

MODULE 2: UNIT 1

GEOGRAPHY, TOPOGRAPHY, AND CLIMATE OF NIGERIA

Introduction

The Federal Republic of Nigeria (otherwise called Nigeria), located on the West Coast of Africa is bounded by Niger to the north, Chad and Cameroun to the east, the Benin Republic to the West, and the Gulf of Guinea in the Atlantic Ocean to the South. Nigeria has a total area of 923, 768 km², with an estimated land area of 910, 770 km² and marine waters of up to 200 nautical miles, extending from 4^o to 14^o North and 2^o to 14^o East. Nigeria is also the fourteenth (14th) largest country on the African continent, and the most populous nation in Africa, with an estimated population of 182 million people as of 2016. Its name is derived from its major river, the Niger, and is also blessed with numerous other productive rivers. At its widest, Nigeria measures about 1,200 km across from east to west and about 1, 050 km from north to south.

With an annual urban growth rate of 4%, and more than 50% of the population living on less than \$5 a day, there is high dependence on the natural resources of the land, and continuous population growth has also increased the exploitation of vegetation, soil, and water (Chukwudi *et al.*, 2017).

Relief and main physical features of Nigeria

Relief in geographical terms is used to describe the differences in height from place to place on the land's surface and is greatly affected by the underlying geology of an area, while **topography** refers to the study of the features and forms of land surfaces. The natural relief in Nigeria generally consists of a gradual rise from coastal plains to the northern savanna regions, reaching an elevation of 600 – 700 m. Altitudes of more than 1,200 m are found in the Jos Plateau and parts of the eastern highlands along the Cameroun border. The coastal plain extends inland for approximately 10 km and rises to an elevation of 40 - 50 m above sea level. Its east and west sections are separated by the Niger Delta, which extends over an area of approximately 10,000 km² and is characterized by mangrove and freshwater swamps separated by numerous islands. The coastal plain region penetrates inland approximately 75 km in the west but extends further inland in the east. This region is gently undulating, with elevation increasing northward and a mean elevation of about 150 m above sea level.

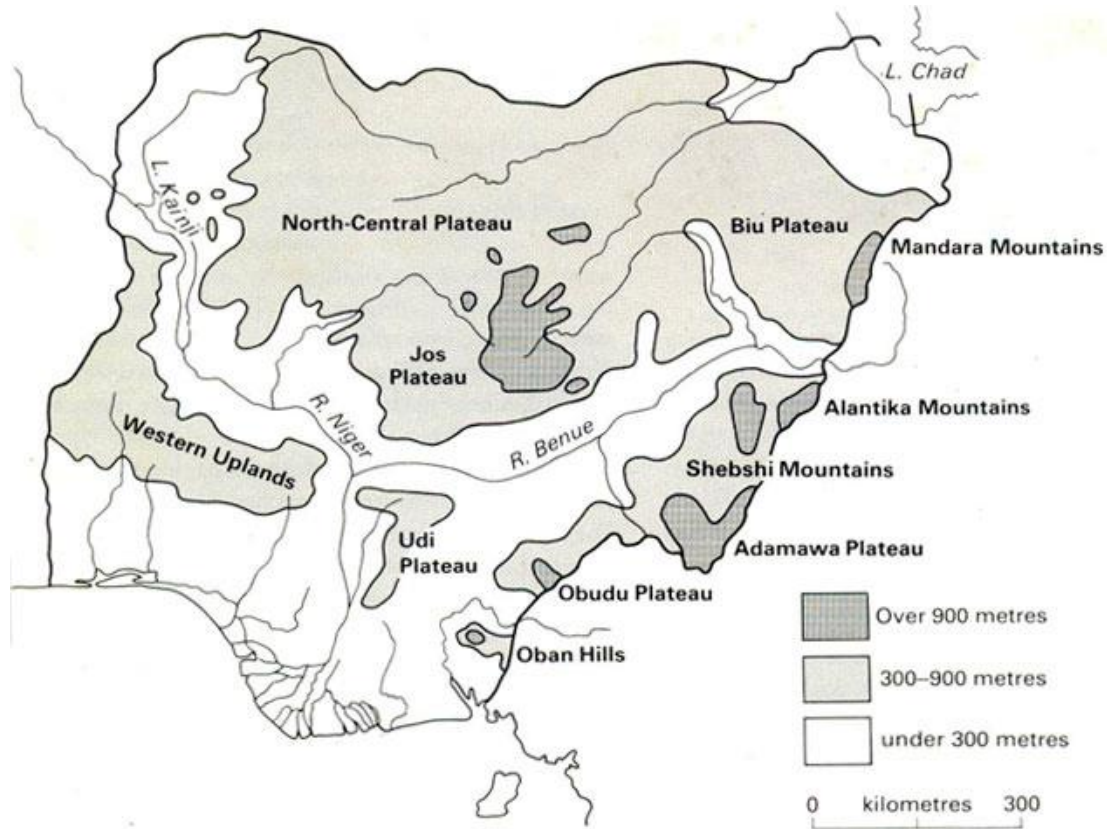


Fig. 1: Relief and main physical features of the Federal Republic of Nigeria

Much of Nigeria's surface consists of ancient crystalline rock of the African Shield. Subject to erosion and weathering for long periods, the landscape of most parts of the country is characterized by extensive level plains interrupted by occasional granite mountains. These features are a major landscape type in Nigeria and West Africa as a whole. Sedimentary strata overlie the major rocks in many areas. The sedimentary areas typically consist of flat-topped ridges, dissected plateaus, and a characteristic landscape of extensive plains with no major rocky outcrops. This landscape is generally found in the basins of the Rivers Niger and Benue, as well as the depressions of the Lake Chad and Sokoto River basins. In southeastern Nigeria, thick sedimentary beds from the Abakaliki lowlands uplift to the Anambra basin has been tilted and eroded. This process has resulted in a rugged scarp with east-facing cliffs in the Udi hills, north of Enugu, and the area around Nanka and Agulu. Volcanic rock occurs in only two areas in Nigeria – the Biu plateau in the northeast extending into some localized volcanic areas along the eastern border with Cameroun, and the Jos Plateau.

The broad river basins of the Niger and Benue Rivers extend to the northwest and northeast of the country. To the north of the Niger and Benue River basins are the broad, stepped plateau and granite mountains that characterize much of northern Nigeria. Such mountains also exist in the southwest, in the region between the western coastal plains and the upper Niger Basin. The western wedge between Abeokuta and Ibadan and the Niger Basin reaches an elevation of 600 m or more, whereas the extensive northern savanna region, includes extensive areas with elevations of more than 1,200 m at the center. Along the middle part of the eastern border of Nigeria, adjacent to the Cameroun highlands, the mountainous zone includes the country's highest point, *Chappal Waddi* or *Girginwal* (2,042 m), situated in the Adamawa mountains found within the Gashaka-Gumti National Park, Taraba State. Elevations fall to below 300 m in the Sokoto and Chad Basins, located in the far north-west and northeast regions, respectively.

In summary, Nigeria has **two** main relief regions: the **high plateaus** ranging from 300 m to more than 900 meters above sea level and the lowlands generally less than 300 m. The high plateau regions include the North Central Plateau, the Eastern and North Eastern highlands, and the Western Uplands. The lowlands comprise the Sokoto plains, the Chad Basin, the Niger-Benue trough, the interior coastal lowlands of Western Nigeria, the lowlands and scarp lands of South Eastern Nigeria, and the coastlands. Most of the country's rivers take their sources from four main hydrological basins: the North Central Plateau (Sokoto-Rima, Hadejia, Gongola, and Kaduna rivers, etc.), the Western uplands (Moshi, Awun, Ogun, Osun, Osse rivers, etc.), the Eastern Highlands (Donga, Katsina-Ala, etc.), and the Uri Plateau (Anambra, Imo and Cross rivers, etc.).

Soils of Nigeria

The soil in Nigeria can be broadly categorized into four groups: **sandy** soils in the Northern zone, **lateritic** soils in the interior zones, **forest** soils in the Southern belt, and **alluvial** soils. The Northern zone of sandy soils lies in the very northern parts of the country, particularly in the Sudan and Sahel zones. In some interior parts of the Northern zone, the soils are mainly fine, sandy loam soils, friable, relatively easy to cultivate, and good for crops, particularly groundnuts. In some parts of the extreme northern Guinea savanna and Southern Sudan savanna, there is a mixture of soils disintegrated from the local granite, and loess soils brought down by winds from

the North. The fertile loam soils found, for example, in the southern region of Kaduna State, are particularly good for crops such as cotton.

The interior zone of lateritic soils is generally found in the Guinea savanna, deeply corroded and grey or reddish in colour. The Guinea savanna also has rich lava soils that are productive and offers good prospects for agricultural expansion. The Southern belt of the forest soils coincides roughly with the high forest belt where the wet season is long, and vegetation plays the double role of supplying humus to the soil and protecting it from erosion. The soils here are used to produce cash crops such as cocoa, kola, palm produce, and rubber. The alluvial soils zone mostly consists of soils found on the flooded plains of rivers, or deltas, or along the coastal flats, which are formed from recent water deposits. The zone extends from the coast inland and runs along the valleys of the Niger and Benue, thus cutting across vegetation belts. The soils found along river courses are sandy in nature, and often sterile in terms of nutrient composition.

Climate Classification as Found in the Nigerian Environment

Nigeria is located within the lowland humid tropics, characterized by high temperatures of up to 32 °C in the southern coastal regions and up to 41°C in the north. Over the country, temperature varies from place to place. The most clearly marked differences are between the coastal areas and the interior; and between the high plateaux and the lowlands. The mean annual temperature figures on the plateaux vary between 21 and 27 °C. On the lowlands, the mean annual temperatures registered are just over 27 °C. The coastal fringes have lower means than the interior lowlands (Iloeje, 1981). The seasonal temperature range is low, as in other tropical countries, with an average value of 6 °C.

The variations in the Nigerian climate are mostly governed by the influence of three major atmospheric phenomena, namely: the maritime tropical (mT) air mass, the continental tropical (cT) air mass, and, the equatorial easterlies (Ojo, 1977). Rainfall generally begins in the south, spreads through the middle belt, and eventually reaches the northern part of Nigeria. In the Niger Delta and coastal areas, average precipitation ranges are above 3,500 mm; while rainfall in the rest of the Southern region ranges from 750 – 2,000 mm. The northern parts of the country have rainfall ranges of between 500 – 750 mm, while the drier arid north areas (Sahel region) may

experience values of less than 250 mm in drought years. It is also worth noting that the northernmost regions of the country had experienced a regularity of droughts for several years, particularly the drier arid regions of the north. The diversity of Nigeria's climate may be therefore summarized as arid North, tropical Central region, and equatorial South.

In general, Nigeria's climate is characterized by strong latitudinal zones, which become progressively drier as one moves north from the coast. **Rainfall** is the key climatic variable and there is a marked difference between wet and dry seasons in most areas. The rainfall onset commences from March to May in areas south of the Niger and Benue river valleys. Farther north, rains do not commence until June or July, with August being the peak of the rainy season. From the months of December running through to February, northeast trade winds called **harmattan**, sweep in from the desert biomes of North Africa into the country, bringing in moderate temperatures and lowering humidity across the country. In addition, these winds are often laden with dust particles from the Saharan region, giving rise to the characteristic harmattan haze, which reduces visibility.

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