

**ASSESSMENT OF FOREST DEPLETION IN BIDA AND ITS  
ENVIRONS, IN NIGR STATE.**

***BY***

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PGD/GEO/2005/321**

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**DEPARTMENT OF GEOGRAPHY,  
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FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA.**

**BEING A THESIS SUBMITTED TO THE POSTGRADUATE  
SCHOOL, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA  
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE  
AWARD OF POSTGRADUATE DIPLOMA IN  
ENVIRONMENTAL MANAGEMENT.**

## DECLARATION

I, Shafiu Ahmad, of the Department of Geography, School of Science and Science Education, Federal University of Technology, do hereby declare that this thesis "Assessment of Forest Depletion in Bida and Environs, in Niger State" was wholly and solely written by me under the supervision of Dr. P. S. Akinyeye. No part of this work had either been wholly or partially presented before any degree elsewhere. Information hereby obtained from published works and unpublished works of others have been referred and acknowledge accordingly.

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**Shafiu Ahmad**

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**Date**

## CERTIFICATION

This thesis titled: Assessment of Forest Depletion in Bida and it's Environs, In Niger State' by Ahmad Shafiu (PGD/GEO/2005/321) meets the regulations governing the award of Post – Graduate Diploma (PGD) of the Federal University of Technology, Minna and is approved for its contributions to scientific knowledge and literal presentation.

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## **DEDICATION**

This project is dedicated to Almighty Allah; it is also dedicated to my parents, my wife and children.

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The successful execution of this project work could not have been possible without the contributions of various individuals and groups, for whose experience and kind assistance I greatly benefited.

My greatest thanks goes to Allah (swt), in His power I am alive today and also gave me the strength to undertake this project work, for that I say Alhamdulillah. I'm indebted to my supervisor Dr P.S. Akinyeye, who despite other commitments and schedule took pain to go through my project work with useful observations and criticism. His effort is in no small measure contributed immensely to the final draft of the work.

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## ABSTRACT

Forest depletion is one of the most pressing contemporary environmental problems; the research work examined the rate and extent of forest depletion in Bida and its environs. The research work established the fact that forests in Bida area are rapidly being depleted through unregulated exploitation and other land use activities. A broad-base and integrated technique was employed in the research work. The study determined the causes and consequences of forest depletion and went further to suggest ways by which the observed trend can be checked. The research was able to identify and establish the fact that population pressure, cultivation of crops, provision of fuelwood, bush fires, over-grazing, and sawmill activities are the major causes of forest depletion in the study area. Some less obvious but equally important causes of forest depletion are lack of awareness, illiteracy and poverty.

The diverse implication of forest depletion in the study area include destruction of natural forest with all its diverse plant and animal species, this is really of great concern to environmentalist. Plausible and attainable recommendations are advanced in attempt to reduce the trend and scenario of the threatening environmental problem in the study area.

## CHAPTER ONE

### 1.0 INTRODUCTION

Vegetal depletion involves the indiscriminate or wanton exploitation or removal of vegetation or forest in a particular geographical location without the effort of replacing it, and this could be done in order to create new agricultural or urban land, to provide wood for building and manufacturing industries, for the exploitation of materials and fossil fuels, to create reservoirs for water supplies and hydroelectric energy, to build highways, etc. vegetal depletion is not only related to felling of timber only, but involves removal of shrubs, lianas and other plants from the environment. The tropical and equatorial rainforest are shrinking at alarming rates because of deforestation or vegetal depletion and there is little or no sign of a real slow down in the trend of vegetal depletion.

With the rapid growth of the world's population, many societies have been demanding more from the earth's resources and affecting its land surface at ever increasing rates. Clearing forest and woodland to create agricultural and pasture has been a human activities since time immemorial. The scale and rate of the clearance has been a human activity since time immemorial. The scale and rate of the clearance has increased drastically as modern agricultural methods and implements are been used recently. Mechanized ploughing results in a situation where large acres of land are been cleared at ease. Naturally, forested upland areas are particularly susceptible to water erosion following clearance.

Vegetal depletion for fuel wood, agricultural use, industries, etc are threatening the environment. This is now causing serious global land degradation as such, drawing the attention of environmentalist. The early agronomist burnt extensive areas of land to create farmland or pasture, modified the ploughing, altered the drainage by irrigation,

introduced or bred new animals and crops, and altered the natural vegetation, excavated large areas of land, greatly modified the landscape and even created new land. Some renewable resources are being used at the rates that exceed the speed at which they can be regenerated. No where is this more apparent than the destruction and vegetal depletion of the forest. A hectare of forest can be destroyed within an hour, but may take several decades for the forest to regenerate itself. A report published in 1991 by United Nations Food and Agricultural Organization estimates that the current destruction of the tropical rainforest is occurring at the of 40 million acres per year, mainly as a result of human activities. The secondary effects of vegetal depletion have complex negative implications deforestation, the nutrients being washed out by the rain due to exposure of the soil. In addition, the organic compounds are no longer replaced in the soil. It may take decades of slow regeneration before the land can support a forest again. Other effects may lead to changes in scope, stability, the amount of soil erosion, increased sediments washed into rivers, changes of climate within a small region, and the increased occurrence of flood.

Vegetal depletion is also as man himself and Enabor (1986) rightly reported the early stages of civilization made it essential to destroy and remove some of the abundant vegetation in order to pave way for activities human settlements and arable farming which advanced man's development. The high rate of vegetal depletion in the tropical forest has thus aroused considerable concern throughout the world. Obviously, not much of the forest eco-system in Nigeria is undisturbed even some of the existing rain forest in the country consist of secondary, not primary forest. Man has increasingly affected the succession of these rain forests through various activities connected with human activities. Consequently, extensive areas of original vegetation no longer exist. Succession either has been set back modified, or arrested by man, and even diverse



communities have been by the elimination of some plants through forest fires, lumbering, overgrazing, cultivation, surface mining, industrialization, urbanization and infrastructural development. In spite of the alarming rates of vegetal deforestation on the global scale all available data are based on estimates. FAO (1981) statistics estimated that between 8 million and 20 million hectares which represent only 10% of the total forest areas are deforested annually, going by this rate. Deforestation and low rate of afforestation the World Resource Institute (WRI) (1985) projected that about 225 million hectares of tropical forest will be destroyed by the year 2000.

Nigeria, being a developing country has most of its population dwelling in rural areas; populace depends so much on the natural environment for their livelihood. Agriculture is one of the most vital and predominant activity that the rural populace depends so much on. The quest to promote and increase agricultural production has led to gross vegetal depletion or deforestation. The art of cleaning forest for agricultural activities promotes vegetal depletion and this tends to land degradation. The increasing pressure on land resources is creating a scenario whereby the land is fast deteriorating and facilitating diverse environmental problems. The continuous rise in human population and limited natural resources available, calls for great concern among well meaningful people such that the deterioration of the environment can be reduced. This is only possible if the populace is made of the implications of the actions or in-actions.

The annual rate of vegetal depletion is estimated at over 400,000 hectare FORMECU, (1997). Removal of forest has been identified as the main cause of ecosystem damage and environmental degradation. This negative trend cannot be allowed to go unchecked. For effective and efficient forests, types of forest, species of trees growing, density, height, volume of trees, shrubs, grass, elevation, moisture levels etc. are to be clearly understood for improvement. Real knowledge of the impact of

natural calamities like cyclone, fire, disease outbreak and biotic factors are required for taking timely preventive and salvaging measures.

The traditional methods of information gathering with respect to vegetal depletion are time consuming, cumbersome and labour intensive resulting in whole lot inaccuracies. These inadequacies or drawback makes the convectional methods of land survey outdated in the study of vegetation of the environment. This calls for a modern, effective, less labour intensive and less expensive method of information gathering. A remote sensing technique offers the best alternative in the recent times.

Combating vegetal depletion requires factual information on what is going on in our forests. This is however, not readily available. Remote sensing is a very powerful tool in the provision of such information. It involves the acquisition of information about an object, area or phenomenon through the analysis of data acquired by a device that is not in contact with the object, phenomenon or area under investigation Lilesand et al, (1987). It has come to be associated more specifically with gaining of interactions between earth surface materials and electromagnetic energy. Sensors aboard satellites in space record the amount of electromagnetic energy reflected from various objects on the earth surface at various wavelengths. From the spectral response patterns, information about the objects is derived.

Through the analysis of remotely sensed data for different epochs, change detection is possible. With time changes analysis, monitoring of forest destruction can be done. The knowledge acquired from this information forms a basis for decision-making in efforts to address vegetal depletion menace. Electromagnetic radiation, which is reflected or emitted from an object, is the usual source of remote sensing data. Each object has peculiar characteristics of reflection or emission known as spectral signature. Therefore, remote sensing is a technique used to identify and understand

objects or environmental conditions through the uniqueness of the reflection.

### **1.1 AIMS AND OBJECTIVES**

The aim of the research work is to find out the extent of forest depletion in the study area and within this broad aim, the specific objectives are:-

1. To determine the extent to which natural forest in the study area has been distorted.
2. To examine the major causes of forest depletion in the study area.
3. To examine the impacts of natural forest destruction in the study area.

### **1.2 STATEMENT OF RESEARCH PROBLEM**

The rate at which forest are been removed, demands serious concern from stakeholders. Forest are of immense befit to humanity, this trend of forest depletion is frightening. In order to forestall this ugly situation a comprehensive study of the root causes and other related consequences of forest depletion is essential. There is the need to address all the anomalies that has led to the continuous cutting of forests. There is great need to address this situation and the first step is to undertake a comprehensive study of the area in order to understand the peculiarity of the situation.

It is very essential to get cogent information in order to check or reduce the incidence of forest depletion in the study area as such; the study is a prerequisite for effective control of forest depletion.

### 1.3 JUSTIFICATION

Forest degradation and depletion are of major concern to environmentalist because of the environs merits inherent in the forest. The relevance of forest resources for both present and future generations cannot be over emphasized. In view of this, a comprehensive study of the intricate factors responsible for degradation is necessary. The high demand for land by agriculturist, legal and illegal felling of trees, fire wood cutting, and drought are causing fast disappearance of some of the important forests in Bida and environs. The project will provide the extent of forest solution to curb the problem.

Farmers are primarily involved in forest depletion because of their attempt to increase land for cultivation, the project will study the predominant system adopted by these farmers and provide an alternative system that will reduce the incidence of forest depletion. The research work will provide some of the information required to control this ugly situation. The research work is necessary because it will provide a frame work for effective analysis of the problem.

### 1.4 SCOPE AND LIMIT OF THE STUDY

The research work will be restricted to Bida and environs, this is necessary because of the time constraints. Questionnaires will be administered to stakeholders within the study area. The sampling technique will be structured in such a way that farmers and stakeholders will be covered or surveyed.

### 1.5 BACKGROUND OF THE STUDY AREA

#### 1.5.1 Location

Bida is on latitude  $9^{\circ} 00' N$  and longitude  $6^{\circ} 01' E$  on the Nupe Sandstone formation. It is located 19km East of River Kaduna, along Mokwa-Bida road and about 84kms South-west of Minna the Niger State Capital.

### 1.5.2 Climate

A typical middle belt town, Bida experiences distinct dry YIKERE and wet ZUNZU seasons. The wet season which lasts for about 200 days start from April to October. Average rainfall is 1222mm with July and September recording the highest rains of 226.3mm and 248.8mm respectively. The weather at this time is humid. The cold harmattan winds Ushering in the dry season which gradually becomes hot between March and May just before the rains set in. the monthly temperature is highest in March at 31.1 °C and lowest in August at 26°C. Bida is thus blessed with moderate climate condition throughout the year.

The year figure (1.3). But large temperature and humidity fluctuation could cause thermal movements in buildings. And unless proper expansion joints are made this could cause structural feature.

Also some materials like timber do not resist large variations in main stone content without sustaining either structural or aesthetic damages. As such unprotected timber would never be exposed.

### 1.5.3 Vegetation

The whole area lies on a natural vegetation known as the Northern Guinea Savannah. The zone is characterized by a predominantly grassland with trees and shrubs scattered here and there. Due to population concentration of this zone (from long time back), human activities have profoundly modified local vegetation at places. The local vegetation of Bida shows high grasses, which have been shortened in many places by seasonal bush fire; tree species predominantly *Parkia biglobosa* (locust bean tree), *magnifera indica* (mango tree), *Azadirachta indica* (Neem tree) and *Vitellaria paradoxa* (kadanya) tree.

Most of these trees species could grow to a substantial height if they can be guarded against bush fire and drought and could be used as weather shields and landscape elements. With development of forest reserves, plantation and Nursemea New Species have been planted in most places with success. (See appendices 2, 3, 4, 5,6 and 7. For mean annual rainfall, mean onset dates, mean cessation, percentage of farmland, percentage of trees and percentage of bare ground).

#### 1.5.4 Relief and Drainage

An area of hills and valleys occurs some three to four kilometers west of the present built up area. Occasional small steep mesas rise 20 to 25 metres above the well drained gently sloping lands between valleys. Most gradients are around 1:40 rarely steeper than 1:20 except at the base of mesas and along the edge of the valleys north and south of the town. The southern valley does not pass as far to the west as the northern one which forms a complete boundary from the western hills to the Gbako River (Bida master plan 1980). The scenery is fairly uniform since lithology and rock structure are not greatly variable. An important feature of the scenery is the existence of large area of fadama.

The town is drained by the chicen and mussa streams with the third stream landzun which floors right across the heart of the town. The importance of these streams is that they provide good irrigation opportunities for the inhabitants. Thus, they are both economic and social importance.

#### 1.5.5 Geological and Soil

Bida lies within the basement complex and the Nupe Sandstones formation. The former comprise coarse sands or sandy clays and the later comprise essentially horizontal beds of weakly cemented clays, silt stones and sand stones. The soil in the area is made up of upland soils and depositing soil. The upland soils overlie

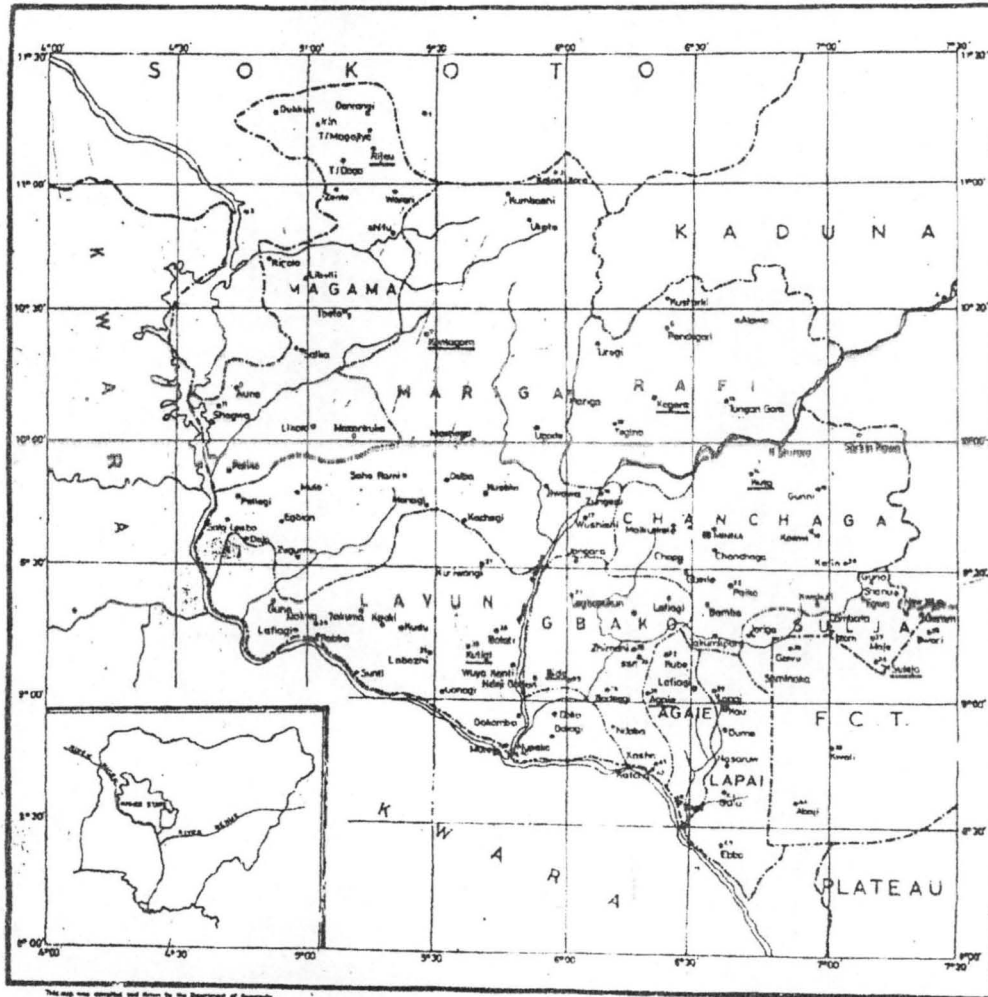
thick sandstone and the major part consists of gently undulating plains with deep soils. Most soil were classified as fernsoles which normally occupy the higher elevations of the terrain at lower levels (steep slopes pass into ferruginous tropical soils which in the valley are replaced by weakly developed soils of depositional and hydromorphic soils(s). Soils in the depositional areas are weakly developed alluvians or hydromorphic soils.

#### 1.5.6 Historical Development

The legendary foundation of Bida, which cannot be dated is ascribed to three sources which ever be the true origin, Bida started rising slowly from a collection of huts to become a village and from the status of a village to become a town. The development activity responsible for the growth to Bida was its role as an agricultural, commercial and administrative centre for several decades. The rapid physical development was however, as a result of the conquest of Bida by the Fulani in the later part of 18<sup>th</sup> Century (1860).

The town today has spread well beyond the traditional yard walls. Development within the walls has become denser as farm lands have been built over with houses. Traditionally, the Nupe compound is highly developed with little free space left within the compound walls. (See appendices 1 below)

# NIGER STATE WITH THE LOCAL GOVERNMENT AREAS



This map was compiled and drawn by the Department of Geography,  
Federal University of Technology, Minna, Nigeria.

SCALE:- 1 : 1,000,000

OR

10 KILOMETERS TO ONE CENTIMETER



### LEGEND

- |                                    |          |
|------------------------------------|----------|
| State Government Boundaries        | -----    |
| Local Government Boundaries        | -----    |
| State Capital                      | ●        |
| Other towns and villages           | ○        |
| Rivers                             | ~~~~~    |
| Local Government Area Headquarters | ★        |
|                                    | ■ MINNA  |
|                                    | ● MARUGU |
|                                    | ★ BIDA   |

ADMINISTRATIVE MAP OF NIGER STATE SHOWING BIDA IN THE CONTEXT



## CHAPTER TWO

### 2.0 LITERATURE REVIEW

Acute concern is now widely expressed over the rate and scale of vegetal depletion of tropical forest, the degradation of grass lands and wet lands, and desertification Kevin and Lewis (1995). Such destruction of natural ecosystems has led to a reduction in bio-diversity and impoverishment of soils. The human impact on land has been enormous, as land use changed, natural vegetation is cleared for agricultural use, settlements and urbanization increase, reservoirs are created, minerals are extracted, and more lands are developed for recreation purposes, all these are clear indication of wide range of vegetal depletion Cooke and doom Kamp (1990).

A good number of empirical works from many countries in the tropics have shown that the rate of vegetal depletion is higher than previously estimated UNEP, (1991). In Brazil alone, the area estimated to be deforested each year has increase from 2.3 million to 8.0 million hectares in recent years thereby making it to have the greatest are deforestation is far lower than those of many major deforestation countries especially in tropical Africa. Nigeria was named as one of the three African major deforestation countries. The two others are Cote d'voire and Zaire. Wood (1990)

Vegetal depletion has however intensified in the tropical rain forest since the Second World War. This is because the growing rural population invaded the forests in search of land for their crops fuel wood for cooking and fodder for the animals. Also most tropical nation in an attempt to raise foreign exchange earning to execute economic development programmes, turns to the forest as a readily exploitation resource. As a result of this relentless exploitation most world tropical forests are diminishing. In most developing countries vegetal depletion is fast accelerating. About eleven million hectares of forest are cleared for other land uses annually. Between

1950 and 1983, Melillo et al (1985) reported that forest and wood land areas declined by about 38 percent, in Central America and 24 percent in Africa. These estimates of natural tropical forests are exploited, thus becoming "secondary re-growth forest".

The prevailing traditional utilization practices only allows for the mature stem of those few tree species with high merchantable value to be removed and this, according to Guppy (1984), usually accounts for about 10 to 20 percent of the standing volume. Apart from this, another 30 to 50 percent of the trees are also destroyed during logging operations thereby leaving the soil to be highly disturbed to impede regeneration. In the open woodlands and savannas, fuel wood and fodder demands are outstripping forest regeneration and population increase and forest stock decline. Anderson et al; (1984), reported that fuel wood consumption now exceed natural regeneration by 70 percent in Sudan, 75 percent in Northern part of Nigeria, about 150 percent in Ethiopia and 200 percent in Niger.

Tropical forest depletion is one of the major environmental problems, now facing the world. This is because tropical forests assume a great variety of forms in terms of species consumption and structural diversity and the disappearance of these forests even within a single region may have global consequences. Tropical forests have always been limited in size at least in recent geologic time. The major regions of tropical rain forest are in South America, African and South East Asia. Three tropical countries namely, Brazil, Zaire and Indonesia, however contain about 50 percent of the world's closed canopy tropical broad-leaved forests. Repetto (1988) however noted that the estimates for these countries only represent just about half of the forest cover of U.S.A. Canada and USSR, which are the three major temperate countries rich in forest resources. Tropical forests are being converted rapidly from expanses of rich floristic and highly diversified forests that support enormous wild life species and a rich heritage

of human cultures into vast wasteland that could only support a few tough, fire-resistant weeds. It has been estimated that about 1-6 billion of tropical moist and wet forests existed before large-scale human induced deforestation started and this area has already diminished to about 1.1 billion hectares Granger (1984). These estimates are based on projected data, the facts still remain that here are an alarming rate. There are several reasons for the decline in total tropical forests and these, according to Steintin (1982), include the rapid population growth in the tropics the ever increasing demand for farming and grazing land the need to produce cash crop in order to earn the much needed foreign exchange. In most cases deforestation resulting from the above reasons occurred spontaneously, unplanned and uncontrolled thereby resulting in forestland being permanently converted to other uses. About 11.3 million hectares of tropical forest are thus lost annually through deforestation caused by population growth and subsistence agriculture and another 4.4 million hectares of closed forest is further lost through logging activities. A total of 15.7 million hectares of forestland is thus lost annually through deforestation Steinllin (1982).

**TABLE 2.1 Estimate of world forested areas (millions of hectares) by region**

Region	Forest land	Closed Forest	Open world land	Total land area	Closed forest (%of land area)
North America	630	470	176	1841	25
Central America	65	60	2	272	22
South America	730	630	150	1760	30
Africa	800	190	570	2970	6
Europe	170	140	29	474	30
USSR	9125	785	115	2144	35
Asia	530	400	60	2700	15
Pacific Area	190	80	105	842	10
World	4030	2655	1200	13003	20

*Source: Council on Environment Quality and the Department of State 1980*

In Africa, agriculture is the main cause of vegetal depletion person (1977). The forests of this continent now cover less than half of the area for which they are considered the natural climax. Howard and Lauh (1975) reported that the forest area in Cote-de'voire has been reduced by 30% in a ten-year period. However vegetal depletion is most severe in the dry sub-tropical woodlands of the Sahel Zone, because more than 90% of the population in this zone depends on fuel wood for cooking.

The spread of vegetal depletion is more noticeable in urban areas. The growth of urban areas brings about appreciable demands for fuel wood, charcoal, and sawn wood and these alter the units for much of the observed decline in forest stocks. Felling of trees on farmlands is also an important factor in vegetal depletion issues in Africa. In Nigeria for example, unpublished surveys in the South and Northern zones revealed that farm tree density have declined from fifteen percent in 1950s to three per (ha.) in the 1970s Anderson (1986).

Deforestation estimates for some African countries have been given by Tanly (1982). For example, the rate of forest depletion in Cote d'Ivoire and Nigeria is estimated as high as five to six percent year while Ochanda and Epp (1982) reported that in Kenya the indigenous forest now cover only 1.9% of the land area, and remote sensing have shown that about 16% of the forest is been lost in each ten year period.

**TABLE 2.2 Mean annual rates of Vegetal Depletion on Tropical Forest 1981-1985**

Region	Undisturbed productive closed forest	Logged productive closed forest	All closed forest productive and unproductive	Open forest	All forest
Tropical America	0.29	2.80	0.64	0.59	0.63
Tropical Africa	0.19	2.41	0.61	0.48	0.52
Tropical Asia	0.39	2.14	0.60	0.61	0.60
Total	0.28	1.98	0.62	0.52	0.58

All values are percentages as a proportion of the forest area in 1980 – Adapted from FAO (1982) and Westoby (1989).

In Nigeria, as in many other countries, the rate of deforestation has been estimated to be about 265,000 hectares of forest being exploited annually Oseni, (1996), at this rate of vegetal depletion. 50% of the countries forested land would be eliminated by the year 3000 A.D. The concern is even greater for the Saharan region of the country, which is characterized by fragile ecosystem and climate peculiarities inimical to fast tree growth. The rate at which the tropical and equatorial rainforest are been depleted is frightening. A few thousand years ago, rain forest covers about 14 percent of the land surface whereas today they cover only 7 percent. Most of these have been lost over the part 200 years, most after the Second World War Eden, (1990). In a study for the United Nations Food and Agricultural Organization published in October, 1992, using the most thorough to date data involving satellite, and aerial photographs recognized in 88 countries, it was estimated that the rain forests are disappearing at the rate of one hectare per second, equivalent to the combined size of England and Wales being lost annually. This annual loss of rainforest or rate of destruction is running at 50 percent more than a decade ago Kevin (1995). A review of available literature on vegetal depletion by Enabor (1986) led to the conclusion that man is the most important agent of vegetal depletion. In a similar manner, Awodola and Oboho (1991) in their study of the semi arid zones of Nigeria reported that deforestation in the zone is a reality; various ecological and socio-ecological indices confirmed these and this causing serious environmental degradation.

Nigeria's land resources are being managed at crisis level Udo, (1975) Dore, (1986). This is because increasing pressure on land resources has generated conflicts between economic development and resource conservatism. Such conflicts are further

pronounced by the adopted poor land use systems, which tend to cause environmental degradation. Although several factors might be responsible for the misuse of land, it is commonly centered on the removal of the tree vegetation without any attempt at its regeneration. Thus the destruction of vegetation results in extinction of valuable wildlife and timber species, siltation of streams, and soil degradation through severe erosion. The influence of socio-economic factors is an important aspect of vegetal depletion in Nigeria that demands emphasis. For instance, the economic benefit of timber supply to local and foreign markets have greatly induced the over exploitation of natural forest. As Enabor (1981), rightly said that the exploitation of natural forests in the country started as early as the 1930s when more Nigeria timber species gained acceptance at the international market. Aurbon (1957) also reported that about one million trees were felled for export in Nigeria between 1905 and 1956 of which more than 50% came from forests of Southwest Nigeria.

On the causes of vegetal depletion, Hirsch (1987), observed that the predominance of tropical forest locations in the less developed countries leads to a functional association of the problem of vegetal depletion is seen as a complex problem that has largely resulted from poverty, unequal land distribution and the pressure from the ever-growing population. As productive land becomes scarce, the small farmer seek new and fertile soil either in fragile upland forest or in original lowlands already over burdened by large number of like minded subsistence farmers. He then argued that rather than seeing vegetal depletion as a symptom of under development. It is more useful to view the problem as a similar conclusion in examining the relationship between the shifting cultivation practices, population pressure and vegetal depletion in Zambia.

The World Bank (1990), came out with a research paper on the nexus between

population, agriculture and environment. The paper asserts with proofs that rapid population growth rates, lack of agricultural development and degradation of natural resources are mutually reinforcing. In their study of vegetal depletion or deforestation in arid and semi-arid countries, it is the over cutting of under valued trees for fuel wood that causes depletion of the vegetation. Furthermore, people culture, habits and other sociological factors affect the rate of deforestation in sub-Saharan Africa. This assertion was also made by Talbot (1996) in his analysis of how demographic pressures affect rangeland area using the Muse of East African rangelands. The obvious results of cutting trees for fuel wood are easily seen nearly virtually all over African cities where treeless ground spread outwards.

Burman (1991), pointed out that timber trade is one of the major causes of vegetal depletion in some Africa countries. Stressing that hectare of natural forests with luxuriant trees has been decimated through timber industry. The careless exploitation of the Savannah's through the planting of inappropriate crops such as Soya bean and sugar cane, and the development of pine plantations, or eucalyptus, all serve to decimate habits where, because of the extremes in climatic conditions, plants are already under natural stress. Ehui (1993), in an analysis of the effect of vegetal depletion on agricultural productivity in Cote d'Ivoire examined two facets of the problem, namely current period deforestation and commutative deforestation. It was confirmed that current period deforestation can have positive impact on agricultural productivity through improved soil fertility due to the effect of nutrient content of ash left after burning the forest. Commutative deforestation on the other hand, has a negative effect on agricultural productivity due to increase erosion and leaching. Clearly, man has radically altered the earth's surface with accelerated impact in recent times. There is a need to understand the impact of human activities and actions, and to manage

resources in sympathy with the natural environment.

It is imperative to acknowledge the fact that a less obvious but equally important factor of vegetal depletion is bush fire as described by Ariola (1993). He was of the view that the first human impact on vegetation, which is still prevalent, is the use and misuse of fire, even though over half of the fires that occur are natural, resulting from lightning strikes or spontaneous combustion of decaying organic materials. The rest can be attributed to accidental fires, which may result from agricultural uses, campfires, trains and children playing with fires. Fire cause reduction in natural vegetation; they threaten wildlife, humans and properties. Fires produce secondary, problems associated with the properties. Fires produces secondary, problems associated with the clearance of vegetation such as soil erosion, flooding and wind erosion.

Animal husbandry or pastoralism also has a major impact on the landscape Revvien, (1990). He further explained that heavy grazing of cattle leads to trampling and compaction of the soil, reducing its capacity to hold water and altering its structure. Ultimately, this leads to soil erosion, both by wind or water. Selective grazing at particular plants may lead to challenges in the nature of the vegetation cover. Livestock-based livelihood is an important component in both commercial and subsistence economic activities in dry lands. Traditional pastoral nomads system has been very important in Northern Africa, some parts of Southern Africa, Arabia and Central Asia for thousands of years. Animals destroy plant communities. Plant destruction is not solely achieved by eating as tramping causes soil compaction, thereby reducing rainfall infiltration. Raising livestock numbers in dry land grazing system have particularly been seen to lead to dissertation which will gradually start as deforestation. Umoh (1999).

Wood and other combustible resources were mankind's first energy resources.



Wood still exhibits more flexibility than other fuel resources. Wood energy gains supremacy over other fuel resources mainly because it cost less and in some circumstance got free. The disappearance of forest and savanna lands depends on excessive dependence on fuel wood as the only source of energy. Nigeria is within the land areas facing crisis of fuel wood extraction. Ojo (1975), has confirmed the wide spread of the use of fuel wood as the only source of energy in the rural areas. FAO, (1985), identified fuel wood as the staple energy source for about three quarters (3/4) of the population in developing countries.

Wood (1985), Morgan and Moss (1981), Akintola (1978), and Areola (1978), all confirmed that fuel wood is one of the most primary sources of energy in developing countries and especially in the 4 tropical lands. Fuel wood is responsible for a high percent of vegetal depletion in developing countries Usman, (1996). FAO (1981), revealed that poor people depend more on fuel wood because they cannot afford the alternative fuel. Also Akintola et al (1996), noted that methods of fuel wood exploitation in both the forest and Savanna regions are unsustainable, as people do not plant trees to replace the ones that are removed. Vegetal depletion is a recurrent phenomenon in developing countries and unless something is done to halt it, it will create complex environmental problems Kevin, (1996).

Our rich vegetation has been winding over the years due to deforestation caused by population increase, poverty, farming system, excessive grazing and uncontrolled forest fires. Other causes of vegetal deforestation could be linked with urbanization, land tenure system, government's forest policy and law. The growth in urbanization and development of infrastructures such as the establishment of industries, construction of highways, airports, stadia etc. have greatly influenced the depletion of the photographs of the vegetation in Nigeria.

Aerial photographs provide the baseline data on vegetation and land use for monitoring subsequent changes and may form a unique historical record of vegetation and land use pattern (Fuller, 1981). The application of aerial photographs in assessing vegetation and land resources change has been studied by several researchers.

In 1976, the FGN through the Federal Department of forestry commissioned a Radar survey of the whole country, with the requirement to produce a series of land use and vegetation maps of the country side Looking Airborne Rada (SLAR), imageries were acquired by Motorola (MARS) ltd, between 2<sup>nd</sup> October 1976 to 31<sup>st</sup> March 1977, using a rout Apisture X-band. The SLAR imageries acquired were interpreted and mapping of the various vegetation cover area was done with the production of land use maps. The projects were the first ever SLAR survey project carried out on African continent and second largest to the RADAM project in Brazil. Adeofun (1991), used remote sensing techniques in assessment of deforestation in a low land forest area of Southwestern Nigeria. The result revealed a large-scale deforestation in the study area between 1963 and 1975, and that deforestation due to farming activities was more pronounced.

Khoria (1993), carried out a study by using serial photographs to study the vegetation and land use changes in the rain forest region of North-East of Edo State. The result showed a great reduction of forestland and wooded shrub grassland between 1967 and 1977 and that notable change were recorded in settlement area. Empirical has shown that vegetal depletion is very common in rural areas because of agricultural activities and high demand for fuelwood as a source of energy at home, Enabor, (1998).

Ample evidence abound for recurrent cases of vegetal depletion in both Niger and Kwara states. These two states are prone to deforestation because of the availability of

forest, kolawole, (1992). The use of fuelwood is common in rural areas because of the relatively high level of poverty and the agricultural activities predominant in the area. Akinlade, (1997), carried out a research work on the extent of deforestation in Oyo state and he came to the conclusion that deforestation is on the increase and if nothing is done, it will pave way for other negative consequences.

## CHAPTER THREE

### 3.0 METHODOLOGY

#### 3.1 Data Collection Procedure

Due to the intricate nature and framework of the research work, with the time constraints, questionnaire was administered as an appropriate and veritable tool for getting first hand information and data from farmers and other stakeholders. In addition with questionnaire reconnaissance survey, personal interview and groundtruthing were carried out to broaden the volume of cogent information needed for the research work. The use of materials from relevant journals, textbooks and research papers stand out as an imperative tool for sourcing of data. The aforementioned techniques gave ample opportunity for adequate data collection.

#### 3.2 Questionnaire

Structured or fixed response questionnaire containing vital and relevant questions was designed and distributed to farmers and other stakeholders residing the study area. The respondents were restricted to some response options. A question is asked and a number of response options were supplied. From these, the respondents were expected to pick any one that has best suits his response. The questions asked have direct bearing to the activities responsible for forest depletion in the study area. Due to the high percentage of illiteracy in the study area, the questions were translated into their local language for proper comprehension.

### **3.3 Reconnaissance Survey**

A reconnaissance survey of the study area was carried out. The survey enabled the physical observation and assessment of man's activities on land such as farming, construction, animal husbandry etc and how these activities are related to forest depletion. The survey involves watching and evaluating the extent of forest depletion in the area. The real and actual facts were visualized. The inventory of the environment was done. The survey presented ample opportunity of observing the real menace created by forest depletion. Pictures were taken to serve as proof attesting forest depletion.

### **3.4 Personal Interview**

Farmers and other stakeholders were personally interviewed about issues of paramount concern to the research work. The interview involves eliciting information from the respondents through verbal interaction. A great deal of skill was adopted in communication. Probing questions were asked to give more details about the theme of the research work. The interview method gave more opportunities for direct and more elaborate explanation on forest depletion. Personal interview provided more comprehensive explanation that was not initially included in the questionnaire. Pertinent and probing questions were asked thereby revealing some basic information or data about the research.

### **3.5 maps and photographs**

Topographical map and photographs of the study area were studied and analyzed to give some cogent information about the trend of forest depletion in the study area.

### 3.6 Other Sources

Materials and data of other relevant empirical works from journals, books and research papers were consulted and scrutinized in order to have justifiable data. Forest depletion cuts across all countries as such a lot of research work have been documented about it. Journals and materials that dwell extensively on forest depletion were used e.g. Agenda 21.

## CHAPTER FOUR

### 4.0 DISCUSSION OF RESULTS

#### 4.1. Type of agricultural activities

The question is aimed at finding out what type of agricultural activities that the respondents are involved in. Land clearance is mostly required by some agricultural activities while some only requires minor clearance. Under this heading, the options are crop production, animal husbandry and those that do not engage themselves into any type of agricultural activities.

**Table 4.1: Type of Agricultural Activity**

Types	Frequency	Percentage
Crop production	72	87.80
Animal production	10	12.20
Nil	-	
<b>Total</b>	<b>82</b>	<b>100</b>

*Source: Survey, 2007*

From table 4.1, 87% of the respondents are involved in crop production and this implies that more hectares of forest are cleared in order to farm more crops, as a result of this, forest depletion occurs. A good number of the people are farmers so the degree of cropping will be high and this is an indication that more forests or land will have to be cleared and this is increasing the rate and extent of forest depletion. The remaining 12.20% are engaged in animal production, although the feeding or grazing of amounts on vegetation can cause deforestation, it may not largely be held responsible for forest depletion as attested to by the data collected shown graphically below in Figure 1

#### 4.3 Source of Energy at home (for cooking)

The type of energy used at home for cooking will provide a good measure of the extent of reliance on natural vegetation. Some households use kerosene, some gas while some use fuel wood. Fuel wood as a source of energy to most Nigerians is one of the most obvious causes of deforestation (i.e. Forest depletion). Most Nigerians families rely absolutely on firewood as there source of energy and this is of great concern to environmental managers.

**Table 4.3: source of energy**

Sources	Frequency	Percentage
Kerosene	9	10.97
Fuelwood	70	85.37
Gas	3	3.66
<b>Total</b>	<b>82</b>	<b>100</b>

*Source: Survey, 2007*

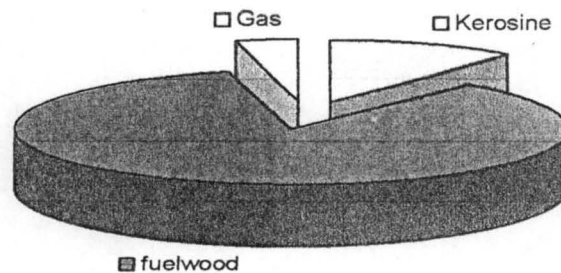
Table 4.3 shows that 85.37% of the respondents rely on fuelwood as source of energy at home, 3.66% rely on gas while 10.97% rely on kerosene. From the information above, it is obvious that more people rely on fuel wood as a source of energy at home in terms of cooking and other activities. The rate and scale of collection of firewood has reached an alarming rate to the extent that attention has been drawn to this problem. The use of firewood at homes is a great problem ascribed to poverty of the masses. The pressure on this natural resource is increasing because of the quest of people to satisfy these needs. The collection is done wantonly and the cumulative effect is a very serious environmental issue, as attested to by the data collected and graphically shown in Figure 3 below (See plate2)





**Plate: 2** rural women regard firewood as a free gift of nature

**Fig. 3: Sources of energy**



#### 4.4 Source of fuel wood

The source or location where fuel wood is got will denote the areas where forest depletion is massive. Most farmers and stakeholders' source for fuel wood locally and some have to travel far distance to get them. This data will indicate the location where forest is fast disappearing.

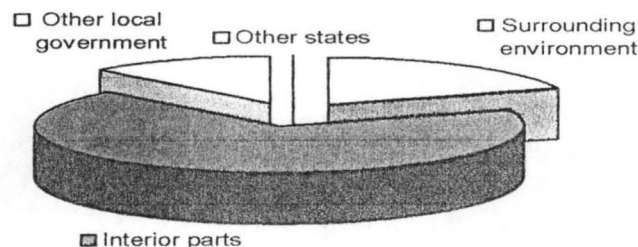
#### 4.4: Source of fuel wood at home

Source	Frequency	Percentage
Surrounding environment	16	19.51
Interior parts	56	68.29
Other local government	10	12.20
Other states	-	-
<b>Total</b>	<b>82</b>	<b>100</b>

**Source: Survey, 2007**

Table 4.4 indicates that 68.29% of the respondents collect fuelwood from the interior parts, 19.51% source of fuelwood from the surrounding environment while 12.20% have to travel to other local government areas. The implication of this data is that trees surrounding the environment are almost exhausted and the people have to go into the interior parts for their fuelwood. Most forests in the study area are depleted due to consumption of fuelwood and activities of Saw Mill operators, as attested to by the data collected and shown in Figure 4 below.

Fig. 4: Sources of fuelwood used at home



#### 4.5 Estimated amounts of fuelwood used monthly

The quantity of firewood used monthly will give a picture of the rate and scale of forest depletion in the study area. Some household make tremendous use of firewood while others make less use of it. In a situation where large quantities are collected, the degree of vegetal depletion will increase tremendously.

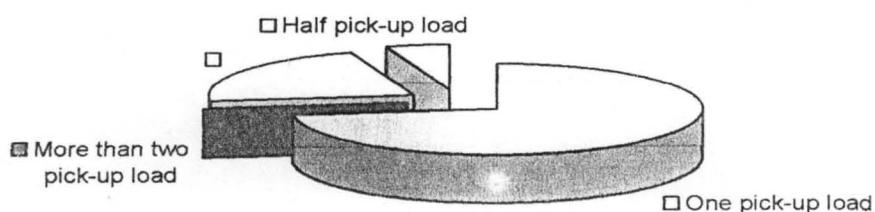
**Table 4.5: Estimated amounts of fuelwood used monthly**

Estimate	Frequency	Percentage
One pick-up load	60	73.17
More than two pick-up load	18	21.93
Half pick-up load	4	4.88
<b>Total</b>	<b>82</b>	<b>100</b>

**Source: Survey, 2007**

There is a sharp difference between the fuelwood consumption of different households. Table 4.5 shows that 73.17% of the respondents use an estimate of one pick-up load monthly, this fact is threatening because at the rate, the trees or forests in the study are will be exhausted in no distance future. About 21.95% of the respondents make use of half pick-up monthly while 4.88% make use of more than two pick-ups monthly. The overall implication is that more and more trees, shrubs, forests are removed, as attested to by the data collected and is graphically shown in Figure 5 below.

**Fig. 5: Estimated amounts of fuelwood used monthly**



#### 4.6 Purchase of fuelwood / firewood

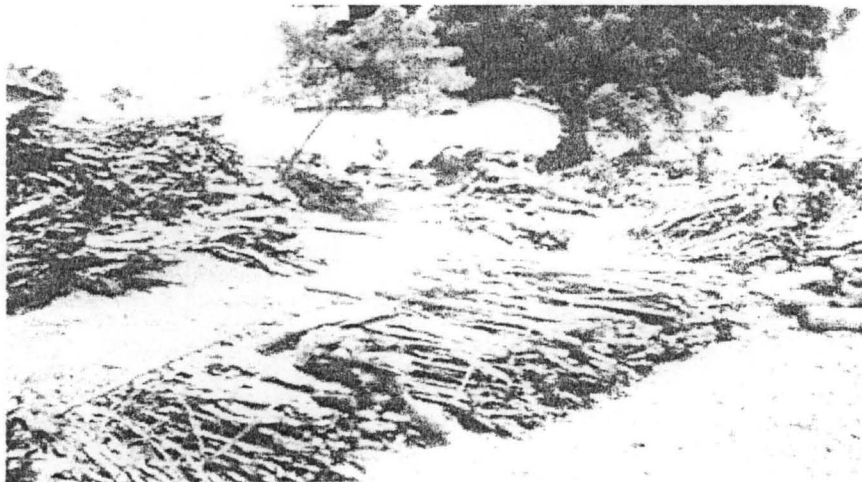
If the users of firewood in the study area have to pay, there will be drastic reduction in the rate of collection. But some of the users do not pay for using firewood; it means that deforestation will be on the increase.

**Table 4.6: Purchase of fuelwood**

<b>Purchase</b>	<b>Frequency</b>	<b>Percentage</b>
Purchase	4	4.88
Do not Purchase	78	95.12
<b>Total</b>	<b>82</b>	<b>100</b>

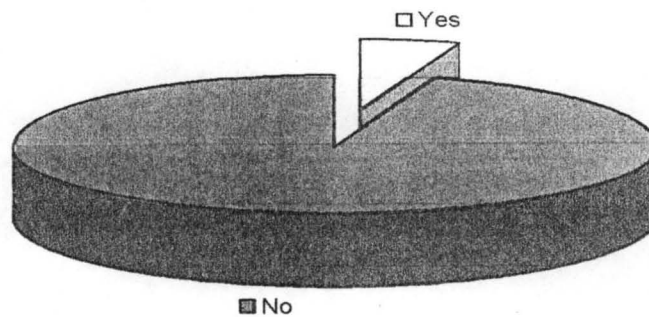
**Source: Survey, 2007**

From table 4.6, 95.12% of the respondents include the fact that they do not pay any amount for the use of firewood. 4.88% of the respondents do pay for the use of firewood. From personal interview, it was deduced that most of the users of fuelwood only go to the forest and fell trees wantonly without anybody or legislation to check them. It must be stated that one of the major reason why firewood is used by almost all rural dwellers is the fact that they do not have to pay for using it. (See Plate 3) and also as attested to by the data collected is graphically shown in Figure 6 below.



**Plate: 3.** a typical firewood market on rural area in Bida

Fig. 6: Purchase of fuelwood



The obvious absence of effective legislation preventing wanton felling of trees from the forest makes people to collect this resource without any caution to the rate and degree of collection.

#### 4.7 Activities of saw –mill operators

This question tends to find out if saw mill activities are evidence in the study area and to find out the rate and scale of the activities of saw mill operators viz-a- vis forest depletion of the area.

Table 4.7: Existence of saw-milling activities

	Frequency	Percentage
Do exist	76	92.68
Do not exist	6	7.32
<b>Total</b>	<b>82</b>	<b>100</b>

Source: Survey, 2007

From table 4.7, 92.68% of the respondents attest to the fact that saw-mill activities are predominant in the study area. Reconnaissance survey carried out also confirms the authenticity of the data. Many saw-mills are located in the study area. The major raw material for saw mill is timber (*Khaya Senegalensis*) and it is derived from the forest. Pictures were taken to provide valid evidence. The scale of felling of trees by saw – mill operators is alarming and nothing is done to check this ugly development.

The natural vegetation is at the receiving end, as attested to by the data collected and is shown graphically in Figure 7 (See also Plate 4)

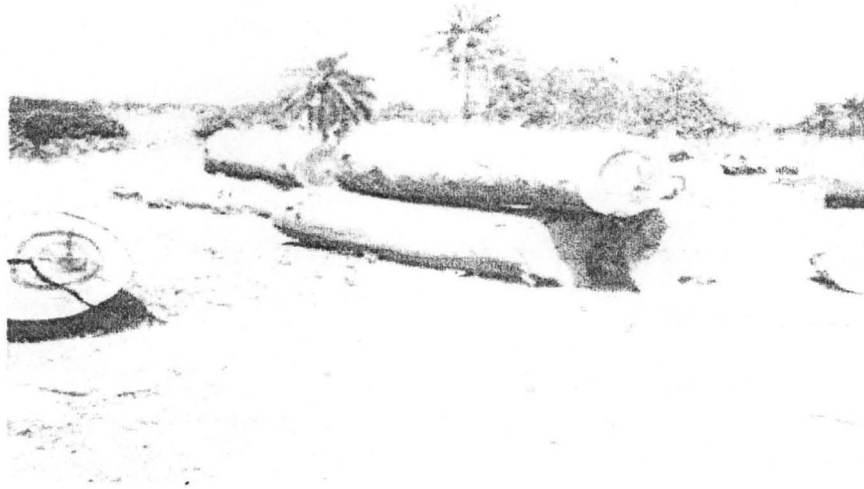
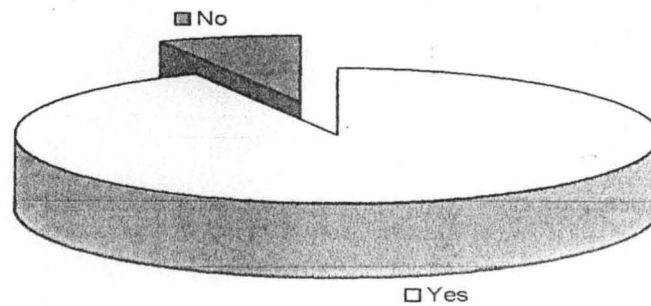


Plate: 4 a typical tree plant used by saw millers for their business

Fig. 7: Existence of sawmilling activities



#### 4.8 Burning of vegetal cover (Trees, shrubs etc)

Burning of forests, trees, shrubs, bushes etc has become a recurring phenomenon and the consequences are of negative impacts because they compound the scale of forest depletion. Burning of forest or vegetation is the fastest way through which deforestation occur. The frequency of vegetal burning is scaring because at the present rate of burning, natural resources will be exhausted soon.

**Table 4.8: Involvement in bush burning activities**

Burning	Frequency	Percentage
No	14	17.07
Yes	68	82.93
<b>Total</b>	<b>82</b>	<b>100</b>

*Source: Survey data, 2007*

From table 4.8, 82.93% of the respondents carry out bush burning for one reason or the other. Bush burning causes fast and large scale deforestation because of the way and manner in which fire operates. Due to the fact that a high percentage of the respondents burn the vegetation, the expectation should be that deforestation will be on the increase except something is done to check, as attested to by the data collected and shown in Figure 8 below. (See Plate 5)

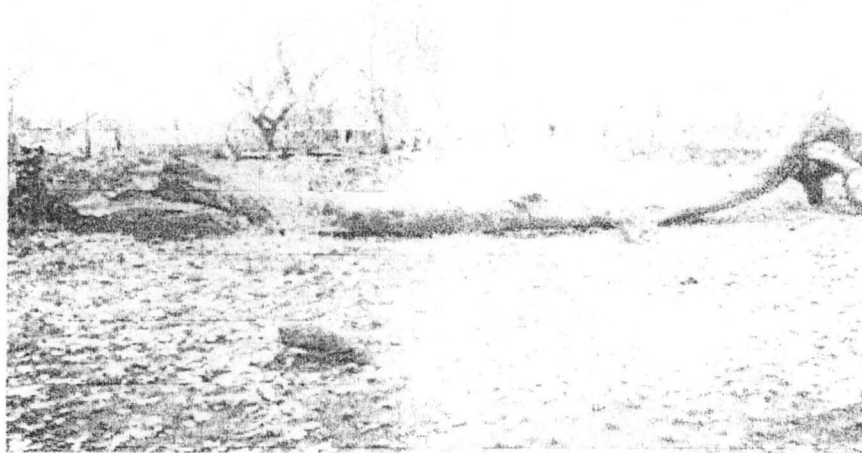
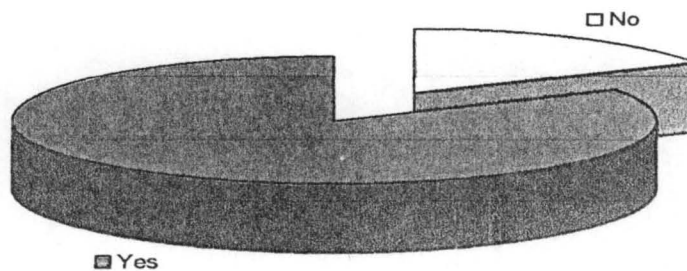


Plate: 5. A burnt vegetation in bida environment

**Fig. 8: Involvement in bush burning activities**



#### 4.9. Trees planted monthly

The attitudes of people towards tree planting will give an ample opportunity in understanding the consciousness of the people towards preventing deforestation. Individuals will be protecting the environment if they tend to plant a good number of trees to combat deforestation. It's a general view that more trees are fell compared to the number planted. Tree planting is one of the most important techniques in reducing the scale of deforestation.

**Table 4.9: Trees planted monthly**

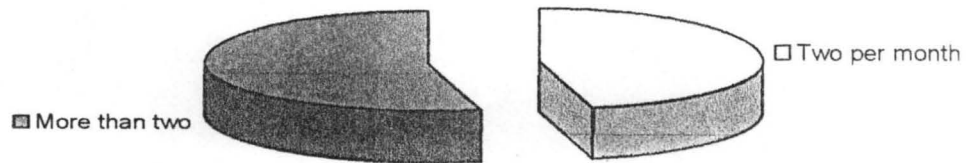
Trees	Frequency	Percentage
Two production	6	7.32
More than two	7	8.53
Nil	69	84.15
<b>Total</b>	<b>82</b>	<b>100</b>

**Source: Survey data, 2007**

From table 4.9, 84.15% of the respondents do not plant trees and this depicts the non-challant attitude of the people towards the environment. Many trees are fell monthly and the number planted is a far-cry from the desired number. It is obvious that many trees are removed daily but yet some people are not inclined towards planting just a tree monthly. 7.32% of the respondents plant two trees monthly while 8.53% of the respondents plant more than two trees per month, as attested to by the data collected and is graphically shown in Figure 9 below.



Fig. 9: Number of trees planted monthly



#### 4.9.1 Awareness campaign against deforestation

This question is aimed at ascertaining whether there is any awareness campaign against deforestation in the study area. If people are aware of the negative implications and consequence of deforestation, they will reduce the rate of vegetal depletion.

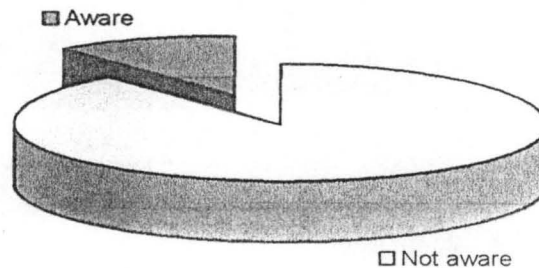
Table 4.9.1: Awareness campaign against vegetal depletion

Others	Frequency	Percentage
Not aware	73	89.03
Aware	9	10.97
<b>Total</b>	<b>82</b>	<b>100</b>

Source: Survey data, 2007

Table 4.9.1 shows that 89.03% are of the view that there is no any form of campaign against deforestation while 10.97% feels theirs campaign against it. Absence of a massive awareness campaign could be attributed as one of the reasons why depletion of vegetation is on the increase, as attested to by the data collected and shown in Figure 10 below.

**Fig. 10: Awareness of campaign against vegetal depletion**



#### **4.9.2. Result of Ground Truthing or Field Studies of April 2007**

Field studies were carried out to assess the current conditions in the study area. The primary objectives was to observe, assess and record the current field conditions in terms of extent of forest depletion and the major factors responsible for deforestation in the area. This was restricted to quantitative visual assessment of physical features.

It was observed that farming activities, sawmill activities, grazing etc accounted for the causes of deforestation in the area. A good number of sawmills were identified in the study area and physical observation was made. The number of trees fell and brought to the saw mill rangers from 100 – 200 per day. At this rate, many forests in the study area will disappear. It was also observed that there is no any means of checking the activities of the sawmill operators. Some operators claimed that they do not pay any amount for felling trees.

#### 4.9.3 CAUSES AND CONSEQUENCES OF DEFORESTATION IN THE STUDY AREA

(a) **Farming Activities**

The local farmers living within and outside the study area are practicing shifting cultivation system of farming and are always encroaching into the forest in search for new fertile land for farming after leaving the old ones. This leads to total clearing, packing and burning of the new site.

(b) **Felling of Trees**

Timber contractors are responsible for this illegal practice. Some of them exploit forest resources at the rate that is best imagined. Illegal felling of trees is one major factor that contributes to large scale deforestation.

(c) **Fuelwood**

There is high demand for firewood from the forest by firewood sellers. Shortages in supply and high prices of kerosene and cooking gas in the country have led to a high demand for firewood. A lot of wood is been removed from the forest by charcoal producers in the area for sales in the near by towns and cities. All these are seriously affecting the forest.

(D) **Bush Burning**

The forests are always set on fire by farmers and hunters. This activity is responsible for the depletion of many forests in the study area. It takes just some minutes and a vast area of vegetation is destroyed.

## CHAPTER FIVE

### 5.0 Summary of Findings

From the discussion of results in Chapter five, it is highly imperative and pertinent to note that forest depletion or deforestation is on the increase in the study area (Bida and environs). It is well established that if nothing concrete is done to halt the observed trend in terms of rate and scale, all the remaining forests will soon be a thing of the past. It was also observed that drastic measures are needed to check deforestation.

Forest depletion or deforestation in the study area is caused by a complex and intricate factors revolving round man and its activities, lack of understanding of the natural systems and the interaction between various earth surface processes and the impact of human activities or actions, and to manage resources in sympathy with the natural environment makes deforestation a serious problem. From the research work, it is obvious that fuelwood consumption, cultivation of crops, bush fires, overgrazing and activities of saw-mill are the basic causes of forest depletion in the study area.

Based on the research findings, about 68% of the people engage in yam production and this requires extremely large hectares of land. Land clearance generally involves cutting of shrubs and trees in order to make heaps, this alone could account for a reasonable percentage of deforestation in the area. The land is seriously distorted in the act of making heaps. In a nutshell, the over-cultivation of crops implies thorough land clearance. In the quest to increase farming land, big forests are cleared and rendered bare, paving way for degradation.

Fuelwood consumption ranked second in the causes of deforestation as shown from the study. Virtually all the people in the area depend on fuelwood as the source of energy at home. Some residents are involved in selling of firewood and this account for some degree of deforestation. Fuelwood is preferred compared to other sources of energy because it cost less and at times got free from the surrounding. Fuelwood is also relatively faster.

The rate and scale of bush fires in the study area is another major cause of deforestation bush fires are very fast and could destroy vegetation within small time. The frequent burning of bushes and add to the already existing problem of deforestation. Hunters are also in the habit of burning bush in order to kill animals and inadvertently causing or increasing the scale of deforestation. Lazy farmers are also in the habit of burning vegetation as a means of land clearance.

Animal grazing or over-grazing is seen to be one of the factors compounding the issue of deforestation. Animals are allowed to graze freely on vegetal covers and within no time the land is left bare. Consistent grazing has a cumulative effect on the incidence of deforestation. Sawmills and other activities could also be a contributing factor in the causes of deforestation because a lot of trees are fell and used by sawmill. Large forests are disappearing due to the activities of saw mill owners. Some less obvious that equally important causes of deforestation are lack of awareness, illiteracy and abject poverty. Most of the respondents and other stakeholders are not aware of the negative consequences of deforestation. Virtually all the respondents are not aware that deforestation causes poor soil fertility, erosion, flooding etc. illiteracy on the other hand, acts as a barrier to awareness that will make individual enhance desirable attitude. The poverty level of the people affects their perception of resources at levels which may be ultimately injurious to the ecosystem.

## **5.1 Effects of Forest depletion in the study area**

Some of the noticeable impacts of deforestation in the study area are highlighted below:

- (a) Loss of valuable minor forest products such as edible fruits, nuts, seeds and medicinal herbs by the villagers which has been a source of food and income in the past.
- (b) The plant communities has been destabilized because the floristic composition offered by the natural forest cannot be found in the resultant plantations thus some families of plants has been extinct while some are endangered.
- (c) The wildlife population of the forest has drastically reduced according to the information that I gathered from the villagers, this is because deforestation has caused the destabilization of the natural habitats of wildlife and they have been forced to migrate to safer place.

## **5.2 CONCLUSION AND RECOMMENDATION**

### **5.3 Conclusion**

The assessment of forest depletion in Bida and environs has shown that a lot of forest depletion has taken place in the area. The study has helped to identify, classify and suggest ways of tackling or checking wanton destruction of forests.

From the analysis, assessment and physical visualization of the study area, it was established that forest depletion or deforestation is taken place. It was discovered that unquantifiable amount of genetic resources of the flora and fauna of the natural forest resources whose usefulness may have not yet been discovered have been lost to mankind. The forest ecosystem has been drastically altered and modified because the characteristic floristic undergrowth of natural forest consisting of woody climbers

has given way to grassy undergrowth.

It was also discovered that the original forest vegetation has been destroyed through the various tactics of deforestation, the existing small portion of the natural forest are under threat.

#### **5.4 recommendation**

In face of the observed trend in terms of the rate and extent of deforestation in the study area, it is absolutely imperative that some policy, strategies and options are needed to mitigate the potential dangers of the current deforestation rate in the study area. The following recommendations are made in order to halt the recent trend of deforestation in the study area:-

1. Adequate and appropriate improvements in systems of farming and land management technique could reduce the rate of deforestation, and this will alleviate the impact of population pressure. For example mixed farming could be embarked upon as a way of improving present prevalent slash – and – burn cultivation. This will halt deforestation in many ways.
2. The practice of afforestation and re-afforestation in the area will mitigate the incidence of deforestation. This involves the planting of economical trees to combat deforestation.
3. The creation of forest reserves will make valuable contribution towards preventing and checking of deforestation.
4. Strict legislation should be made to prevent wanton felling of trees and burning of vegetal cover, the legislation should be thoroughly enforced.
5. A massive awareness drive to substantially improve environmental

consciousness should be embarked upon by the Local Government Area and thus will create a healthier environment at cheaper cost. Educational campaign will redress the problem.

6. The supply and distribution of alternative energy sources should be expanded and improved so that kerosene, coal and cooking gas can get to rural areas and urban consumers at affordable prices. Design and development of improved cooking stoves at low cost to energy consumers.
7. Finally, the need for general alleviation of poverty cannot be over-emphasized, in view of the insidious damaging effects of poverty on the environment.

It is believed that these recommendations will go a long way to reduce the rate of deforestation and its attendant consequences not only in the study area but in the country at large.



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LIST OF PLATES



Plate: 6. a typical natural forest environment in Bida

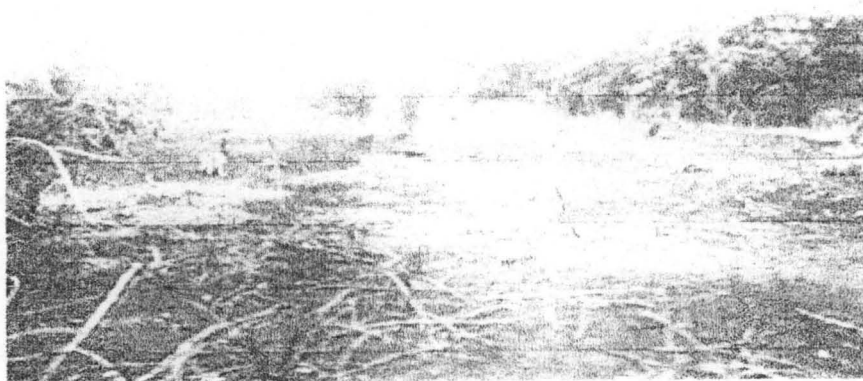


Plate: 7 natural forest cut by fire



Plate: 8. natural vegetation not yet depleted

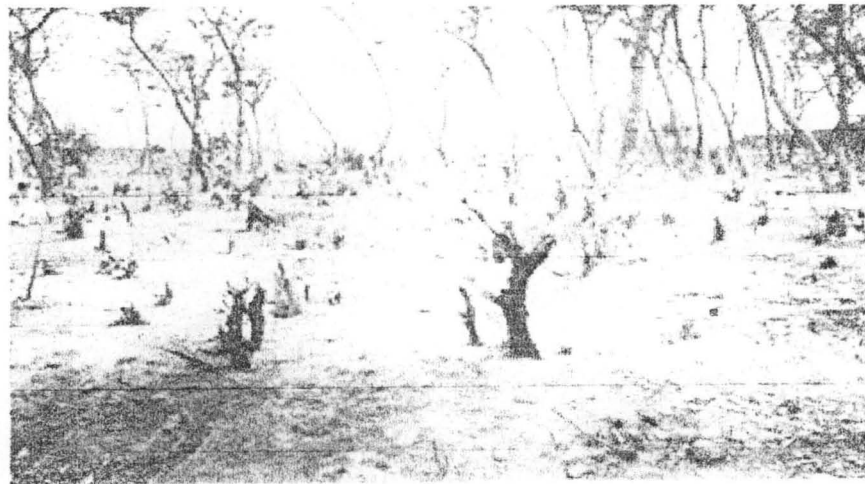


Plate: 9. government reserved forest been depleted and cut by fire

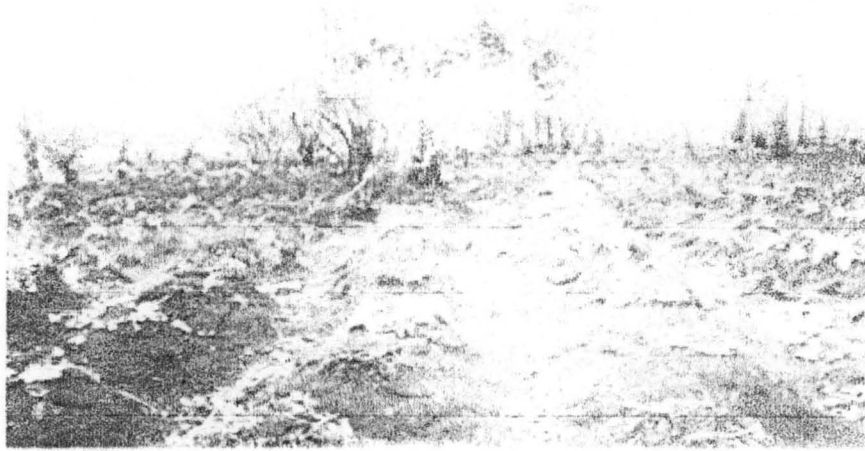


Plate: 10. unsustainable farming activities will mount pressure on land



Plate: 11. a typical firewood transporter in action

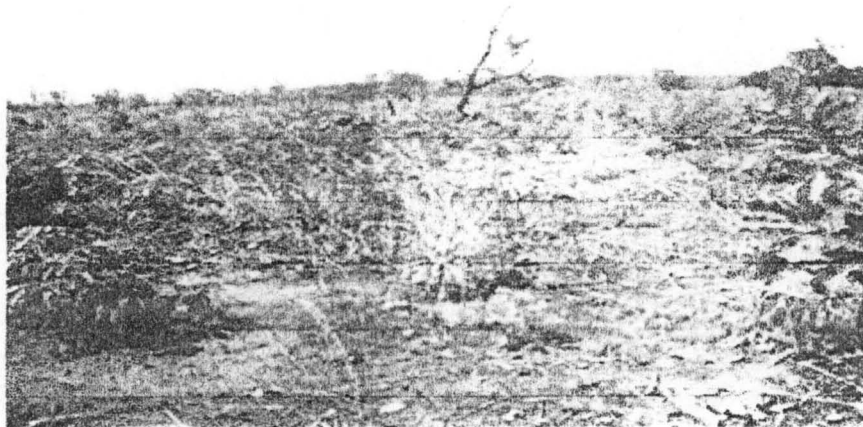
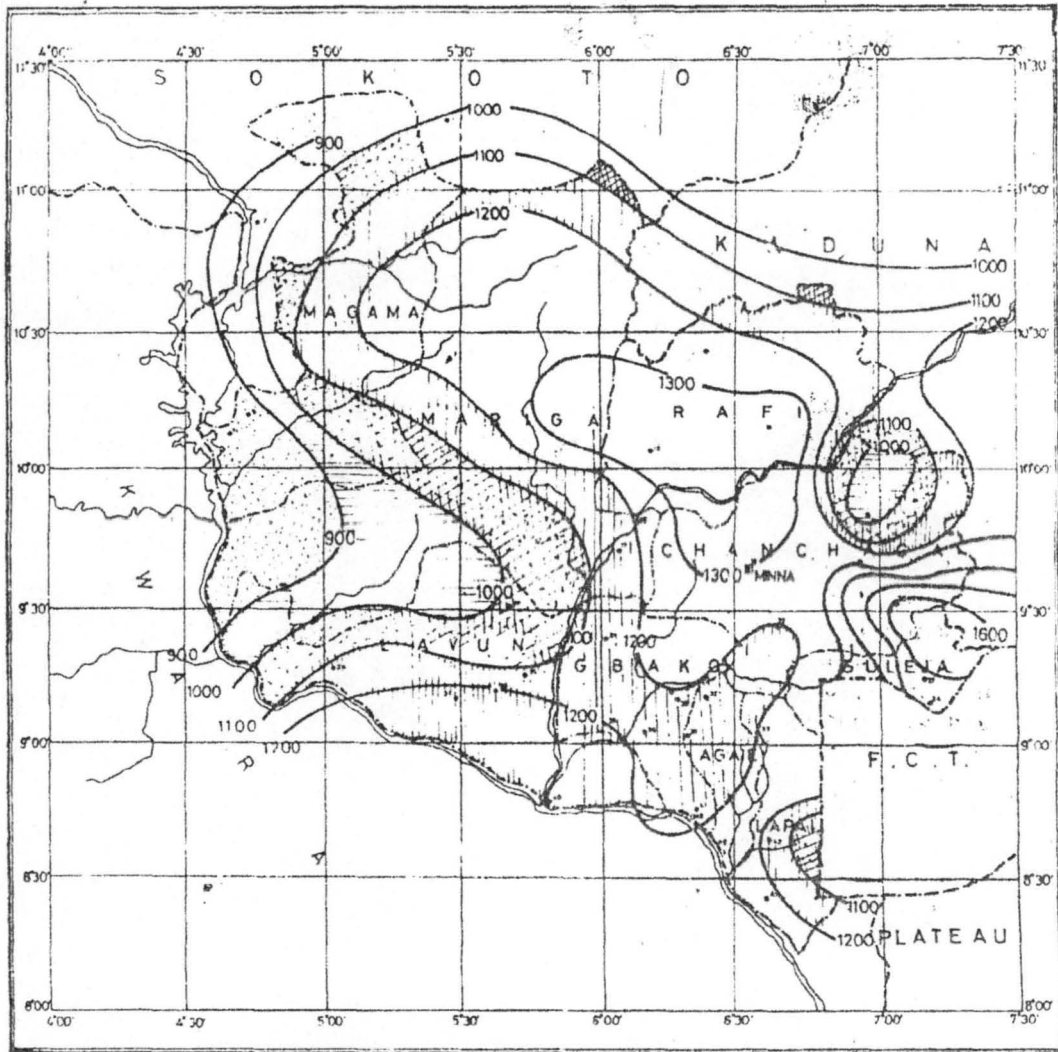


Plate: 12. Depleted forested area in Bida



Plate: 13. Wanton of firewood needs

**LIST OF APPENDICES**  
**NIGER STATE**  
**MEAN ANNUAL RAINFALL (IN MM)**



SCALE - 1:1,000,000  
 OR  
 10 KILOMETERS TO ONE CENTIMETER

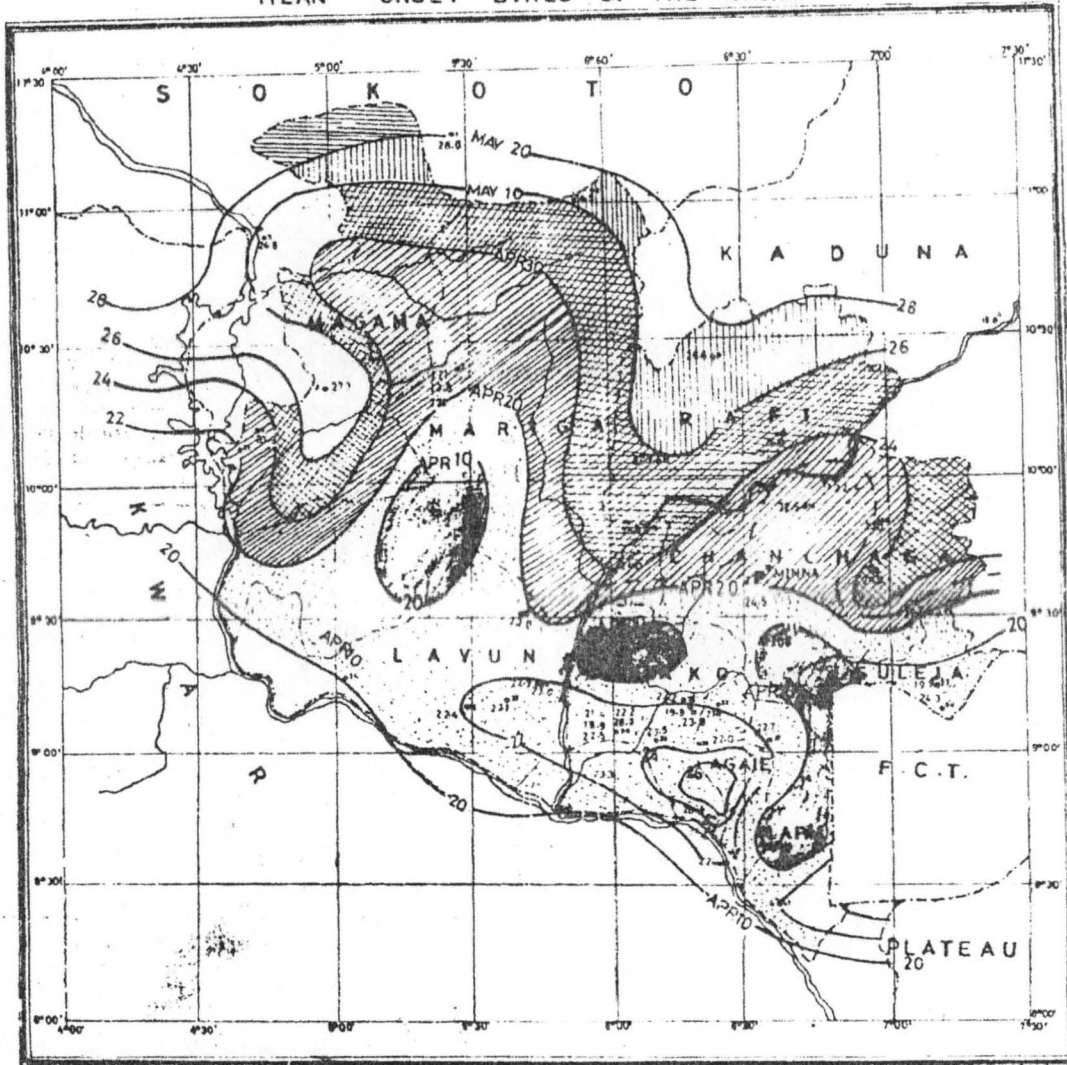
L E G E N D

- |                       |                       |               |                          |               |
|-----------------------|-----------------------|---------------|--------------------------|---------------|
| Greater than 1200mm   | 1100-1200             | 1000-1100     | 900-1000                 | Less than 900 |
| State Govt Boundaries | Local Govt Boundaries | State Capital | Other Towns and Villages | Rivers        |



# NIGER STATE

## MEAN ONSET DATES OF THE RAINS.



SCALE 1:1,000,000

OR

10 KILOMETERS TO ONE CENTIMETER

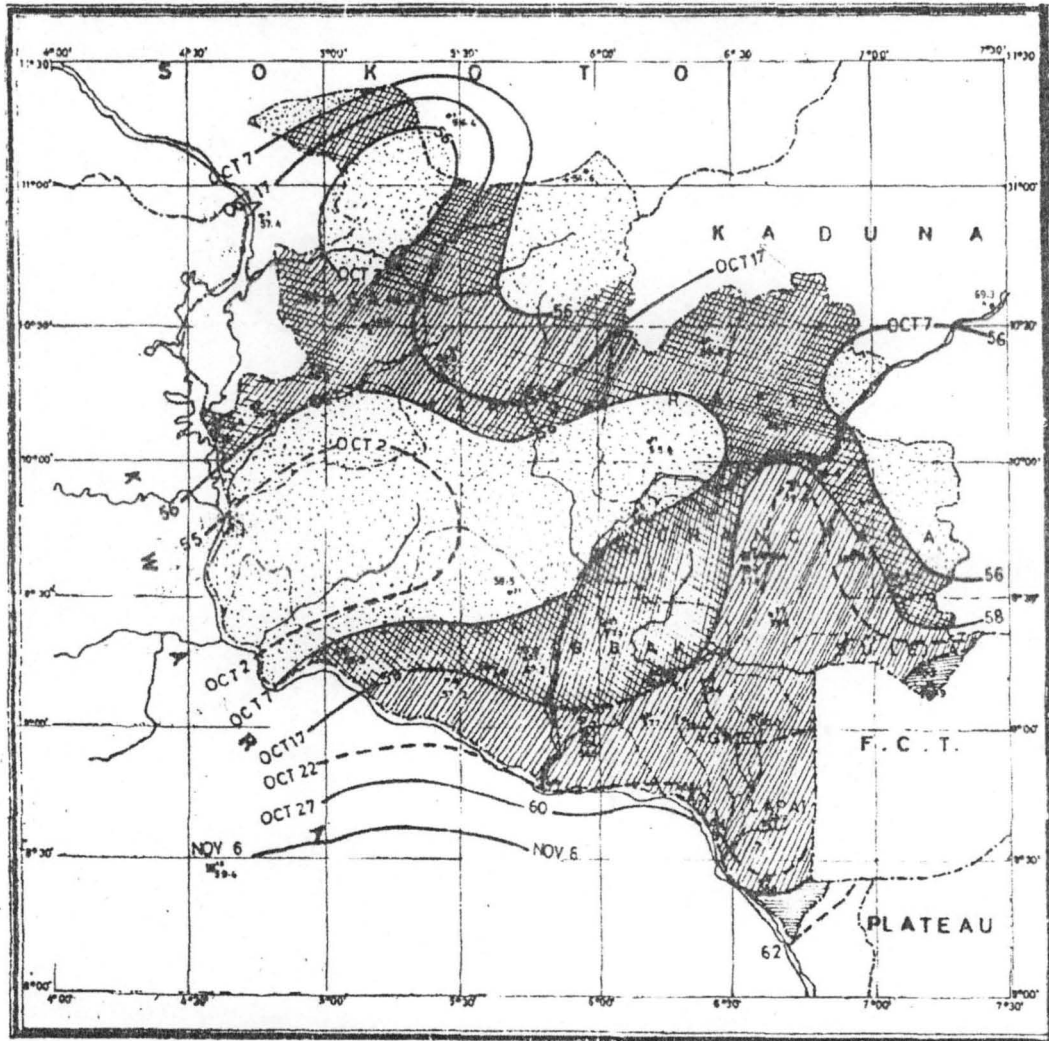
KILOMETERS 20 0 20 40 60 80 100 120 140 160 180 KILOMETERS

### LEGEND

- |   |   |   |  |
|---|---|---|--|
| <ul style="list-style-type: none"> <li> Before April 10 (Early)</li> <li> May 10 To May 20</li> <li> State Capital</li> </ul> | <ul style="list-style-type: none"> <li> April 10 To April 20</li> <li> After May 20 (Late)</li> <li> Other Town and Villages</li> </ul> | <ul style="list-style-type: none"> <li> April 20 To April 30</li> <li> State Govt. Boundaries</li> <li> Rivers</li> </ul> | <ul style="list-style-type: none"> <li> April 30 To May 10</li> <li> Local Govt. Boundaries</li> </ul> |
|---|---|---|--|

# NIGER STATE

## MEAN CESSATION DATES OF THE RAINS.



SCALE - 1 : 1,000,000

OR

10 KILOMETERS TO ONE CENTIMETER

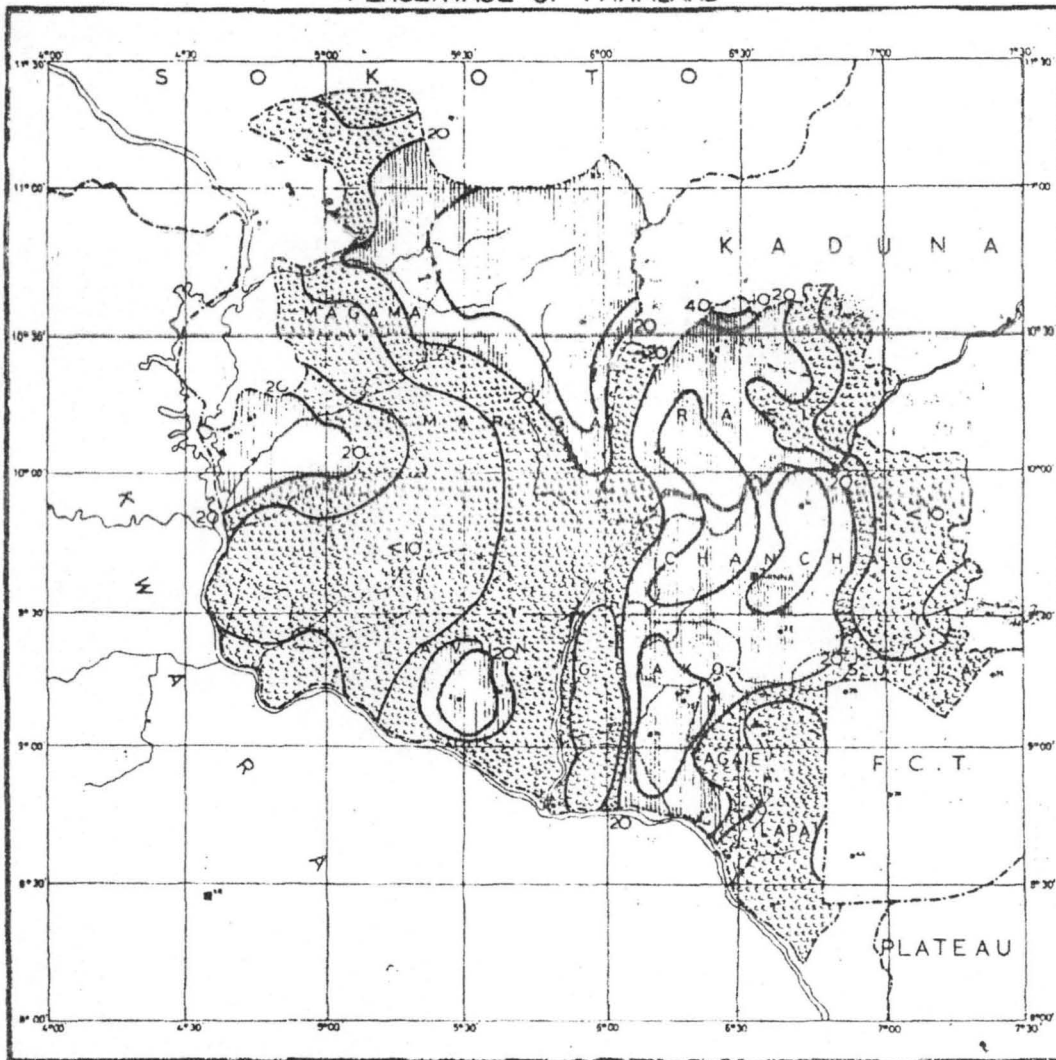
KILOMETERS 0 20 40 60 80 100 120 140 160 180 KILOMETERS

### LEGEND

- |  |   |   |   |
|--|---|---|---|
| <p> Before Oct.7 &lt; 58</p> <p> State Govt. Boundaries</p> <p> Rivers</p> | <p> 58 To 59 Oct.7 To Oct.17</p> <p> Local Govt. Boundaries</p> | <p> 59 To 60 Oct.17 To Oct.27</p> <p> State Capital</p> | <p> &gt; 60 After Oct.27</p> <p> Other Towns and Villages</p> |
|--|---|---|---|

# NIGER STATE

## PERCENTAGE OF FARMLAND

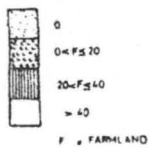


SCALE - 1 : 1,000,000

OR

10 KILOMETERS TO ONE CENTIMETER

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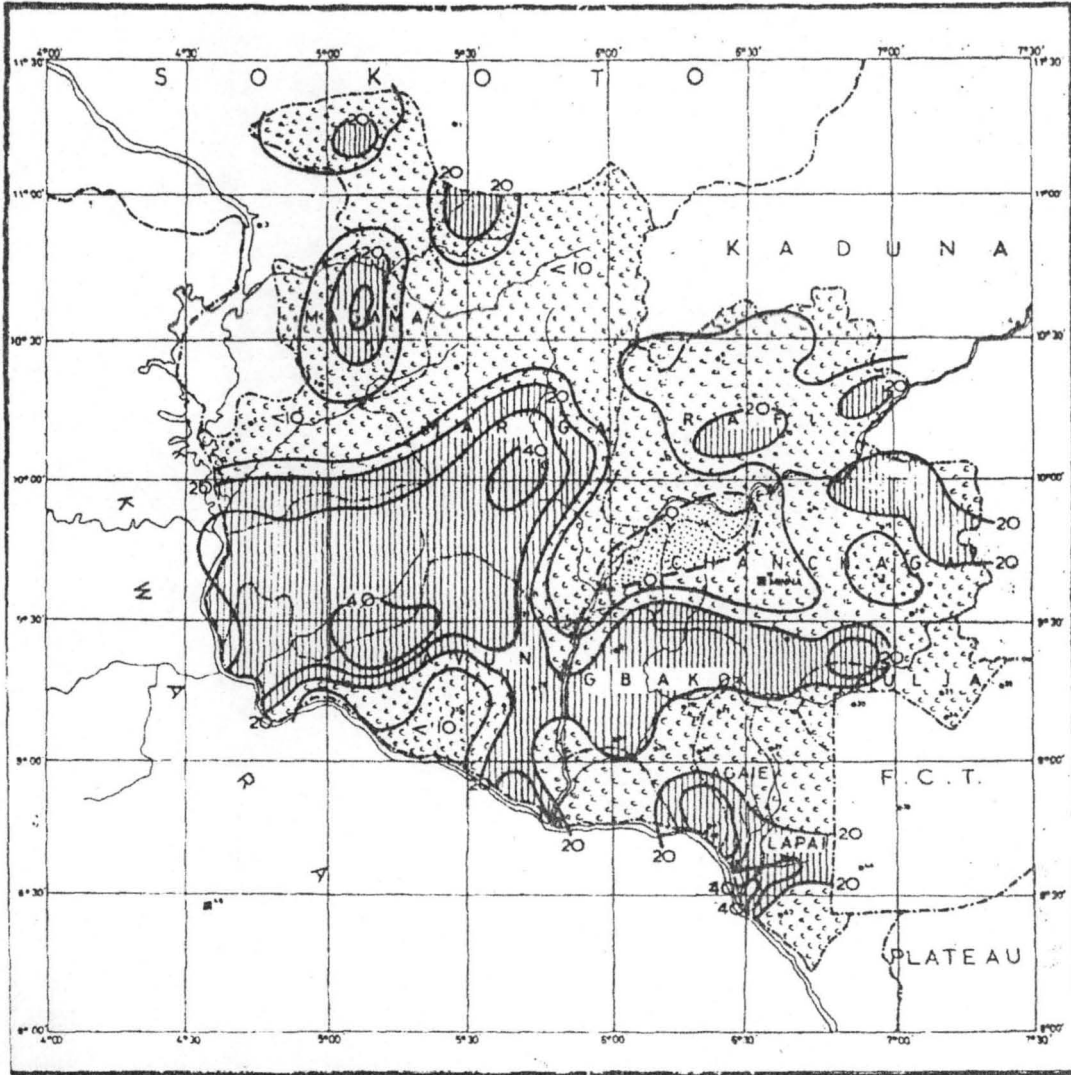


- State Government Boundaries
- Local Government Boundaries
- State Capitals
- Other Towns and Villages
- Rivers

### L E G E N D

- MINNA
- Other Towns and Villages
- Rivers

# NIGER STATE PERCENTAGE OF TREES



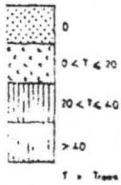
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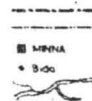
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KILOMETERS 20 0 20 40 60 80 100 120 140 160 180 KILOMETERS

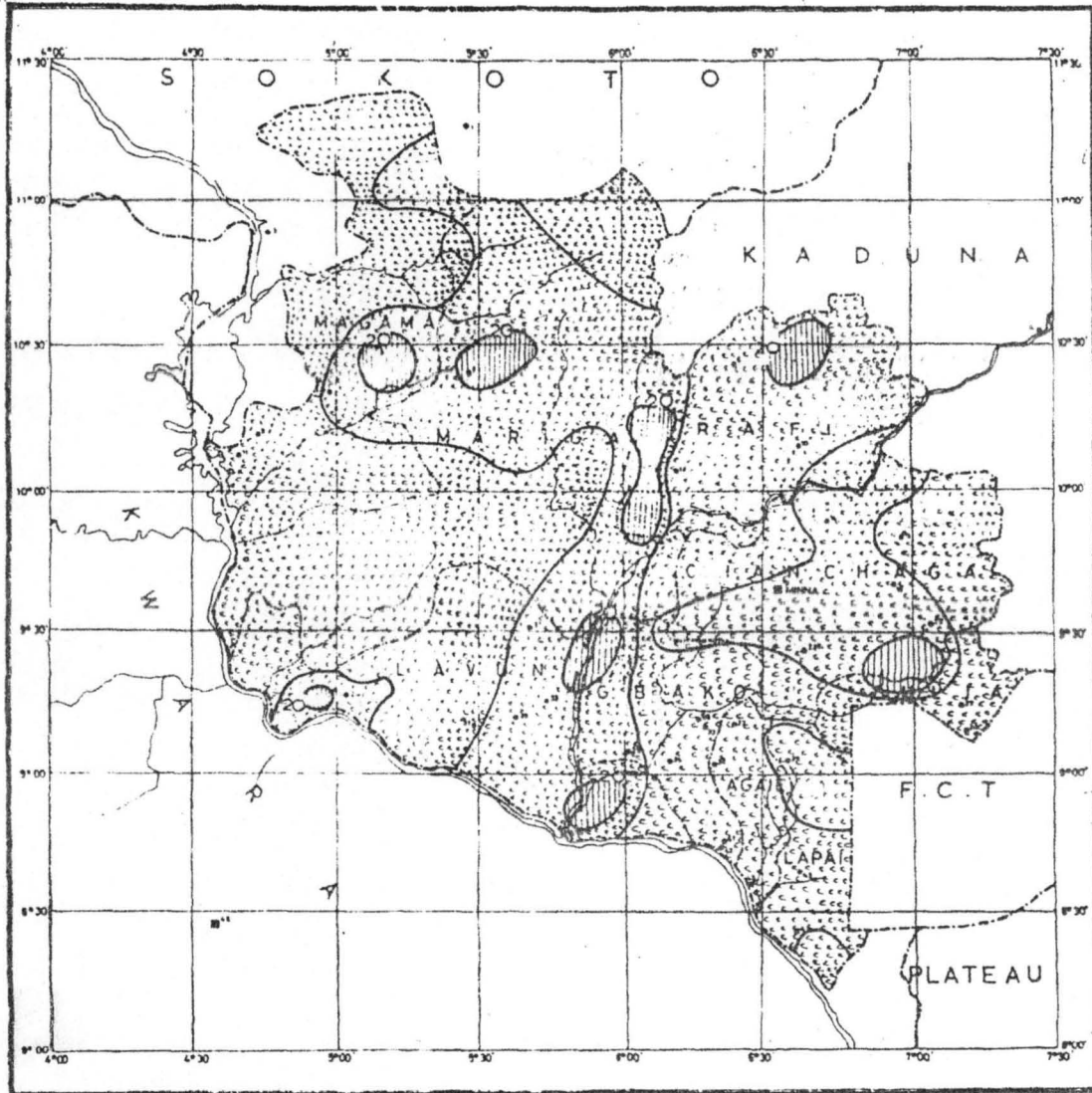
### LEGEND



State Government Boundaries  
Local Government Boundaries  
State Capital  
Other Towns and Villages  
Rivers



# NIGER STATE PERCENTAGE OF BAREGROUND



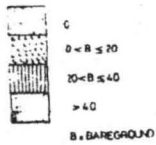
SCALE: - 1 : 1,000,000

OR

10 KILOMETERS TO ONE CENTIMETER

KILOMETERS 20 0 20 40 60 80 100 120 140 160 180 KILOMETERS

### L E G E N D



State Government Boundaries  
Local Government Boundaries  
State Capital  
Other Towns and Villages  
Rivers

MAPUA  
Bida

**FEDERAL UNIVERSITY OF TECHNOLOGY,  
SCHOOL OF SCIENCE AND SCIENCE EDUCATION  
DEPARTMENT OF GEOGRAPHY**

**INSTRUCTION:** This is a research questionnaire specifically meant for academic exercise, please, kindly fill the questionnaire. All information will be held confidentially.

1. Name of respondent: \_\_\_\_\_
2. Sex: \_\_\_\_\_
3. Age: \_\_\_\_\_
4. Occupation: \_\_\_\_\_
5. What type of Agricultural activity are you involved in?  
(a) Crop production (b) Animal production (c) Nil
6. What type of crop do you cultivate?  
(a) Yam (b) Maize (c) Millet (d) Others
7. If you are into animal rearing, what grazing system do you employ?  
(a) Zero grazing (b) Free grazing (c) Semi – Intensive.
8. What source of energy do you use?  
(a) Gas (b) Fuelwood (c) Kerosine (d) Biomass
9. Where do you get your fuelwood from?  
(a) Interior parts (b) Surrounding environment (c) Others LGA
10. Give a vivid estimate of firewood used monthly?  
(a) One pick-up load (b) Half pick –up load (c) More than two pick-ups
11. Do you purchase or source for fuelwood from the environment?  
(a) Yes (b) No
12. How many economic trees do you plant in a year?  
(a) Nil (b) 2 (c) More than 2
13. Do you set –fire on vegetation?

(a) Yes (b) No

14. Do saw-mill activities take place in this area?

(a) Yes (b) No

15. Do you think that saw -mills are responsible for forest depletion in this area. (a)

Yes (b) No

16. Mention any three uses that trees are put into?

(a) (b) (c)

17. Are you aware of the campaign against vegetal depletion? (a) No (b) Yes

18. Are you aware of the negative effects of forest depletion? (a) Yes (b) No

19. Mention the important of forest

20. Suggest ways of controlling vegetal depletion.

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