

Ajayi, D. D. (2006) The Landscape of Nigeria. In: L. Libros (ed), Nigeria: Cultural and Natural Heritage, UNESCO, pp. 83-116. –France (100.0%)

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The Landscape of Nigeria

Ajayi Dickson Dare

Nigeria, with its extensive territory, has greatly varied geographical patterns associated with specific landscape units. On the following pages, we will discuss the characteristics of the savanna, the two large fluvial valleys and the Niger Delta, from the point of view of their importance as part of the natural and cultural heritage of the country.

Nigerian Savanna

While in southern Nigeria forest is the predominant vegetation, northern Nigeria, with its lower rainfall and shorter rainy season, is 80% covered by vast expanses of savanna. The mean annual rainfall in the area ranges from 500 to 1,000 mm, most of it falling between May and September. The mean annual potential evapotranspiration ranges from 1,600 to 2,000 mm, with a mean annual temperature varying from 24° to 28°C.

Cattle rearing have been given the greatest prominence in Nigeria's farming industry and the savanna land forms an excellent natural habitat for a large number of grazing livestock such as cattle, goats, sheep, horses, donkeys and camels. About 90% of the country's cattle population, as well as about 70% of the Nigeria's population of sheep and goats that have adapted to the ecological constraints are concentrated on the Sudan Savanna. Despite being Nigeria's primary livestock territory, this type of savanna has limiting factors, such as the scarcer water resources as one moves north towards the Sahara and the existence of tsetse-fly infested forests to the south. The two other cattle-producing areas are the southern forest zone where the Muturu cattle are raised, which are tolerant to trypanosomiasis, a disease transmitted by the tsetse-fly, and the Guinea Savanna where the Ndama cattle are raised along with a cross between Muturu and Northern Zebu cattle. High incidence of livestock diseases and the high humidity level make this region inadequate for the cattle raising, except for indigenous breeds, like dwarf sheep and goats. Various exotic breeds of pigs are also found in different areas of Nigeria. All over the country, there is also a very large population of poultry, especially local breeds reared under free-range conditions.



Granite
formations
in Riyons,
Jos Plateau

Commercial production of poultry and pigs takes place in various states of the federation.

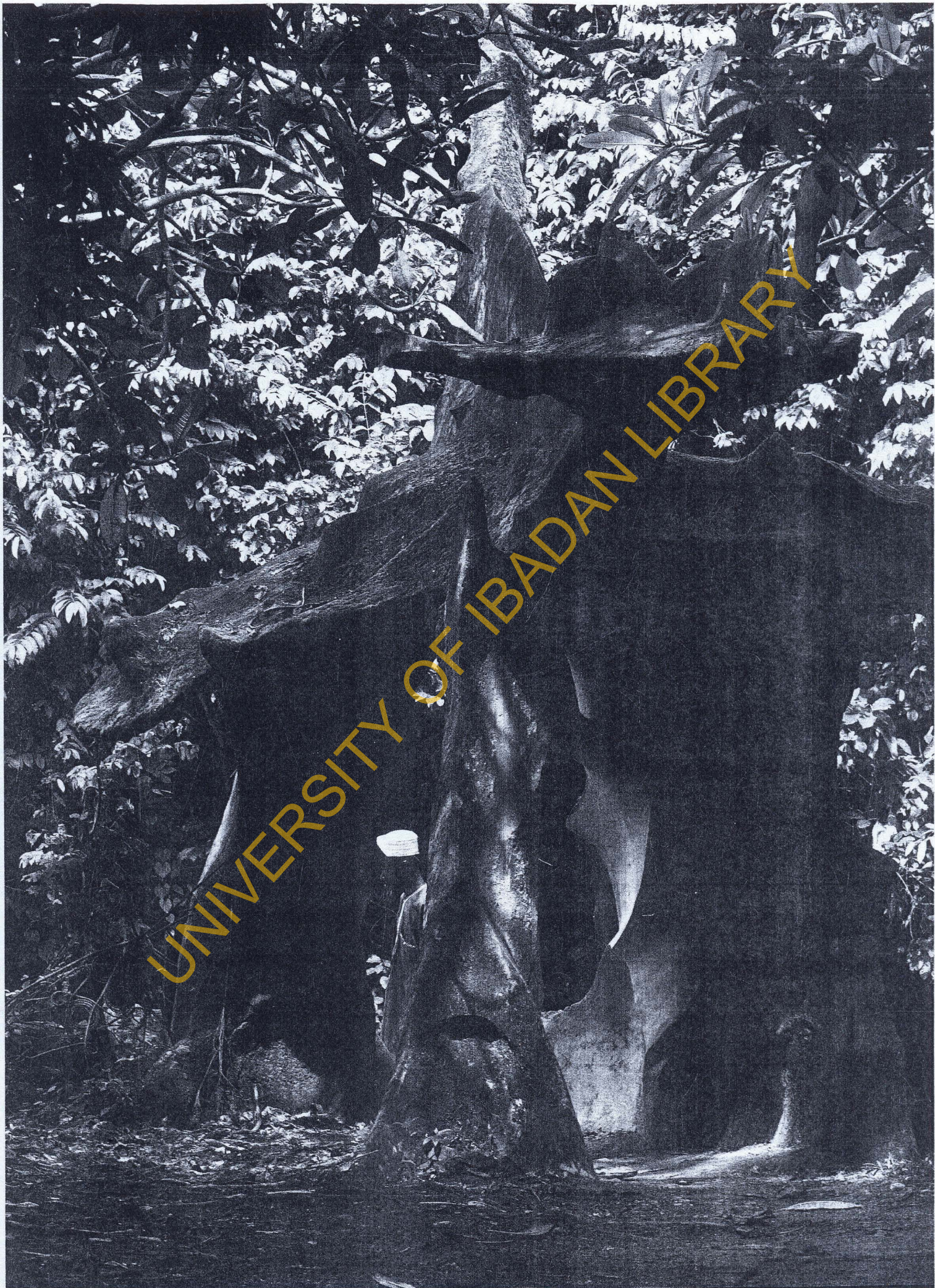
In the savanna and arid zones of the Sahel, a large variety of cereals are cultivated, such as sorghum, maize, rice, beans, soybean, Guinea corn as well as vegetables, including pepper, carrots and garden eggs among others.

The savanna vegetation resulted from the interaction of rainfall and soil conditions. These factors have been modified by human activities and man's land use pattern. Based on these criteria, Nigeria's savanna can be classified into six large zones: the derived Guinea Savanna with relict forest; the Southern Guinea Savanna zone; the Northern Guinea Savanna zone; the Jos plateau; the Sudan Savanna and the Sahel Savanna. However, the savanna zone is usually broadly classified into four types: the Guinea Savanna, the Sudan Savanna, the Sahel Savanna and the montane vegetation savanna.

Due to bush burning and overgrazing, cultivation and hunting activities over a long pe-

A woman
walking on
beach, Tā
Bay, Lagos







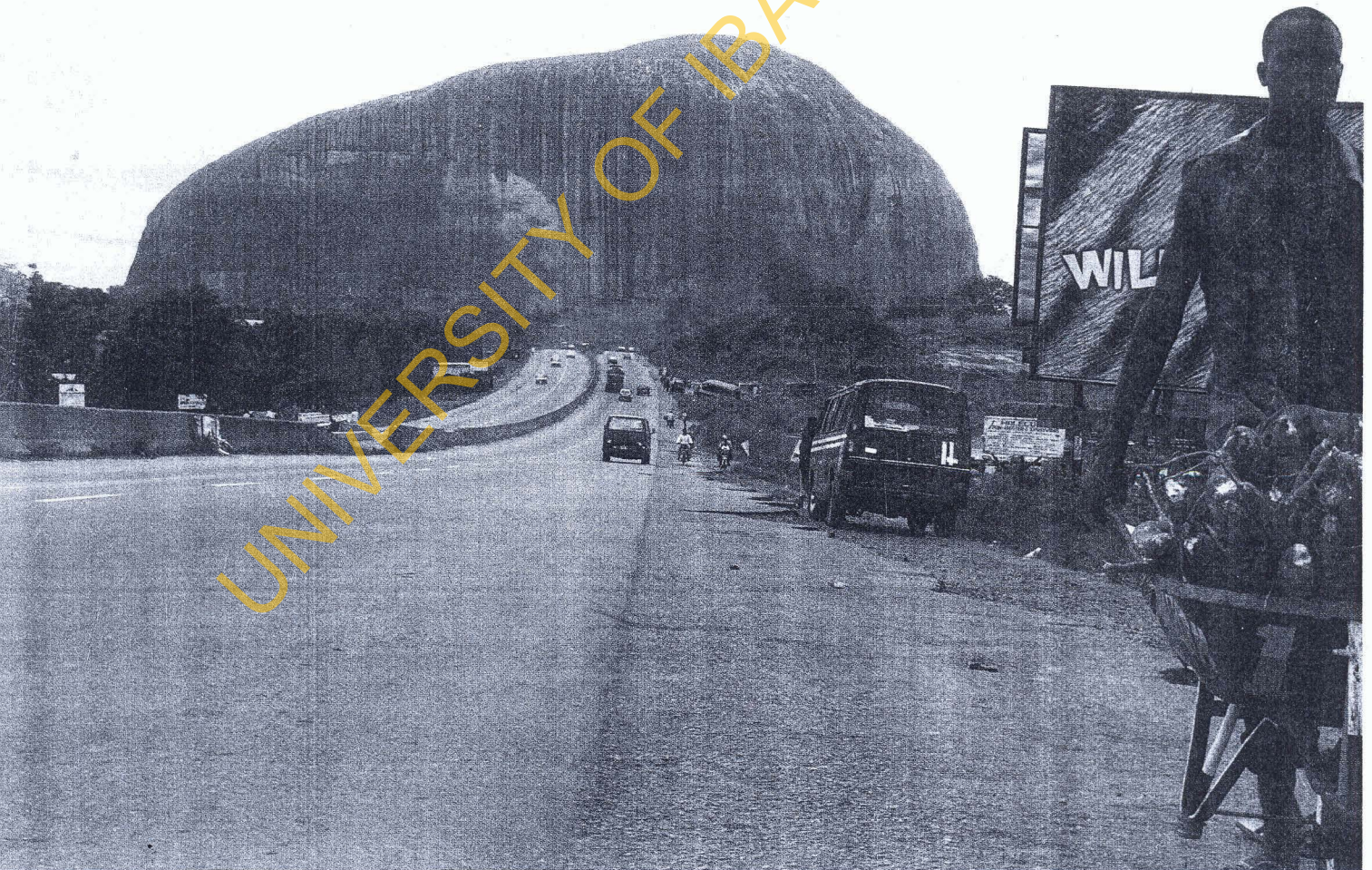
*Water
reserve,
Daura, Katsina
State*

riod of time in the zone, the high forest trees were destroyed and the forest that used to exist is now replaced with a mixture of grasses and scattered trees, called derived savanna. However, along the streams and in wet low-lying areas, where surface water accumulates, there are still some traces of forests. The derived savanna zone stretches across Nigeria from east to west, separating the rain forest to the south from the fire-swept Guinea Savanna to the north. In eastern Kabba, two types of tree species grow in the derived savanna, while in the west the characteristic derived savanna disclimax is obscured by a mosaic of intermediate and transitional types which may indicate the nature of the original vegetation linking forest and savanna.

- The derived savanna vegetation has been induced by the activities of farmers in clearing land, thereby creating a grassy ground layer and consequently firing it. The derived savanna is the broadest vegetation zone in the country and it occupies almost half of its territo-

ry. It is located in the middle of the country, has an annual rainfall of 100–150 cm and the wet season lasts for between 6–8 months. The false balsam copaiba, which is used for carving mortars and pestles for pounding yam, as well as the so called “poors’ mahogany”, are growing in the Southern Guinea Savanna, while in the northern part the doka species form the bulk of the scattered woodland, alongside the locust bean tree, shea butter tree and mangoes. Comparatively, there are fewer trees in the Northern Guinea Savanna than in the southern part and they are not as tall. Most of the tall grasses found in the derived Guinea Savanna, are also found in the Guinea Savanna, however, they are less luxuriant. The appearance of this zone differs from season to season. During the rainy season, it is very green and covered with tall grasses that grow and reach maturity rapidly and thus become fibrous and tough. In the dry season the grasses tend to die and disappear and one can see over a range of many kilometres. This clearing is due to several periodical bush-burning that

Zuma rock,
Abuja, federal
capital of
Nigeria

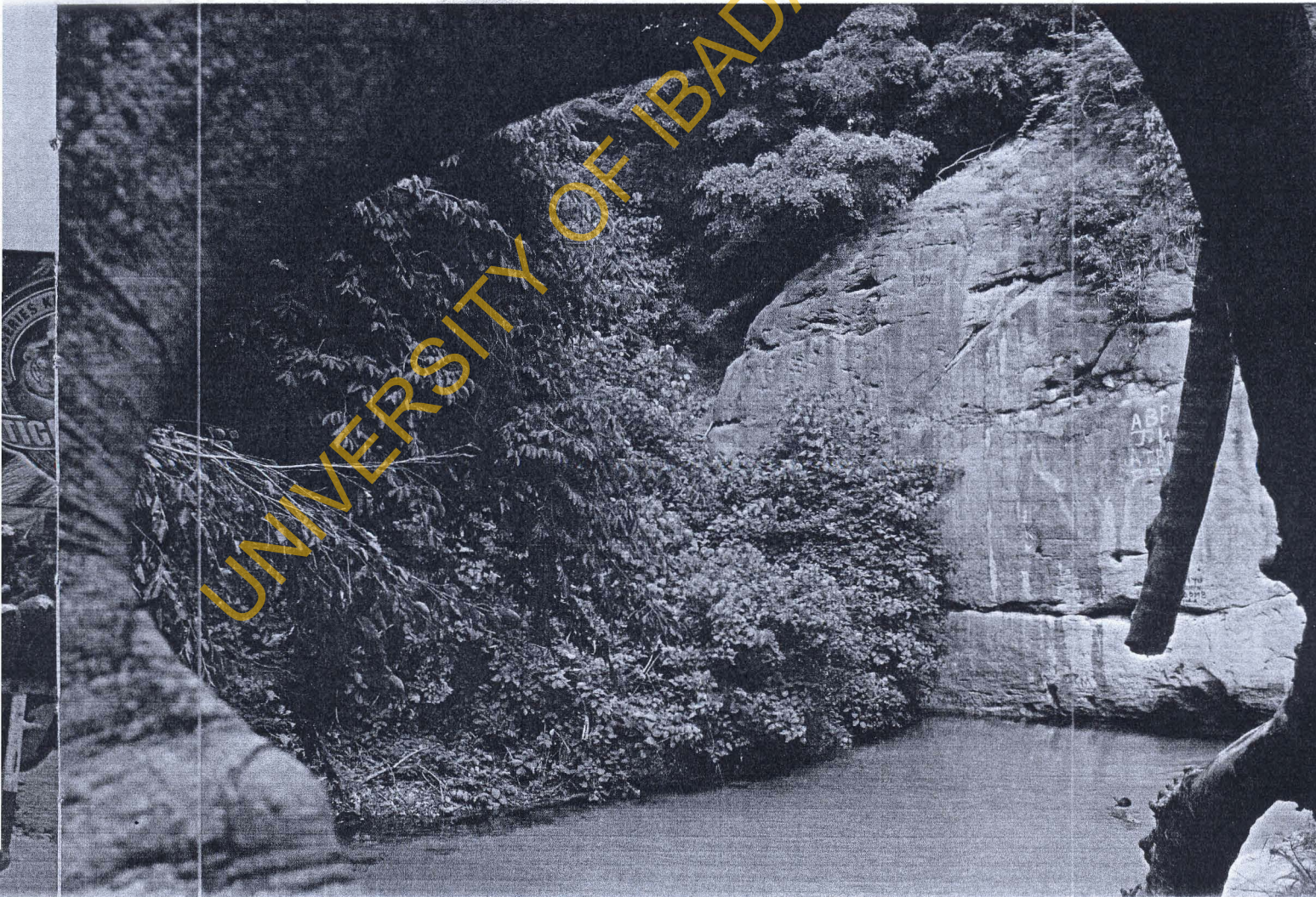


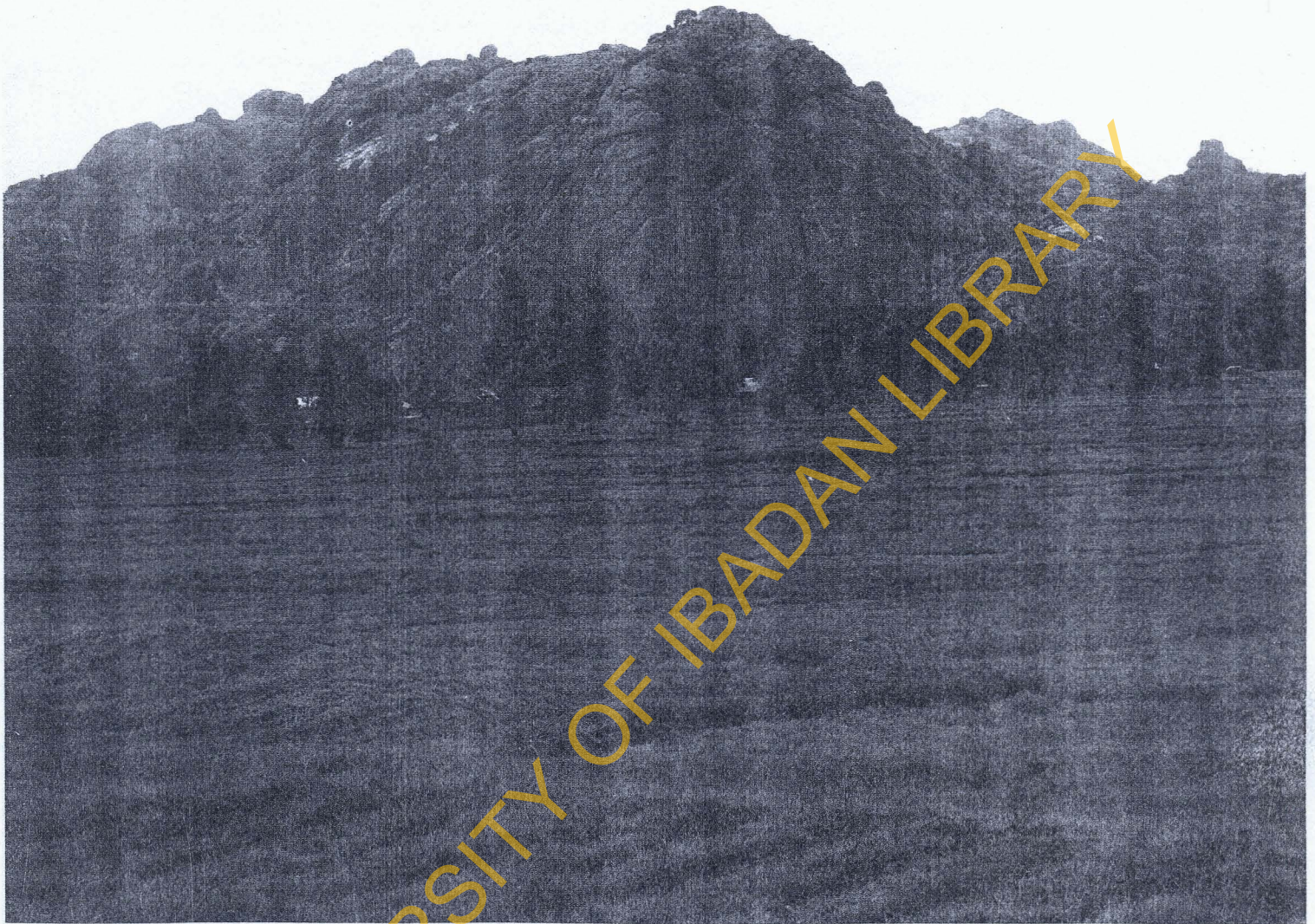
occur during the dry season between November and April, carried out to either assist in farm clearance or hunting.

The Sudan Savanna is chiefly associated with groundnuts, sorghum and millet cultivation. Grasses found in this zone are not generally as tall, coarse or thick as those found in the Guinea Savanna. The continuous grass vegetation is short and feathery and is interspersed with farms and thick bush trees such as the shea butter tree and the acacia, which are well-represented and prolific in the Sudan Savanna zone. Also found in the zone are the locust bean tree, the tamarind tree and the mango tree. A large portion of this zone falls within the tsetse-fly free belt of West Africa and is excellent for the rearing and breeding of ruminant livestock: cattle, goats, sheep, donkeys, horses and camels. The nomadic Fulani roam about this zone in search of fodder and water for their livestock.

The Sahel Savanna occupies about 18.130 km² of the extreme northeast corner of Nige-

*Water
reserve,
Yankari
National Park*





*Cultivated
land in the
Jos Plateau,
central Nigeria*

ria and is the last vegetation zone of this sort between the Sahara and the northern frontier of the Sudan Savanna. The annual rainfall is low and the rainy season lasts between three to four months, and therefore the vegetation is sparse and the grasses are very short. The characteristic plants are acacias and various shrubs like the African myrrh. This zone cannot be cultivated without irrigation. The people found in this zone are the nomadic herdsmen who are very careful not to burn the grass found there, because, although sparse, it provides the only pasture available for their grazing livestock.

There is no true montane-type vegetation in Nigeria, but rather slight variations in the prevailing plant cover depending on the altitude. For instance, the Jos plateau, the Bauchi Highland and the Adamawa Plateau lie in the savanna zone, however, the grasses found on these highlands are shorter and the trees are fewer than at lower level. The Fulani who live in great numbers in the area turn the available fields into pasture for their grazing animals.

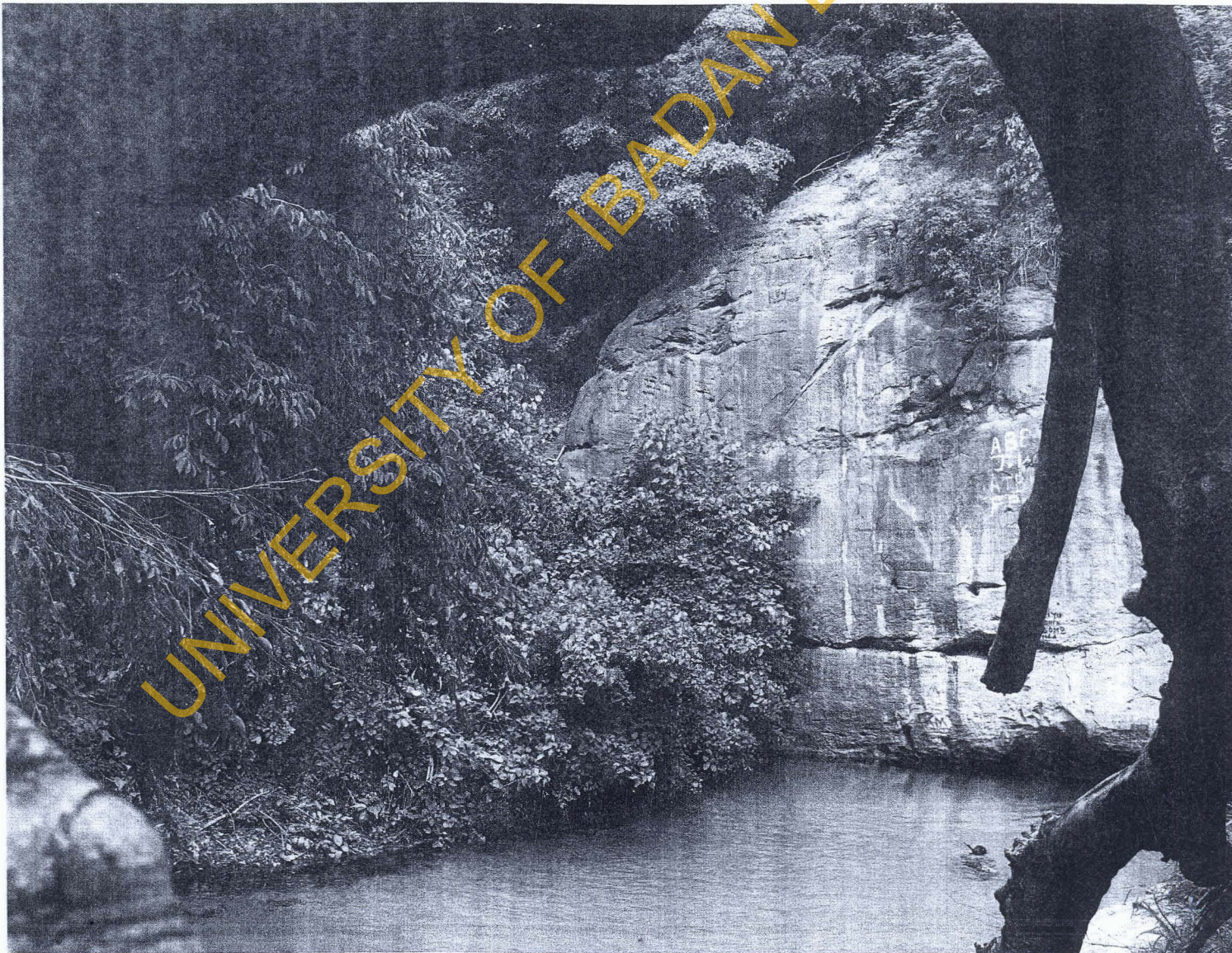
*Harve.
Sukur*

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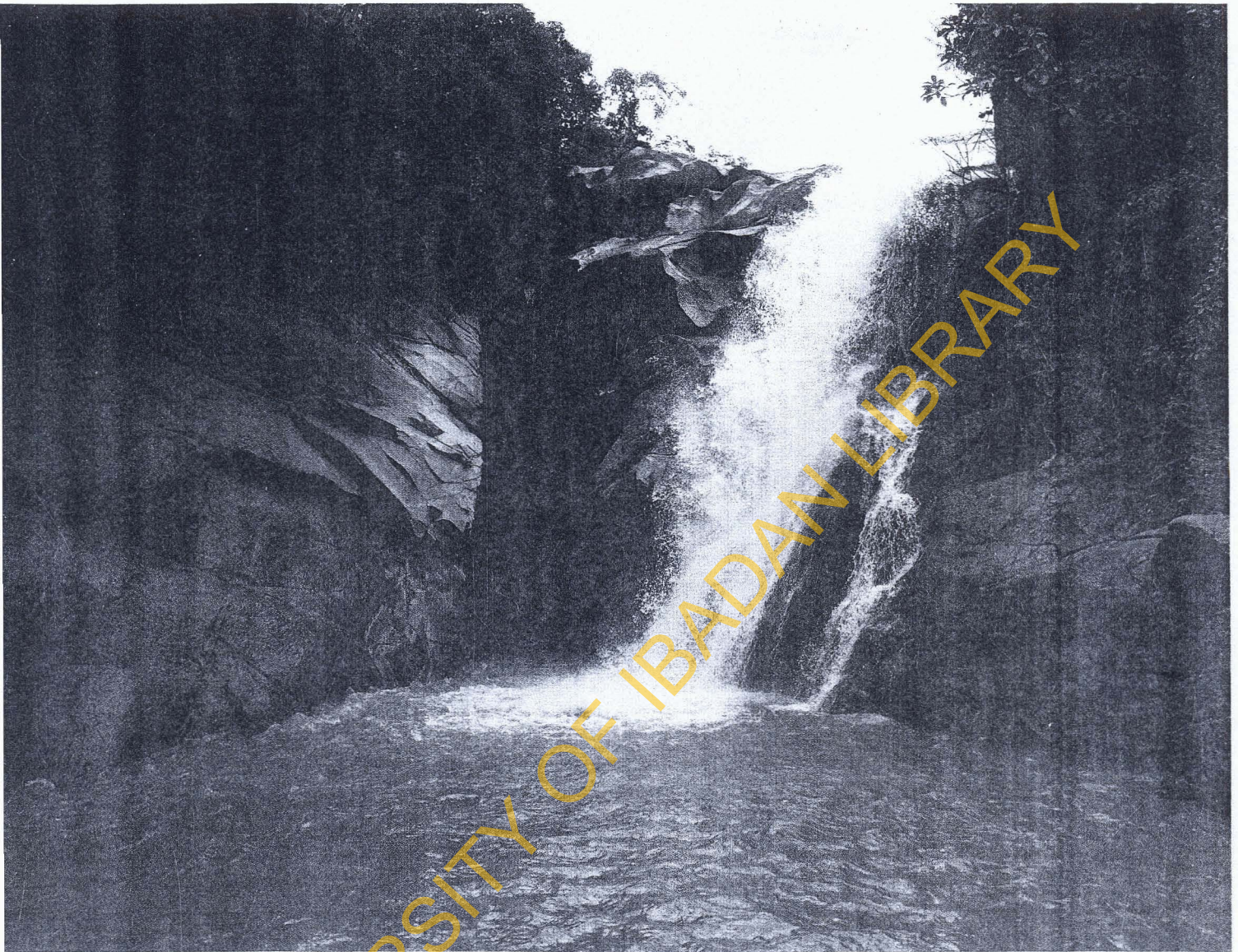




*View of the
Osun River*

The main constraints on feed resources in all the zones are the destruction of perennial tree cover for timber as well as the bush fires caused by hunters, livestock herdsman and overgrazing. These man-made constraints often lead to serious degradation of the pastoral resources and in some cases to an irreversible process of desertification, especially in the Sahel zone.

Desertification is perhaps the most devastating ecological and environmental problem in Nigeria today, as it affects about 15 states. Currently, the areas north of latitude 15° N are either deserts or highly prone to desertification. It has also been estimated that between 50 and 75% of Bauchi, Bornu, Jigawa, Kano, Katsina, Kebbi, Sokoto, Yobe and Zamfara states, which have a population of about 27 million people and account for 38% of the country's total land area, are affected by desertification. Indeed, drought incidence is on the increase everywhere in the country, aridity is intensifying in areas north of latitude 11° N, former



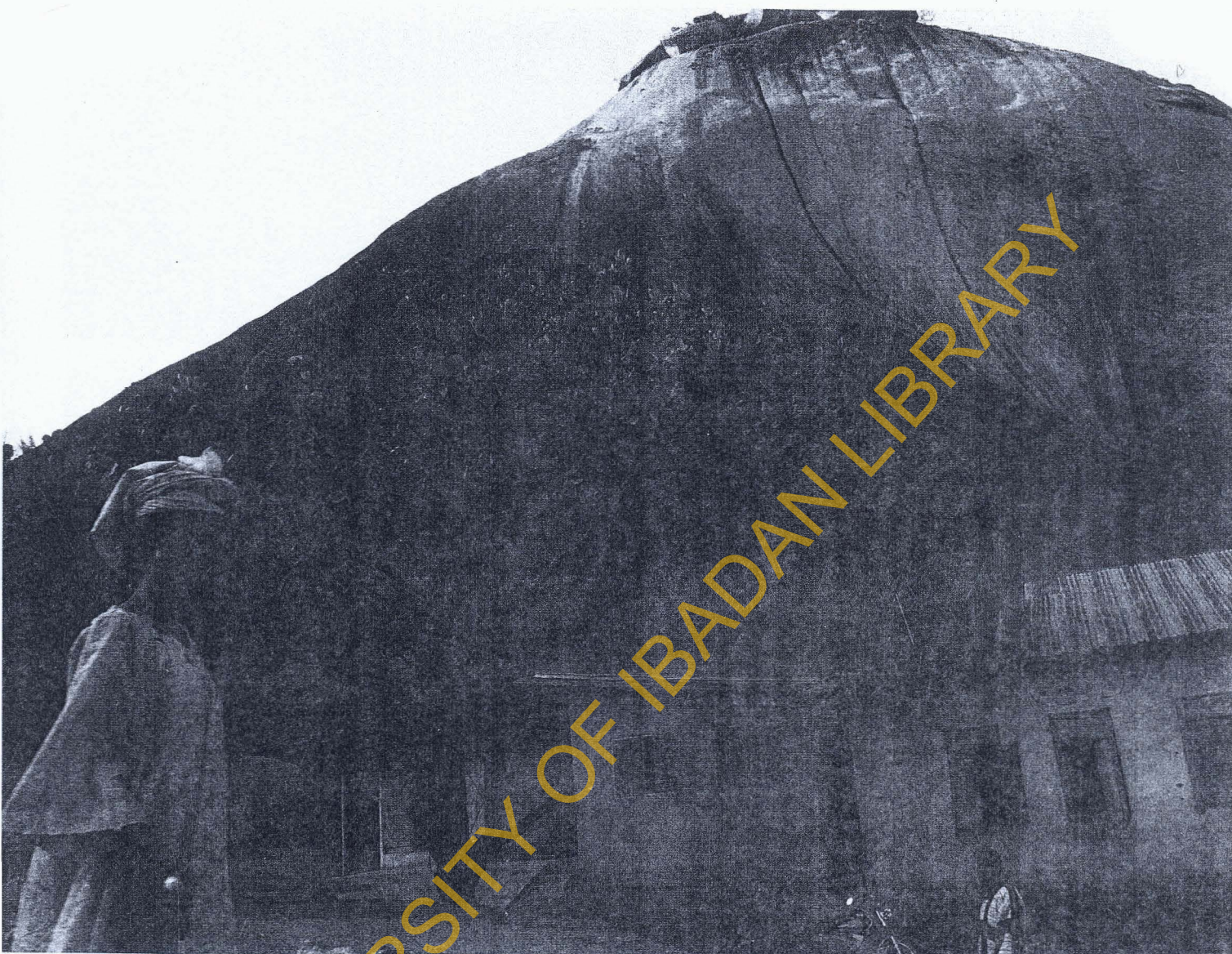
Assop
waterfalls,
Plateau State

fixed dunes are being mobilized and agricultural lands are becoming less productive as desertification spreads its wings. Desertification is traceable to factors which include natural causes of poor physical soil conditions, vegetation, topography, as well as inherent extreme climatic variability as evident in periodic drought, especially in the dry northern lands. Human-induced activities include wood extraction for fuel and construction, bush burning, grazing, cultivation of marginal land, faulty irrigation management practices and the most subtle, but often neglected cause, poverty which continues to cripple socio-economic development in the affected areas.

The sub-humid zone has a high potential for ruminant production because of high rainfall and the vast land area available for forage production. However, this zone contains only 19.59% of the total national livestock. This low percentage of total livestock unit in the Nigerian sub-humid zone is partly attributed to tsetse-fly infestation and high humidity.

Sunse
Nsukk

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Houses at the base of the Idanre hills

Niger and Benue Valleys

The Niger and its tributary the Benue are the two major rivers in Nigeria. The Niger-Benue trough runs from the southern boundary of the Sokoto plains in the northwest to the northeast near Yola, having passed through Lokoja from where it extends south to the Onitsha gap, north of the Niger Delta. Denudational actions by the Niger-Benue rivers system liberate enormous alluvial sediments that form extensive flood plains along the trough, providing at the same time water for irrigation farming and a major source of fish.

Covering 4,169 kilometers, the Niger is the longest and widest river in West Africa, and the third longest river in Africa after the Nile and the Congo. Its basin covers 7.5% of the continent and spreads over ten countries. In Nigeria, it covers 584,193 km², representing 25.7% of the entire basin and 63.2% of the total area of the country. The Niger rises in Fouta Djallon to the northeast of Sierra Leone, it enters Nigeria from the west and then runs southeaster-



Children playing on the beach, Takwa Bay

ly to Lokoja where it forms a confluence with the Benue, its principal tributary. Other main tributaries of the Niger are the Sokoto, Kaduna and Anambra rivers. The construction of the Kainji hydroelectric dam on the Niger river created a lake with an area of 1,236 km² also used to control the flow of the Niger flood waters. Efforts are afoot to make the river navigable throughout the year, from Escravos in Nigeria to Niamey in the Niger Republic, on a distance of more than 1,600 km.

The other major rivers in Nigeria are the Ogun, which flows into the Lagos lagoon; the Delta, on which now stands the modern port of Sapele; the Escravos, the Forcados, the Sombreiro and Bonny, which provides Harcourt Port with an outlet to the sea and the Cross river and its feeders which include the Imo and Qua-lboe rivers.

The area of the Niger River basin in Guinea is only 4% of its total area, but the quantity of water entering Mali from Guinea (40 km³/year) is greater than the quantity of water entering



As for the upper basin of this river, its source that lies farthest from the delta is in the mountains of Guinea, near the border with Sierra Leone. After traversing the interior plateau of Guinea, the Niger River flows northeast towards Mali and its inner delta, where it is joined by another important tributary, the Bani River, which is about 1,100 km long and has its sources in Ivory Coast and Burkina Faso. After forming a great bend and meandering through arid areas, the river enters the Niger Republic. In the Niger Loop 4,000 cubic hm of water disappear in the Niger Loop, mainly due to evaporation. Strengthened by the runoff from six new tributaries, the river becomes the border between Niger and Benin, receives the wa-

Nigeria from Niger (36 km³/year), about 1,800 km further downstream. This is due among other reasons to the enormous reduction in runoff in the inner delta in Mali through seepage and evaporation, combined with almost no runoff from the whole of the left bank in Mali and Niger, that are almost entirely dependent on the Niger River for their water resources.

Canoes in
the Badagry
Lagoon,
Lagos, old
capital of
Nigeria



The Landscape of Nigeria

In the Owa
Kajola jungle,
feldum local
government
region

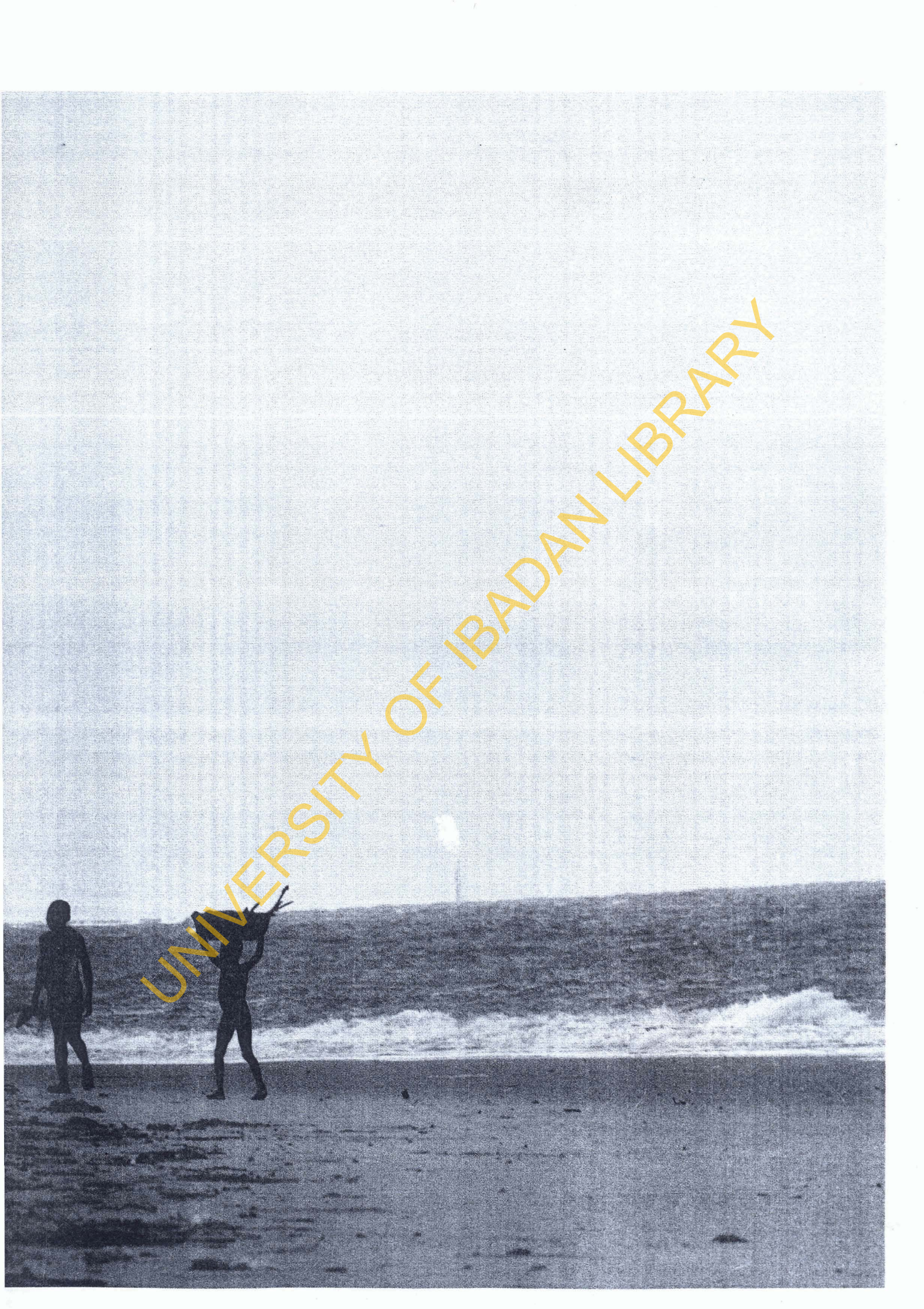
ters of other three tributaries and finally enters Nigeria. Here, in its lower basin, the Niger River is joined by numerous tributaries. After merging with Benue in Lokoja, the Niger heads southwards and empties in the Gulf of Guinea through a network of outlets that constitute its maritime delta.

The Benue River, with its 1,083 km, is the major tributary of the Niger River. It originates in Cameroon, where its flow experiences important seasonal variations and receives water from several tributaries, such as the Katsina-Ala and the Gongola. The quantity of water entering Nigeria was estimated at 25,000 cubic hm per year before the 1980s and at only 13,500 during that decade. In Nigeria itself the Benue is joined by several tributaries, of which the ones at the left side originate mainly in Cameroon. The Benue reaches its flood level in September. It begins to fall in October and falls rapidly in November, continuing slowly over the next three months to reach its lowest level in March and April. The Benue is almost entirely navigable by power-driven boats in August and September, the height of the rainy season, and during the low-season is navigable by small boats. The river is used quite often for commercial transport, including petroleum, cotton and peanuts, and consists of a series of braided channels of different sizes which meander across the floodplain. The floodplain also contains seasonally inundated depressions called fadamas, which provide important fishery resources once the flood has receded. The vast area of Benue River Basin and its practically untouched groundwater sources require a rational exploitation for sustainable use of natural resources.

The Bwatiye people claim to be first settlers of the Upper River Benue Valley. The Fulani, which arrived in the Upper Benue River valley during their holy war at the beginning of the 19th century, imposed an administrative structure to collect taxes and/or dues such as forced labour from the Bwatiye people. British colonists arrived in the Upper River Benue valley at the beginning of the twentieth century and worked with the collaboration of the Fulani hegemony to colonize the region. During the British colonization, a modern administrative structure was developed in parallel to the Fulani administration. Under the 1992 Inland Fisheries Decree, the management and regulation of access to the fisheries comes under the jurisdiction of the State Commissioner for Agriculture in every state. However, despite the ultimate aim of both the State Fisheries Department and the local fishing communities to sustain fishing livelihoods along the river, there are instances where the local fisheries management systems are subject to disputes and conflicts.

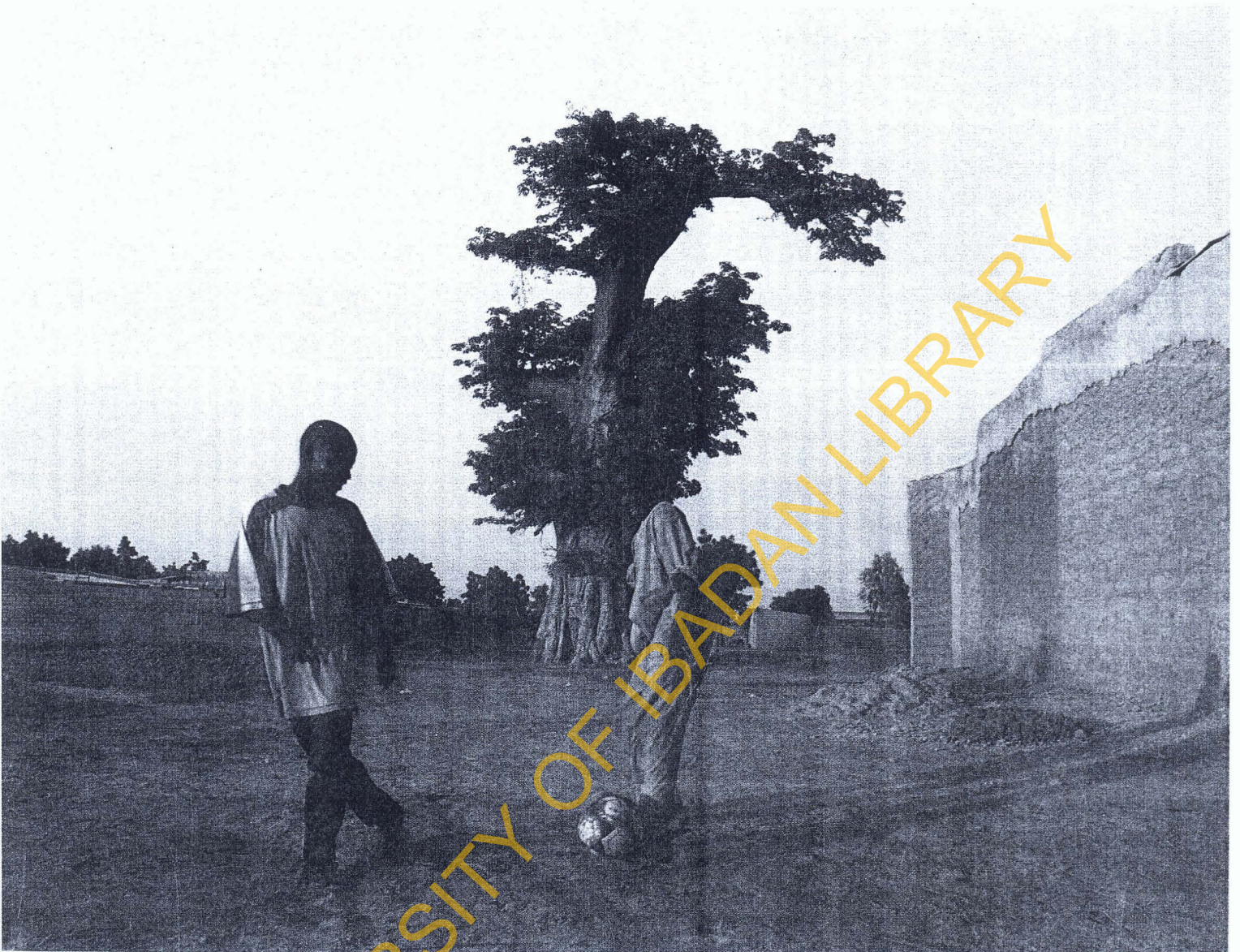
Fadamas are the irrigation lands, wetlands, and flood plains where flood recession cropping is practiced. The crop production in these areas traditionally depends on rainfall in the wet season and on residual moisture after flood recession in the dry season. About 275,000 ha of public schemes are planned under the existing water infrastructure, but only 40,540 ha have been completed and irrigated. In areas with easily accessible shallow groundwater or surface water, water lifting devices are used to lift water up for irrigation. The existing formal fadama area has been evaluated at 79,000 ha and in addition there are about 550,000 ha of residual fadama cultivation in the Niger basin.

According to the National Water Resources Plan, the irrigation potential of the public programs in the Niger River basin is estimated at 885,510 ha, to which the 793,000 ha of potential development of the fadamas should be added.



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*Football break
at dusk, near
Daura Lake*

The large majority of the 177 km^3 of water that annually flows into the sea from the Niger is generated from the Benue basin in Nigeria, and only $36 \text{ km}^3/\text{year}$ enter from Niger and 25 from Cameroon. In any case, important storage works for the development of irrigation are necessary throughout the whole basin. Probable navigation and hydropower problems may arise if more water is extracted for agricultural purposes.

The Niger Delta Coastal Swamps

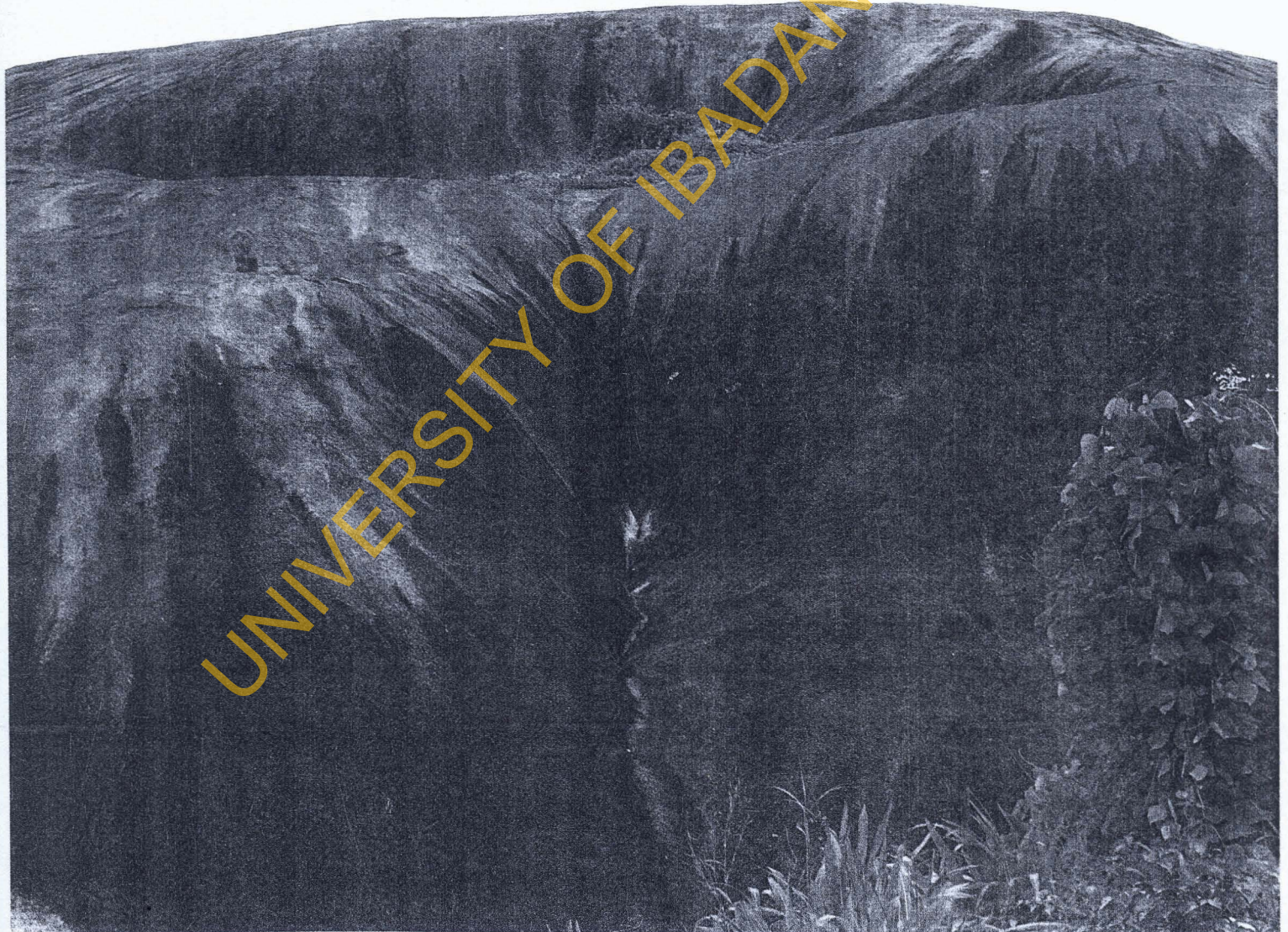
About 60 million years ago, the sea deposited a thick sequence of shales and sandstones within a belt of Nigeria which stretches from Lagos to Calabar. During the Miocene, sedimentation in the Niger Delta Basin was characterized by alternating sequences of sands and shales of varying thicknesses, forming vast hydrocarbon, i.e. petroleum and gas reservoirs. In the latter part of the Tertiary era, prolonged erosions resulted in the formation of peneplains

*Typical house
and crops,
Sukur*

on which thick layers of laterites were formed. In northeastern Nigeria, down-warping produced a wide basin in which deposits of clay and sands, now known as the Chad Formation, were formed about a million years ago. Similar sediments in Sokoto area and in the Niger Delta are believed to belong to the same geologic era.

The Niger Delta is bound on both the east and west by a strip of low-lying coastal plains known as the coastal lowlands, which are barely more than 30 metres above sea level. This area consists of a maze of lagoons, creeks and river estuaries bordering the entire shoreline along the Gulf of Guinea. The coastal lowlands to the west depict a remarkably intricate network of lagoon inlets, meandering creeks and extensive lagoons, with the Lagos Lagoon representing the largest lagoon system in West Africa. This area is also characterized by well developed river estuaries, such as those of the rivers Ogun, Shasha and Benin which flow into the vast network of creeks and lagoons.

*Idanre hills,
Abeokuta,
Abuja territory*



The coastal lowland east of the Niger Delta is a uniform low-lying area terminating into creeks and swampy terrain at the shoreline. The prominent Cross River basin, of numerous tributaries, enters the Gulf of Guinea through the Cross River estuary. The reduced tidal influence, due to the estuary distance upstream, makes possible in the wetlands of the Eket and Calabar areas the development of vast freshwater swamp forests, dominated by the raffia palm and the rich oil palm bush. The monotonous configuration of low-lying swamp terrain at the shoreline gives rise to the strand coastline formation of the east, while the prograding sand bars of the west result in the formation of the barrier ridge-lagoon complex.

Nigeria has a vast expanse of inland freshwater and brackish ecosystems. Their full extent cannot be accurately stated as it varies with season and from year to year depending on rainfall. These important water resources are spread all over the country from the coastal region

Woman,
Manbilla
plateau





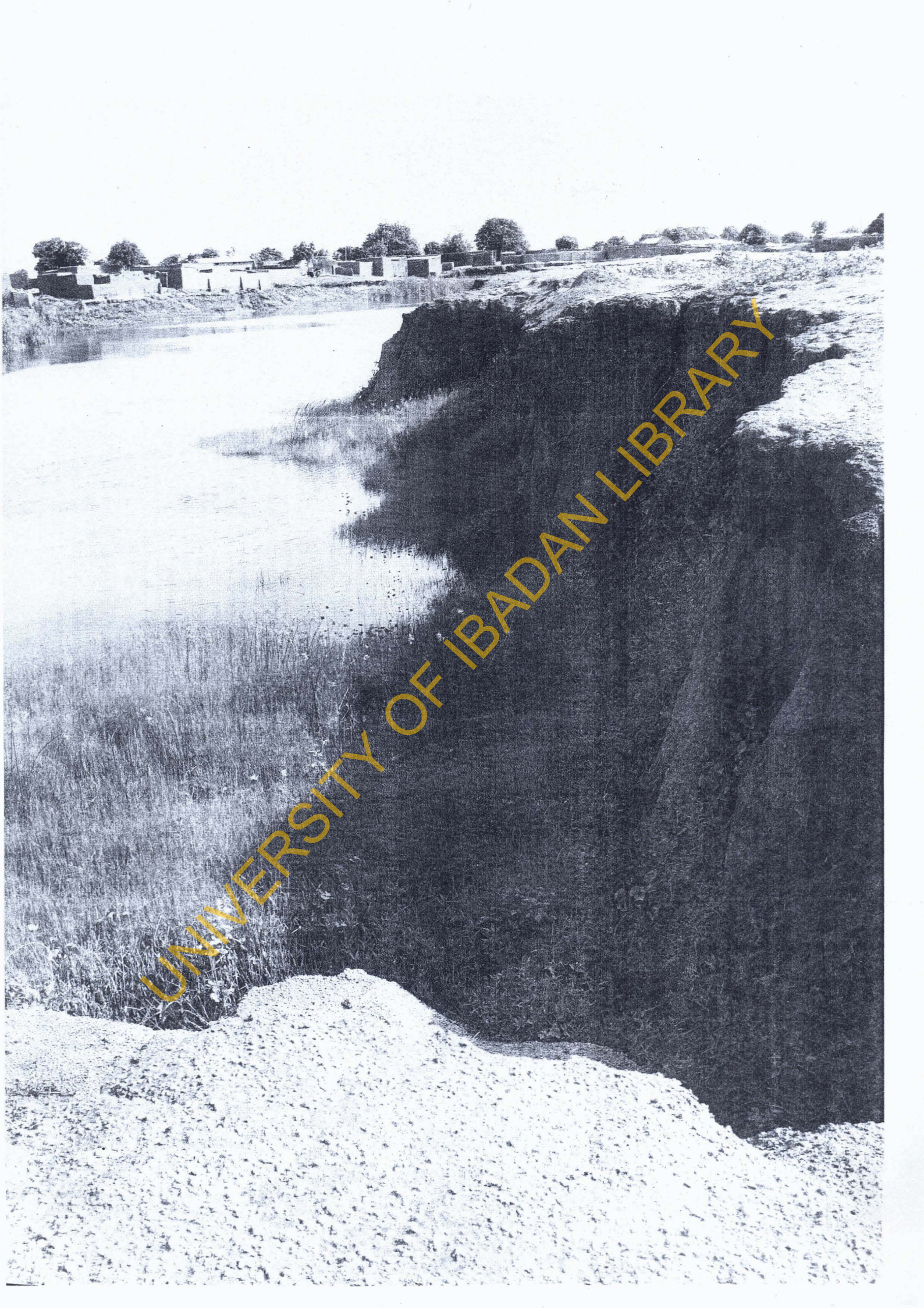
Hausa woman walking in the savanna, close to Serti

to the arid zone of the Lake Chad Basin. Freshwaters start at the northern limit of the mangrove ecosystems and extend to the Sahelian region.

It is estimated that mangroves cover about 12,000 km² of land in Nigeria, although it is difficult to know exactly as the mangroves are interspersed with swamp forests. The most important remaining mangrove areas in Africa are found in the Niger River Delta in Nigeria, which has been growing for millions of years and is still in the process of expanding into the Gulf of Guinea. The delta mangroves marks the transition between swamp forest habitats to pioneer communities on the coast and can extend up to 40 km wide.

The economic importance of these swamps is reflected, among others, in the gross volume of timber production. For instance, the rainforest region that occupies an area of about 9,000 km² produces 120,000,000 m³ of timber, while from the 14,200 km² of freshwater swamps there is a production of 185,000,000 m³. Mangroves are also important for species found pri-

*The L
the K
River,
City*







Typical huts in the savanna, close to Serti, Manbilla, Taraba State

marily in adjacent habitats, but who may depend on them for parts of their life cycle. As is the case of other coastal areas, the Niger Delta provides spawning and nursery areas for the fisheries in the Gulf of Guinea. The mangroves are important mating and nursery zones for a large number of species, as well as a refuge area for young and little fish as they are developing and other marine life while they are in the larvae stage. A high diversity is found in the pelagic fish community, with 48 species in 38 families.

The mangrove swamp is noted for its diverse tree species, of which it is worth noting the white mangrove. The coast of the Gulf of Guinea is primarily dominated by this mangrove, standing out above the extension of the swamp. The coastal swamp area is not widely cultivated except for swamp rice in places that are stabilized and non-saline.

Fragmentation itself does not greatly affect mangrove biodiversity, as mangroves are naturally fragmented, and are able to disperse over long distances. Of greater concern is the to-

Salvaging wood, Owa Kajola jungle, Kwara State



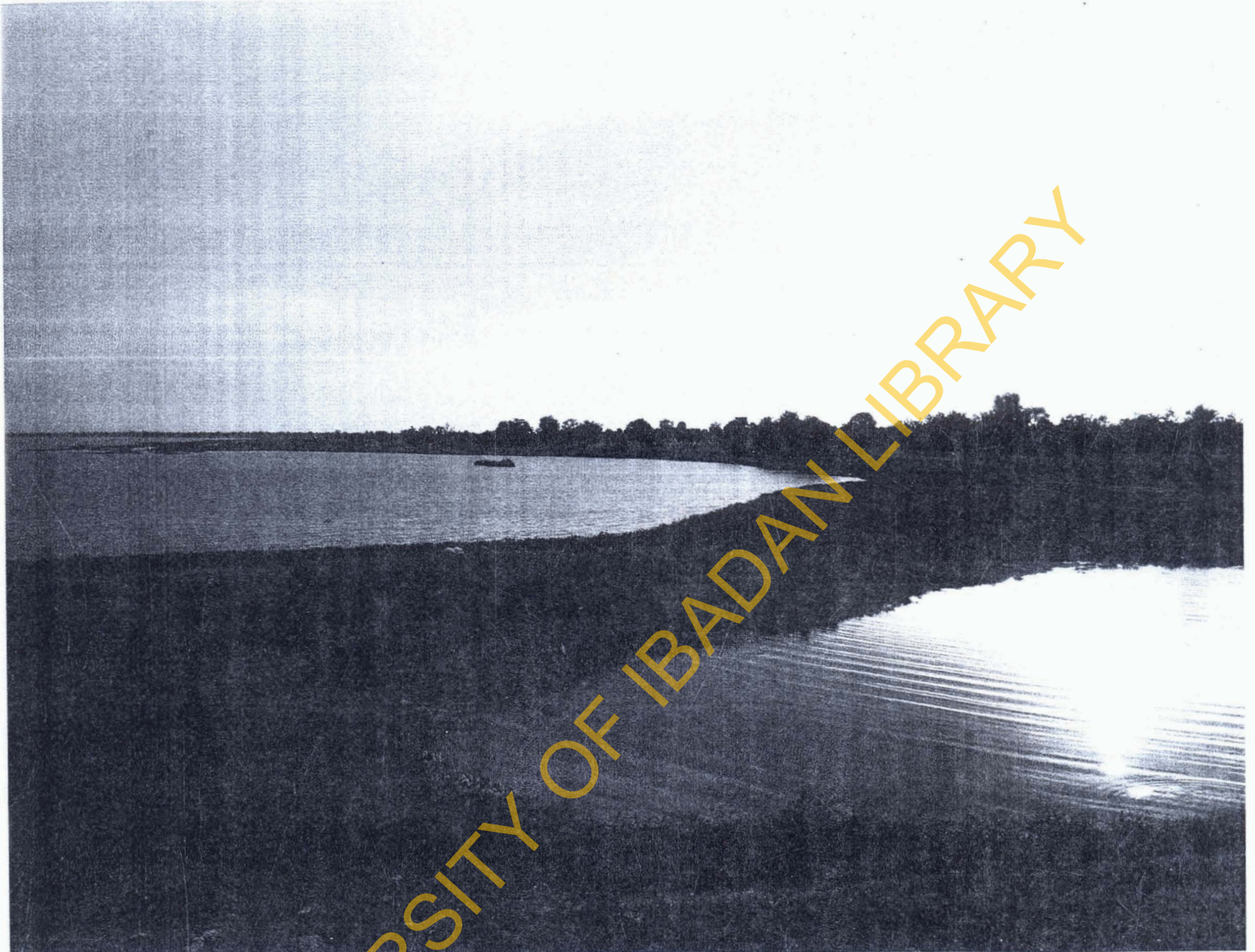
Plantation,
Zaria

tal amount of mangrove area lost to urbanization, industrialization and agriculture as well as impacts from timber and petroleum exploitation. Timber is primarily used for firewood and poles for housing construction. Impacts from petroleum exploitation include coastal subsidence that may aggravate the effects of sea-level rising as well as infrastructure development and oil spills that have led to large mortalities of invertebrates and fish. It is important to note that, over the past three decades, seismic lines have been placed in the Niger Delta mangrove forests in Nigeria. Other threats include the practice of gas flaring, the use of poison and dynamite for fishing, canalization, discharge of sewage and other pollutants, siltation, sand mining, erosion, construction of embankments and growing population pressure along the coastal zone.

The periodic flooding gradually deposits new layers of alluvial soils on the surface of the land, a deposit that leads to the formation of more solid ground behind the swamp, where

Typical
surrounding
the Owa
waterfall.
Owa Ka





Landscape,
Daura

we find the beginning of the rainforest. Important among the vegetation of this zone are the various palm and fiber plants, like the wine palm and the roof-mat palm, which are used for thatching mats and for providing rafter, poles and stiff piassava fiber for the production of brooms. Leaves of the pandanus palm are used for preparing sleeping mats and baskets. Fishing and fiber-making are the important products of the fresh-water swamp community.

The undulating plains of the interior lowland constitute a physiographic region north of the coastal lowlands and the Niger Delta, with an average elevation of about 100 metres above sea level. With a far better drained surface than the other two regions mentioned above, the sedimentary deposits are formed by the Cretaceous and Tertiary rocks of shales, coal, sandstones and clays, with an abundance of limestone. The interior lowlands cover upper Lagos, southern Ogun, major parts of Ondo, Edo and Delta States to the west, and most parts of Anambra, Imo, Abia and Akwa states to the east.

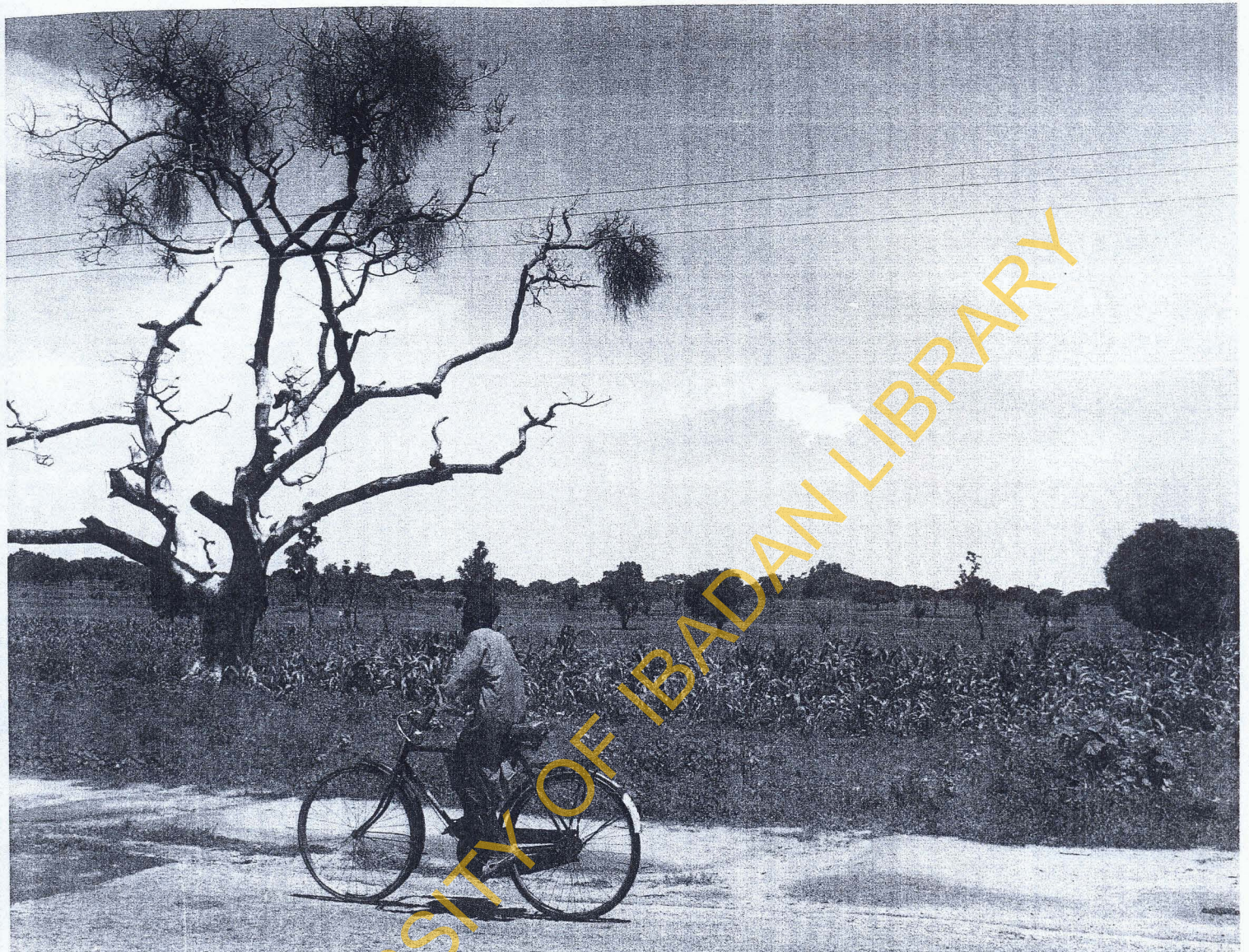


*Mangroves
and rainforest,
Bonny Cove,
Harcourt Port*

Central plateau

The scarplands of south-central Nigeria form a unique physiographic region truncated by the Niger-Benue trough as it runs southward. The scarplands of Nigeria exhibit plateau-like features with slopes terminating steeply into the valleys of drainage basins. The most prominent is the Udi-Nsukka escarpment which terminates, by a steep slope, into the Cross River Basin. As the watershed of the numerous rivers flowing into the Cross River Basin, the scarpland to the east of the Niger is notorious for incidences of gulling and severe soil erosion. To the southwest, and close to the Niger valley near Onitsha, are the Awka-Orlu uplands which terminate with an east-facing escarpment into the Mamu valley. The steep escarpment, formed near the lower Niger valley where the upland of the Esan area of Edo State terminates, forms the western extension of the Udi-Nsukka scarpland. The Asaba upland forms the western extension of the Awka-Orlu scarpland. The nature of landforms under the pre-

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*Riding down
the road,
Yankari*

vailing geomorphic processes in this physiographic region has led to far-reaching land degradation problems, particularly of gulling and soil erosion.

The tropical high forest zone is the major source of timber for construction and cabinet making. Of all the zones it contains the most valuable species of vegetation. However, due to human activities, this forested area has been drastically reduced. Bush fallows, villages and farms are scattered throughout the zone. Currently the drier end of its inland side is becoming reduced to derived Guinea Savanna because of felling and clearings. In the humid rain forest are found economic cash crops such as oil palm, cocoa, rubber, plantain and cola nut. Also found are some principal staple food crops such as yam, coco yams, sweet potato, maize, rice, groundnut, cowpeas and beans as well as a number of fruit. A number of timber trees such as the African mahogany, the scented sapele wood and iroko, to mention a few, are found in this zone and thus led to the development of silviculture and timber production.

andscape,
viri

