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AGRICULTURAL DEVELOPMENT AND APPLICABLE TECHNOLOGY IN AFRICA



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Preface

Nigeria is the most populous black nation in the world with numerous ethnic groups scattered around the country. Agriculture, being the single sector that accommodated not less than 70% of the population until the advent of oil boom, was the mainstay of the economy in the 1950's and 1960's. Being asked to write a book to give a succinct description of farming and agriculture in the country was firstly thought to be a simple task, yet considering the vast landmass of the country, it was discovered to be an enormous task. Writing the book also gave us insight to appreciate the enormous potential yet to be fully tapped in Nigeria. The availability of various weather conditions, which



Gabriel Adesina

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provides good support for diverse agricultural practices in the six agro-ecological zones of Nigeria, is a great resource for the entire nation as a whole. Farms were visited and enquiries were made to crosscheck published research works on farming in Nigeria. It was a worthwhile exercise as our experiences of the past almost two decades as a scientist gave allusion to our findings from different sources of information we have explored. We appreciate greatly the cooperation of members of staff of Teaching and Research Farms, Ladoke Akintola University of Technology, Ogbomoso and Obafemi Awolowo, Ile Ife and many of our colleagues in these Universities and other Universities in Nigeria.

Moreover, we would like to state that this book will stimulate the people's interest in developing agriculture, knowing fully well that a nation without adequate food supply is a weak nation no matter how strong their numerical superiority is. And a weak nation is a beggar nation who will not be able to have a say among the comity of nations. Long Live Nigerian farmer!



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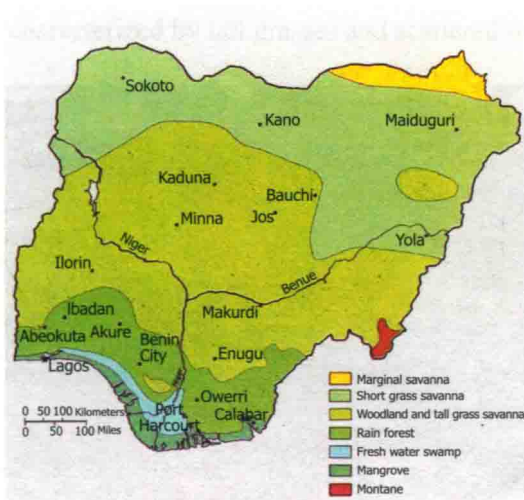
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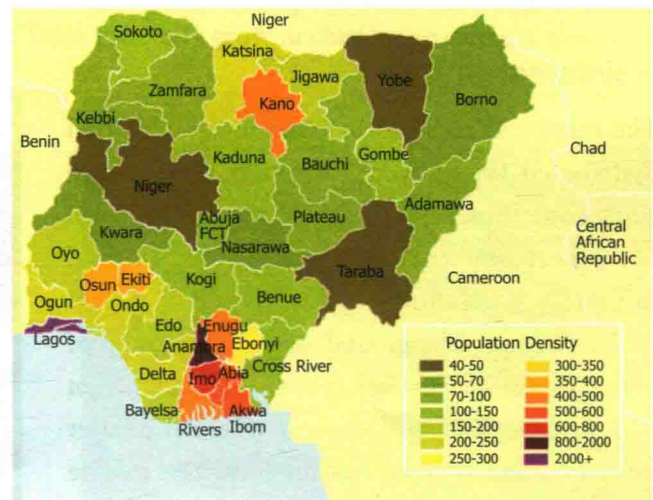
CHAPTER 1 BASIC INFORMATION ON NIGERIA

Population and Land Area

Nigeria is the most populous country in Africa accounting for over half of West Africa's population. Less than 25% of Nigerians are urban dwellers. According to Nigerian Population Commission, the country has a population of 160 million people with about 250 tribal groups. The land area is about 923,800 sq. km (356,700 sq. mi). The terrain ranges from southern coastal swamps to tropical forests, open woodlands, grasslands and semi-desert in the far north. The highest regions are the Jos Plateau (1,200 to 2,400 m above sea level) and the mountains along the border with Cameroon. The agricultural land is estimated to be about 785,000 sq. km and arable lands account for 40% of this area.



Vegetation belts in Nigeria



Population density of Nigeria

Vegetation and Agro-ecologies

Natural vegetation belts in Nigeria have evolved into different agro-ecosystems presenting distinct soil and weather conditions suitable for good growth and development of various plants and crops.

Mangrove Swamp

This is a swamp where fresh water from the Niger River meets salty water from the Atlantic Ocean. The typical vegetation is made up of mangrove plants of different species, hence this belt is sometimes known as the mangrove swamp. This vegetation is a tangled mass of stems and aerial roots (i.e. roots above ground). The roots are aerial because they tend to avoid the surrounding water. Coconut plantations and paddy rice farming predominate along the coast.

Fresh-Water Swamp

To the north of the mangrove swamp are the fresh-water swamps. Here one could find species like the raffia palm which cannot handle the salty waters close to the ocean. Besides, this area contains evergreen forest with tall trees. This kind of environmental condition well support the production of kola, coconut, raffia palm and paddy rice.

Rainforest

The rainforest receives high amounts of rainfall distributed fairly evenly throughout the year. This contributes to the growth of evergreen forests of several layers. Because of this, rainforest vegetation is more diverse than that of the swamps. The ground storey is made up of herbs, shrubs and grasses growing up to a height of 3 to 6 m. They are densest where the taller trees are cleared along forest edges. The middle storey composes the bulk of the forest visible in photographs. This storey is composed of trees



A cacao plantation in the Rainforest belt

range from 18 to 24 m tall. In this area, hundreds of different species mingle together, forming a dense canopy cover for the rainforest. The two most common altered landscapes are “oil palm bush” and “derived savannah”. The first occurs in a selective cutting forest where has been dominated by economic species like the oil palm. Derived savannah is created when deciduous species invade northern fringes of the rainforest belt, producing a “parkland savannah” similar to the Guinea savannah. This is the vegetation belt that shoulders the tree farming in Nigeria.

Permanent crops like cacao, citrus, kola, oil palm, rubber and plantain flourish in this area. In addition, food crops such as maize, yam, cassava, rice and tomato grow well in this agro-ecology.



A partly opened Rainforest vegetation

Guinea Savannah

This vegetation region covers roughly half of the area of Nigeria. This type of savannah is characterized by tall grasses and scattered trees. Trees generally grow in clusters, reaching a maximum



Maize plants in the Guinea Savannah



A typical Guinea Savannah area

height of 6 m. Elephant grasses fill in between the trees, growing to a height of approximately 3 m. Along rivers gallery forests often develop. These are thin strips of forest that are supported by the groundwater of rivers in the dry season. In general, the vegetation of the Guinea Savannah is well suited to the seasonally dry conditions and to persistent human-induced burning. The most common tree species are the isoberlina tree, the locust bean tree, the shea butter tree, and the oil bean tree. Guinea Savannah is the cereal vegetation belt of Nigeria because a large amount of maize, sorghum and rice are produced in this area. Meanwhile, other food crops like tomato, potato, melon, groundnut, yam, cassava and cocoyam are grown in this area as well.

Sudan Savannah

The Sudan Savannah is similar to the Guinea Savannah in broad terms, although it has less vegetative biomass overall. It generally has both shorter grasses and shorter trees. Grasses reach average heights of 1.5 to 2 m. Most trees are stunted, with the exception of the silk cotton tree, which grows as tall as 9 to 15 m. Other prominent tree species are the baobab (a squat tree with a disproportionate trunk), the acacia, and the Dum palm. Maize, millet, sorghum, cassava, tomato, pepper, onion and groundnut are cultivated in this area.

Sahel Savannah

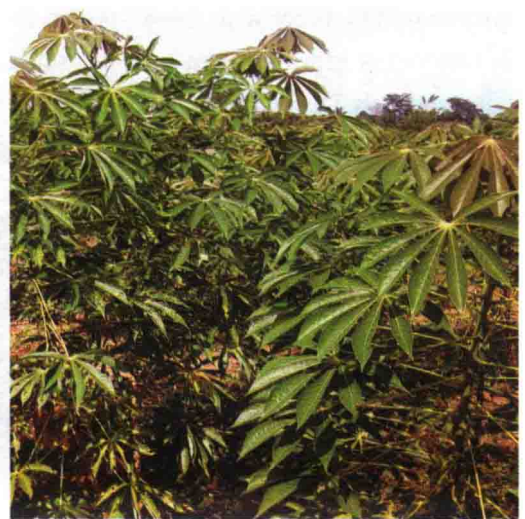
This is the driest and sparsest vegetation regions in Nigeria. In the Sahel Savannah, short clumps and patches of grasses are interspersed with sand dunes. The acacia is the main tree species in this area. Some date palms are also found in this region. Millet and sorghum are the dominant crops in this savannah.

Modified Montane

These are not true montane regions. Most species found in these regions are similar to those found in areas of comparable latitude. However, grasses are shorter and trees are fewer than areas at lower altitudes. The main montane regions are in the Jos Plateau, the Adamawa Plateau, and the Bauchi Highland. Cultivation apple, yam, tomato and strawberry are the dominating crop farming in these areas.

Climate and Seasons

Nigeria, like the rest of West Africa and other tropical lands, has only two seasons—the dry season and the rainy season. The dry season is accompanied by a dust laden air mass from the Sahara Desert, locally known as Harmattan, or by its official name, the Tropical Continental (CT) Air Mass. While the rainy season is heavily influenced by an air mass originating from the South Atlantic ocean, locally known as the south west wind, or by its official name, the Tropical Maritime (MT) Air Mass. These two major wind systems in Nigeria are known as the trade winds.



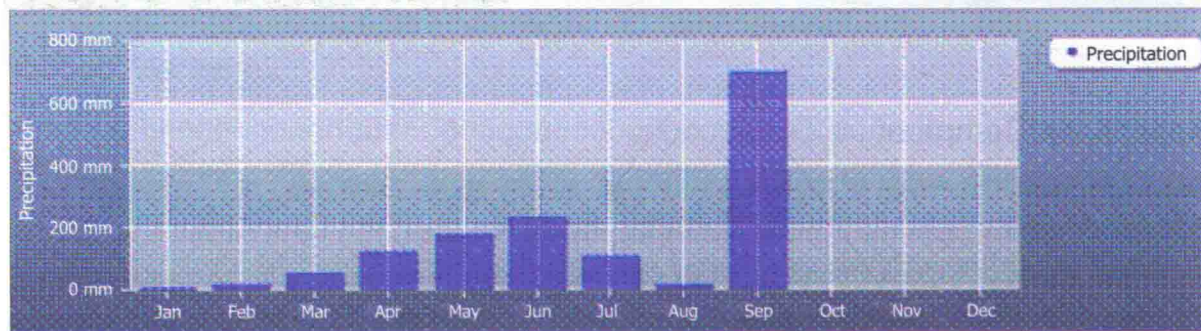
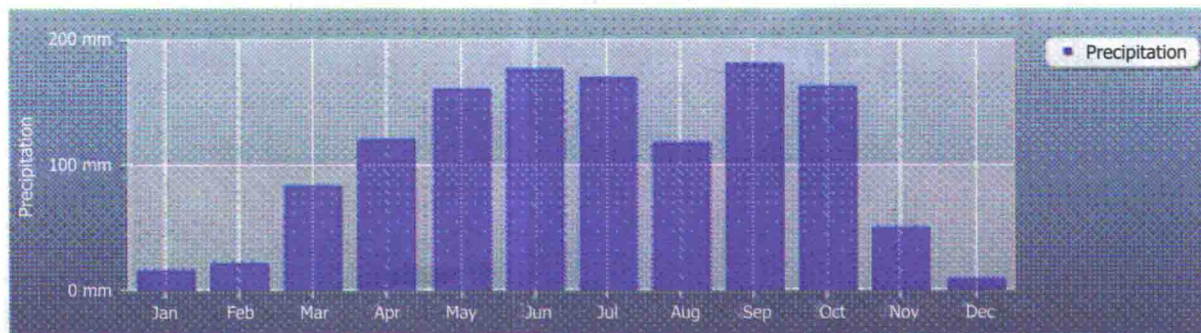
Banana and cassava crops recovering from the effect of dry season

Rainfall and Temperature Distribution

The annual rainfall received in Nigeria is very high, usually above 2,000 mm (78.7 in) rainfall totals reported for tropical rainforest climates worldwide. Over 4,000 mm (157.5 in) of rainfall is received in the coastal region of Nigeria around the Niger delta area. Bonny town, locating in the coastal region of the Niger delta area in southern Nigeria, receives well over 4,000 mm (157.5 in) of rainfall annually. The rest of the southeast receives between 2,000 mm (78.7 in) and 3,000 mm (118.1 in) of rainfall per

year. The tropical rainforest climate has a very narrow range of temperature range. The temperatures are almost constant throughout the year. For example, Warri town in the southern part of Nigeria, records a maximum of 28°C (82.4°F) in its hottest month while the lowest temperature is 26°C (78.8°F) in its coldest month. The temperature difference of Warri town is not more than 2°C (5°F).

The southern region of Nigeria experiences heavy and abundant rainfall in a bimodal forms, which is characterized by two high rainfall peaks, with a short dry season and a long dry season falling between and after each of the peaks. The first rainy season begins around March and lasts to the end of July with a rainy peak in June, and is followed by a short dry break in August which is known as the August Break lasting for two to three weeks. The second rain starts around early September and lasts to mid-October with a peak period in the end of September. The ending of the short rainy season in October is followed by a long dry season that ends in early March with the peak of dry conditions between early December and late February.



Rainfall distribution in Northern and Southern Nigeria (mm)