ENVIRONMENTAL CONSEQUENCES OF DEFORESTATION IN BOSSO LOCAL GOVERNMENT AREA, NIGER STATE, NIGERIA

BY

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M.TECH/SSSE/2005/1343

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SUBMITTED TO THE POSTGRADUATE SCHOOL,FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF TECHNOLOGY (M.TECH) IN GEOGRAPHY WITH ENVIRONMENTAL MANAGEMENT (ENVIRONMENTAL DEVELOPMENT PLANNING)

AUGUST 2008

DECLARATION

I hereby declare that this research project has been conducted by me under the guidance of Prof. J.M. Baba of the department of Geography, Federal University of Technology, Minna, and have neither copied some one's work nor have some one else done it for me.

Credit has been given to writers whose works have been referred to in the Thesis.

..... 16-09-08.....

Adamu Mohammed Karuma Date

CERTIFICATION

This Thesis titled: Environmental consequences of Deforestation In Bosso Local Government Area of Niger State,Nigeria by: Adamu, Mohammed Karuma (M.Tech/SSSE/2005/1343) meets the regulations governing the award of the degree of Masters of Technology (M.tech) of the Federal University of Technology, Minna and is approved for its contribution to scientific knowledge and literary presentation.

PROF.J.M. BABA — Signature & Date: 23/09/2008
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ACKNOWLEDGMENT

Gratitude to Almighty Allah who spared my life; my appreciation goes to the project supervisor Prof J.M.Baba who took his time on the thesis ward by word to make sure that a satisfactory is done.

I express my gratitude to late Dr Hassan M Tukura who encouraged me through the programme.

I am indebted to Mallam Yanusa S. Adamu and Mohammed Sani Ahmed who read through the work and assisted on typing.

I acknowledge my head of department Dr. P.S. Akinyeye and also, Dr. A.S Ma'aji. I recognized and acknowledge the following people Dr.D.C Tarachi, Abubakar Usman, A.K Shatta, Alh Shehu Barwa Beji, Hauwa Adamu.

I also acknowledge the patience of my family and those who contributed in one way or the other towards the success of this study.

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CHAPTER ONE

INTRODUCTION.

1.1 BACKGROUND TO THE STUDY.

Deforestation is a form of environmental hazard. It is the process of clearing or removal of the vegetation cover for a variety of purposes like housing, farming, mining, industrial, residential and grazing activities without any immediate replanting of trees, shrubs and grasses (Abegunde, *et al*, 1991). The bare soil is thereby exposed to rain and wind erosion.

Deforestation is the product of the interaction of many environmental, social, economic, cultural and political forces at work in any region. The mixture of these forces varies from place to place over time and space. As a consequence, generalizations are dangerous for most cases. Deforestation is a process that involves a competition amongst different land-use type for the scarce resources; it creates wealth for some, causes hardship for others and almost always it brings serious consequences for the environment.

In rural areas, deforestation is caused by people because of the need for firewood for cooking. Fire from wood releases carbon dioxide, which is the dominant green house gas that contributes to global warming.

The population dynamics in Nigeria seem to be at the center of the prevailing development challenges. Rising

population density in many areas put pressure on the available natural resources especially land. This also implies that high population growth in rural areas means that the agricultural sector is becoming increasingly pressured to increase food production.

The Food and Agricultural Organization (FAO 1985) of the United Nations Organization has taken a lead in studying the Tropical deforestation in recognition of deforestation problem and the need to conserve tropical forest resources. FAO declared 1985 as international year for forest.

The problem of deforestation in the tropics has been appraised in numerous studies by governments, private organizations and industrial scientists in recent years. Norman (1979) and world Resources Institutes noted that, the forests have global implications not just on life but also on quality of it. Plants determine rainfall and replenish the atmosphere, clouds form and provide another way of blocking out some of the sun's radiation heat.

The alarming rate of deforestation in various areas of the tropics including Nigeria as well as the study area, if this trend continues uncontrolled or unchecked it is bound to have far-reaching consequences on mankind and the environment on which we depend.

Hence the need to study the environmental consequences of deforestation in Bosso Local Government Area of Niger State.

1.2 STATEMENT OF RESEARCH PROBLEM.

Deforestation in Bosso Local Government Area of Niger state has been on the increase since the 1980's. If this trend is not checked or controlled it is feared that it will lead to ecological disaster such as soil degradation, gully erosion, drought and desertification, loss of animal pasture, loss of farmlands and even environmental imbalance. This will also have far-reaching consequences on the biodiversity of the area. Some of the effects of deforestation have started showing on the environment.

Before 1983, exploitation of timber in the area was very low because the forestry department was considered as a social sector with little financial obligations. Since then, the department has metamorphosed into the economic sector with revenue generation as one of its major priorities. This has led to issuance of licenses/ permits to fell trees indiscriminately. This has led to the establishment of and proliferation of saw mills, timber contractors and even illegal loggers. This in consequence also leads to massive increase in the rate of deforestation in the area while the local

Government Authority became unconcerned and reforestation was not prioritized.

The land use in the local government areas became more competitive. The area is now a host to five major agricultural projects the operation of which has also contributed to deforestation. Coupled with this is the fact that majority of the population are rural, whose major economic activity is agricultural, based on the traditional method of shifting cultivation with short fallow period due to rapid population increase.

The local Government area is a host to a greater number of nomadic Fulani herdsmen. Even the indigenous Gbagyis practiced mixed farming. Consequently, livestock rearing and grazing also contributes to deforestation.

Another factor is the quest for domestic energy requirements for cooking and other activities. In the absence of cheap and available alternative source of domestic fuel, tree felling to provide firewood for domestic and even commercial activities such as cooking, heating oven for bread baking became more pronounced. Also relevant is the activity of log burning in the forest to provide charcoal as an alternative to kerosene to meet the domestic and commercial fuel requirement. This activity is no doubt illegal but the sale of charcoal is flourishing daily without government restriction.

It is in the light of the above that this research seeks to study the environmental consequences of deforestation in Bosso local government Area of Niger state.

1.3 AIM AND OBJECTIVES.

The aim of this research work is to study the environmental consequences of deforestation in Bosso L.G.A. in Niger state.

Specifically, the objectives of the study are:

1.) To study the extent and level of deforestation in Bosso L.G.A.

2.) To identify the causes of deforestation in Bosso L.G.A.

3.) To assess the environmental consequences of deforestation in the L.G.A.

4.) To recommend practicable control measures against deforestation in the area.

1.4 SCOPE OF THE STUDY

The scope of this research is specifically based on the phenomenon 'deforestation' in Bosso local Government Area of Niger State. This would cover the identification of the causes, the extent, and environmental consequences of deforestation in the five sampled wards in the study area was selected for the study. The research also recommend

practicable control measures against deforestation in the study area.

1.5 JUSTIFICATION OF THE STUDY.

Bosso L.G.A. came into being in 1991 following the nationwide L.G.A. creation exercise by the then military administration. The L.G.A. surrounded the metropolitan Minna; the capital of Niger State in all directions.

The increasing role of Bosso L.G.A and its proximity to the state capital Minna, has influenced its rapid rate of population growth as well as urbanization especially along the areas contiguous to the boundary of Minna. These areas include; Maitumbi, Shango Chanchaga, Bosso, Fadikpe, Nyikangbe, and others. Just as Minna is expanding into the Bosso L.G.A. so also are it's agricultural lands, residential, industrial, transportation, institutional and other land uses expanding deeper and deeper into the forest land of the L.G.A. The results of this phenomenal expansion of various land uses in the LGA translates into rapid rate at which its forest resources are depleted to satisfy human needs, comfort and other necessities of life.

The quest and competition for the satisfaction of the above human needs have far- reaching consequences on the environment. Inventory of the rate, extent, and effects of deforestation of the environment over time and space is

important if any meaningful development planning is to occur.

So far research information is lacking on the consequences of deforestation in the study area. There is therefore the need to carry out this research to fill the information gap. The result of this study would provide knowledge of the environmental consequences of deforestation in the area and a basis upon which further research in related fields can be conducted in Bosso Local Government Area.

1.6 DESCRIPTION OF THE STUDY AREA.

Location & Extent

Bosso L.G.A. is located on the latitude 9^0 40" N longitude 6^0 28" E. covering an area of 6,606.14m2, which completely envelops Chanchaga Minna, the state capital of the state. The area is bounded to the North and N.E by Shiroro L.G.A, to the N.W by Wushishi L.G.A, to the S.E by Paikoro L.G.A, to the south by Katcha L.G.A and S.W by Gbako L.G.A.

The L.G.A came to being on 27th September 1991 with its administrative headquarters in Maikunkele a suburb of Minna, the state capital. (fig .1)

LOCATIONAL MAP OF BOSSO

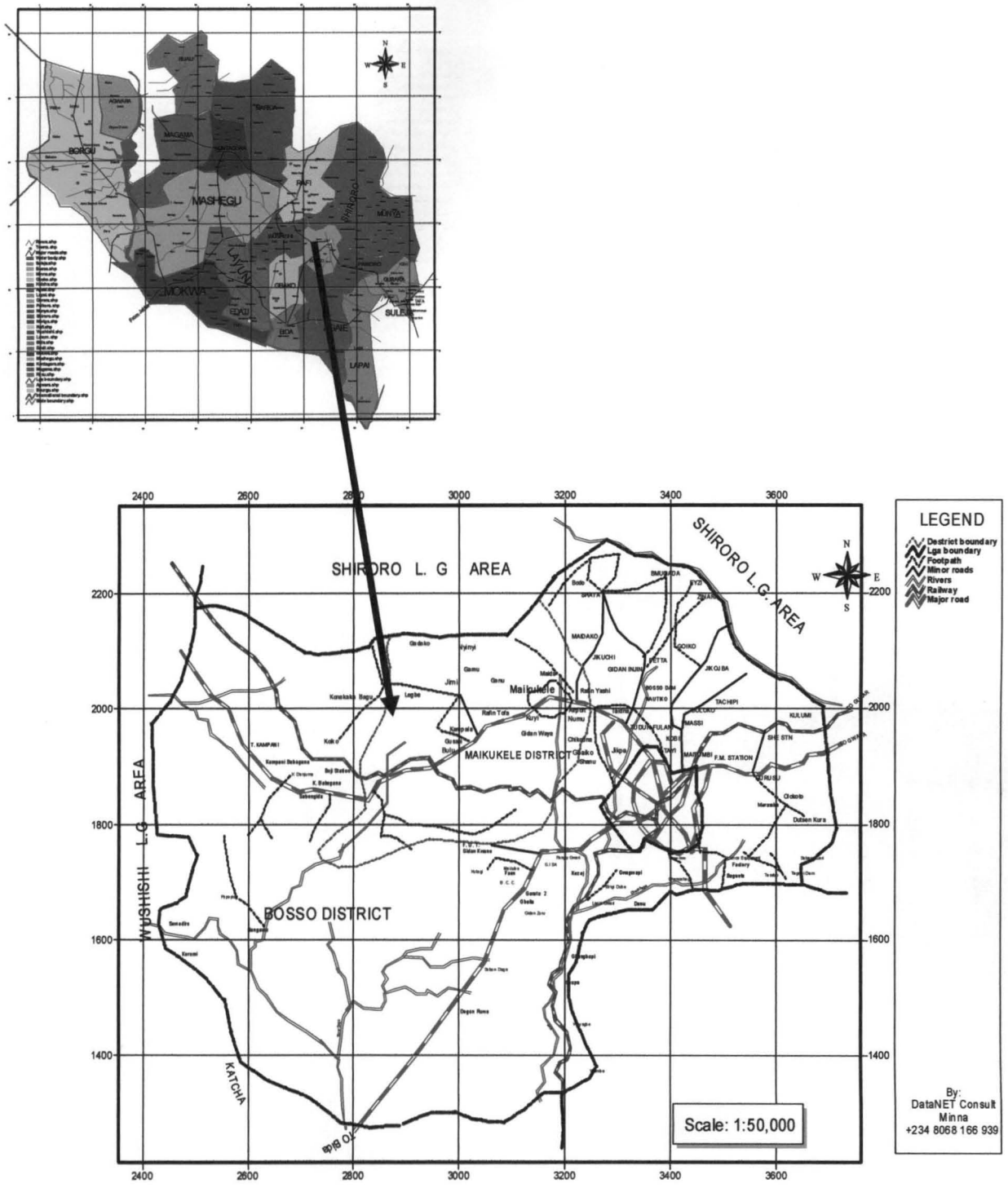

Fig. 1.1 Locational Map of Bosso

Population.

The population of the entire L.G.A, based on the 1991 National Population Census, was 90,397(N.P.C. 1991). Based on the National Population and Housing census of 2006 had a population of 147,359; an increase of 56,962 people.

Climate.

The climate of Bosso L.G.A. is the Tropical (Hot and Dry) continental type coded as Aw by W.Koppen (1918). The mean annual rainfall is about 1293 mm, spread over 190-200 days with the highest monthly record received between July and September. The mean maximum monthly temperature is 29 .8^0 C in March and the mean minimum temperature is about 25^0 C in September. The average annual sunshine duration is about 7.2 hours. The annual potential evaporation is about 1429.6 mm while the relative humidity is above 60% in the rain season. The area is influenced by the N.E trade wind, which brings cool and dry harmattan wind in dry season and S.W monsoon wind, which brings a warm wet wind in raining season. (Maxlocks,1979)

Geology

Bosso L.G.A lies on the geological base of undifferentiated basement complex rocks of mainly gneiss and magmatite.

To the north and northeast of the areas occur a more or less continuous steep crop of granite hills with altitude of between 750-950m above sea level. The soils are about 70% ferruginous tropical soils with abundant lithosol and raw minerals on the interfluves. There are also minor occurrences of hydromorphic soils and weakly developed soils of alluvial deposits on the valleys and river reaches (Maxlock, 1979:4.1).

Hydrology.

The L.G.A is well drained with most of the rivers being the left bank tributaries of the river Niger. The major rivers include; Chanchaga, Seyi, Waya, Kpobugi, Tagwai, Goada Daga and the Rafin Yashi. Other minor rivers and streams exist. Their flow regime is influenced by the rainfall pattern and geology. Thus, they tend to be ephemeral and flashy with low dry season flow. The peak flow is generally in September due to the influence of the rain season (max clock, 1979,4.1).

Vegetation

The vegetation presently is a mixture of natural and cultural vegetation due to prolonged human interference. However, where the natural vegetation exist it is dominated by what Charter (1970) referred to as the "mixed leguminous

wooded savannah" labeled as northern guinea and southern guinea savanna (keay, 1953). The plant species composition and aerial coverage varies due to the soil, and topography as well as degree of human interference. The common plant species found include; *Butryrospernum parkii, lophira alata, Delirium senegalensis, isorberlina Doka, Bur kea Africa, Terminalia Gavcoscenaces, afzelia Africa ptenocarpus erinaceous and ecufidaca long pen duculda.* Along the forest fringes in the L.G.A species like *khaya Senegalese, chlorrphara ecelsa, invengia gabonnesi, mansonia* etc are found.

Land Use.

The area is a rural L.G.A; hence over 90% of the land-use is for agriculture, being dominated by slash-and-burn shifting cultivation technique due to low population density. The staple crops grown are yam, sorghum and maize except along some river valleys where vegetables are cultivated by the Hausa migrants. Rice is also cultivated in small quantity for market. Livestock grazing is uncontrollably carried out by mostly the Fulani nomadic as well as sedentary populace of the Gbagyi natives' also practical mixed farming and the livestock grazed include cattle, sheep and goats. Other forms of land-use in the area include transportation, institutional, industrial and commercial.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The earth and the lives of everything that depends on it – from the smallest bacteria to the largest sea creatures – rest on a delicate matter and that is balance. A single, seemingly harmless disturbance in this balance has consequences that are both beneficial and disadvantageous. One of these is deforestation.

The term deforestation is permanent destruction of indigenous forest and woodlands (Jocelyn, 2001). The term does not include the removal of industrial or cultural forests such as plantations.

Deforestation as defined by Nathalie (2003) has always been a practice of many developing communities and has contributed greatly to civilization, as we know unfortunately; much of the negative effects of deforestation is caused by greed, bad agricultural practices and government neglect.

The significant role forests play in our daily lives cannot be overestimated. Other than for their beauty, forest are highly responsible in keeping and sustaining global ecosystems. Infact as pointed out by Nathalie (2003), " much of the quality of life we enjoy, we owe to the forest".

It is also the home of more than half of all creatures and organisms on this planet. From food to life – saving medicines, forests give mankind a variety of gifts that contribute much to our quality of life.

Consciousness of the problems of global deforestation began in the 1980s. Tariq (1989) noted that in 1988, scientists found the first strong evidence that depletion of the protective zone layer has already occurred over the Northern Hemisphere. This has partly been linked to deforestation.

2.2 Extent Of The World's Forests.

The global forest resource base published by the United Nation Food and Agricultural Organization (UNFAO) in 1987 indicated that the closed forests cover 2.8 billion hectares or 20 percent of the Earth's land surface. Other wooded areas include tropical open woodlands and tropical forest fallow makes up the planets total woody cover to 4.2 billion hectares or 34 percent. Of the closed forests, 43 percent are found in the tropics. Of this figure, Africa has 221 million hectares of closed forest and 499 million hectares of open woodlands making a total forests cover of 720 million hectares.

In Nigeria, forests occupy a total area of 349,278km^2, or approximately 35.0 percent of Nigeria's total land area of

997,936 km^2. The forest reserves constitute 97,047 km, representing about 97 percent of the total land area. About 78 percent of the forest reserves lies in the savanna regions, while only about 20 percent is in the humid tropical zone of the south. The remaining 2 percent of the area is constituted in other ecological zones, mainly in the south (Umeh, L.I 1989). In terms of distribution of reserved forest between the states in Nigeria, Niger state fall under those states with relatively low proportions of forest reserves to the total land area. Even the country's percentage of forest estate is quite low and falls short of the internationally recommended standard of 20 percent.

2.3 Rate Of Deforestation In The Tropics

Of great concern is the rate at which deforestation is occurring. Currently, about 12 million hectares (ha) of forests are cleared annually (Joselyn, 2001). Tariq (1989) outlined that almost all of this deforestation occurs in the moist forests and open woodlands of the tropics as a result of agriculture or the harvesting of fuel wood. In addition to this deforestation, about 4.4 million ha of the tropical forest are selectively logged every year.

Estimate of deforestation rate in the tropical forest varied widely spatially and over time. From between 11 and 15 million ha. Per annum in the 1970s to about 6.1 million

ha per year in the 1980s (FAO/UNEP, 1990). At this present deforestation rate of 6.1 million ha per year it is feared that by the year 2050 all the moist tropical forest could be lost except for isolated areas in the Amazonian basin, the Zaire basin, as well as the protected areas within the reserves and parks (Joselny, 2001).

However, the rate of deforestation is even much more acute in some countries. Cote d" ivore and Nigeria annually lose about 52 percent of their forest while Costa Rica, Sri Lanka, and Salvador the rates are 3.6 %, 3.5 %, and 3.2% respectively. Depending on its rate of loss, each of these countries would lose all its forests sooner than was fore cast if no conservation steps are taken (Tariq, 1989).

2.4 Causes And Consequences Of Deforestation

On the causes of deforestation, many researches have been made. The causes seem to be similar though with some variations over time and space.

Umeh, (1989) explained that the Nigerian forests have witnessed wanton destruction. He attributed the causes to over cutting, over grazing, bush fires and other abuses that it can no longer adequately provide the much-deserved goods and services. He also revealed that Nigeria, which hitherto used to be an exporter of timber, is now increasing her importation of forest products.

In a related development, Ikhoria (1993) studied the land use changes in the rainforest ecosystem in Edo state using aerial photographs and satellite imageries. The objectives are to provide inventory of the land use/ land cover characteristics of the ecosystem and to determine the rate and extent of deforestation and conservation in the area. The result indicated that within a decade, the ecosystem experienced drastic depletion of forested lands, rapid territorial expansion of settlements and tremendous increase in agricultural farmlands. This is as a result of increase in rural population densities, the impact of which translated into deforestation especially for firewood, reduction in fallow period, and frequent exposure of the soil surface for cultivation thus enhancing the susceptibility of land forms to various forms of degradation.

Suleiman (2002) studied the availability, utilization and consequences of fuel wood in Ushafa area of Abuja, FCT. The objectives are to determine the extent of deforestation in the area, to examine the consumption/ utilization pattern, the consequences as well as to examine the alternative energy sources available. He uses a combination of questionnaires, oral interviews and discussion with sampled population as a primary source of data using simple proportion and percentages in analyzing his data. The result indicated massive deforestation in the area resulting from

fuel wood as the dominant source of energy in the area. The consequence is that of soil erosion, deforestation and gradual loss of cultivable lands. The study recommended public awareness of the danger of deforestation, encouraging the use of alternative fuel sources as well as for the government to live up to its responsibilities so as to control deforestation.

Musa, (2002) studied the impact of deforestation in Bobi grazing reserve in Mariga LGA of Niger state. His objectives are to assess the impact of increase agricultural and livestock production, to provide guidelines for maximum utilization of the natural resources in the area and to recommend possible ways of checking or ameliorating the problems. He uses questionnaires distributed to sample population of farmers, nomads and other stakeholders. The analysis was done using frequency/percentages of responses. The findings indicated massive deforestation in the area resulting from population pressure, forest clearing for agriculture, logging, fuel wood consumption, bush burning and over grazing. The effects include poor soil fertility, soil erosion and loss of forest resources. He recommended among others a massive awareness drive to improve environmental management, legislation to control deforestation, improvement in farming methods and land

management as well as reforestation and use of alternative energy source to minimize fuel wood exploitation.

Jaagi, (2002) studied deforestation and its consequences in Mokwa LGA of Niger state. The objectives of the study are to identify the causes and consequences of deforestation in the area with a view to recommending ways of controlling the problem. He relied on questionnaires and oral interview with sample population of farmer and other stake holders including records of logging between 1998 to 2001 from the zonal forestry office as sources of his primary data. The result indicated a massive increase in deforestation in the area. He attributed the causes to logging, shifting cultivation practices by the local farmers, rural energy needs through fuel wood, over grazing, wild fire and bush burning. He also found out the consequences of deforestation in the area to include flooding along the riverbanks, loss of Biodiversity, reduction in soil fertility, soil erosion and increase in evapo-transpiration rate. He recommended improvement in the system of farming, reforestation and legislation against unnecessary deforestation.

As summed up by the Global Forest Fund (1982) deforestation comes as a direct consequence of the following, "shifting cultivation, and logging, over grazing, fuel wood use, bush/wild fire and urbanization". Of these

factors it concluded that, "shifting cultivation is by far the most important cause and it accounts for about 70% of the total deforestation in the African region". Some of the consequences of deforestation are already manifesting on the environment.

In Nigeria, Ujah (1982) asserted that the adverse effect of deforestation is already measurable in the form of increased light intensity, soil and air temperature, and decrease in soil moisture and atmospheric relative humidity.

The effects of deforestation on atmospheric condition on a global scale are still a matter of speculation. Richard (1977) discusses the possible increase of atmospheric carbon (CO_2) content by up to 10% and a consequent increase in global temperatures through the greenhouse effect as a likely result of removal of the tropical rain forest.

It is also pertinent here to point out that increase in deforestation in Nigeria was noticeable during the oil boom years of the 1970s and as a result of the activities of the Operation Feed the Nation (1977-1979).The Green Revolution (1980-1983), The Directorate of food Road and Rural Infrastructure (1986-1993), and National Land Development Authority (1989- Date).

Roby (1991) calculated the rates of deforestation for reserved and unreserved forest in different vegetation zones

of the country between 1976 and 1990 and arrived at a total deforestation rate of 400 000 hectares per annum.

FAO (1992) using logistic function linking deforestation to land area and population densities for 1980, 1985 and 1990 forecast deforestation rates for the period 1981-1985 and 1986-1990 as 3.4% and 3.57% respectively. From this, it concluded that if these rates are maintained, the remaining forest area of Nigeria could disappear within the next three decades i.e. by the year 2020.

Deforestation may not be completely viewed as negative in totality. Nathalie (2003) identified some of the positive consequences. Depending on the need of the social group concerned, deforestation has made it possible for communities to be built. Forest makes way for residential houses, office buildings and factories. Governments are able to build roads to make trade and transport easier and therefore more convenient to residents.

Deforestation can also mean the conversion of the forestland to production land for agricultural uses. This results in better and more abundant production of food and raw materials, virtually eradicating periods of want and lack.

Economically, Nathalie (2003) pointed out that deforestation has contributed much in giving many communities the opportunity to make positive changes in their lives.

Tariq, (1989) observed that deforestation rate might change because population and economic activities are growing rapidly in many countries, and both market forces and government policies can either promote or restrain deforestation. Growing population could lead to more deforestation because of the need to grow more food. Economic development is frequently accompanied by an increase in the amount of food each person consumes possibly requiring the clearance of even more land. On the other hand, economic development also permits greater investment in agriculture, with higher yields per hectares the same amount of food would be grown on a smaller area of land, thereby reducing deforestation rate and off setting the effects of growing population.

Unfortunately, the negative consequences of deforestation far out weigh the positive consequences.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This section shows the procedure used in the data collection and the types of data collected. It also shows the sampling techniques used as well as how the data collected was processed, prosecuted, analyzed and interpreted to achieve the objectives of the research.

3.2 SOURCES OF DATA

Two major sources of data were explored for this research work: the primary sources and the secondary sources.

The primary source is in the form of prepared questionnaires administered to the sampled population by the researcher and his assistant.

Where the sampled population is literate, the questionnaire is self-administered and the responses were collected later. In other cases where the sampled populations are non-literate, the researcher and his assistant asked respondents questions from questionnaires and the responses recorded.

The secondary sources used were in the form of journals, other research works, pamphlets, press releases, periodicals, seminars, workshops and conference papers,

books and other relevant literature. These were used in the preliminary chapters and literature review of the research work.

3.3 RECONNAISSANCE SURVEY

Before embarking on the real collection of primary data for this research, a reconnaissance survey was carried out by the researcher where direct personal observations were made in the study area to familiarize self with the environment and the scope of the research.

3.4 SAMPLING TECHNIQUES

To achieve the objectives of this research, cluster sampling technique was used .The researcher recognized and made use of the administrative division of the LGA into ten (10) wards as clusters. These are;

i) Basso Central ward I
ii) Basso Central ward II
iii) Beji ward,
iv) Chanchaga ward,
v) Garatu ward,
vi) Kampala ward,
vii) Kodo ward,
viii) Maikunkele ward,
ix) Maitumbi ward and

x) Shatta ward.

Out of the ten (10) wards or clusters, five (5) wards or clusters were selected based on simple random sampling .In this process, the wards were numbered 1- 10 in alphabetical order of above list and each number was written on a small piece of papers and folded. All the ten (10) folded pieces of papers were put inside a small container and five (5) people were called to pick 1 piece of paper one after the other .The 5 pieces of folded papers were opened and the numbers which appeared were of those wards selected. These includes; (1) Beji (2) Bosso (3) Chanchaga (4) Garatu (5) Maikunkele

Each of the five (5) wards selected above were stratified in the following order;

i) Farmers/ Livestock Rearer

ii) Commercial/ domestic fuel wood users.

iii) Fuel wood Vendors and loggers.

3.5 REPORT ON FIELD PROCEDURE

A total of 225 questionnaires (i.e 0.5% of the total population of the L.G.A) was distributed to the respondents in the five wards. For each ward,45 copies of questionnaires were distributed in order of fifteen (15) questionnaires for each of the three (3) strata. Table 1 below shows the distributions and the number of responses received.

The data analysis and interpretation will be done using simple proportion /percentages and will be presented in tables.

Distribution Of Questionnaires

A total of 225 questionnaires were distributed to five (5) sampled wards or cluster on the basis of 15 questionnaires per strata of 45 questionnaires per ward or cluster (see chapter3.4). Table 1 shows the distribution and responses received.

Table 3.1 DISTRIBUTION OF QUESTIONAIRES TO WARDS AND RESPONSES RECEIVED.

S\NO	WARDS	QUESTIONNAIRES DISTRIBUTED	RESPONSES RECEIVED	QUESTIONAIRES NOT RECEIVED	PERCENTAGE RETURNED (%)
1	BEJI	45	38	07	84.4
2	BOSSO 1	45	41	04	91.7
3	CHANCHAGA	45	39	06	86.7
4	GARATU	45	36	09	80.0
5	MAIKUNKELE	45	43	02	91.3
	TOTAL	225	197	28	87.6

Source; Field work 2007.

Table 1 shows the distribution of questionnaires to sampled wards in Bosso local government Area, and the responses received in each ward. From the table it is seen that out of

the 225 questionnaires distributed. A total 0f 197(87.5%) were returned, this implies that a great majority of the sampled population (86.7%) responded and hence, the analysis of the data centers around these responses.

3.6 FIELD ENCOUNTERS

Many respondents are not literate and this necessitated the researcher and his assistant to interpreter the questionnaire in the local language of the respondents (Gbagyi and Hausa) and the responses were recorded in English.

The measurement of farm lands which were most often small in size and scattered became difficult. The researcher had to relate the farm sizes of individual respondent to the size standard foot ball field i.e 1 hectare (h.a). This method made it easier and convenient to achieve the objective of the research.

Access to aerial photographs or satellite imageries of the area over two more periods become difficult and hence it was not used.

3.7 DATA ANALYSIS AND INTERPRETATION

The data analysis and interpretation of this research was done using simple proportion/percentages and was presented in tables.

CHAPTER FOUR.

DATA ANALYSIS AND DISCUSION

The chapter present and analyses the data collected from the sampled population of respondents to the questionnaires administered. The chapter also discussed the findings of the analysis.

4.1 DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS.

This section shows the demographic characteristics of respondents in the sampled wards of the local government area such as Age, sex, marital status, occupation and educational status. Table 2 shows the distribution.

Table 4.1: AGE DISTRIBUTION OF RESPONDENTS.

AGE GROUP	FREQUENCY	PERCENTAGE (%)
<25 years	49	22.5
26-35 years	83	40.1
36- 45 years	58	25.2
46 years and above	07	2.6
Questionnaires not returned	28	9.6
Total	197	100%

Source: Field work 2007.

The table above shows the age distribution of respondents in the sampled area. From table 4.1 above it is seen that those below 25years accounted for 22.5%, 26-35years, 40.1%, 36-45years; 25.2% and 46years and above, 2.6%. While 9.6% accounts for questionnaires not returned.

Table 4.2: MARITAL STATUS OF RESPONDENTS.

Marital status	Frequency	Percentage (%)
Married	122	56
Single	56	24.2
Divorced	12	4.1
Widower	07	2.6
Unreturned questionnaires	28	13.1
Total	225	100

Source: Field work 2007.

Table 4.2 above shows the marital status of respondents, from the table it is seen that those married (56%), single (24.2%), divorced (4.1%) and widow (2.6%) while 13.1% stand for un received questionnaires. This implies that those married are the majority (56%) and hence the use of fire wood as a source of energy for cooking and other uses in home would tend to be higher especially among the married couples.

Table 4.3: OCCUPATIONAL DISTRIBUTION OF RESPONDENTS.

Occupation	Frequency	Percentage (%)
Public servant	45	19.8
Farmer\livestock rearing	122	58.9
Traders	27	9.8
Others	31	11.5
Total	197	100

Source: Field work 2007.

Table 4.3 shows the occupational status of the respondents. From the table it is seen that public servants account for 19.8%, farmers/livestock rearers, 58.9%, traders 9.8% and others, 11.5%. This also implies that overwhelming majority of the respondents in the area are farmer/livestock rearers,(58.9%). Even those respondents in other categories take to farming as a complementary or part time occupation. This occupational distribution affects the extent of deforestation in the area for they are activities that deals with exploitation of the forest.

This also implies that overwhelming majority of the respondents (87.8%) are youthful and active, below the age of 46years.

This implies that since the major occupation of the area is agriculture, the level or extent of deforestation would be high, for farmers accounts for 58.9% of the population of the area (Table 4).

4.2 NON-DEMOGRAPHIC CHARACTERISTIC OF RESPONDENTS

This section shows the non-demographic characteristics of respondents such as the kind of activities they engaged in such as farming/livestock rearing, fuel wood vendors/loggers and domestic/ commercial fuel wood users. It also shows how such activities impact on the forest resources in the area as well as its effects on the environment. Suggestions were also given on how such effects of deforestation may be remedied.

Table 5 shows the distribution of questionnaires to each of the three activities mentioned above and the responses received.

Table 4.4: ACTIVITIES ENGAGED BY RESPONDENTS IN THE AREA.

S/no	Activities	Questionnaires distributed	Responses	Percentage (%)
1	Farming/livestock rearing	75.	73	34.1
2	Firewood vendors/loggers.	75	56	25.4
3	Domestic/commercial fire wood users	75	68	31.1
Total		225	197	90.6

Source: Field work 2007.

Table 4.4 shows the kind of activities engaged by the respondents, which cause deforestation. From the table, it seen that farmers/live stock rearing is 34.1%, fire wood vendors/loggers is 25.4% and domestic/commercial fire wood users 31.1%. This implies that farming/livestock rearing is the major activities (34.1%) followed by domestic/commercial fuel users (31.1%) and lastly fuel wood vendors/logger (25.4%)

4.3 Farming/Livestock Rearing.

This section shows the non-demographic characteristics of farming and livestock rearers, their impact on forest resources and effect on the environment. Below are the responses to the questionnaires.

4.4 Types Of Farming Activities Engaged By The Respondents.

The question shows the types of farming activities the respondents are engaged in.

Table 4.5: TYPES OF FARMING ACTIVITIES ENGAGED BY RESPONDENTS

TYPES	FREQUENCY	PERCENTAGE (%)
Crop farming	39	53.4
Animal Rearing	23	31.5
Mixed farming	11	15.1
Others (specify)	0	0
Total	73	100

Source: Field work 2007.

Table 4.5 shows the type of agricultural activities engaged by the respondents in the area. From the table, it is seen that crop farming is 53.4%; animal rearing is 31.5%, mixed farming 15.1% and others 0%. This implies that although the three forms of farming mentioned above are practiced in the area, crop farming predominates and hence majority (53.4%) of the respondents engaged on such type of

farming. Also animal rearing engages a substantial number of the populace (31.5%). This also reveals the high presence of Fulani nomads in the area. Mixed farming engages a small proportion of the populace 15.1%, majority of whom are the Gbagyi natives.

4.5 Duration Of Farming Activities In The Area.

The question seeks to find out for how long have the respondents engaged in farming activities in the area.

Table 4.6: DURATION OF FARMING ACTIVITIES IN THE AREA

Duration (years)	Frequency	Percentage (%)
<5	02	2.7
5-10	04	5.5
11-15	10	13.7
15 and above	57	78.1
Total	073	100

Source: Field work 2007.

Table 4.6 shows how long the respondents have engaged in farming activities in the area. From the table it is seen that 2.7% are less than 5 years, 5.5% between 5 to 10 years, 13.7% between 11 to 15 years and 78.1% over 15 years.

4.6 METHOD OF FARM CLEARANCE

The question shows what method of farming clearance or preparation the farmers use?

Table 4.7: METHOD OF FARM CLEARANCE.

METHODS	FREQUENCY	PERCENTAGE (%)
Mechanized	11	15.1
Burning of farm land	20	27.4
Slash and burn	33	45.2
Cutting and felling of the bush	09	12.3
Total	073	100

Source: Field work 2007.

Table 4.7 shows the method of farm clearance or preparation the farmers use. From Table 4.7 it is seen that mechanized system is 15.1%, Slash-and-burn system account for 84.9%. This implies that majority of the population used slash and burn system which account for 84.9%. However, 15.1% of the population mostly the civil servants, traders and politicians used the mechanized methods.

Table 4.8 Shows Types of farm implements employed in farming.

The question shows the type of farm implements employed in the farming operation

Table 4.8: TYPE OF IMPLEMENT EMPLOYED IN FARMING.

Type	Frequency	Percentage (%)
Mechanized	15	20.6
Animal	5	6.8
Manual	53	72.6
Others (specify)	0	0
Total	073	100.

Source: Field work 2007

Table 4.8 above shows the type of farm implement in the farming operation. From the table it is seen that mechanized power is 20.6%, animal power; 6.8%, manual power; 72.6% and others; 0%. This implies that the overwhelming majority of the people used manual implements in their farming operation which accounts for 76.6%, Mechanized means accounts for 20.6% while 6.8% used animals and 0% for others and Size of farm lands.

This question shows the sizes of farmlands owned by individual farmer. Here due to the scattered nature of farm lands the sizes of farm land were compared to a standard foot ball field which is one hectare (1 h.a)

Table 4.9: SIZES OF FARM LANDS.

Size	Frequency	Percentage (%)
<1hectare	23	31.6
1-5 hectares	39	53.4
6-10 hectares	09	12.3
>10 hectares	02	2.7
Total	073	100

Source: Field work 2007.

Table 4.9 above indicates the sizes of farm lands owned by individual farmers. From the total it is seen that those who owned less than 1 hectare are 31.6%, those who owned between 6-10 hectares: 12.3%, and over 10 hectares: 2.7%.

This implies that the overwhelming majority of the people owned between 1-5 hectares as shown by 53.4% responses, less than 1 hectare are owned by mostly youth under 25years of age as shown by 31.6%, some adults between the ages of 35-45years owned between the 6-10 hectares 12.3%. This category employed the use of their family as well as communal labour, which they paid in cash or kind.

Those who owned more than 10 hectares (2.7%) are mostly politicians, contractors, as well as companies e.g. maizube farms etc.

4.7 Presence Of Scattered Trees In The Farmland.

This question seeks to find out whether the farmer have scattered trees in their farmlands

Comparism of last season harvest with that of previous year

The question seeks to compare the last season's farm harvest with that of the previous year.

4.8 EXPERIENCES OF ENVIRONMENTAL PROBLEMS ON FARMS.

This question seeks to find out whether these respondents ever experience any environmental problem on their farms.

Table 4.10: EXPERIENCES OF ENVIRONMENTAL PROBLEMS ON FARMS.

Option	Frequency	Percentage (%)
Yes	71	97.3
No	02	2.7
Total	073	100

Source: Field work 2007.

Table 4.10 above shows whether the farmers ever experienced environmental problems on their farms. From the table it is seen that majority of the respondents (97.3%)

have experienced environmental problems on their farms and hence their response were "yes". However 2.7% have responded "No" meaning they have not experienced environmental problems. This implies that environmental problems have been experienced on farmlands in the L.G.A as shown by the 97.3% "yes" responses.

Environmental problems experienced on your farm.

This question which environmental problems the farmers experienced, this question only applied to those farmer who experience environmental problems on their farms.

4.9 TYPES OF ANIMAL KEPT.

This question seeks to find out the type of animals kept if the farmer engaged in mix farming or livestock farming.

Table 4.11: TYPES OF ANIMALS KEPT.

Type	Frequency	Percentage (%)
Cattle	44	60.3
Sheep	13	17.8
Goat	06	8.2
All of the above	10	13.7
Others	0	0
Total	073	100

Source: Field work 2007.

Table 4.11 shows the type of animals kept by mixed farmers and live stock keepers. From the table it is seen that cattle

keeping is 60.3%, sheep: 17.8% goats: 8.2% combination of cattle, sheep and goats: 13.7% and other:0%. This implies that cattle rearers are the major live stock rearers or animal farmers accounting for 60.3%, goat keepers: 13.7% and those who keep all of the above animals accounts for 13.7%.

Method Of Animal Farming.

The question methods of animal farming used by the farmers and livestock keepers.

Table 4.12: METHOD OF ANIMAL FARMING.

Method	Frequency	Percentage (%)
Nomadic herding	49	67.0
Ranching	8	11.0
Cattle farming	16	22.0
Others (specify)	0	0
Total	073	100

Source: Field work: 2007.

Table 4.12 shows the methods of animal farming used by the farmers and livestock keepers in the L.G.A. from the table it is seen that nomadic herding is 67.0%, ranching is 11.0%, Cattle fattening: 22.0% and others 0%, this implies that the major method of animal farming used by the farmers and livestock keepers is nomadic herding as shown

by 67.0% responses. Other methods used include ranching 11.0%, Cattle fattening 11.0%.

4.10 Methods of Animal Feeding Used.

This question shows the methods used by the farmers and livestock keepers in feeding their animals. The responses are shown in the table below.

Table 4.13: METHODS OF ANIMAL FEEDING.

Methods	Frequency	Percentage (%)
Animal feeds	15	20.5%
Natural pasture	58	79.5
Others (specify)	0	0
Total	073	100

Source: Field work 2007

Table 4.13 about shows the methods used by the farmers and livestock keepers in feeding their animals. From the table it is seen that the use of animal feeds account for 20.5%, of responses, natural pasture account 79.5% of responses and other methods is 0%. This implies that the major method of feeding livestock in the L.G.A is by natural pasture accounting for 79.5% mostly by the nomadic Fulani. Animal feeds accounts for only 20.5% used mostly by mixed

farmers, this however has implications on the forest resources of the area for the forest resources is used in feeding the animals leading to its decline in quantity.

4.11 Ever Experienced Problems In Feeding Animals.

This question shows whether the farmers ever have or experienced problems in feeding their animals or livestock.

Table 4.14: PROBLEM OF FEEDING ANIMALS OR LIVESTOCK

Option	Frequency	Percentage (%)
Yes	72	98.6
No	01	1.4
Total	73	100

Source: Field work 2007.

Table 4.14 above shows whether the livestock keepers ever experienced problems in feeding their animals. From the table it is seen that 98.6% of the livestock rearers experienced problems of feeding their animals. While only 1.4% have not. This implies that overwhelming majority of the livestock rearers have problems of feeding their animals due to decrease in quantities of the forest resources used in feeding animal.

Table 4.15: PROBLEMS OF FEEDING LIVESTOCKS.

Problems	Frequency	Percentage (%)
Lack of pasture	25	34.2
Lack of animal feeds	03	4.2
High cost of feeds	36	49.4
Others (specify)	9	12.3
Total	73	100

Source: Field work 2007.

Table 4.15 shows the type of problems of feeding livestock in the area. From the above, it is seen that lack of pastures was 34.2%, lack of animal feeds is 4.1%, high cost of animal feeds is 49.4% and others is 12.3% which includes constant clashes between the nomads and sedentary farmers, expansion of farm lands and settlement into range lands, bush burning, remoteness of range lands and fluctuation/seasonality of rain fall. However, the major problem is high cost of animal feeds especially to those that keep their livestock at home and mixed farmers followed by lack of pasture particularly to the nomads.

4.12 Commercial/Domestic Fuel Users.

This section shows the non-demographic characteristic of commercial/domestic fuel wood users in Bosso Local Government Area. These include the type/ sources of energy used (fuel wood), the quantity its effects on the forest resources and how it can be controlled. Below are the responses to the questionnaire.

4.13 Sources Of Energy Used For Commercial And Domestic Activities.

This section shows the source of energy used for commercial and domestic activity e.g. cooking.

Table 4.16: sources of energy used for commercial and domestic activities.

Energy source	Frequency	Percentage (%)
Fuel wood/charcoal	34	89.7
Gas	01	1.5
Kerosene	05	7.3
Electricity	01	1.5
Others (specify)	0	0
Total	68	100

Source: Field work 2007.

Table 4,16 shows the sources of energy used for commercial and domestic activities e.g. cooking. From the table it is seen that fuel wood/charcoal is 89.7%, gas is 1.5%, kerosene is 7.3%, and electricity is 1.5% and others 0%. This implies that majority of the respondents (89.7%) used fuel wood/charcoal. However, 7.3% used kerosene while 1.5% of the respondents respectively used gas and electricity. No response (0%) was registered for others.

Sources of fuel wood/charcoal used.

This question tends to find out the sources of fuel wood and charcoal used for domestic and commercial activities such as cooking, bakery etc in the L.G.A. the question is only applicable to those that use fuel wood or charcoal only or in combination with other source. Below are the responses.

Table 4.17: Sources of fuel wood/charcoal used.

Source	Frequency	Percentage (%)
Market	32	47.0
Near by bush	26	38.2
Distant forest	10	14.7
Others (specify)	0	0
Total	68	100

Source: Field work 2007.

Table 4.17 above shows responses of the respondents on the source of fuel wood and charcoal used for commercial

and domestic activities (e.g. cooking) in the L.G.A. From the table it is seen that market is 47.0%, near by bush 38.2%, distance forest 14.7% and others 0%. This implies that over whelming majority of the respondents (47.0%) source their fuel wood or charcoal in the market 38.7% source their fuel wood charcoal from the distance forest, some even burn particular species of tree to obtain charcoal for use, while for other source 0%.

Quantity of fuel wood used per week for domestic/ commercial activities.

This section estimates the quantity of fuel woods used per week by the respondents in the area. Depending on the activities, the quantity is measured in term of cord for domestic/ catering activities bought at a rate of N100 per cord. For activities like bread baking, the quantity bought is measured in terms of pick up van at a rate of N2,500 per pick up depending on the distance. For charcoal, it is terms of bags at the rate of N800 per bag or polythene bag at the rate of N50.

Below is the quantity of fuel wood used for domestic/ commercial activities (in term of cords) in the area.

Table 4.18: Quantity of fuel-wood used for domestic/commercial activities.

Quantity (cord)	Frequency	Percentage (%)
<5	33	45.5
6-10	22	32.4
11- 15	09	13.2
>16	04	5.9
T0tal	68	100

Source: Field work 2007.

Table 4.18 above shows the estimated quantity of fuel wood used for domestic/ commercial activity per week (in term of cords) in the area. From the table, it is seen that less than 05 cords is 48.5%, 6-10 cords is 32.4%, 11-15 is 13.2% and greater than 16 cord is 5.9%. This implies that majority of the respondents that used less than 05 cord per week are small size families who used it for domestic cooking. Also a substantial proportion of extended families living in family compounds used 6-10 cords per week for domestic cooking and other home activities.

However, 13.2% of the respondents used 11-15 cords per week largely for commercial purposes such as catering services. By and large, 5.9% of the respondents used greater than 16 cords per week such as bread bakery.

Table 4.19 Preference of fuel wood to other alternative source of energy for domestic use.

This question tends to show the responses of respondents on whether they prefer fuel wood to other alternative source of energy for domestic use. The option here is either "yes" or "No". Below is the table showing the responses.

Table 4.19: PREFERENCE OF FUEL WOOD TO ALTERNATIVE SOURCE OF ENERGY FOR DOMESTIC USE.

Option	Frequency	Percentage (%)
Yes	64	94.1
No	04	5.4
Total	68	100

Source: Field work 2007.

Table 4.19 shows whether the respondents prefer fuel wood to other alternative source for domestic use. Table above shows that the "yes" response was 94.1% indicating their preference of fuel wood to other alternative sources. The "No" response was 5.4% indicating that very few respondents prefers alternative source.

4.14 Reasons For Preference Of Fuel Wood As A Source Of Energy.

This question indicates the responses of the respondents on why they prefer the use of fuel wood as a source of energy for domestic use. Table 21 below shows the responses.

Table 4.20: REASON FOR PREFERENCE OF FUEL WOOD AS A SOURCE OF ENERGY.

Reason	Frequency	Percentage (%)
Very cheap	35	51.5
Readily available	24	35.3
Easier to use	09	13.2
Others (specify)	0	0
Total	68	100

Source: Field work 2007.

Table 4.20 indicates the responses of the respondents on their reasons for preferring fuel wood as a source of energy for domestic activities. From the table 4.20, it is seen that 51.5% believed that it's very cheap, 35.3% said it's "readily available" in their area as compared to other sources especially in villages. 13.2% responded that it is easier to use "especially to those with low level of literacy and that it poses less risk of fire out break'. This implies that overwhelming majority (51.5%) of responses seems to have preferred using fuel wood because it's very cheap as compared to other source. However a substantial proportion of the responses (35.3%) believed that its only source that

is readily available to them. For they have to go beyond their locality if they want other alternatives such as kerosene, charcoal, gas and electricity.

Comparism of cost of procuring fuel wood/ charcoal this year with previous years.

This section shows s comparism between cost of procuring fuel wood/ charcoal this year and previous years. The table 4.21 shows the responses to the question.

4.15 Fuel Wood Vendors And Loggers.

This section shows the non-demographic characteristic of fuel wood vendors and loggers in Bosso L.G.A. This includes their source, cost of procurement, comparism of present and previous forested area etc. the section also explores the impact of their activities to the environment and its forest resources and how it can be controlled.

Below are the responses of the population to the questionnaire.

Do you engage in logging or sale of fuel wood/charcoal as an occupation?

This section shows if the respondents are engaged in the sale of fuel wood/ charcoal or logging as an occupation. This will however provide information on the sale of fuel wood/ charcoal or logging as an occupation or economic activity of

some people in L.G.A. the Table 3.1 shows the responses of the population to the questionnaire.

Table 4.21: SALE OF FUEL WOOD/ CHARCOAL AND LOGGING AS AN OCCUPATION.

Occupation	Frequency	Percentage (%)
Fuel wood/ charcoal	29	51.8
Logging	27	48.2
Total	56	100

Source: Field work 2007.

Table 4.21 above shows the proportion of respondents engaged on either the sale of fuel/ charcoal or logging as occupation. It is seen that 51.8% are engaged in either selling of fuel wood or charcoal, while 48.2% are engaged in logging. This also implies that both logging and sale of fuel wood/ charcoal are economic activities, which engage some proportion of the population in the area.

However, both occupations rely on the forest for their products, which in consequence leads to deforestation.

Source of fuel wood/charcoal.

This question is designed to find out the source of fuel wood/ charcoal sold by the vendors. And highlight whether the source is within the L.G.A. or outside.

Table 4.22: SOURCES OF FUEL WOOD/ CHARCOAL.

Source	Frequency	Percentage (%)
Nearby bush	08	14.3
Distant forest	19	33.9
Market	26	46.4
Buy from trucks	03	5.4
Others (specify)	0	0
Total	56	100

Source: Field work 2007.

Table 4.22 shows the responses of the respondents as to the source of the fuel wood/ charcoal they sale. From the table, it is seen that nearby bush contributed 14.3%, distance forests for 33.9%, market, 46.4%, those who buy from truck is 5.4% and 0% for others. This implies that majority of the fuel wood vendors buy from the market in the neighboring villages as shown by 46.4% response, 33.9% is source from the distant forest some times even out side L.G.A. particularly charcoal. 14.3% of the respondent's source their fuel wood from nearby bush not far from their community which they also sale to people or even commuters.

However, 5.4% of the vendors buy from trucks whose source is often out side the community but within the L.G.A. These respondents were mostly obtained in urban wards of the L.G.A. due to the depletion of the forest around them.

How can you compare the cost of procuring the fuel wood/charcoal this year 2007 with the previous year. This question tends to find out/ compare the cost of procuring the fuel wood/ charcoal by the vendors this year 2007 and the previous year.

This would however highlight the researcher with information of increase or decreases in the cost or stability of the cost.

Table 4.23: COMPARISM OF THE COST OF PROCURING FUEL WOOD/ CHARCOALS THIS YEAR 2007 AND THE PREVIOUS YEARS.

Option	Frequency	Percentage (%)
More now	36	64.3
Less now	07	12.5
Same now	11	19.6
I don't know	02	3.6
Total	56	100

Source: Field work 2007.

Table 4.23 above shows the responses of the fuel wood/ charcoal vendors on the comparism of cost of procuring fuel wood/ charcoal this year 2007 and the previous years. From the table it is seen that the cost this year 2007 as compared to the previous year are more now; 64.3%, less now; 12.5%, the same now; 19.6% and I don't know; 3.6%. This

implies that the cost is generally more now as shown by the 64.3% response. However, some responded that the cost is same now (19.6%), mostly, the rural wards whose forest is not depleted and hence had their fuel wood from the nearby bush. Other responses are " less now"(12.56%) are mostly those vendors in the rural wards whose fuel wood stock for the previous year has not been exhausted and hence reduce its price so that it can be exhausted.

Also, there is 3.9% for "I don't know" responses from mostly old women who are not literate and cannot remember whether the cost is more or less or even same.

4.16 DO YOU PAY OR OBTAIN LICENSE FROM THE GOVERNMENT BEFORE LOGGING?

This question shows if the loggers are cutting legally (i.e. obtain license by paying a certain amount of revenue) or illegally by not obtaining license from the authority. Below are the responses of the loggers.

Table 4.24: PAYMENT OF AND OBTAINING LICENSE FROM THE GOVERNMENT BY LOGGERS.

Options	Frequency	Percentage (%)
Yes	32	57.1
No	24	42.9
Total	56	100

Source: Field work 2007.

Table 4.24 shows the responses of loggers on payment for and obtaining of license from government authority for logging. From the table it is seen that 57.1% of the loggers obtain license before felling trees, while 42.9% do not. This implies that majority of the loggers (57.1%) follow the legal process of obtaining license before felling trees, however there are substantial proportion of illegal loggers (42.9%) who do not obtain license and hence practiced indiscriminate logging.

4.17 How Often Do You Log (Fell Trees)?

This question shows the rate of deforestation through the rate of logging.

Table 4.25: THE RATE OF LOGGING.

Option	Frequency	Percentage (%)
Twice a week	13	23.2
Monthly	19	33.9
Every month	02	03.6
Others (specify)	22	39.3
Total	56	100

Source: Field work 2007.

Table 4.25 shows the rate of logging in the study area. From the table it is seen that those who log daily are 23.2%, weekly is 33.9%, monthly is 03.6% and others who said any time there is the demand and the desirable trees are located; 39.3%. This implies that majority of the

loggers(39.3%) responded that there is no specific time for logging since logging rate depends on the demand and availability of the species desired. However, 23.2% log daily, 33.9% log on weekly basis and 03.6 on a monthly basis.

4.18 DO YOU REPLANT TREES WHERE YOU FELL THEM?

This question is designed to find out if the loggers replant trees where they fell them. This will however provide the researcher with information about measures taken against deforestation in the area by loggers. Below are the responses of the loggers to the question.

Table 4.26: REPLANTING OF TREES BY LOGGERS.

OPTION	FREQUENCY	PERCENTAGE (%)
Yes	0	0
No	56	100
Total	56	100

Source: Field work 2007.

Table 4.26 shows if the loggers replant trees where they fell/log as a measure of controlling deforestation in the study area. From the table it is seen that the "yes" responses accounts for 0% while the "No" responses accounts for 100%. This implies that the loggers do not replant trees where they fell or log. This, they claim is the responsibility of

the government authority since most of them pay and obtain license for logging. Others claimed that the trees in the bush do not need to be replanted, they grow naturally.

4.19 Have You Ever Experienced Any Environmental Problem In Areas Where You Log?

This question is designed to find out if logging is perceived to bring about environmental problems in the areas. Below are the responses of the loggers to the question.

Table 4.27: EXPERIENCE OF ENVIRONMENTAL PROBLEMS IN AREAS AFFECTED BY LOGGING.

OPTIONS	FREQUENCY	PERCENTAGE (%)
YES	49	87.5
NO	07	12.5
TOTAL	56	100

Source: Field work 2007.

Table 4.27 above shows whether environmental problem is experienced where logging take place. From the above it is seen that "yes" showed 87.5% while" No" was 12.5%. This implies that the loggers experienced environmental problems where they log or fell trees (table 4.27). However 12.5% of the loggers do not experience environmental

problems for according to them, the logging is selective. Only a particular species that is up to a certain stump dimension or diameter that is fell and not the entire trees.

4.20 Environmental Problems Of Logging Or Felling Of Trees.

This question is designed to find out the environmental problems arising from logging or felling of trees in the area. This is only applicable to those that responded "yes". Below are the environmental problems outlined by the respondents?

Depletion of the specific tree species fallen or logged exposing the ground to sunlight and other elements of weather.

Destroying other forest or plant species when trees fell on them. Accelerating soil erosion by rains and wind. Biodiversity of the area is affected. Ecological balance of the area is off set. Increase in temperature of the area.

4.21 Awareness Of The Effect Of Logging On The Environment.

Above shows if the loggers have any awareness of the effect of logging on the environment. Below are the responses of loggers to the question.

Table 4.28: AWARENESS OF THE EFFECT OF LOGGING ON THE ENVIRONMENT.

Options	Frequency	Percentage (%)
Yes	49	87.5
No	07	12.5
Total	56	100

Source: Field work 2007.

Table 4.28 shows if the loggers have any awareness of the effect of logging on the environment. From the table above, it is seen that 87.5% responded "yes" while 12.5% responded "No". This implies that majority of the loggers (87.5) are aware of the effects of logging on the environment and according to them, there is nothing they could do since its their only means of livelihood. However, 12.5% of them are not aware of the effects of logging on the environment for according to them, logging is selection of a particular desired trees. Those that are not desired are not felled and beside, the trees grow on their own.

If Yes What Are The Effects?

This question applies to those that responded, "yes" to question 4.5.11 above. However, they are given the freedom of expressing themselves. Below are the lists of effect of logging as express by the respondents

- Depletion of specific tree species felled.
- Exposure of the ground to weather elements such as sunlight, rain and wind.
- Increase in heat or temperature of the area since trees that provide shade are felled.
- Accelerated soil erosion by heavy rainfall and strong wind.
- Reduction in wild life and forest organism including birds.
- Offsetting the biodiversity and ecological balance of the area.
- Dryness of the area where logging is carried out.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION.

Summary:

This study was conducted to find out the environmental consequences of deforestation in Bosso Local Government Area of Niger State.

1. From the study conducted, it became obvious that population pressure leading to farming activities, overgrazing of livestocks, timbering or logging, fuel wood or charcoal consumption as a source of energy.
2. Urbanization and bush fire are some of the causes of deforestation in the area.
3. Based on the research findings, 37.1% of the respondents are engaged solely in farming and livestock rearing, 28.4% engaged in fuel wood sale and logging, while 34.5% are domestic commercial fuel wood users (Table 5). The implication of the foregoing on the environment is that for human activities such as farming, timbering, and provision of energy (in form fuel wood and charcoal) for domestic and commercial uses to be carried out effectively, forests have to be destroyed.

4. The livestock rearers particularly the nomads have to provide their herds with much needed nutritional requirements, hence, the forests have to be overgrazed.
5. The extent and level of deforestation in the local government area is obvious on the landscape. Areas which were hitherto covered with thick forests consisting of varieties of plants and animals lives is fast diminishing paving way to farmlands expansion of urban areas and other land use into the forest land so that the extent and aerial coverage of the guinea savanna vegetation has drastically diminished over the years.
6. The vegetation of the area at present is no longer natural due to interference as a result of human activities.
7. The consequences of the foregoing human activity have started showing on the environment these includes; depletion of the specific tree species felled, exposure of the soil to weather elements such as sunlight, rain and winds; increase in temperature in the area since the trees which provide shade are felled, Accelerated soil erosion by heavy rainfall and strong winds, reduction in wildlife and forest organisms including birds, dryness of the area where logging is carried etc.

8. These have also resulted to increase in emigration especially by the native Gbagyi farmers to other neighboring LGAs. These also have far reaching consequences on the food security in the area.

9. Efforts on the part of the state and local government authority to check the trend are at its lowest ebb. The tree planting campaign by various levels of government has been more of ceremonial and political than practical efforts to curb deforestation. The local population is also ignorant about the consequences of deforestation on the environment and human life. Hence the need for public awareness, re-orientation of the attitude of the public towards conservation and sustainable exploitation of the environment is therefore the urgent need for the government agencies to practically apply and implement the policies of the government to remedy the situation.

5.2. Recommendations:

In the face of the foregoing causes and consequences of deforestation analyzed, it became imperative that some policies, strategies and options are needed to control or mitigate the potential dangers of the current deforestation rate in Bosso L. G. A. The following recommendations are made in this regard.

1. The three tiers of government and non governmental organizations (N. G. Os) should embark on a vigorous and massive awareness campaign to sensitize the public on the causes and inherent consequences of deforestation.

2. There is the need for the relevant government agencies to educate the farmers on the adequate and appropriate methods of farming and land management to reduce the rate of deforestation. This will also alleviate the impact of population pressure. For example mixed farming, crop rotation could be enhanced as a way of improving the practice of slash and burn shifting cultivation. This will also halt deforestation and improve the nutrient status of the soil and hence increase productivity for agriculture.

3. The practice of afforestation and re-afforestation in the area should be courage by relevant agencies. The forestry department could even distribute improved varieties of seedlings to local farmers to plant in their area. For example, economic trees will provide farmers with the advantage of selling the products (e.g. fruits) as well as combating deforestation.

4. Establishment and maintenance of forest reserves by the forestry department will also make valuable contribution towards preventing and checking deforestation.

5. Legislation should be made and strengthened against un authorized felling of trees as well as bush burning.

6. Government should encourage the use of alternative source of energy that minimize reliance on fuel wood. For example the government should subsidise the cost of cooking Gas, Kerosene and coal, making it available to both urban and rural area.

7. Reclamation policy be embarked upon by government agencies especially in area massively deforested so that appropriate re-a forestation measures can be implemented.

8. The need for general alleviation of poverty can not be overemphasized in view of the inherent damaging effect of poverty on the environment. In this regard, the government can encourage the production of cash crops by subsiding the cost of inputs as well as purchasing the products from farmers at a reasonable price. This will stimulate export of commodity use, provide employment and hence reduce poverty and deforestation.

Other alternative sources of fuel, such as solar energy, wind energy and biomass can be developed and exploited since they are in abundance, not only in the L. G. A. but also throughout the country. This will reduce the over dependence or reliance on fuel wood and hence reduce deforestation.

There is the need for the creation of Grazing reserve in various areas of the L.G. A. to reduce over grazing by the nomads.

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA SCHOOL OF POST GRADUATE STUDIES
GEOGRAPHY DEPARTMENT
POST GRADUATE RESEARCH QUESTIONNAIRE
TOPIC; THE CONSEQUENCES OF DEFORESTATION IN BOSSO LOCAL GOVERNMENT AREA OF NIGER STATE.

The research questionnaire is purely academic research project and all the responses given will be treated confidentially.

DEMOCRATIC CHARACTERISTICS

i. Age (a) < 25 years ☐ (b) 26-35yrs ☐ (c) 36-45yrs ☐ (d) 46 and above

ii. Sex: male ☐ female ☐

iii. Marital status (a) single ☐ (b) married ☐ (c) divorced ☐ (d) widow ☐ (e) separated ☐.

iv. Occupation (a) public servant ☐ (b) farmer ☐ (c) trader ☐ (d) Other (specify) ---------

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v. Literacy level (a) Tertiary Education (b) Secondary Education (c) Peimary Education (d) Islamix Education (e) None

NON DEMOGRAPHIC CHARACTERISTICS FOR FARMERS

. Are you engaged in any form of agricultural activities (a) yes (b)No

. What type of agricultural activities do you engaged in?

(a) Crop farming (b) animal farming (c) mix farming (d) other (specify)

. How long have you been engaged in such activity ?

a) 5 years (b) 5-10yrs (c) 10-15yrs (d) 15yrs and above

. If engaged in crop farming, what method of farm clearance or preparation do you use?

(a) Mechanized (b) burning of farm land (c) slash and burn (d) cutting of the plant only

5. What type of farm power do you employ in your farm with?

(a) mechanized (b) animal (c) manual (d) other (specified) ----------

6. How many hectares of land do you put into use?

(a) I ha (b) I-5ha (c) 6-10 (d) 10ha (e) over 10ha

7. Do you have scattered trees in your farm?
(a)Yes (b) No

8. If yes what species and what do you use them ? ----------

9. How was your farm harvest last season compare to the previous years harvest.

(a) more (b) less (c) same (d) I don't know

1 0. Do you ever experience any environmental problem on your farm?
(a) Yes (b) no

1 1. If yes which of these environmental problems do you have?

(a) Soil erosion (b) deforestation (c) desertification (d) draught (e) others (specify) .....

12. If engaged in mixed farming or livstock farming what type of Animal do you keep? ..... cow

1 3. What type of method do you use

(a) Nomadic herding (b) ranching (c) dairy farming (d) other (specify)

14. What methods do you use in feeding your animals?

(a) Animal feed (b) Natural pastures.

15. Do you ever have problems in feeding your animals?

(a) Yes (b) No

16. Which of these do you think is / are the problems

(a) lack of pasture (b) lack of animal feeds (c) high cost of animal feeds (d) others (specify) .....

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NON DEMOGRAPHIC CHARACTERISTICS FOR DOMASTIC FUEL WOOD USERS

1. Have you ever observed the problem of deforestation or loss of pasture in this community?

a. Yes b. No

2. If yes what do you think are the causes.?.....

3. What sourcesof energy do you use for your domestic activities or cooking?

   a. fuel wood b. charcoal c. gas d. kerosene e electricity d. Others (specify)..... .....

4. If you use fuel wood/charcoal what quantity do you use in a week? .....

5. What is the source of your fuel wood/charcoal?

   a. market b. Nearby bush c. Distant forest d. others

   (specify) .....

6. Do you prefer fuel wood to other alternatives for domestic use?

   a. Yes b. No

7. If yes, why do you prefer using fuel wood as source of energy?

   a. very cheap b. readily available c. Easier to use d. others

   (specify).....

8. How can you compare the cost of procuring the fuel wood/charcoal this year with the previous years?

   a. more now b. less now c. same now d. I don't know

9. What do you think are the causes of the above.?.....

   .....

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NON DEMOGRAPHIC CHARACTERISTICS FOR WOOD VENDORS AND LOGGERS

1. Do you sell fuel wood/charcoal?

a. Yes b. No

2. If yes what is your source of fuel wood

a. Nearby bush b. Distance forest c. Market d. Buy from trucks e. others (specify).....

3. How can you compare the cost of procuring the fuel wood/charcoal this year with the previous year?

a. more now b. Less now c. same now d. I don't know

4. What do you think are the causes of above ? .....

5. How can you compare the amount of the forest around your community now with thepast 10 years.....

6. What do you think is/are the causes of the above.....

7. Do you practice logging as an occupation? a. Yes b No

8. What type of tree species do you log?

.....

9. Do you pay or obtain iicense from the government before logging?

a. Yes b. No

10. How often do you log (fell trees)?

a. Every day b. Every week c. Every month d. Others (specify).....

11. Do you replant trees where you fell them?

a. Yes b. No

12. Have you ever experienced any environmental problem in areas where you log (fell trees) ?

a. Yes b.No

13. If yes what are the problems.....

14. Have you any awareness of the effect of logging (falling of trees) on the environment a. Yes b. No

15. If yes what are the effects ? .....