mats (yashin jauro). They can serve for structural and for covering purposes. Resulting shapes are of a great variety. Even the furniture (shelves) is built with bundles of reeds.

Thatch walls and roof, in Mbamba, Yola South, Adamawa State
© UniMaid

Thatch walls and roof, in Dikwa, Borno State – © UniMaid

Thatch shelves, in Dikwa, Borno State - © UniMaid

CASE STUDY: NOMADS

Nomads place premium on structures that could be easily dismantled or abandoned depending on the building resources and level of mobility. Stenning (1959) observes that the Woodabe of Western Borno have no attachment to land or specific place. Their home (*wuro*) is placed where there is any favourable ecological condition for pastoralism.

Each hut (*suudu*) has two sleeping platforms on both sides with a tiny entrance. Nomads appreciate order in every sphere of their endeavour. The bed on the left side belongs to the wife, while the right hand side is for the husband.. A *wuro* exists only if there is a woman living inside.

Concerning the use of building materials in their shelter, 70% use thatch; while others use mud blocks (the settling Fulbe). 62.3% construct their shelter through personal efforts and 27.2% combined their efforts with that of the members of their family. 4.4% engage others to do them.

About 47% have 6-metres diameter tent, while 41.2% use 4 metres and 9.6% prefer tent of 8 metres diameter.

Amongst the Fulbe huts, there are no provisions for windows.

> Typology 2: Round earth walls + Conical thatch roofs (*Bongo*)

This typology differs from the previous one in the **earthen material used to build the walls**, which is collected from selected pits. Depending on the available raw material, the mix is laid straight on the wall (*bani-bani*), or it is moulded into bricks (mud bricks), later bonded with mud mortar. In areas where **stones** are easily available, people use stones instead of mud bricks. **Roofs are conical and thatched.**

Bani-bani and thatch roof, Michika, Adamawa State - © UniMaid

Mud-bricks and thatch roof in Opalo, Lamurde, Adamawa State
© UniMaid

Stones and earth with thatch roof in Gwoza, Borno State - © UniMaid

> Typology 3: Square earth walls + Hipped thatch roofs

This typology is like the previous one, but instead of round walls it has **earth square walls** and instead of a conical roof, they are **covered with hipped thatched roofs**.

Their rectangular plan facilitates the construction of the structure of roofs with four slopes. Materials, techniques, and shapes are also of a great variety. The top is sometimes reinforced with a ballast.

Mud bricks walls and thatch roof, in Hong, Adamawa State
© UniMaid

Bani-bani walls and thatch roof, Gombi, Adamawa State - © UniMaid

Bani-bani walls and thatch roof, Hong, Adamawa State - © UniMaid

> Typology 4: Rectangular earth walls + Flat mud roofs (*Shoro*)

This typology is characterised by the use of **earth in both walls and roof**. This typology walls are usually built in the technique of bani-bani, but they can also be built with mud bricks.

Flat mud roofs act as good thermal insulators and are ideal in an area which is prone to fire outbreak due to dry weather conditions. The flat roofs are also suited to the limited amount of rainfall experienced within the year.

Concerning their **roof structure**, they can be built in two rather different techniques:

a. **Flat timber roof**: In this technique, rafters are round logs of a certain thickness and length. Very often they are Delep Palm trees (*azara*), in halves or entire pieces. They are more popular in southern Borno extending to some parts of Adamawa State. They lay horizontally onto the walls or, sometimes, large sticks are placed at some intervals to serve as columns supporting the roof structure. Smaller round sticks (*gofa*) lay on the rafters.

b. **Corbelled arches flat roof**: This technique is typical of Hausa traditional builders. Arches are composed of tiers, with pieces made from the outer hard part of the palm tree (*azara*), due to its strength and insect resistant. For the covering, the pieces are laid across each other in a herringbone fashion after which both sides are plastered with mud. A special water proofing plaster is applied to the roof.

In both cases, the grid formed by the roof structure is covered with fibre fabric mats (*zana*), which is later plastered with several layers of mud. Although they are called “flat”, these roofs actually have a slight slope in order to release rainwater through timber gargoyles, long enough not to damage walls.

Earth roof with timber structure (a), Ngala, Borno State - © UniMaid

Earth roof with corbelled arches made with *azara* and plastered with mud mortar and lime (b) in Bade, Gashua, Yobe State - © UniMaid

TYPOLOGIES RESULTING FROM TRANSFORMATIONS OF VERNACULAR MODELS

Security

Security issues have affected North-East Nigeria architecture in many forms. The concentration of families living in close proximity to the marketplace as a result of defensive instincts of the people, explaining the emergence of concentrated settlement pattern.

Regarding the compound, family sizes are shrinking as result of insecurity, and the courtyard system is gradually disappearing. Similarly, the demand for agricultural space or compound farm found in the traditional dwelling continue to wane. Also, there are more fences with strong iron gates and the need of stability has sometimes led to increase in wall thickness and height.

This shape has aided in the use of corrugated iron sheets in roofing. Resulting from this, is the abandonment of traditional thatch, which helps the spread of fire in the event of terrorist attacks as constantly being witnessed in Borno State (Okeke and al., 2021).

Defensive iron gate, and iron sheets in roofing, Damaturu, Yobe State - © UniMaid

Regarding plan shape of buildings, while structures in rural areas are characterized by circular plans, their counterparts in urban areas are made of rectangular walls having mud roofs.

Two typologies (5 and 6) respond to an evolution of vernacular types, where metal sheets are used instead of thatch and earth in roofing.

> Typology 5: Rectangular mud bricks walls + Mono-pitch metal sheets roofs

Earth walls and mono-pitch zinc roof, Buniyadi, Yobe State © UniMaid

Earth walls and mono-pitch zinc roof, Ajari Community, Dikwa, Borno State - © UniMaid

> Typology 6: Rectangular mud bricks walls + Gable/hipped metal sheets roofs

Earth walls and gable zinc roof, Michika, Adamawa State - © UniMaid

Earth walls and hip zinc roof, Buniyadi, Yobe State - © UniMaid

GLOBALIZED STYLES TYPOLOGIES

Migration to urban centres in search of jobs and western education have created a serious demographic imbalance in the rural areas. Returning migrants have a new world view and **different architectural models** in their minds, accelerating the process of swift from the vernacular house forms to globalized styles typologies.

Present day trends in dwelling forms all over the areas studied are moving towards **industry-based materials and technologies**. The incursion of industrial materials, CGI sheets, carpentered windows and doors, and industrial furniture into the traditional setting have all had an impact on the lifestyle (Saad, 1991).

The relocation of people from their place of origin to other areas has created a **void in the continuity of their architectural forms**. For instance, decorations in Hausa traditional architecture were displayed on the facade of the *zaure*, but there are no longer mud walls to decorate, and the craftsmen who have the technical know-how have fled for safety. In Maiduguri, these wall decorations are presently executed with paint and plaster screed.

Within this category of globalized styles there are three main typologies. Makeshift typologies can be considered either as a transformed vernacular typology but also as a globalised style one. The materials used are industrial, but local people adopt and use them with ingenuity. Typology 7 (makeshift) is presented in this section and there are two more typologies (8 and 9) built with industrial materials, although they keep some cultural aspects in the design.

Compound with defensive elements and industrial materials in Bama, Borno state - © UniMaid

> Typology 7: Makeshift typologies, where small constructions are built with old CGI sheets, clothes, carton, etc.

Recycled zinc sheets for roof and walls, Damboa, Borno state
© UniMaid

Recycled boards walls, Malakyariri, Borno state - © UniMaid

Recycled shelter, Malakyariri, Borno state - © UniMaid

> Typology 8: Rectangular sandcrete blocks walls + Mono-pitch metal sheets roofs

Cement walls, mono-pitch zinc roof, Bama, Borno state - © UniMaid

Cement walls, mono-pitch zinc roof, Banki, Borno state - © UniMaid

Cement walls, mono-pitch zinc roof, Malakyariri, Borno state
© UniMaid

> Typology 9: Rectangular sandcrete blocks walls + Gable/hip metal sheets roofs

Cement walls and hip zinc roof, Gwoza, Borno state - © UniMaid

Cement walls, gable zinc roof, Bulabulin, Borno state - © UniMaid

Cement walls and gable zinc roof, Gashua, Yobe state - © UniMaid

4.6. CONSTRUCTION MATERIALS AND TECHNIQUES

CONSTRUCTION MATERIALS

In the studied localities interviewed people have named a great quantity of materials, listed depending on the construction element where they are placed, their source, and the factors why they choose it. These materials are presented in the following table:

A selection of construction materials used in Northeast Nigeria is presented here in a non-exhaustive way.

MATERIAL	USES	SOURCE	REASONS OF CHOICE
Mud/earth	Walls, floors, fence, roof, finishing	Local	Affordability / Availability / Thermal comfort / Quality
Mud brick	Foundation, walls, fence	Local or market	Affordability / Thermal comfort
Animal dung	Mixed with mud	Local	Availability
Fibres (*Zana*)	Mixed with mud	Local	Availability
Weaved grasses (*Yashin jauro*)	Roof, fence	Market	Quality / Availability / Durability / Thermal comfort
Sticks (*Gofa*)	Roof frame	Local or market	Durability / Affordability
Wood	Roof, lintel, boards	Market	Quality
Azara	Roof, fence		Quality
Timber	Roof, lintel, rafters, formwork, doors, windows, fence	Market	Quality / Durability
Plywood	Ceiling	Market	Quality
Nails	Roof, door, formwork	Market	Quality / Strength / Availability
Ropes	Roof, fence	Local	Affordability
Stones	Foundations	Local	Quality / Availability
Sharp sand	Mortar, concrete	Local	Availability
Cement	Foundations, lintel, mortar, concrete	Market	Quality
Sandcrete blocks	Foundations	Market	Quality
Zinc/ CGI (Corrugated Galvanised Iron) sheets	Roof, doors, windows	Market	Affordability / Durability
Aluminium sheets	Roof	Maiduguri	Quality / Aesthetics
Aluminium frames	Doors, windows	Market	Quality
Metal doors			Security
Latches and padlocks	Doors, windows	Market	Quality / Security
Wire mesh	Windows	Market	Quality
Galvanised poles	Veranda, fence	Market	Quality
Paint	Walls	Market	Aesthetics
POP (Plaster of Paris): powder gypsum	Ceiling	Market	Comfort
Asbestos	Kitchen ceiling	Market	Comfort
Asphalt/bitumen	Plaster, thatch treatment	Market	Quality
Used engine oil / Diesel	Timber treatment	Market	Availability
Salt	Termite prevention at foundations	Market	Quality / Affordability

Main construction materials found in the studied locations, uses, sources and reasons of choice of these materials mentioned by the interviewed population

CONSTRUCTION TECHNIQUES BY MATERIAL

> Earth

Mud bricks wall

Originally, the bricks were conical or cylindrical or even with a loaf shape. Currently, the wet mix is put into a rectangular mould, forming a brick called adobe, and let to get dry. They can be plastered or not, but they last longer when they are.

Mud bricks wall, Dikwa, Borno state
© UniMaid

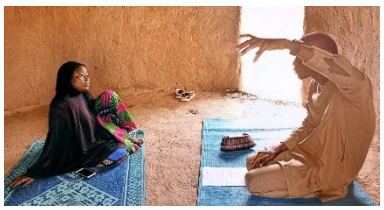
Cob wall (*bani-bani*)

In this case, the technique used is cob (locally *bani-bani*). The earth mix is directly laid on the forming wall by layers of about 50 cm height and let to get dry before another layer is applied. The wall becomes thinner as it rises to increase its stability.

Bani-bani wall under construction, in Gombi, Adamawa state - © UniMaid

Earth floors

Earth floors were usually laid by women. A surface or laterite about 3 centimetres thick is put on top of a layer of beaten earth. It can also be made of building earth, sprinkled with gravel, then watered and beaten with a tool thick (madabi), a slightly curved branch, flattened a little on the outer side. When it was dry. Once the floor is dry, it is hardened with a waterproof plaster (makuba in Hausa language).



Earth-floor, Fufore-Daware, Adamawa state - © UniMaid

Earth mortar plastering

The ground is dug with a hoe, crumbled, watered, well pounded, and let some days until it gets a plastic texture. If the clay within the soil shrinks too much when it gets dry, some dry grasses or cow dung are added. In Hausa tradition, either ash additives or liquid from locust bean pods are used to make it water resistant. Currently, people use bitumen or asphalt and black engine oil or diesel, to turn the plaster more water resistant, but this takes its plasticity away, cracking and making the plaster less effective in the long term.

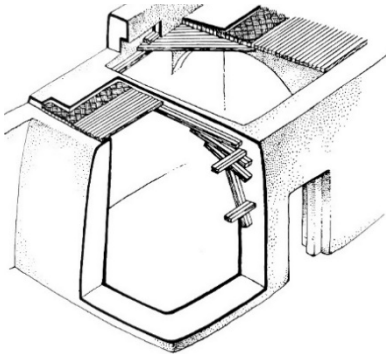
Earth plaster with fingerprints, Dikwa, Borno state - © UniMaid

Earth roofing

These roofs are very common in Kano area (North Central region), but it is also possible to find them in Yobe State (e.g., in Gashua) or even in Borno State (e.g., in Diwka).

Abandoned earth roof, Rabih house, Ajari community, Dikwa, Borno state - © UniMaid

The structure of a corbelled arch roof is based on nerves or tiers that are progressively built with projecting corbels. These corbels are usually made of four rods (*kafar guga*) cantilevered and set obliquely in the wall. In the first layer, rods are placed at a very sharp angle, almost vertical, as the support for the three subsequent layers. This process is synchronised with the raising of the wall, in a way that the upper end of the corbel stood about a third of a metre above the wall so far erected. Above the base of the tier, at right angle to it, short azaras are laid along the axis of the wall, providing a counterweight for the overhanging part of the tier. The same process is repeated with further tiers mounted with angles steadily reduced. The last tier being is almost horizontal. These last azaras (bika) are about 10m long and cover the crowns of two opposite walls. The beams are bond together with rope, and plastered over to form a quadrant of quarter-ellipse in outline (Dmochowski, 1990).



Corbelled arches for a flat roof
© DMOCHOWSKI, Z. R., 1990. "An introduction to Nigerian traditional architecture: Northern Nigeria, Volume one". London: Ethnographica. 272 p. ISBN 978-0-905788-26-5.

> Stone

Stone foundations, plynths and walls

Mostly used by those living in the hills, foundations, plynths and erected walls from weathered or broken rocks, with the clefts wedged with small pieces of stone and filled with earth plaster.

Dry stone walls and retaining walls exist as well.

Foundations with stone, Gwoza, Borno state - © UniMaid

> Cement

Sandcrete blocks wall

According to Nigeria Industrial standard NIS 87:2000, sandcrete block is a composite material made up of cement, sand, water, moulded into different sizes. Materials should be:

- Clean sharp sand, free from impurities.
- Ordinary Portland cement (OPC).
- Potable water free from suspended particles, salts and oil contamination.

Sandcrete blocks can be made either in solid and hollow rectangular types. Sizes usually are:

- 450 x 225 x 225mm for load bearing walls.
- 450 x 150 x 225mm for non-load bearing walls.

Hollow blocks have a void that runs from top to bottom and occupy around one third of the volume of the blocks. Solid sandcrete blocks do not have any void in it.

The cement and sand are mixed (ratio 1:6) in a dry form and water is added in spray form in moderate proportions to allow the cement to hydrate. Excess of water should be avoided as it causes shrinkage and distortion of the block on drying.

Compaction can be done with a vibrating compacting machine or manually, with the aid of a wooden rod. In order to maintain satisfactory moisture content and allow proper hydration and hardening of the sandcrete blocks, blocks should be cured for 28 days during which they are tested for their compressive strengths. The range of minimum strength of sandcrete specified in the Nigeria Industrial Standard NIS 87:2000 is between 2.5 N/mm^2 to 3.45 N/mm^2. However, the strength of sandcrete blocks is inconsistent due to the different production methods employed, duration of curing, sizes of blocks and the properties of constituent materials.

Walls combining stones and earth, Gwoza, Borno state - © UniMaid

Stone retaining wall, Michika, Adamawa state - © UniMaid

Concrete

Concrete (cement + sand + gravel + water) is sometimes used in foundations and in reinforced concrete structures. This technique is not very common in affordable housing or shelter solutions. However, it is more and more used in foundations, ringbeams or lintels.

Sandcrete blocks in foundation of an earth wall, Fufore, Adamawa state - © UniMaid

> Metal

Steel or aluminium frames and openings are used for doors and windows. Steel is also used in reinforced concrete structures, but also in elements such as nails, or wire.

Metal sheets for walls and roofing

Metal sheets are mainly used for roofs, but also for openings, walls and, to a lesser extent, fences. In the last two cases, the sheets are nailed to a timber structure. As they are quite light, they should be reinforced with weight or anchorage so that wind gusts do not take them away. Also, higher slopes and openings under the covering help avoid this suction effect.

There are two different materials used to produce roofing sheets:

- Corrugated Galvanized Iron (CGI), also called Zinc Sheets: They should not rust as they are hot-dip galvanised. To prevent CGI sheets from rusting at storage, place sheets with layers of wood between them to allow air circulation; do not stack more than 20 to 50 sheets; and store them at an angle so that condensation water can run off. Do not store CGI sheets for too long.
- Aluminium: It is the most expensive, but lasts a long time compared to a CGI of the same thickness. They come in bright colors and are generous in length.

CGI walls and roof for a veranda, Damboa, Borno state - © UniMaid

Aluminium sheets roof, Dikwa, Borno state - © UniMaid

> Wood and fibers

Multiple vegetable origin materials are used in construction, depending on its avaliability. Pilars and roofs can be made of different especes of timber. They are usually collected from the surroundings during the rainy season and set to dry. They can be breaded to form a mat (*zana*). The construction of a hut starts with the arrangement of sticks forming a cage.

Roof thatch covering a wood structure, Fufore, Adamawa - © UniMaid

Wood roof structure

Conical structures are formed by a frame of azaras with bamboo sticks inserted between them. The cone is raised with the aid of a scaffolding inside the house to the crown of the walls, overlapping by 60 cm. The conical frame is stiffened on the outside by numerous slender rings of grass. At half of its height, the cone has a thick ring (*gangawal*) inside, made from thin stems closely bound together. It has twenty rings (*murdaka*) of grass bound round with strips of bark. The apex of the cone was covered by a horizontal circular mat (*bedel*).

Rectangular roofs are built similarly to round ones, only that its structure is composed by rafters bound in pairs, trestle-like. The ridge beam laid across their crossing, and four or five battens are fixed on each side of the roof.

Thatched roof and cornstalk palisade, Gombi, Adamawa state - © UniMaid

Thatch covering

The slope depends on how fast it can evacuate water. Grass is very much used. Mats are laid spirally on top of the structure, with the bottom part of the grass stems downwards. The first layer of thatch consist of four thicknesses of mats, one on top of the other. The next layer is three mats thick. From then on, up to the middle of the roof, single layers are wound in a spiral with small overlap. A step is formed in the middle of the roof by placing four layers of mat, then the same process as in the lower half is repeated. The simplest finishing of the thatch involve the tight binding of the topmost spirals with *balamji* rope above the apex of the roof frame. Sometimes a clay pot is placed over the binding, protecting the most fragile part of the thatch roof.

Thatch hut with plastic sheets reinforcement, Dikwa, Borno state - © UniMaid

CONSTRUCTION PROCESS

The following table contains some characteristics of the different stages of the construction process comparing buildings made with local or industrial materials (what materials are used, who is usually responsible for the task, and how far away the materials are).

Data was collected through multiple interviews in more than twenty locations, sometimes with self-builders and sometimes with specially qualified workers from the places visited.

PHASE	LOCAL MATERIALS	INDUSTRIAL MATERIALS
Collection / purchase of materials	• Mud, laterite, grasses, sticks, stones, water • Mostly by household members • Harvested from farm or surrounding bushes	• From market in towns • Transport price has to be considered (motorcycle, car, pick-up) • Once bought, storage is needed (especially for transportation and security reasons)
Production of materials	• Mud bricks (Dig the soil, mix with grass, then with water, pound it well, mould it, and get to dry), soil mix for bani-bani, mud and grass mix for mortar, cut and anti-termite treatment for wood • Mostly by household members	• Sandcrete blocks, anti-termite treatment for timber
Preparation of site	• Clear shrubs, cut trees, break rocks, demolish existing building, clear debris • Mostly by household members, friends or labourers	
Foundation and base	• Dig, blind with cement, and fill trench with the chosen material • Materials: Stone laying, mud bricks masonry, compacted earth • First course for base • Usually by 1-4 masons	• Dig, blind with cement, and fill trench with the chosen material • Materials: Sandcrete blocks, concrete • First course for base • Usually by 1-4 masons
Walls and frames	• Mud bricks, bani-bani, frame (Cut wood, dig hole and fix pole) • By owner or 3-4 masons	• Sandcrete blocks • By 3 masons
Roof structure	• Arrange wood (azara), brace with sticks, and tie them together and to the wall • By owner and carpenters	• Timber • By carpenter
Roof covering	• Thatch: Preparing and weaving grasses. Arrange and cover the roof structure with the thatch • By owner, household	• Cover with metal sheets (zinc, CGI or aluminium) • By carpenters
Doors & windows	• Thatch or wooden windows and doors • By owner, household	• Produce and install doors and windows (nail timber frame, and cover with zinc) • By masons or carpenters
Floor surfaces	• Pour mud on floor and shape ramp • By masons	• Cement and sand screening • By 3-4 masons
Finishing	• Earth coating: Mud with bitumen, straw or cow dung. At interior and exterior of walls • By masons	• Painting walls • By 3-4 masons

Different stages of the construction process of industrial and local materials

CONSTRUCTION MATERIALS MARKETS

↘ In each location, it is necessary to address information about eventual material shortages, availability of certain materials along the year, problems of transportation, scarcity, best season for collection of local materials, etc.

Nigeria imports over 62% of all building materials and components used in construction (Umo & Umo, 2023) as the local production of building materials is not sufficient to meet the demand for the housing sector. In a country where there is a monopoly in supply, shortages have been deliberately created to force up the price.

Cement is used in the construction of the great majority of private and public buildings in the formal sector. Cement production in Nigeria dates to 1957 (Nwolisa, 2012). The owners of cement buildings were respected and placed high in the society, and the use of the new material overshadowed the thought of the limited energy sources needed to produce cement and the impact on human environment. In fact, cement is often regarded as a local product, but 60 % of the production cost is due to imported energy (Ogunkah, 2015). Extra interior heat was attributed to the new construction material, creating a higher dependence of energy for cooling.

The increase in the price of cement is significant. For instance, in about 12 years (from 1999 to 2011) the price of cement increased by over 200 per cent (Alagbe, 2011).

The use of **earth as a construction material** in Nigeria declined in the 1970's era of oil boom. So much revenue was generated from exportation of crude oil that the importation of building materials like cement, steel and glass became popular. However, in recent years there has been a reawakened interest in the use of earth as a construction material.

A collaboration of the National Commission for Museum and Monument, Jos, Nigeria and the French Embassy in Nigeria since the 1990s have been promoting the use of **mudbricks** and **compressed earth block** (CEB). Efforts have been made using training workshops for building professionals in private and public sectors, but still the CEB is rarely adopted for housing development (Egenti and al., 2014). Nevertheless, the introduction of CEBs by CECTech in early 90's gave birth to private earth construction companies in the country. In 1991 the Belgian Centre for Development of Industry (CDE) sponsored a workshop in collaboration with CRAterre with five Nigerian companies, on the improvement of fabrication of brick presses in Nigeria.

Several Nigerian architectural masterpieces were reproduced for records and preservation of Nigerian architectural heritage in the Museum of Traditional Nigerian Architecture (MOTNA) in Jos, which also served as a catalyst for setting up of the Centre for Earth Construction Technology (CECTech) in 1992. Both centres have been instrumental for rebirth of earth construction in Nigeria. MOTNA is concerned with restoration and preservation of earth buildings, while CECTech is for promotion or earth construction (Shittu T, 2004).

An experiment carried out by the Nigerian Building and Road Research Institute (NBRRI) with the Federal Housing Authority (FHA) showed that there is at least a **40% cost saving in the use of local building materials over conventional modern ones of identical construction**. The FHA–NBRRI project in Lagos employed the use of cement-stabilised clay blocks and fibre-cement roofing tiles for terraced houses of two bedrooms. In 1991, a similar vein, the Borno State Government through its Housing Corporation collaborated with NBRRI in the construction of 50 units of terraced bungalows in the Pampomani Housing Estate, Maiduguri and appreciable savings were also made using alternative building materials (Olotuah, 2002).

> Cost analysis of construction stages

In the interviews with skilled labours and self-builders the following considerations about cost of different constructions stages have been collected:

- Preliminary site activities: Low.
- Foundations: Low or High, depending on the nature of foundation, on the ground, the weight of the house.
- Walls: Medium or High, depending on the material.
- Roofing: High (for metal sheets).
- Finishings: Medium or High, depending on the material.
- Labour: Medium or High, depending on the material.
- Transport: Medium or High, depending on the materials, the distance and the mean of transportation.

Building with CSEB in Maiduguri, Borno state - © IOM Nigeria

CONSTRUCTION MAINTENANCE

> Sandcrete blocks walls

Sandcrete walls are coated with a cement and sand plaster finished with paint. Theoretically, they need little maintenance, but in practice the quality of the mix is too often quite low, so it weathers rapidly and looks old until the owner can afford a new plastering, which is usually needs to be done by a mason, which makes it more expensive for the owner.

> Earth walls

Earth walls are normally coated with mud plastering, which require annual maintenance to complement washed portions, especially when they are not protected from rainwater (with too short eaves or overexposed to the preferent wind during rainy season), or when they have no base to keep soil humidity away from the wall. When the plaster has good quality, the frequency can be reduced. This is a task that can be done by the family owner at an affordable price, and it makes the wall look like a new. Anyway, walls can have cracks and people tend to repair it by fulfilling them with extra material. This is an aesthetical solution as it does not consider the cause of the crack, which can be a default of design or execution, or the consequence of the defect of a different construction element. Cracks will reappear until a professional gives a diagnosis of this specific pathology.

> Metal sheets roofing

Roofs are very much exposed to weather agents, so regardless the material they are built with, they all require regular maintenance. The material most used is zinc or CGI sheets, which gets quickly rusted until it leaks and needs replacement.

> Timber structures

Replacing covering is normally done every year, otherwise they leak inside the house, and the timber structure starts deteriorating, so owners need to call a carpenter to replace or reinforce the damaged parts.

> Thatch covering

The second most used material for roof covering is thatch. Reports tell that this task, which can consist on replacement of the damaged parts, or just a reinforcement of its ties, is more often done every two years by the household members for very little cost, for both the collection of materials and the reparation itself.

> Earth roofs

In areas less exposed to rainwater (Gashua, Ngala), there are earth roofs. More than maintenance, they need supervision of their drainage system, and then repair of the wasted areas. Both the replastering and the collection of materials can be done by the owner's family, when it is not very difficult to source mud due to distances of evacuation of area or the lack of tools to dig.

> Other elements

Other elements that require frequent repairs and regular maintenance are plywood ceilings, doors, windows, fences (more affected than other walls), floors (women repair worn out parts every two years or so), and even latrines. Regular preventive works such as creating drainage paths to keep rainwater away, are highly recommended as they are less expensive than the replacement of already damaged elements.

Zinc roofing sheets and thatch covering, Michika, Adamawa state - © UniMaid

Plywood needing repair, very often because the roof covering is leaking on it, Malakyariri, Borno state - © UniMaid

4.7. ORGANIZATION OF CONSTRUCTION

CONSTRUCTION SECTOR: FORMAL SECTORS AND INFORMAL SECTORS, SELF-CONSTRUCTION

There are formal and informal sectors in the Nigerian construction industry. Different scales of self-construction are very common, when it comes to Local Building Cultures.

> Formal sector

According to Kehinde & Simon-Ilogho (2023), the formal sector consists of small, medium, and large scale international and domestic companies. The few large corporations (mainly multinational) account for only about 5% of all firms in the formal sector, but control nearly 95% of the construction market, while small firms get a very humble proportion of only about 5% of the market (Kehinde & Simon-Ilogho, 2023).

The decision to opt for multinational construction firms is as a result of limited technical competence, deficiency in managerial skills, planning and evolution to adapt to modern techniques and innovations in the construction sector (Ibid.).

> Informal sector

Activities of the informal sector in Nigeria include those of the carpenter, the plumber, the mason, and other artisans.

Contracts are usually informal verbal agreements. This arrangement comes by practice, following a former collaboration with some workers with which families usually have a good relationship, as they help families solve technical problems. Normally, they discuss and come together to build a particular project. This is also because builders are often the only available profile families can find at the community or LGA level (although it may reach the State level). The choice comes because they know them personally, they heard about them and the quality of their work has a good reputation, or because they give a good price. Builders are also in good relationship with tradespeople, as they usually share knowledge, tools and even contracts. Payment can be done by daily wages, by completed task, or it can be part of an agreed contract fund.

> Self-construction

Most of building related activities are done by the owner himself (or the landlord in case of renting) and his family, especially for activities such as: Obtaining land or building permit; Obtaining financing for the construction; Design of the construction (although in formal settlements, layout is given by authorities); Collection, transportation or production of materials; Land preparation.

Different forms of mutual support in construction persist in the territories visited, such as: Some families provide food for workers, some help clearing the site, fetching water, etc.

In many of the locations studied, water for construction is generally fetched by the women of the house. Women can also cook for the workers, if they are not paid for it.

> Design and supervision of work

Design and supervision of work is mostly done by owners or by the master builder. Few times, for instance when the contractor of the works is an NGO or the administration, a technical expert such an architect or engineer will be engaged. Therefore, very often, builders have strong influence on families: they advise on the design and orientation of the house, on quality and durability of materials.

Building with sandcrete blocks in Yola, Adamawa State - © IOM Nigeria

AVAILABLE SKILLS

Construction workers usually learn by working with a more experienced tradesperson. They get information from social media or by observation. NGOs, local or national authorities often propose specific trainings such as the use of safety tools, building gable and hip roofs, or other actions to prevent from wind hazards. These actions help upgrading professionals, as there are very few vocational training centres for construction. There are associations of builders, such as the Carpenters' Association in Ngala or the Association of Artisans in Gombi.

The skills most found in the studied localities are bricklayers, carpenters and iron benders. There are also welders, plumbers, borehole drillers, solar panel installers and those specialised tiling or finishes (tyrolienne or gypsum plasters).

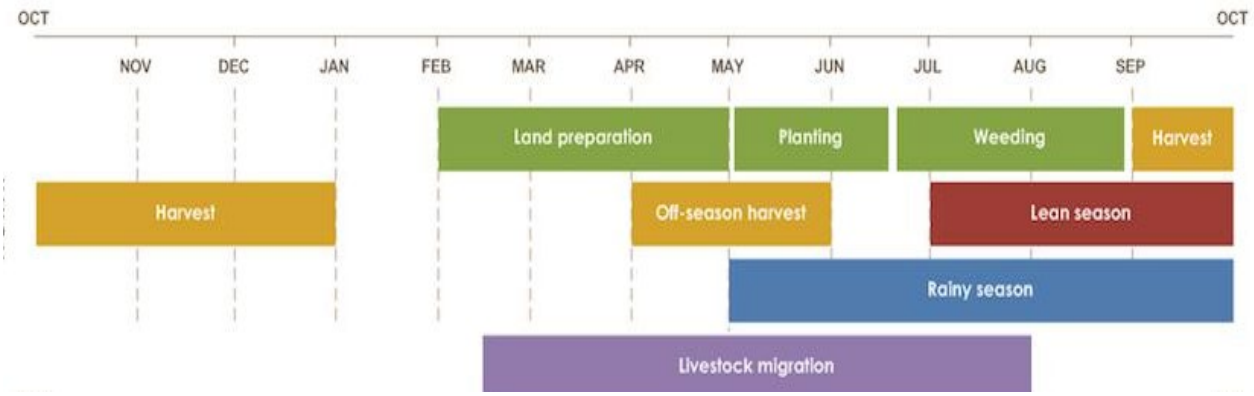
A standard team of building workers can be composed by:

- 2-3 laboureres (NGN 1,500-3,000 per day per person)
- 2-3 masons (NGN 3,000-5,000 per day per person)
- 2 carpenters (NGN 3,000-4,000 per day per person)
- 1 iron bender (NGN 2,500 per day per person)
- Foreman (NGN 5,000-10,000 per day per person).

CALENDAR (SEASONAL ACTIVITIES)

ACTIVITY		MONTH											
		1	2	3	4	5	6	7	8	9	10	11	12
Weather	Rainy season						■	■	■	■			
	Dry season		■	■	■	■							
	Coldest and hottest months	■		■									
Construction	Main construction time	■	■	■	■	■							
	Production of adobes	■	■							■	■	■	■
	Collection of thatch	■	■							■	■	■	■
Agriculture	Soil preparation	■	■	■	■								
	Planting				■	■							
	Weeding						■	■					
	Harvest of groundnuts										■		
	Harvest of maize											■	
	Harvest of corn												■
	Cereal price peak						■	■	■	■			
	Lean season (hunger)						■	■	■	■			
Other livelihood activities	Commodity production	■	■	■	■	■	■	■	■	■	■	■	■
	Trading	■	■	■	■	■	■	■	■	■	■	■	■
	Fishing	■	■					■	■	■		■	■
	Crafting	■	■	■	■	■	■	■	■	■	■	■	■
	Tailoring	■	■	■	■	■	■	■	■	■	■	■	■
	Livestock sales or auctions				■	■	■						
	Carpentry						■	■	■	■	■		
	Masonry	■	■	■	■	■	■	■	■	■	■	■	■
	Casual Labour	■	■	■	■	■	■	■	■	■	■	■	■
Hazards	Flooding season/peak								■	■			
	Fire outbreaks	■	■	■	■								
	Heavy rains - flash flooding								■	■			
	Strong winds					■	■	■					
	Termite infestation			■	■		■	■	■				
	Droughts							■					
	Insecurity	■	■	■	■	■	■	■	■	■	■	■	■
Health	Main illnesses (malaria)						■	■	■	■	■		
	Main illnesses (diarrhoea)	■											
+	Firewood collection	■	■	■	■	■						■	■
	Main holidays				■			■	■				

Calendar of main seasonal activities in different areas according to data gathered in the interviews with the different communities living in the studied locations



Calendar of main seasonal activities in agriculture / livestock breeding

5. Analysis of local building cultures

5.1. LIFESPAN, MAINTENANCE AND ADAPTATION

(+) Positive points

Life expectancy

(+) **Life expectancy** of earthen walls is very high (up to 50 years) if they are maintained.

(+) **Maintenance** is basic to resist from natural hazards. For instance, where rain is frequent, a stone **base** helps extend the lifespan of earthen houses.

(+) The required skills to **maintain** earthen walls, timber and thatch roofs are generally mastered.

(+) Compounds with enough space can lodge **extensions** for increasing families.

(-) Negative points

(-) Depending on, among other things, the earth used and the degree of exposure of earthen walls, they may need annual **replastering** of their washed parts.

(-) Earth roof requires a checking of its capacity to **drain water**.

(-) Bad quality sandcrete blocks walls are often **deteriorated** within a decade. In fact, sandcrete walls also require periodic maintenance by the house owner to repair damaged portions, with costs between N1,500 and N25,000, depending on the extent of the damage. This is quite expensive compared to local materials (timber, mudbricks, thatch, earth plasters, etc.) which rank from N1,500 to N5,000 (most of the times).

The practices presented in this section are not exhaustive and represent only a sample of those existing. Some need to be better documented. They are constantly evolving and must be analysed on a localized scale.

Proper maintenance of the evacuation of an earthen roof, Gashua, Yobe State - © UniMaid

Loss of know-how on how to maintain a *bani-bani* wall, Wuroahi Community, Fufore, Adamawa State - © UniMaid

5.2. BIOCLIMATIC COMFORT

(+) Positive points

Location

(+) People consider **position and orientation** of the house avoid sun exposure.

Thermal confort

(+) **Earth houses** keep thermal comfort in every kind of weather, specially at the roof, due to the heat resistance properties of earth. Indeed, earth material (*lope*, *birji*) helps regulate extremes of temperature between day and night thus keeping interiors cool during the hot daytime and warm during the cold nights.

(+) The hot-dry climate prevalent in the Northern Nigeria obliges houses design to consider **sun protection** to keep some comfort level indoors: **pale surfaces** to reflect the sun's radiation, and all kinds of **shading details** such as **eaves, verandas.**

(+) **Trees and plants** also filter excess of light.

Half impluvium patio and high walls, Buniyadi, Yobe State - © UniMaid

Double veranda, Malakyariri, Borno State - © UniMaid

(+) Outside **thatch covered shelters** are very common, as they provide climatic comfort during daytime.

(+) **Adjustable windows** are used in the Adamawa Highlands, as it is cold in the morning, evening and night with very mild day temperatures.

(+) Many compounds include **courtyards** to improve natural ventilation. In the hot-dry climate, most of the vernacular buildings also have **high walls**, these provide protection from sandstorms and act as shading for the central courtyard. The hot air in the building also goes up, while the cool air stays at the lower level creating comfort inside (Mobolade, Pourvahidi, 2020).

(+) People use **plastering** inside the rooms to avoid moist and cold.

(+) **Trees and plants** are natural evaporative coolers, if water supply permits.

Ventilation

(+) In the Savannah, very **small windows** are used to prevent solar radiation and hot air from entering indoors. Some interviewed people consider their windows are sufficient for ventilation and lighting.

(+) There is a provision of **pools and basins**, especially for the micro-climate of Lake Chad Basin, with high day temperatures and humidity in the morning, violent winds in the afternoon, and a pleasant but dry breeze from the lake.

(+) **Trees and plants** filter dust from the air that is brought by the North-Eastern wind from the Sahara Desert.

(+) **Trees and plants** also act as windbreakers.

(-) Negative points

Lighting

(-) Insufficient **street lights** and pavement makes people feel very uncomfortable.

(-) Some houses suffer from **suboptimal lighting systems and windows**, resulting in inadequate illumination both during the day and at night.

Thermal comfort

(-) One of the problems with **sandcrete wall houses** is that they have cooling and heating requirements that were non-existent in traditional construction. These constructions are hot in summer, especially during the night, because of the capacity of concrete for storing heat. This is why people, and especially elders prefer earthen walls.

(-) Too often **windows and doors** are unfinished because they **lack of a covering** sheet, which would avoid dust and cold from entering inside the room.

Acoustic comfort

(-) **Lack of ceilings** in the rooms make rooms very uncomfortable, as rain generates an annoying noise on metal sheets.

Veranda extension with reeds and thatch, Damboa, Borno State - © UniMaid

High walls keep hot air away from people, Bade, Community, Gashua, Yobe State - © UniMaid

Shading street trees, Rabiri Community, Dikwa, Borno State - © UniMaid

Small covered window, Bama, Borno State - © UniMaid

Insufficient indoors light, Bulabulin, Borno State - © UniMaid

5.3. ENVIRONMENTAL ISSUES

(+) Positive points

Biodiversity

(+) Trees, gardens and the presence of animals help increase **biodiverse ecosystems** including **soil diversification**.

(+) Rearing **animals** helps fertilise the soil without polluting it.

Water

(+) **Collection of rainwater** is practiced in some villages, reducing the need of fetching if, at least during some time.

Waste and pollution

(+) Traditional building practices promote **biodegrading of construction materials** back into environment.

(+) Local building materials like earth and thatch have **low carbon footprint.**

(-) Negative points

Water

(-) **Filtration of water** is necessary due to the presence of suspended colloids, which can lead to earthworms and stomach-aches.

(-) Most of the people use **water from rivers** which is not safe, and consequently suffer from typhoid fever.

(-) Herbicides pollute drinking water in some locations, which leads to health issues in local population.

Waste and pollution

(-) Water is polluted when **fumigating against mosquitos** or other pests.

(-) Presence of **asbestos** in roofs covering.

(-) Soil mining in **large quarries for mudbricks** can lead to water pools and therefore vector-borne infestations (as mosquitos or other pests).

Desertification

(-) Bulk **consumption of wood and sticks** accelerates desertification.

Compound with garden and animals, Michika, Adamawa State - © UniMaid

Cow eating next to the compound, Wuroahi Community, Fufore, Adamawa State - © UniMaid

Collection of rainwater, Wuroahi Community, Fufore, Borno State - © UniMaid

Cooking with firewood, Fufore, Adamawa State - © UniMaid

5.4. HAZARD-RESISTANT PRACTICES

POSSIBLE ACTIONS TO TAKE TO REDUCE VULNERABILITY

In the studied locations, the persons interviewed have mentioned several actions to be taken before, during and after a disaster:

> Before

(+) Ways of **knowing** that an event will take place include: Notice from kidnappers, and announcement from radio stations of forecast alert when there is excessive rainfall. Other communication channels are: town criers, phone calls, bell strikings or drum beats (for emergencies), and through community mobilisers, youth or women leaders.

(+) **Preventive activities and measures** include: Increasing local security during harvest; paving of water ways; sandbagging around houses and roads; plastering / replastering cracked walls; reinforcing and anchoring roofs to walls; relocating when previous unsafe house locations; planting trees to serve as wind breakers; improving security through stronger doors, windows and use of locks; and putting ballast on roof.

> During

(+) People take **shelter** during / after a disaster / conflict in: In neighbours, family and friends' houses, in temporary tents, or for instance settlers at the outskirts of localities go to denser parts. When a flood is occurring, people stay at hilly part within the settlement.

(+) **Safest parts** of the house or the area are: Compounds (especially toilets), community facilities, places of worship, security duty posts, and houses on hills.

> After

(+) Actions taken by the local **community** are: Supporting affected ones financially / in-kind, negotiating with kidnappers and ransom contribution to release the kidnapped ones, sensitizing/informing the local community on what has happened and how to avoid it.

(+) **External assistance** and resources needed as seen by the interviewed communities are mainly: Provision of temporary emergency shelters, materials for reconstruction of buildings, and learning techniques for local materials in innovative ways.

(+) **Observing the disaster** carefully to understand what has made collapsed the building.

(+) **Repairs** are done by all community members except PWDs. Most common repairs are: Reconstruction of damaged walls. Community aid groups can assist households in repairing works.

(+) **Materials** that can be reused after a disaster are mud, stones, timber, sticks, nails, sandcrete blocks, zinc sheets, and doors and windows.

Community gathering to get informed, Bama, Borno State - © UniMaid

Sandbagging, Dikwa, Borno State - © UniMaid

Isolated toilet, Malakyariri, Borno State - © UniMaid

STRONG WINDS / STORMS

Site layout

(+) **Positioning and orientating buildings** within the compound and in relation with neighbours' houses or the road, to avoid strong winds and rain is a common practice.

(+) **Planting trees** all around the house to provide **buffer zone** against windstorm, which is an existing practice in some of the zones visited. The distance between houses and trees should be enough so as trees do not destroy houses in case of very strong winds.

Materials and shape

(+) **Thatched dome** typologies are aerodynamic, providing the smallest possible surface area to the pressure of strong winds for the same covered area. Therefore, they are more resistant to wind gusts.

(+) **Circular plan shapes** of some vernacular models have a good resistance to the horizontal strength of wind, which does not find obstacles to continue its way. They have a good stability thanks to a od distribution of the forces on the whole wall, which prevents them from deforming.

(+) Some constructions with CGI sheet roofs have **step sloped hip roofs** which help better stand strong winds. Nevertheless, each covering material requires a specific slope to properly evacuate rainwater.

(+) **Veranda roofs** are more resistant to being torn off by wind gusts.

Structural strength

(+) Increasing structural strength of the buildings to withstand natural factors such as wind or rain is very common, with practices such as **stones and wood ballast** on top of the building, or even **sandcrete blocks at the edge of the roof** (*danna kwano*), to prevent it from roof uplifting. This practice has a potential negative impact in case the roof is blown off as the heavy elements can cause damage to persons and goods. Other usual practice in this sense is the firmly **anchoring of roof members** to wall plates or the head course (*langa langa*).

(+) After an event, some people recommended to **renail roofing timbers** or to retie roofing covering, as hard winds can weaken these reinforcements.

Materials

(-) Even mild winds, and especially strong ones, have a significant impact on houses with **CGI sheet**, often causing damage not just to the roof but also to the walls. They can also be torn off the house and injure people.

It is necessary to consider all the risks that may affect an area, and not only the one that may be considered preponderant.

Circular plan shape and thatch roofs, Mbamba, Yola South, Adamawa State - © UniMaid

Different roof slopes depending on the material, Fufore-Daware, Adamawa State - © UniMaid

Heavy objects as ballast on top of the roof, Wuroahi Community, Adama State - © UniMaid

Roof members anchoring (*langa-langa*), Bama, Borno State - © UniMaid

HEAVY RAINS / FLOOD / EROSION

Erosion and rocks falling

(+) Some villages and towns have **drainage systems** in roads and streets that help evacuate rainwater particularly in case of intense storms.

Generous road drainage. Bama, Borno State - © UniMaid

(+) Currently, people declare to experience more intense weather events such as heavy rains and storms. Therefore, people are increasing the **plantation of trees** as crucial elements in erosion control.

(+) In the areas where the **slope** of the soil is critical, people try to get some distance from them because they risk collapsing after heavy rains. Also, when the mountains are rocky, in order to avoid falling stones.

Rains and floods

(+) In towns near rivers or lakes, it is very important to **damp the riverbanks** to prevent annual flooding.

(+) When possible, people **pave waterways** and build a water channel system to avoid water from entering into the compound and therefore, the house. It is also very common to do some **sandbagging** or laterite filling at the entrance of the house.

(+) When the water level is seasonally high, some households **rise the floor level with a base** and they build above it. Others, build **foundations with sandcrete blocks or stones** at foundation to improve stability.

(+) **Bags ceilings** are sometimes used to prevent leakages and reduce noise from rain.

(+) **Maintenance**: many people asure they check and/or reinforce roof structures and braces after an event occurs. Regarding covering, leaking roofs should be repaired and old CGI sheets replaced in order to stop degradation before it goes worst.

(-) In many locations there is a lack of **road drainage** leading to severe damages of roads and house walls.

(-) **Building upon water ways** compromises the durability of constructions in general, and of earthen buildings more particularly, as they need to be kept from great proportions of water to keep their structural strength.

(-) The risk of erosion is very high in places without **retaining walls** for exposed sloped ground.

(-) The omission of a **floor platform** to prevent water from entering the house, as well as the lack of a **water-resistant footing**, ends with erosion in the lower part of the wall, which is the most critical part of it.

(-) **Plastic sheets shelters** are very vulnerable to heavy rains and floods.

FIRE

(+) Interviewed women declared that **well-ventilated indoor kitchen**, to cook during rainy season but with no risk of fire.

(-) **Thatch** roofs and vegetable fibre fences can be burnt easily, especially if the kitchen is nearby.

Trees help retain step slope soils, Lamurde, Adamawa State - © UniMaid

Stagnant water next to earth buildings, Opalo, Lamurde, Adamawa State - © UniMaid

Soil erosion. Potiskum, Yobe State - © UniMaid

Erosion of the lowest part of the wall. Potiskum, Yobe State - © UniMaid

Improved kitchen for cooking outside, Monguno, Borno State - © UniMaid

BLACK COTTON SOILS

If possible, avoid building in black cotton soils zones

(+) Building on black cotton soils is to be avoided when possible because the change in water content has a big impact of shrinkage and swelling in these soils containing clays highly reactive in contact with water. This fact may cause crackings and even the collapse of buildings standing on these soils.

Avoid alteration of water content in the soil

(+) A good strategy is to avoid any risk of altering the water content of the soil supporting the building. Verandas and large roof overhangs avoid the risk that changes in humidity associated with rain will swell the soil under the walls.

(+) Drainage systems and a proper slope of the ground surrounding the building is also a strategy to evacuate water away from the site and from wall bases.

(+) Trees have an impact on the amount of water in soil and depending on the time of year and soil type may cause the ground to heave or subside. Buildings should be constructed outside of the canopy of any tree

Architectural and constructive features

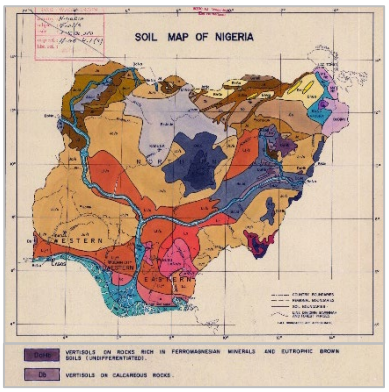
(+) Constructions with relatively reduced dimensions as well as several constructions disconnected from each other help adapt more easily to the movements of the ground and therefore crack less due to its expansion and retraction.

(+) Within a masonry building, there needs to be a disconnection of the walls for example in the openings or in the middle of facades, so that walls meet in the angles and there is a possibility for each angle of the building to move without making the whole building crack.

Flexible materials and techniques

(+) Vernacular building technologies such as those completely built with timber and thatch fit well to black cotton soils, as the buildings are light and flexible so they can move with the soil's movements due to variation in moisture content. This would also be the case for CGI sheet houses and timber structures.

The geographic areas with presence of black cotton soils (vertisols) in the BAY states are quite large. Vertisols have a high content of expansive clay minerals, many of them known as montmorillonite, that form deep cracks in dry seasons. There is a need to build in these areas following some considerations.



Nigeria map of soils. Black cotton soils (vertisols, DaHb & Db) are present in the south of Yobe, southwest of Borno and different parts of Adamawa (particularly in the northwest) – © FAO

Flexible materials resist ground movements, Gombi, Adamawa State - © UniMaid

TERMITES

(+) **Neem tree** branches are used as reinforcement to the roofs because they are naturally resistant to termites.

(+) As a local termites repellent, **salt** is mixed with water and sprinkled on termites prone area, with special prevention at **foundations level** (dugging about half a metre and pourring inside the product).

(+) When timbers are imported, which usually are frequently attacked, people treat timbers with **anti-termite products** before installing them on the roof.

(-) Termites affect joinery, doors, windows, frames, planks, furniture and carpentry, but **plywood**, **windows and doors are especially vulnerable**, so some people prefer metal sheets covering.

(-) Some people **apply used oil** to the wood before inserting it into the wall, but this may affect inhabitants' health.

Imported timber suffering from termites, Bama, Borno State - © UniMaid

Plywood ceiling, Bama, Borno State - © UniMaid

5.5. INCLUSION: GENDER AND DISABILITIES

(+) Positive points

(+) **Plot division** is based on age or gender needs. The **women's courtyard** allows intimacy for social interaction and household activities, and provides of some security for them and their children, as playgrounds within the compound allow women to take care of the children.

(+) Women **participate** in some stages of the **house construction**, especially for the harvesting and gathering of materials, but also collaterally, by preparing food for workers.

(+) **Women's clubs are very much used** by women for interaction. Although there is no official women's association in the community, women come together to contribute both financially and physically for events like weddings, naming ceremonies, and burials.

(-) Negative points

(-) Individuals with disabilities, their caregivers, and representative organizations often find themselves **marginalized and excluded from decision-making** processes within the community.

(-) **Financial barrier** is the main obstacle for adapting households to the needs of people with disabilities.

(-) Streets are very much difficult for people with disabilities. Educational and health infrastructures currently lack the necessary features for **accessibility**.

(-) No availability of **schools** in the neighbourhood and quality education, and lack of **maternity and good primary health** care centre.

(-) Long **queues to fetch water** at boreholes take women's and children's time. Women would like to have a water pipeline to individual homes.

Women courtyard with veranda, Mubi, Adamawa State - © UniMaid

Women meeting under a tree shade, Gwoza, Borno State - © UniMaid

Zaure to enter female compound, Mubi Adamawa state – © UniMaid

5.6. HEALTH AND HYGIENE ISSUES RELATED TO HOUSING

(+) Positive points

(+) Compounds where the space is not shared with **animals and toilet far from rooms** are safer, as they keep vector-borne diseases away.

(+) Households with animals (goats, ducks, chickens, pigeons, pigs, cows, etc.) and productive vegetable gardens have **better nutrition**.

(+) Adoption of low cost, **affordable models of adapted latrines** can accelerate access to sanitation.

(+) Damp proof membrane and good foundations **avoiding damp and mould** in the house, which is one of the main problems affecting people's health.

(+) Houses equipped with **mosquito nets** on the windows and doors, and **solar-powered fans** do not suffer from diseases due to mosquito vectors such as malaria.

Goats shed away from rooms, Pulka, Borno State - © UniMaid

Water source and drainage system, Ngala, Borno State - © UniMaid

(+) No respiratory disorders due to air polluted from cooking with **outdoor kitchens**.

(+) Rooms have medium **lighting**, which **is culturally sufficient** in most of the cases.

(+) Many interviewed people say they have enough rooms to **avoid overcrowding**.

(+) A great majority of households declare they do **not suffer from noise**.

(+) In dry areas, some people collect and **store rainwater**.

(-) Negative points

(-) Some families **have to deal with staying in flooded areas** because they have no other place to stay.

(-) Poor drainage systems and **stagnant water** facilitates the emergence of cholera, malaria, and typhoid fever. Presence of **damp and mould** in some houses, because of a **deficient ventilation and waterproof**.

(-) **Open defecation** and open disposal of garbage is still carried out in some locations, contributing to disease outbreaks. There is a lack of access to **basic sanitation facilities**, such as latrines with good maintenance. **Water system latrine** with no proper evacuation can lead to vectors proliferation.

(-) Women interviewed reported that they would like to reach awareness to help them turn their pit latrines toilets into modern **toilets for women**.

(-) The **collection of firewood** takes considerable effort and time. And the use of **firewood emits fumes** and carbon monoxide, leading to respiratory disorders and lung diseases, posing a threat to human health and comfort.

(-) Cancer and respiratory disorders because of **asbestos** and other toxic materials.

(-) **Close cohabitation with animals**, sometimes attracts pests' infections because of the hips of dongs, animals and open defecation. General risk of diseases when animals are housed in adequate sheds.

(-) Lack of adequate **protection against mosquitoes**, exposing residents to the nuisance and health risks associated with these pests.

(-) **Noise problems** have been noted in certain localities, particularly due to small industries (e.g., grinding machine next to a Health centre).

(-) **Heath care system** is very precarious (lack of facilities, means and human resources).

Thatch shelter for cooking, Gombi, Adamawa State - © UniMaid

Proper WASH facility in a compound, Shuwari Community, Dikwa, Borno State - © UniMaid

Stagnant water next to houses, Malakyariri, Borno State - © UniMaid

Pigs within the compound, Opalo, Lamurde, Adamawa State - © UniMaid

5.7. USE AND AESTHETICS

(+) Positive points

(+) **Trees and plants** enhance the aesthetics of the region.

(+) Numerous interviewers acknowledge the value of the **harmonious integration** of traditional materials with environment.

(+) Housing **compound layout** not only showcase the community's cultural identity but also highlight their resourceful and environmentally conscious approach to constructing and organizing their living spaces.

Harmonious integration of natural materials, Gwoza, Borno State - © UniMaid

(+) Separation between **public and private** spaces as a cultural critical aspect.

(+) Shaded areas such as **verandas** are very much used for family meeting and relaxation.

(+) Placement of toilets, often at the back of the house, near the bedroom, for **privacy** consideration.

(+) Some women appreciate to have space for **storage** next to the kitchen.

(+) **Furniture** is very much appreciated.

(+) **Traditional decorations** are based on customs, as a social and cultural expression, meanwhile decoration today is a manifestation of popular culture.

(+) Considerable attention is given to the **orientation of the entrance door**, with a prevalent practice of facing it towards the west or east (especially for Burra people).

(+) **Schools** are very much appreciated.

(-) Negative points

(-) **Outside finishings** in some houses are poor, mainly due to lack of resources.

(-) The **number of rooms** is not enough for some households. Some areas, especially urban ones, **lack of larger spaces** for freedom of movement.

Entrances are marked as very important milestones, Michika, Adamawa State - © UniMaid

Congested compound in urban areas, Lambu, Borno State - © UniMaid

5.8. ECONOMIC ASPECTS

(+) Positive points

(+) Households with enough space to hold **economic activities** (workshop, store, gardens, etc.), or that can lodge **rooms for rental** as complementary economy.

(+) **Local materials** are available and do not depend on external markets.

(+) Diverse and **adapted means of transportation**: motorcycles, bicycles, tricycle carts cars, and boats or canoes for rivers.

(+) Gardening and rearing animals within the compound can nourish the family, but also, they can be used as a complement of revenue.

(+) Mutual **grinding** places exist in some locations.

(+) Some compounds have **solar systems** on top of their roofs, helping people improve their living conditions, as well as their economic development.

(+) Direct **participation of inhabitants in construction**, such as: collection of materials (mud and grass); Mutual assistance: teamwork by community, as in farming; Savings groups: financial support of family or friends; buying materials to store to avoid inflation.

(-) Negative points

(-) The **lack of electricity** and reliable current does not allow economic activities to prosper.

(-) **Shortages of water** make livelihood difficult.

Mutual grinding mill, Shuwari Community, Dikwa, Borno State - © UniMaid

House with solar panels on top of the roof, Gwoza, Borno State - © UniMaid

New commercial premises, Ngala, Borno State - © UniMaid

(-) **Deficient roads** demote economic development.

(-) Mat**eri**als are less and less affordable due to **inflation**.

(-) Sometimes, it is only possible to find **poor quality workmanship**.

(-) **Lack of awareness** of the benefits of local building materials, make some people invest in expensive industrial materials with poor quality results.

(-) Regarding the compound, the demand for **agricultural space or compound farm** found in the traditional dwelling continue to wane as result of insecurity.

(-) IDPs or even people who rent the house where they live cannot make many improvements as they may be asked to **relocate**.

Garden within the compound, Banki, Borno State - © UniMaid

5.9. SOCIO-CULTURAL PRACTICES THAT PROMOTE RESILIENCE

(+) Positive points

(+) **Peaceful coexistence and cohesion** within the community are very much appreciated.

(+) There are **shared household facilities** as sitting rooms, kitchens, toilets and compound access areas (***zaure***), which are very much used for social interaction.

(+) In most of the studied locations a great quantity of houses is provided with a **veranda** in the front, as they are very much valued as best place to gather the family, relatives or friends.

(+) Open shelters as the **parlour** for dinning, for family, unity and peaceful life. As well, **large tree shade** at village head front house (parliament) is a place for special activities such as festival, community gathering, etc.

(+) In many locations, the ***majalisa***, the **Parliament house**, and the Lawan palace are preferred meeting points for communication.

(+) Other places for social interaction are **women's clubs, youth centres, the mill for grinding grains, boreholes, the market or the river**.

(+) **Community supports** marriage and death ceremonies with monthly money from the *adashe* (rotating savings and credit association).

(+) In terms of construction solidarity, **community members actively support** each other when mud houses are affected, such as after rain or other crises. All the **family support construction activities** (fetching water, cooking, clearing the site). When a young man wants to build a room, his **friends will help** him.

(+) When their house is damaged, people usually take **shelter in neighbour or relative's safer houses**. Otherwise, they can be lodge in community primary school or in temporary shelters.

(+) Both **young and old people work together** on community projects.

(+) People who had to leave their homes **(IDPs) now live in these communities**. They can join in deciding things for the community. But it's not always easy for them because they had to adjust to a new life, and finding jobs and businesses is tough for them.

Security and privacy are achieved with the entry space (*zaure*), Bulabulin Community, Dikwa, Borno State - © UniMaid

Relaxing under a tree shade, Taradal Community, Banki, Borno State - © UniMaid

Women's room in a modern house, Daware, Adamawa State - © UniMaid

Children playing in the Yedseram River, Bama, Borno State - © UniMaid

(-) Negative points

(-) **Lack of safe farming** because of crime. Regarding the compound, as result of insecurity, and the **courtyard** system is gradually disappearing.

(-) **Safety and privacy** are not always guaranteed by facilities and shelters that use quality materials for interior locks on shelter and latrine doors, and where sanitary facilities are segregated by sex.

(-) The need for **cultural separation by gender** is not always respected, even though in cases of shared shelters between different family units (extended family), **internal partitions** are a priority for most households.

CGI sheet fence within the compound. Lambu, Borno State - © UniMaid

5.10. IMPROVABLE BUILDING PRACTICES AND RECOMMENDATIONS

ENVIRONMENT

Improvable practices

(-) Careless **disposal of waste** in the environment and open defecation is a common practice, leading vector-borne diseases such as cholera, typhoid, and malaria.

(-) The poor state of latrines system or, in general, **poor WASH facilities** in some communities where people confront mosquito issues derived from the abondance of **stagnant and polluted water**.

Recommendations

(+) **Drainage** system to help evacuate excess of rainwater should **be maintened** in order to work properly.

(+) **Burning waste**, especially during the dry season, can also be an option.

(+) Concerning organic waste, it is an alternative to do solid waste **composting** in the farms, or in for the compound's garden, as animal excrements can fertilize soil.

(+) It is possible to handle open disposal in refuse pits or containers, but this practice should go along with other activities completing the whole **waste management**. For instance, in Potiskum, they used to conduct weekly community sanitation of waste.

(+) Another example of good practice in the studied locations is presented here. In the aftermaths of the crisis, with the active involvement of humanitarian partners, the introduction of a **proper waste management system** in Monguno brought a structured approach to handling and controlling waste products, ensuring that they are collected, disposed of, and managed in an organized and environmentally friendly manner.

These improvable practices and recommendations are not exhaustive and represent only a sample.

Lack of maintenance of street drainage with cumulation of waste, Bulabulin, Borno State - © UniMaid

Chicken house in the compound, Ngala, Borno State - © UniMaid

SITE SELECTION AND PLOT LAYOUT

Improvable practices

(-) Where mountains are rocky, the risk of **falling stones** is high.

The slope of the ground is mastered, Michika, Adamawa State - © UniMaid

(-) In the areas with a **soil steep slope**, heavy rains can produce erosion, land sliding, and therefore wall cracking or even collapse of walls by differential settlement of the ground.

(-) **Settlements in flooding prone areas** can derive into damage or collapse of buildings. It can also cause land erosion, washing away crops and reducing arable land size.

(-) **Shelters located far away from economic poles** and facilities, or with difficult access to them, can lead to a decrease of possibilities to revenues and therefore an increase of poverty.

(-) Some locations request for **security to do farming**, as their need of nurriture is compromised with the possibility of being attacked in their farms, or in their way there.

(-) **Land tenure insecurity**, especially for women or for families renting the house, prevents their capacity of investing for enhancing their living places.

(-) There is a general lack of space, specially in urban areas, leading to **overcrowding** and therefore lack of hygienical possibilities leading to the apparution of diseases.

(-) Women point out a lack of **storage space** for cooking utensils.

Recommendations

(+) Settlements should try to **distance** themselves **from steep slopes**, and if this is not possible due to lack of available sites, **suitable retaining walls** should be built, in terms of materials (they must be stable to water), stability (correct dimensions and shape) and water evacuation (openings in the retaining walls are required for water to drain without pushing the retaining wall down).

(+) Topography should be studied for a correct **water drain**. A good site analysis to assess if the land is suitable for house construction regarding **water ways**.

(+) The presence of **plants and trees** stabilise soil from erosion.

(+) **Access to water** is essential when planning a settlement.

(+) Increased room numbers to **prevent overcrowding**, specially in urban areas.

(+) It is important to leave a provision of space in the house for **economic activities**.

(+) If security plans cannot include transportation to the farms, it is recommended to consider **space for gardening** within the premises.

(+) **Kitchen** improvements can greatly increase cooking comfort, especially with regard to **ventilation**. For indoor kitchens, it is necessary to make a ventilation hole in the lowest part of the wall and a vent in the highest part of the opposite wall, in order to facilitate cross ventilation and evacuate smoke and gases.

(+) Consequent **storage space** must be taken into account, since food is usually prepared for a large number of people, and consequently, large utensils are required.

(+) **Helping displaced people** with a **restoration of their HLP rights** is crucial, starting from giving them access to documentation and to a legal and institutional framework.

Rice fields next to the village, Shuwari community, Dikwa, Borno State - © UniMaid

Storage for kitchen utensils is needed, Banki, Borno State - © UniMaid

Adequate number of rooms for large families to prevent from overcrowding, Mubi, Adamawa state – © UniMaid

Gardening within the compound, Wuroahi community, Fufore, Adamawa state – © UniMaid

Place for storage at veranda, Malakyariri, Borno State - © UniMaid

(+) **People with disabilities require changes** in their living spaces, particularly in terms of room conditions, toilet facilities, kitchen accessibility, and the creation of a comfortable relaxation area.

KNOWLEDGE AND KNOW-HOW

Improvable practices

(-) There is a **loss of know-how** concerning traditional construction, but sometimes it is just a **deficient updating capacity** to face modern requirements, or sometimes, more intense natural hazards. An important number of interviewed people asked for **advocacy by professionals** with technical know-how on how to face better housing practices.

Recommendations

(+) Awareness topics can be done through orientation (**workshops**) and **training** through a skills centre or with training from agencies. Training centres would help develop builders skills, where workers could be trained for a better understanding of materials, by learning their behavioral principles to be able to adapt their knowledge of traditional materials for more adapted purposes. The practical training could be done within the shelter **pilot construction**, so that they could earn an economical activity.

(+) Mobilization and **communication through community leaders** and community influencers is efficient, as they are used to bringing people together.

(+) To prevent termites from destroying wood and fiber materials, it is mandatory to keep the **interior of the house well ventilated**, since if these materials are dry, their natural resistance to being eaten by insects is greater.

(+) Water purification is the process of removing undesirable chemical or biological contaminants from water. **Methods used to purify water** can be physical, such as filtration, sedimentation or distillation; biological, such as slow sand or biologically active carbon filters; chemical, such as flocculation (process by which colloidal particles sediment in the form of flocs due to the addition of a clarifying agent) or chlorination (addition of chlorine or chlorine compounds such as sodium hypochlorite); and the use of ultraviolet light.

SETTING-OUT, FOUNDATION, BASEMENT AND WALLS

Improvable practices

(-) The main obstacle for building is the **high cost** of materials, skilled labour, or transportation. That is why most of the people claim for awareness on how to access finances.

(-) Significant cracks can appear in constructions **without foundations**, due to a difference of settlement in the ground or other structural misconception.

(-) Poor quality **sandcrete blocks**.

(-) **Degraded wooden pillar bases** due to moisture. Many houses suffer from **dampness** in the walls, due to the poor capacity of some materials, such as cement blocks or plastering, to evacuate humidity out of them, but also because rainwater is not properly evacuated from the surroundings of the house.

Cracks on sandcrete walls due to the lack of a ringbeam, Bulabulin community, Dikwa, Borno State - © UniMaid

Cement slab next to earthen wall causes damage to wall base, Gombi, Adamawa State - © UniMaid

Claustra walls help ventilate indoor spaces, Banki Goniri, Banki, Borno State - © UniMaid

Damaged wall because it lacks of foundations, Wuroahi Community, Fufore, Adamawa State - © UniMaid

Eroded sandcrete blocks, Pulka, Borno State - © UniMaid

Recommendations

(+) Using **local materials** would solve these three questions at once, as they are available, skills are there in most cases and transportation is quite reduced. As well, the use of loans would not be recommended in such inestable time.

(+) **Sandcrete block quality** can be reached utilizing sharp sand to enhance structural integrity, but also respecting the curing process, which is necessary for the correct hardening of the cement. In order to maintain satisfactory moisture content and allow proper hydration and hardening of the sandcrete blocks, blocks should be cured for 28 days during which they are tested for their compressive strengths.

(+) To keep humidity away from the house, first thing is to asure it is not kept besides the house with a proper **perimeter drainage**. In flood-prone areas, there's an emphasis on increasing floor levels.

(+) To achieve a more **stable foundation**, it is recommended to build on a rocky area or on ground with good load-bearing capacity. When these are not available and the ground can change its load-bearing capacity when it is soaked in water, to avoid differential settlements it is possible to build stronger footings and foundations with water-resistant materials, such as stones or sandstone blocks.

(+) **Wooden pillars** should not be directly inserted in the ground, as they can be weaken when they are wet and they do not have the possibility of drying. Instead, they can be placed on top of a water-resistant material base.

(+) To solve moisture problems inside rooms, houses should be properly ventilated. But it is also possibe to avoid the entry of humidity from the ground with an **anti-damp membrane** applied between the base and the wall, or to **raise the level of the footings** to the point where the capillarity of the water cannot reach the earthen material.

(+) Walls in ***bani-bani*** are still good and strong when their mix is of good quality.

Cracks on sandcrete walls due to proximity to septic tank, Rabiri Community, Dikwa, Borno State - © UniMaid

Drained earth footing, Wuroahi Community, Fufore, Adamawa State - © UniMaid

Sandcrete blocks foundation under earthen walls avoids rising humidity, Opalo, Lamurde, Adamawa State - © UniMaid

ROOFING

Improvable practices

(-) Regardless of the material they are made of, some **roofs leak**, which in addition to being very uncomfortable for the inhabitants, favors the appearance of other pathologies in the roof structure.

(-) **Deteriorated earth roofs** are very heavy when they get wet, so they can become very dangerous for inhabitants.

(-) **Wood structures** deteriorate and break when they are wet, or when they are made of bad quality wood species.

Abandoned earth roof, Bade Community, Gashua, Yobe State - © UniMaid

Recommendations

(+) To prevent rainwater from penetrating through the roof, **eave overhangs** must have consequent dimensions, the **slope of the roof** must be consistent (especially for thatch covering), and CGI sheets must have adequate **overlap**.

(+) Verandas roofs should be detached from the rest of the roof structure to prevent them from being lifted by gusts of wind.

Detached veranda roof, Hong, Adamawa State - © UniMaid

(+) The roof truss is made of **azara timber** which serves for many years.

(+) **Earth roof** needs annual replastering and a check to make sure its drainage system is working properly.

(+) Good braces and tie-downs of wood and sticks at both end and bottom edge of the roof, make it strong enough to withstand wind and rainfall pressure. Local practices such as ***langa-langa*** (anchorage of roof members to the wall plates or the head course) and ***danna kwano*** (stones, sandcrete blocks or woods ballast on top of the building to prevent it from roof uplifting) are also recommended.

Stones and sandcrete blocks as roof ballast, Bulabulin Community, Dikwa, Borno State - © UniMaid

OPENINGS

Improvable practices

(-) Some structures are not adequately **ventilated**.

(-) Water splashing into the rooms because of **lack of windows and doors**.

(-) Some people suggested to improve **indoors lighting**.

Local construction is still managed in most cases. Here, earth walls and small openings works for a dry and hot climate, Banki, Borno State - © UniMaid

Recommendations

(+) Windows and other types of openings in the wall (such as lattices) are essential for good ventilation of rooms, and to get enough indoors lighting. Orientation of winds, and how to get crossed ventilation should be studied.

FINISHINGS

Improvable practices

(-) **Earthen wall plaster** represents the vulnerable aspect of the house, necessitating frequent maintenance. The wall plaster may deteriorate due to inappropriate design or leaking issues, requiring the re-plastering of damaged sections.

(-) One of the practices people are doing that need to be questioned is the application of **cement on mud walls** to avoid plaster from being washed away. This kind of "protection" of earthen material is actually weakening it, as it avoids earth from drying after the rain, and stopping the required migration of moisture, which makes the wall lose its strenght.

(-) **Bitumen stabilisation** of earth material hardens it, what helps the apparition of cracks and avoids easy maintenance.

(-) **Asphalt and kerosene** used to stabilise earthen plasters may cause sickness to builders and inhabitants.

Cement plaster over a bani-bani wall, Hong, Adamawa State - © UniMaid

Earth walls requiring re-plastering maintenance, which is more difficult if the plaster is stabilised, Opalo village, Lamurde, Adamawa State - © UniMaid

Recommendations

(+) **Plasters** on earthen walls should be **perspiring**.

(+) Local practices such as **fingerprint earth plaster** slow down the speed of rainwater running down the wall, preventing soil from being washed away.

(+) To prevent damage to the earth plaster on the walls, the wall should not be placed against the direction of the rain, as this weakens the wall. Provide exposed walls with a **wind barrier** where the wind blows (e.g., by planting trees).

Earth plaster with fingerprints, Bulabulin Community, Dikwa, Borno State - © UniMaid

6. Typologies responding to the humanitarian crisis

6.1. INTRODUCTION

Most shelter solutions are developed by households and communities themselves (makeshift shelters, mutual support, hosting arrangements, support by relatives, etc.).

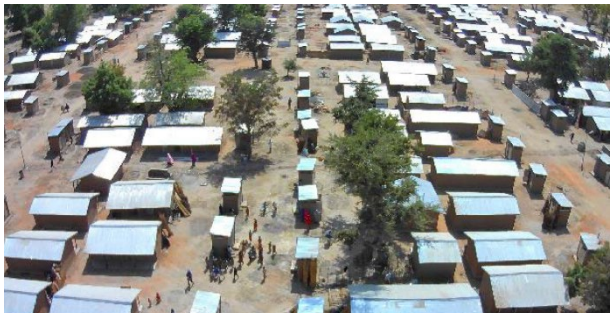
Apart from this majoritarian part of the response that follows self-recovery pathways, over the years several shelter support approaches have been developed by humanitarian actors in Northeast Nigeria.

There are different categories of shelter depending on the materials used, the durability over time or whether the solution is individual or collective. The focus of this chapter will be on emergency, transitional, and permanent shelter solutions. Some case studies will be provided for the different categories (not exhaustive). Apart from this classification of shelters in terms of construction materials and/or durability, other shelter solutions or arrangements exist: IDP households staying with host families, renting solutions, collective shelters.

6.2. DURABLE SOLUTIONS APPROACH

"IDPs find durable solutions when they no longer have needs related to their displacement and when they can exercise their rights without discrimination because of their displacement" (IASC definition) (IOM Nigeria, 2023).

A durable solution is characterized by an integrated approach, or settlement approach. Durable solutions seek to support communities minimising displacement, and **taking larger factors into account, such as the local economy and culture, security, sanitation, town planning, land tenure, human rights**, etc. These solutions have several objectives to promote recovery, stability, and self-reliance for affected populations:



A durable solution project through a Settlements Approach in Malkohi (Adamawa) – ©IOM

- Safety and security / Protection / Social cohesion.
- Access to basic services.
- Access to job creation and economic opportunities.
- Restoration of Housing, Land & Property (HLP).
- Access to documentation.
- Family reunification.
- Participation in public affairs.
- Access to effective remedies and justice.

Regarding shelter, the goal of durable solutions is to ensure that they have access to safe and secure housing over the long term.

Durable approaches can have both transitional or permanent shelter solutions, with a preference for the second ones. Shelters can be made of local materials or not.

The focus for this approach is on areas with a high stability index and returns and it needs working with authorities at Federal, State and LGA level.

Durable solutions are in line with the research of peace and development objectives of the Nexus approach.

↘ TO FIND OUT MORE

YAC & IOM NIGERIA (2023)
NIGERIA. HOME AFTER CRISIS. CONTEXT ANALYSIS AND CASE STUDIES
https://yac.directus.app/assets/628a6c87-05ae-4f10-a111-8807fac590c7.pdf?download

NRC (2023)
BUILDING PRACTICE & SHELTER DESIGN CATALOGUE –NIGERIA 2023
https://reliefweb.int/report/nigeria/building-practice-shelter-design-catalogue-nigeria-2023

IOM NIGERIA (2023)
BRIEFING TO CCCM, SHELTER & NFI SECTOR PARTNERS AND GOVERNMENT ON DURABLE SOLUTIONS
https://shorturl.at/4O6ll

6.3. EMERGENCY SHELTER SOLUTIONS

An emergency shelter is often a tent provided by organizations or governmental departments, in response to security issues, disasters or other crises. It is meant to be a short-term solution, providing affected populations with a safe and secure place to stay until more permanent housing solutions can be established or return is made possible. Different typologies of emergency shelters exist, for instance Emergency Shelter Kits (ESK), Bama, etc.

Emergency shelters present several challenges. They have a short lifespan of around six months, with the potential need for more frequent replacement of plastic sheeting depending on environmental conditions. Also, fire incidents due to the use of plastic sheets are a risk. Finally, privacy can be challenging.

A variation of emergency shelter are **communal shelters.** They are usually constructed to accommodate multiple families at reception centres and can accommodate 10-20 families depending on design. They consist of a Timber frame, CGI roofing, tarpaulin wall, tarpaulin partitioning, doors/entry for each unit. Communal shelters can fall under type of emergency shelter since their intended lifespan is for affected population to stay for a period of 24 to 72 hours.

Costs are just indicative as they tend to increase fast, and the exchange rate evolves quickly.

The exchange rate used is that of the beginning of June 2023 (**USD 1 = NGN 460**) as costs in NGN date from 2023.

As for September 2024, the NGN has dropped (USD 1 = NGN 1640,33).

↘ TO FIND OUT MORE

NRC. (2023). BUILDING PRACTICE & SHELTER DESIGN CATALOGUE –NIGERIA 2023
https://reliefweb.int/report/nigeria/building-practice-shelter-design-catalogue-nigeria-2023

YAC & IOM. (2023). NIGERIA. HOME AFTER CRISIS. CONTEXT ANALYSIS AND CASE STUDIES
https://yac.directus.app/assets/628a6c87-05ae-4f10-a111-8807fac590c7.pdf?download

CASE STUDY – BAMA MODEL

Implementation: Different partners.

Location: In and around Maiduguri, Borno State.

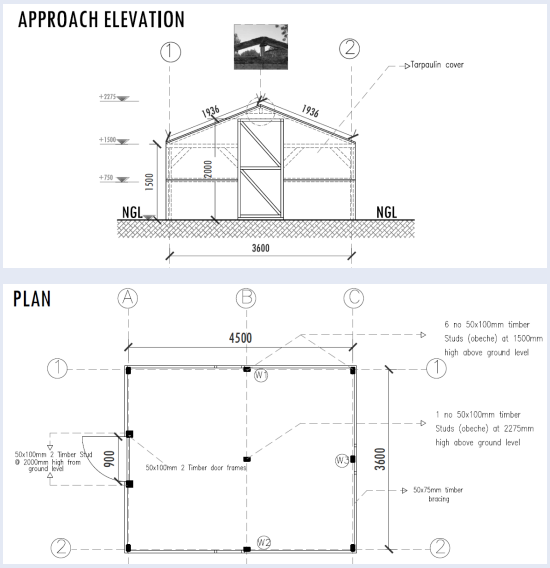
Cost: NGN 65,000 (2023) – USD 143

General information: This emergency shelter is used in and around Maiduguri (Borno), in areas with difficult access. It has important logistic cost, but people can use it for some time. The model is intended for settlements with limited space and a large flux in population numbers.

Materials: Structure Frame: Timber reinforcement / Foundation: poles 50 cm deep / Wall: Timber reinforcement and tarpaulin / Roof: plastic tarpaulins

Dimension: 4.5 x 3.6 m (16.2 m²)

Lifespan: 6 months – 1 year



Plans – © Shelter Sector

Emergency shelter (Bama model) – © IOM

6.4. TRANSITIONAL SHELTER SOLUTIONS

A transitional shelter is a simple partially re-locatable structure that offers appropriate shelter in which usually a family can live with dignity for as long as a permanent accommodation takes to build or restore. Compared to an emergency shelter, it provides a more durable and stable housing solution, as it is designed for people who are expected to remain beyond the emergency phase.

In Northeast Nigeria, these solutions usually consist of mainly two rooms, timber frame, CGI roofing, concrete block foundation, two doors and windows, and tarpaulin wall covering. Construction should be overseen throughout the project. The shelter has an intended lifespan of 2 - 3 years (with maintenance and periodic replacement of walls, which are tarpaulin) suitability for the heat and the rains. These shelters can be upgraded, reused, sold or recycled.

These shelters also present some challenges. For instance, there is a need of frequent replacement of plastic sheeting depending on environmental conditions. Also, there is a potential challenge in deforestation created by the use of timber for the structure. Flammable tarpaulins finally present high fire risk.

Improved emergency shelter (Dikwa-type) – © IOM

CASE STUDY – IMPROVED EMERGENCY SHELTER (DIKWA TYPE)

Implementation: IOM, NRC and other partners.

Location: In Dikwa, Borno State.

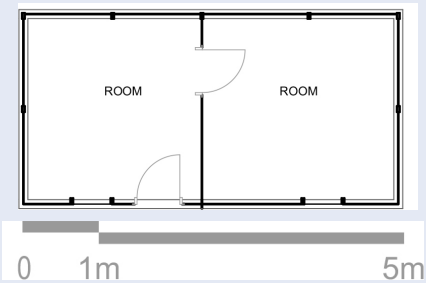
Cost: NGN 350,000 (2023) – USD 770

General information: It is a transitional hybrid solution combining characteristics of emergency shelters (use of tarpaulins in walls) and more permanent ones (cement block foundation, CGI sheets for roofing). The design focuses on enhancing ventilation (openings at different heights in walls), on reducing the exposure to sun radiation (roof overhangs) and on implementing flood mitigation measures (foundation). The idea of transition is that households can implement improvements in the wall materials (mudbricks or cement blocks) whenever they have the financial ability or time available to do so, as the foundation is already there.

Materials: Structure Frame: Timber reinforcement / Foundation: Poles 50 cm deep with two-layer block foundation / Wall: Timber reinforcement and tarpaulin / Roof: CGI sheets covered with local materials to reduce the temperature (false ceiling).

Dimension: 6 m x 3 m (18 m²) / 6 m x 4 m (24 m²)

Lifespan: 2 – 3 years.



Plan – © IOM

Improved emergency shelter (Dikwa-type) – © NRC

6.5. PERMANENT SHELTER SOLUTIONS

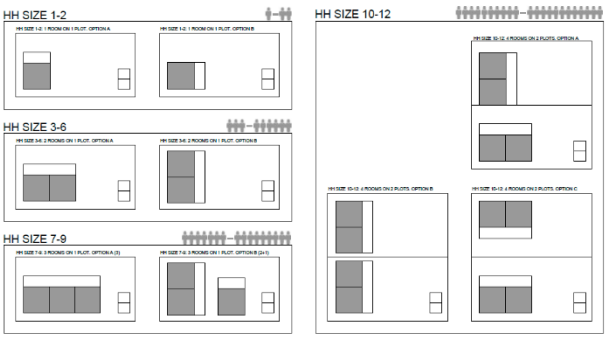
A permanent shelter is a dwelling, most often a house that aims to stay for the long-term. They are typically made from mudbricks, *bani-bani,* cement blocks, or wood, and CGI sheet roofs. Cultural and social needs of affected populations are generally considered.

These solutions range from simple, low-cost to more complex housing options. The approach depends on the needs, wills and resources available (both external and internal to the community / households).

The interviewed population relate permanent housing with the land/housing tenure, some stating that they will build permanent solutions (if they have the means) when they get their own land, relocating from where they live. Those who rent define their shelter solution as temporary, because the tenant can send out the occupant at any time. Meanwhile, owners define their house as permanent.

Other parameter the interviewed community often explain to consider a shelter as permanent is if it strong enough to stand for long time so that they can live in it through their lives, and it can be inherited by their children. They attribute this strength either to the materials the walls are built with (sandcrete blocks, concrete, *bani-bani*, or mudbricks), the roofs (CGI sheets), or even if the construction is reinforced (for instance with walls of at least 1 foot width). On the other hand, many assume that a permanent house can also be affected by floods, but without getting completely damaged.

Beyond the central housing module for the typical family typology, shelter programs focus both on the design of central housing modules and on the possible evolutions of the typical family typology over time, providing options for plot and shelter allocation based on HH size.



Examples of layout options for Malkohi "New City" Settlement – © IOM

CASE STUDY – MALKOHI "NEW CITY" SETTLEMENT

Implementation: IOM

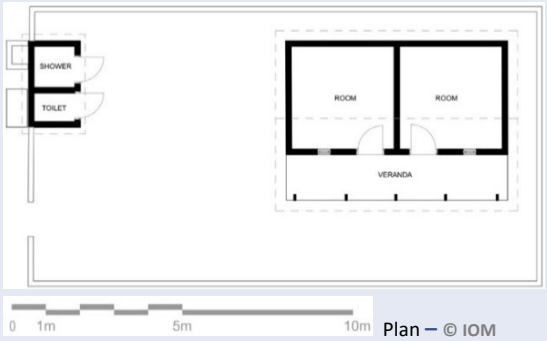
Location: In Malkohi, Yola South LGA, Adamawa State

Cost: NGN 488,000 (2021) – USD 1,062 (average considering the 2.4 rooms on average). NGN 407,000 (USD 885) for the two-room option.

General information: Families can receive 1, 2 or 3 plots. Cooking area and fencing are self-built by inhabitants.

Materials: Foundation: Sandcrete blocks / Wall: Adobes (local mudbricks) / Roof: Timber and corrugated iron sheets (CGI), gable roof / Flooring: Rammed earth with cement-sand finishing.

Dimension: One-room unit: 21.6 m² (plus 10.8 m² of veranda). Two-room unit: 18 m² (plus 9 m² of veranda)



Plan – © IOM

Malkohi semi-detached durable shelter – © IOM

CASE STUDY –BANI-BANI SELF-BUILT MUD HOUSE

Implementation: IOM

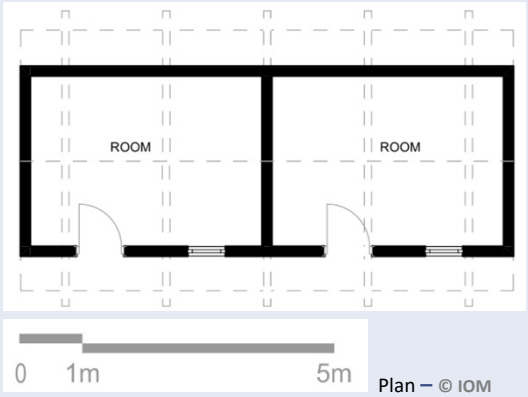
Location: In Gwoza LGA, Borno State

Cost: NGN 250,000 (2023) – USD 550

General information: These units are totally self-built.

Materials: Foundation: One layer of sandcrete blocks / Wall: Mud layers (*bani-bani*) / Roof: Timber and Corrugated iron sheets (CGI), roofing nails, gable roof.

Dimension: Covered 20 m^2. No veranda.



Plan – © IOM

Bani-bani self-built mud house – © IOM

CASE STUDY – COMPRESSED STABILIZED DURABLE SHELTER

Implementation: Mercy Corps

Location: In Jere, Borno State

Cost: NGN 550,000 (2023) – USD 1,200

General information: 1 shelter per site with option to increase additional room(s) if the HH size exceeds 7. Cooking area and fencing are self-built by beneficiary/participant.

Materials: Foundation: Cement, sharp sand, sandcrete blocks, Bama gravel, water / Wall: Compressed and stabilized earth blocks (CEBS) / Roof: Corrugated iron sheets (CGI), roofing nails, mono-pitch roof, and well-seasoned Obeche hardwood timbers of different sizes for rafters and purlins, common wire nails for connecting roof frames, metal straps / Flooring: Backfilling sand with compacted earth.

Dimension: Covered 8.6 m x 5 m (43 m^2). Veranda of 9 m^2

Plan – © IOM

Compressed stabilized durable shelter – © Mercy Corps

7. Conclusions: key points

SITE SELECTION

- **Security of tenure** is a key aspect for long-term dignified durable solutions in IDP sites, as they need to invest in order to improve their living conditions.
- Planning for an **IDP site should include connections** between the site and the existing town or city, as the IDP site may become a permanent part of it.
- When choosing a construction site, it is recommended to take into account data from historical studies, but also from **local knowledge** on the specific risks affecting the site (e.g., steep slopes or areas prone to flooding).
- **Planting trees** where new settlements are established in areas with little vegetation, including their care, would help in several aspects such as: stabilizing soils against erosion, improving bioclimatic comfort and achieving people's cultural habits of spending time in open-air and shaded spaces.
- Access to **income-generating activities** is vital for IDP sites and for local inhabitants.
- There is a need of for nearby **facilities** (particularly for health and education), and of energy for cooking.
- Security to **access to farm** lands is required.

SITE PLANNING AND ACCESS TO WATER, SANITATION AND OTHER BASIC SERVICES

- Access to **water** is mandatory. Concerning drinking water, it is recommended to develop plans on how to improve water quality to avoid diseases.
- Sin order to avoid stagnant water and sanitation issues, it is recommended to create **drainage** systems (particularly in flat localities with poor natural drainage systems) and maintained regularly, especially before rain periods.
- **Waste** and refuses should not be discarded from latrines into the drainage system.
- Especially in urban areas, the tendency is towards overcrowding, so larger **plot sizes** would help decongest living spaces and therefore facilitate healthier conditions.
- Meanwhile, rural areas also require **space within the enclosure** to be able to include other economic activities.

CONSIDERATION OF CULTURAL ASPECTS RELATED TO HOUSING

- Traditional architecture considers cultural factors, with compounds arrangement of **dwelling spaces based on clan, marital status and needs** (Bikam & Chakwizira, 2020). More specifically, separation between **public and private spaces** is a cultural critical aspect.
- It is advisable to find **locally manageable solutions** (and limit innovations) so that they can be adopted for sustainable development and greater local resilience. Although sometimes challenging, it is recommended to **incorporate local cultural preferences** to promote local capacity development and ensure that **age, gender and diversity aspects** are considered in shelter designs, and more specifically in sanitation facilities.
- **Internal partitions** are a priority for most homes, particularly when it comes to sharing accommodation between different family units, as in the case of an extended family.
- It is recommended to respect cultural standards, ensuring that the building is located and built based on the cultural methods of **layout planification.**

TAKE THE ENVIRONMENT INTO ACCOUNT

- ➔ Housing responses increase the **resource extraction** for construction materials. Pressure on timber use creates risks of environmental degradation and increases the risk of erosion, deforestation, landslides, and flooding. This can deprive communities of livelihoods and put people, infrastructure, and ecosystems at increased risk of disasters (WWF, 2016).
- ➔ The shelter sector should consider **reforestation** in appropriate regions, as a contribution to housing solutions that use wood responsibly.
- ➔ The **biodiversity** of ecosystems can be enhanced by the presence of vegetation and animals, which help fertilize the soil without destroying its life.
- ➔ Local building materials, such as earth and straw, have a **low carbon footprint** and also can be decomposed and reintegrated into the environment.
- ➔ **Harvesting rainwater** reduces the need to fetch it, but also helps reduce pressure on water sources.
- ➔ Several features can be considered to improve the **bioclimatic comfort and health** of inhabitants:

  • The **thermal inertia** capacity of materials such as earth or stone, help reduce the variation of the temperature in the interior of houses,

  • Earth materials help **regulate humidity**, which is particularly important for overcrowded spaces (e.g., earth plastering can avoid moisture as it can store a portion of the humidity coming from people's breath). When humidity is controlled, it also helps regulate extremes of temperature between day and night (keeping interiors cool during the hot daytime and warm during the chilly nights),

  • **Orientation** of houses can help **block solar radiation** (East and West orientations should be avoided to reduce heat gains), and can **facilitate ventilation**, with the position of the openings taking into account the prevailing winds (blowing from the North-East from the Sahara Desert), and that openings in the upper part of the walls can help evacuate excess of heat (as hot air is lighter than cold air),

  • **Shaded spaces** around houses filter sunlight and therefore help minimize heat gains, particularly to the East and West (e.g., proximity of other constructions, overhangs, verandas, courtyards with vegetation, plantation of trees at the West side of houses…),

  • **Small windows** in the Savanah region prevent solar radiation and warm air from entering the interior, but also reduce interior light, so it is recommended to add window **shutters**, which also minimize heat gains while protecting against sandstorms or vector-borne diseases and increasing security, which is a factor that a lot of interviewed people require,

  • **Height of constructions** are to be studied, as they can help reduce hot temperature in the lower part of the house's volume, while keeping the hot air high,

  • The addition of **ceilings** can increase inside comfort, as they reduce rain noise on metal sheets and creates a tampon space between the roof and the indoors air,

  • **Pale colour** building materials, or whitewashing of walls, increases reflexion of sunlight, and therefore heat.

INTERIOR AND EXTERIOR SPACES AND EVOLVING HOUSES

- Some household **facilities are usually shared,** such as sitting rooms, kitchens, toilets and compound access (zaure), which are very much used and appreciated for social interaction.
- Most of the living activities take place under **thatch covered spaces** such as the parlour for dinning, for family unity and peace.
- **Compounds evolve** as families increase in number of people.

CHOICE OF CONSTRUCTION TECHNIQUES

- **Earth and stone** are materials that can be recycled for life and can be obtained in almost all areas of the country (one, the other, or both) in sufficient quantity and quality to build durable housing. For large scale projects, it is necessary to study how to properly manage the quarries for the extraction of earth, sand, or stone, in order to avoid damaging the environment.
- To improve the life span of **earthen constructions**, water must be kept away from the wall bases. This can be done in two main ways: by building a foundation of non-water sensitive materials, and add, if possible, a barrier against rising water; or by building houses on earthen platforms with slopes that help to drain rainwater away from the base of the walls. The sides of buildings exposed to driving rain should be protected with plasters compatible with the walls (avoid cement).
- Organic materials (wood for framing and thatch) have traditionally been used in vernacular constructions and provide good comfort inside houses. The humanitarian sector could pilot the use of these techniques in shelter models.
- **Plastic sheets** (for walls and roofs) have several problems related to durability, comfort and pollution.
- The use of **CGI sheets** is very much spread because its advantages: it is a light material (consequently, the structure can be lighter), and sheets can eventually be assembled and disassembled for repair. But it causes discomfort: CGI sheets reflect some of the sun's radiation, but iron rusts and becomes darker and less reflective. New or not, they heat up and radiate heat into the house. To improve comfort, it would be advisable to provide ventilation systems, as well as ceilings.
- **Plywood** ceilings are expensive and they degrade easily when they get wet.

SUPPORT TO LOCAL ECONOMY AND TRAINING TO LOCAL WORKERS

- Lack of resources and widespread poverty are the main obstacles to building improvements. Therefore, priority should be given to implementing solutions that promote the **circular economy**, such as locally sourced materials, not only because they are more accessible, but also because they can help create jobs and enhance economy of the entire population.
- The informal sector is charged of building the great majority of the houses. Most of craftspeople have the skills and knowledge required to build properly, but there are some features that can be improved or adapted to modern conditions through the **updating the skills of local craftspeople**, which leads to higher quality buildings, but also creates the basis for a better overall value of the built environment in the long term.
- Workers could be trained for a **better understanding of local materials**. Learning the technical and behavioral principles of each material would help them adapt their knowledge of traditional materials and use them more efficiently.

CONSIDERING LOCAL STRENGTHS FOR RESILIENT PROJECTS

➔ As discussed in Chapter 5, "Analysis of Local Building Cultures", the **strengths of local building cultures** represent an enormous potential. At each scale, the analysis of the cycles of production, use, regular maintenance or partial repairs, abandonment, and eventual recycling can produce enriching knowledge for the reverse engineering of local building cultures. In terms of methodology, participatory approaches are suggested to distinguish:

- what is very valuable and should absolutely be kept,
- what is very useful but has become difficult to apply, which implies studying the reasons for it,
- what needs to be adapted to better meet today's requirements,
- conversely, what has been modified from traditional models with negative impacts,
- what is no longer relevant or has become negative in the current context and must absolutely be "replaced".

➔ Solidarity in construction is largely spread, with community members actively supporting each other, especially when houses are affected after a crisis. All family members, friends and the community in general, support with some construction activities (fetching water, cooking, cleaning the land, etc.). The humanitarian sector can promote approaches that foster the use of these systems of **mutual solidarity** that contribute to the weaving of strong social ties and favor resilience.

8. Additional resources and bibliography

↘ FOR MORE INFORMATION

ASSESSING LOCAL BUILDING CULTURES, A PRACTICAL GUIDE FOR COMMUNITY-BASED ASSESSMENT (CAÏMI, 2015)
https://hal.archives-ouvertes.fr/hal-01493386/

SELF-ASSESSMENT SUSTAINABILITY TOOL FOCUSED ON SHELTER AND SETTLEMENT RECONSTRUCTION IN THE AFTERMATH OF NATURAL DISASTERS: QSAND TOOL
http://www.qsand.org/

8.1. KEY CONCEPTS

Adaptive Capacity: The ability of systems, institutions, humans and other organisms to adjust to potential damage, take advantage of opportunities, or respond to consequences[3].

Disaster: Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic or environmental effects that require an emergency response(s) to satisfy critical human needs and possibly external support for recovery[3].

Exposure: The presence of people, livelihoods, species or ecosystems, environmental functions, services, resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected[3].

Globalized habitat: Housing influenced by "global trends" promoted in the media, but also by industrial companies and the formal education system. Cement, steel and CI Sheets gradually replace traditional materials, but such changes don't always result in real improvements. Difficulties in affording respect for norms and standards lead to compromising space quality, thermal comfort, and even structural safety.

Hazard: The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources[3].

Local building cultures: A building culture is the intangible dimension of what is produced by humans to live, work, thrive, etc. It includes assets related to each phase of the building life cycle: design, construction, use(s), maintenance, replacement, extension, adaptation, etc., that are linked to social, economic, environmental and cultural aspects. The genesis and evolution of building cultures are closely linked to their environment and the specific history of each territory. This is why they are so diverse worldwide and why several building cultures can co-exist within a single territory.

Makeshift habitat: This covers different realities depending on the factors that generate it: economic difficulties, climate change, disasters, or conflicts. It characterises houses or shelters built by low-income families or those who, without a land property title, prefer to limit their investment by choosing light structures that are easy to dismantle or repair.

Resilience: The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation[3].

Risk: The potential for consequences where something of value is at stake and the outcome is uncertain. Risk is often used to refer to the potential for adverse consequences on lives, livelihoods, health, ecosystems and species, economic, social and cultural assets, services (including environmental services) and infrastructure.

Vernacular habitat: It is characterised by using local resources to respond to people's needs, way of life and local climate. It results from reproductions, improvements and ongoing adjustments or adaptations over time and often includes external inputs and imported solutions, though rather parsimoniously. Such constructions often rely on strong links between the inhabitants, their families and neighbours, and their persistence facilitates housing accessibility, pride and feelings of belonging within the community.

Vulnerability: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt[3].

[3] (IPCC, 2014), AR5 Synthesis Report: Climate Change 2014

8.2. GLOSSARY OF TERMS IN LOCAL LANGUAGES

Adashe *(Hausa)*: Informal saving/loan association.

Anguwani *(Hausa)*: Rural Hausa community.

Ardo *(Fulani)*: Ward head.

Azara *(Hausa)*: Palm log (*Borassus Aethiopum*).

Bika *(Hausa)*: Azaras covering the crown of two opposite walls.

Balamji *(Hausa)*: Fibres used to make rope.

Bindiwa *(Burra)*: Small bins for the storage of seasoning crops.

Bongo *(Hausa)*: Round huts covered with sticks and thatch. It also means a wall of a house.

Bulama *(Hausa/Kanuri)*: Ward heads in Borno.

Cham *(Burra)*: The husband's hut of a Burra compound.

Cikin gida *(Hausa)*: Hausa Women quarters.

Dakuna *(Hausa)*: Rooms.

Danna kwano *(Hausa)*: Stones or woods ballast on top of the building to prevent it from roof uplifting.

Dha *(Higgi)*: A forecourt at the entrance of a Higgi compound.

Filin gida *(Hausa)*: Hausa word for a compound.

Gangawal *(Hausa)*: Inner thick roof ring, made from stems.

Gida *(Hausa)*: Hausa compound.

Glinka *(Higgi)*: Forked sticks supporting a thatch cover.

Gofa *(Hausa/Kanuri)*: Wood sticks.

Gona *(Hausa)*: Farmland.

Hakimi *(Hausa)*: District head.

Hamma bachama *(Bachama)*: Emir.

Jauro *(Fulani)*: Ward heads in Adamawa.

Jega *(Hausa, Fulani, Kanuri)*: Tricycle cart.

Kafar guga *(Hausa)*: Corbels usually made of four rods, cantilevered and set obliquely in the wall.

Kambale *(Higgi)*: A room in the male section on the upper levels of a Higgi compound.

Kauaye *(Hausa)*: Hausa village.

Keke napep *(Hausa, Fulani, Kanuri)*: Tricycle.

Kindla: A grass or cornstalk fence of a Burra compound.

Kpana rigadi (*Higgi)*: District head.

Langa-langa *(Hausa, Fulani, Kanuri, Shuwa)*: Anchorage of roof members to the wall plates or the head course.

Lawan *(Kanuri)*: Town or village head.

Yabe *(Hausa):* Prepared soil with a plastic texture to make earth mortar plastering.

Madabi *(Hausa)*: A thick Hausa tool made with a slightly curved branch, used to beat and compress earth floors.

Mai *(Kanuri)*: Emir.

Mai-Anguwa *(Hausa)*: Ward head.

Mai-Jumilla *(Hausa/Fulani)*: Town or village head.

Majalisa *(Hausa)*: A social space in front of the house, very much used by men for interaction.

Makuba *(Hausa)*: Hausa waterproof plaster used to harden floors.

Mbawawala *(Burra)*: A sleeping hut of each wife of a Burra compound.

Murdaka *(Higgi)*: Rings of grass bound round with strips of bark.

Nzuwade *(Higgi/Burra)*: Town or village head.

Sangaya *(Hausa)*: Islamic and informal schools.

Sarkin *(Hausa)*: A king.

Shehu *(Kanuri)*: Senior customary leader.

Shoro *(Hausa)*: Huts with rectangular plan mud walls and flat mud covering.

Suudu *(Fulani)*: The hut of pastoralist Fulani people.

Tuka tuka *(Hausa)*: Community manual boreholes.

Tutu *(Burra)*: The reception hut of a Burra compound where the head of the compound and his guests are encountered first on entering the dwelling.

Wakili *(Hausa)*: The person who assumes responsibilities and stands in case of the Lawan's absence.

Wuro *(Fulani)*: For Fulani people, a *wuro* consists of at least one hut owned by a woman.

Yashin jauro *(Fulani)*: Weaved grasses forming mats.

Zana *(Hausa)*: Grasses used for thatching.

Zaure *(Hausa)*: Multi-functional entrance lobby.

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