

# **CAUSES AND EFFECT OF DESERTIFICATION ON THE ENVIRONMENT**

(A CASE STUDY OF BIRNIN KEBBI LOCAL GOVERNMENT)

**BY**

**SANUSI SAIDU**

*PGD/GEO/2001/2002/208*

**DEPARTMENT OF GEOGRAPHY  
F.U.T. MINNA**

*NOVEMBER, 2003*

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## CERTIFICATION

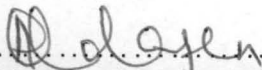
This is to certify that this project was carried out by SANUSI SAIDU of the Department of Geography Federal University of Technology Minna in partial fulfillment of the requirement for the award of post graduate Diploma in Environmental Management.



.....  
**Dr. Halilu A.S**  
Project Supervisor

08/12/03

.....  
Date



.....  
**Dr. Odafen (Mrs.) A.E.**  
Head of Department.

8/12/03

.....  
Date

.....  
External Examiner

.....  
Date

.....  
**Prof. J.A Abalaka**  
(Dean Post graduate School)

.....  
Date

## DEDICATION

I'm dedicate this project to my parent ALHAJI SAIDU DAN, DIO,  
HAJIYA ZALIHATU SAIDU DAN, DIO and my wife MRS. FATIMA  
SANUSI SAIDI.

## **ACKNOWLEDGEMENT**

Glory be to Almighty Allah who made all this possible. My thanks goes to my Honourable Supervisor Dr. Halilu A.S.

My special thanks goes to my parent, my wife and my colleagues for bearing with me throughout this period.

## **ABSTRACT**

This study examined the causes and effect of the desertification in Birnin-Kebbi Local Government.

To fully analyze the cause and the effect of the desertification on the environment therefore a critical study of the town was undertaken.

An Initial reconnaissance was carried out to enable the physical observation and assessment of man's activities such as intensive farming, bush burning, and animal rearing. After this, questionnaire administered to really determined the causes and the effect of the desertification in the locality. An analysis of the questionnaire and personal interview reveal the nature of man's activities within the study region.

## LIST OF FIGURES

1. Bush Burning
2. Intensive Farming
3. Over Grazing
4. Deforestation

## TABLE OF CONTENTS

Title Pages.....	I
Certification.....	II
Declaration.....	III
Dedication.....	IV
Acknowledgement.....	V
Abstract.....	VI
List of Plates.....	VII
Table of Contents.....	VIII

## CHAPTER ONE

1.0 Introduction.....	1
1.2 Aim and Objectives.....	3
1.3 Justification.....	4
1.4 Statement Of Problem.....	5
1.5 Scope & Limitation.....	5
1.5.1 Historical Background.....	6
1.5.2 Study Area.....	7

## **CHAPTER TWO**

2.0	Literature Review.....	8
2.1	Cause Of Desertification.....	9
2.1.0	Natural Causes.....	10
2.1.1	Anthropogenic Factors.....	11
2.2	Effect Of Desertification.....	14
2.2.1	Socio-economic Effect.....	15
2.3	Control Of Desertification.....	16
2.3.1	Short Term Measures.....	16
2.3.2	Long Term Measures.....	17

## **CHAPTER THREE**

3.0.1	Methodology.....	19
3.0.2	Questionnaires.....	19
3.0.3	Reconnaissance.....	20
3.0.4	Personal Interview.....	21
3.0.5	Other Sources.....	21
3.0.6	Sampling Techniques.....	21
3.0.7	Data Analysis Techniques.....	21

## **CHAPTER FOUR**

4.0	Data Presentation And Analysis.....	22
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## CHAPTER FIVE

5.0	Summary and Conclusion.....	30
5.1	Recommendation.....	32
5.2	Reference.....	33

TITLE	PAGE
Type of grazing system.....	22
Hectare of grazing land use.....	22
Management practice application.....	23
Types of Agriculture activity.....	23
Hectare of Land Cultivated.....	24
Land Clearing.....	24
Soil Fertility.....	24
Fertilizer Application.....	25
Source of energy.....	26
Management practice.....	26
Fire wood trade.....	27
Educational Level.....	27

## CHAPTER ONE

### INTRODUCTION

#### 1.1 DESERTIFICATION

The term desertification refers to the diminution or destruction of the biological potential of the land that can lead to desert - like conditions. Drought however, refers to a situation where the "demand for water" by any system exceeds the water supply from all possible natural resources, (WCAP – 7 1989).

Desertification as defined earlier, signifies the extension or intensification of desert – like conditions through the destruction of the regeneration ability of the vulnerable ecosystem of arid and semi-arid regions of the world. Some rough estimates indicate that about 30% of land surface is at risk, including the sub - humid tropics and some world's rangeland, rainfed cropland and irrigated land. Tolba (1984) has estimated that some 21 million hectares of land is currently being desertified each year. The reliability of the above figure is low because of poor historic and baseline data.

Moreover, there is not yet a global agreement on which are desertification indicator that should be measured and on the method of data gathering and analysis. An FAD / UNEP attempt (1984) described a methodology for the assessment of desertification. In general, natural vegetation in desertification – prone area is very sparse or scanty due to

lack of sufficient precipitation. But this scanty vegetation is able to protect and to a large extent stabilize the ground surface. Except where the land is completely degraded, there is always in arid regions some diffuse cover of at least 20 – 40% perennial species (shrubs and grasses) which protect the soil surface from erosion. But when, as a result of animal's or man's intervention, so one of these covers becomes removed or degraded, wind erosion sets in and causes the topsoil to be blown away. At this stage permanent plant life may be destroyed because of lack of water reserves in remaining shallow soil may prevent seedling from surviving. Several attributes for ever –cultivation are seen to create problems, short – fallow period leads to nutrient depletion which is a serious problem in Birnin – Kebbi local government. This lowers the potential for production and reduce yield results. Soil erosion may result from weak soil structure.

Clearing forest and woodland to create agricultural and pasture land is a common feature in Birnin Kebbi area and its environs (Jikan Yari 2001). The scale of clearance has increased as modern agricultural methods have been implemented, both for mechanized ploughing where large fields are most cost for application of irrigation schemes, forested upland areas are particularly susceptible to water erosion following clearance. Deforestation for fuelwood, agriculture industry and homecraft

to an extent is increasing at an alarming rate within Birnin- Kebbi within locality and this is serious causing land degradation.

Urbanization has been a major feature in Birnin- Kebbi area, being a state capital i.e. Kebbi State (KARDA 1996). The facilities in the area of Education, Health, Water, Electricity and recreation here now become inadequate to go along with the ever increasing the influx of more people to the town.

In this direction the state government has planned to provide standard hotel to ease accommodation problems in the state capital and have already constructed about 500 housing units in the state (KARDA 1996). Dualization of major streets in the town have embarked upon, so far the first phase of the project is almost completed. The physical expansion of built land reduces or totally remove the biological production of the land and all mechanism which fuel the desertification Process.

## **1.2 AIM AND OBJECTIVES**

The aim of this study is to assess the cause and effect of desertification on the environment.

The major objectives of this study are the factors that cause desertification and the extents at which they are engaged. On particular important objective of this studies is to examine trends in the growing of

deforestation, bush burning, overgrazing and over cultivation and suggest sustainable and appropriable way of reducing them.

### 1.3 JUSTIFICATION OF THE STUDY

The problem of desertification in Nigeria is more an illusion while man tries to take advantage of natural resources particularly land and water resource in agriculture, there is a tendency to disturb fragile ecological balance in the drought prone-sudan-sahel belt in Nigeria.

However, in the past government did their almost best in the area of tree planting and development of shelterbelt to complement the practical approach for conservation and preservation of land scape a multi purposely initiative of this nature this nature.

In recent years, desertification has caused on the one hand huge drop of crop in the domestic Gross National Product (G.N.P) product from the agriculture sector of the economy resulting in heavy government subsidies and relief. Birnin-Kebbi has necesiated very good tree planting campaigning.

The area of research which is Birnin-Kebbi and its environs, in Kebbi State is purely an agricultural area. The farmers of the area have been contributing immensely on environmental degradation. It is felt that the area is suitable for the types of investigation pursued in this study.

#### **1.4 STATEMENT OF PROBLEM**

The environment of a man is complex, and man is a scientist, observing and wondering members of the animal kingdom (Hare 1984). The action people take that cause desertification are of land use which are inappropriate in the sense that they apparently lead to environmental degradation. These include overgrazing, over cultivation, deforestation.

Livestock – based livelihood are important component in both subsistence and commercial economic activities in Birnin – Kebbi local government. Traditional pastoral nomads system has been very important in Birnin – Kebbi locality. As a result of plant community is destroyed by the animals, plants destruction is not solely achieved by eating as trampling of plant, disturbance of root system or scuffing and compaction of the surface reducing rainfall infiltration all contribute to damage. Degrading has especially been regarded as ensuring from situation where herd sizes are allowed to increase an almost uncontrolled and irresponsible manner. Raising livestock numbers in dry land grazing system have particularly been seen to lead to desertification.

#### **1.5 SCOPE OF THE WORK**

Due to limited resources available for the research and time constrain, the study be limited to Birnin-Kebbi and its environs.

### 1.5.1 HISTORICAL BACKGROUNG OF THE STUDY AREA

Historically, Birnin – Kebbi is one of the oldest settlements in the state, believe to have established by Kabawa ethnic group many centuries ago. Fallowing the fall of “Surname” on earlier settlement established by Mohammed Kotal Kanta and serve as hi headquarters Birnin – Kebbi which by then had transformed into principal town and major commercial centre, become the new administrative centre of the Kabawa Kingdom (KARDA 1996). The new city had remained until the emergence of the 18<sup>th</sup> century Fulani Jihad movement led by great Shehu Usman bin fodio (KARDA 1996)

Birnin – Kebbi was located in the North – west further – stream along the extensive valley of River Rima, the ancient town of Birnin – Kebbi is today, the administrative head quarter of Kebbi state (KARDA 1996). As headquarter of Gwandu Emirate, Birnin – Kebbi was formidable force with an overwhelming superiority in term of political spiritual importance (Jikan Yari, 2001).

Birnin – Kebbi local government largely inhibited by multiple ethnic group. Major among who are Kabawa, Gobrirawa, Fulani and Zabarmawa. However the diversity of ethnic composition with metropolis has multiplied with present status which the town attained (Jikan Yari 2001).

Majority of the inhabitant of Birnin – Kebbi local government are peasant farmers who reside in rural settlement, particularly along river back existing river and vest Fadama portion of river Rima (KARDA 1996). Farming, generally is subsistence and most done the old and modern method.

#### 1.5.2 STUDY AREA

The study area shall include Birnin – Kebbi and its environs. Its environs shall comprise of Ambursa, Gwadagwagi, Badariya, Bulasa and other village.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 INTRODUCTION**

Desertification, as defined earlier, signifies the extension or intensification of desert-like condition through the destruction of the regeneration ability of the vulnerable ecosystem of arid and semi-arid region of the world (WCAP-7 1989).

The economic and social problems associated with desertification are very pressing. Over the past decade, they have attracted serious government concern particularly in the northern state e.g Kebbi and Sokoto (Gwandu, 2000) where these problems are of varying dimension.

Hot and dry region of arid zone cover more than one third of the earth land surface (WCAP-7 1989) less than half of the area of these regions are unproductive because of climatic reasons. Even the productive land is being turned to wasteland or semi-desert due to the influence of men and livestock.

Desertification and its associated problems are devastating many part of the world especially the developing countries. According to the United Nation Environmental Agency (U.N.E.A) about 60% of 3.3 billion hectares of Agricultural land outside humid areas are affected to some degree by desertification (WCAP-7 1989). Decline in land biological productivity and diversify due to deflation of plant cover, the exposure of

the soil to wind erosion decline of soil organic and nutrient content deterioration of the soil structure and its capability to retain water.

Continental, Africa is the most affected accounting for 37% of the area-decertified world wide fallowed by Asia accounting for 29%. (World Resource Institute, 1988). In 1984, U. N. E. P estimated that 38% of the world land surface were at risk and that nearly  $5.2 \times 10^7$  acre ( $2.1 \times 10^{10}$  hectares of productive land were being reduced to near or complete uselessness each year.

In Nigeria, zone occupied nearly 12% of the total area and in Sokoto State covers about 65% of total land area while in Kebbi State.

## 2.1 CAUSES OF DESERTIFICATION

Arid and semi-arid lands may become prone to desertification if the limitation imposed by climate, available water resources, vegetation and soil are not respected through proper land-use Practice that mitigate the adverse effect which lead to an in-balance and subsequent deterioration of the ecological productivity of the land. Thus the cause of desertification can be classified into major groups, namely the periodic stress of the climate on the one hand and man's use of the sensitive and vulnerable dry land ecosystem on the other. To these can be added feed back mechanism.

Climate fluctuation which change in the temporal and spatial distribution of rainfall may result in the lengthening of aridity phases,

higher temperature and wind of greater intensity. Similarly, increase human pressure on the ecosystem may result in the extension of cultivated area's beyond the borders where man's activities are in equilibrium with the environment. These activities include extension of irrigated area for farming, intensive use of the tree-biomass for fire wood and overgrazing livestock.

### 2.1.0 NATURAL CAUSES

The natural causes of desertification include the poor physical condition of soils, vegetation, topography as well as the inherent extreme climatic variability, as evidence in periodic drought. Climate variation is perhaps the most important natural cause of desertification and drought in the dry land of Nigeria.

a) **Climatic Factors:** - Climatic factors and extreme and prolonged occurrence of adverse weather conditions particularly the absence of rainfall resulting in drought. It also be summarized as the variation of in meteorological conditions (especially rainfall and wind) or change in aridity or high climatic stress caused by intense solar radiation, increasing albedo of the underlying soil surface; low and erratic rainfall amount, intense rainfall, shift spatial and temporal distribution of rainfall, dryness of the air and soil, high temperature, wind speed of high intensity. These changes are not related to human activity. They can

also be viewed in the large context of climatic fluctuation. Not only seasonal and annual variation in rainfall, but long –term cycles of drought wet condition. (Hare, 1984).

b) **Hydrologic Factors:** - These are changes in water regime those in ephemeral surface as run-off, which can accelerate or alter erosion processes, and can cause scarcity of absence of permanent, seasonal or temporary sources of water.

c) **Geomorphological Factors:** - These factors are related to the nature of the surface of the land and its underlying structure that can be influenced by certain climatic factor resulting e.g. in water and wind erosion.

d) **Pedologic Factors:-** These factors include the potential weakness in the soil forming processes, low humus or high carbonate content, high calcareousness and salinity, susceptibility to erosion and water logging.

e) **Vegetative Factors:-** These factors are those which are not resultant of human activities but relate to the natural and behaviour of the plant cover. They include the periodic natural reduction of plant density, seasonal plant growth and development cycle, low biomass productivity and increase xenomorphic and succulent forms

### 2.1.1 ANTHROPOGENIC FACTORS

The anthropogenesis factor is mainly the disruption of the ecological system, caused by poor land use and ever increasing pressure put the available resources by the expanding population, more specifically, there are five primary causes of over grazing, deforestation, wood extraction for construction, poor irrigation practice, bush burning e.t.c

a) **Over Grazing:-** Livestock rearing is a common feature in the Birnin- Kebbi locality meaning that animals depend on natural pasture, the nature of the ecosystem in the locality is such that they would not support large number of animals exceed the carrying capacity of the system. This pasture do not have time to recover and the situation may be worsening then at the time of too frequent or too persistent drought. When the pasture do not have time to recover between drought, there is even more severe overgrazing as animal graze the remain closer and brown shrubs and tree ruthlessly and destructively and this lead strictly to desertification. (Gwandu 2000)

b) **Bush Burning:-** The practice of bush burning which is part of traditional farming system in the area has for a longtime know to be detrimental to forestry activities. Fire over large areas often result in considerable loss of human lives, vegetation crops, livestock, and man's

structures. Natural burning is usually caused by lighting but fire often due to man carelessness. (Gwandu, 2000).

c) **Shifting cultivation**:- The practice of farming a piece of land and abandoning it for a more fertile land after a period of 3-5 years, or after noticing dwindling yield from the same piece of land is shifting cultivation. The system has rendered large expanse of land desolate and has been major cause of desertification. (Abdullahi, 2000).

d) **Erosibility**:- In Birnin-Kebbi area, the soil are relatively young and without a well defined profile. In arid areas of the state the soil are loose, light with low organic content due to scanty vegetation. These soil are highly susceptible to wind and water erosion. Continuous movement of the soil particles, especially sandy soil has led to the formation of sand dunes (e.g Dukkus in Birnin-Kebbi). Other marginal and shallow soil hardly support vegetations except for hard Acacia Species that have been exploited for firewood. Such land are scattered all over the state but typical example can be found in Ambursa/ Kardi village (Gwandu, 2000).

e) **Urbanization**:- It is a well known fact, that trees have always given way to given to physical development; for this reason, apart from vegetation that is close to habitation, Birnin –Kebbi has equally lost two fuel plantation at Gwada Gwagi village (KARDA, 1996).

f) **Population expansion:-** All these aspects are directly or indirectly linked with population. The factor of population expansion is a problem to be faced more seriously. The need to accommodate on the limited land area of increasing human and animals population has correspondingly placed an increased demand on forestry resources. With increasing population, man's need and dependence on the forest and its resources have become both intensive and extensive. The effect has always been over exploitation, leading to desertification.

g) **Deforestation:-** The severe pressure on woody species in Birnin-Kebbi for fuel and construction. As population increase, wood becomes progressively scarce with reduction of shade and the dead of the expose root system of trees and large shrubs. To preventing regenerating cutting tree and shrubs vegetation consequently lead to disturbance of soil cover, development of sand deflation, wind and water erosion

## 2.2 EFFECT OF DESERTIFICATION

Effect of desertification are seen to be caused by a number of factors. They are many and varied, depending on the extent of drought in a given area. The effect can be viewed from two major area i.e environment and socio-economic

a. **Shortage of food crops:-** The most important, and long lasting effect of desert encroachment is the dwindling productivity of food crops.

This is brought about chiefly by disintegration of the soil, short rain storm leaching of the little nutrient. All these combine to reduce productivity of the land. This leads to lesser food production progressively should the situation persist yearly. (Le Hoveron 1975).

### 2.2.2 SOCIO-ECONOMIC EFFECT

Problem which have to do with food shortage often have socio economic consequence. Some of these are given below as they occurred in some part of the country (Hare.1984)

#### a) **MIGRATION**

There has always been an alarming rural-urban migration due to the extreme food shortages and lack of rural employment. When farming is no longer feasible and there are no alternative employment opportunities. This lead to other anti-social vices. This act of migration usually destabilizes both economic and social system of a community. It is even worse such a community is forced out of its locality by desert problems

#### b) **SOCIAL VICES**

These lead to incidence of crime and truancy among idle immigrants from areas affected by desertification. These cities are filled with loiterers and beggars which are common sight on over street.

### c) **FAMINE AND MALNUTRITION**

Due to drastic reduction in farming population and low agricultural productivity of the affected lands there is eminent food production efficiency. This leads to hunger and starvation in the affected areas and dependent surrounding cities. Food shortage caused escalation of price of food items. This has remained so since 1985. low income earners have suffered most.

### **2.3.0 CONTROL OF DESERTIFICATION**

It can be observed that desertification is a very complex phenomenon and the processes interact with each other to reinforce. One another to a point where rehabilitation is possible at very high cost. This is why it is desirable to prevent rather than to try to effect a cure for it.

The measure for the control of desertification are many, and very difficult to classify on short and long term basis. Most of the measures seem to be long term. However, an attempt is made to classify them under the two heading.

#### **2.3.1 SHORT TERM MEASURES**

These are measure aimed at giving a cushion effect on the already prevailing situation. These include the following

a) **Conservation of Existing Vegetation:-** Despite the deplorable conditions of the environment a frantic effort towards conserving the existing vegetation is a right step in the right direction. Legislation against indiscriminate felling of trees in gazette forest reserves and other wooded areas should properly police to ensure compliance. Legislation bush burning should be strictly enforce while those against over grazing and protection of plant trees should be enacted.

b) **Improvement of Soil Nutrient:** - Through the use of manure and fertilizer, to enhance improved growth rate of the existing vegetation. This will improve the situation on reserves as well as farm lands under the farm forestry programme of the Afforestation Programme state. With improved soil improved soil nutrient the forest can regenerate itself.

c) **Alternative Energy Resources:** - For heating and cooking are desirable in the immediate to further help conserve the existing vegetation. Gas cookers, kerosene, stoves, solar energy appliances, bio-gas as well as improved wood stores when popularized will go a long way to reduce pressure on forest.

### 2.3.2 LONG TERM MEASURES

These are measures which take along time to implement or whose effect t manifest, after a long time of establishment.

- a) **Integrated Rural Development:** - The provision has necessitated other welfare services especially the provision of water for the rural people and livestock. There is no denying the fact that these welfare services have improved the living condition of the community affected.
- b) **Farm Forestry Practice:** - In recent years all forest programme have placed adequate attention to farm forestry. Seedlings have been given to farmers free of charge to plant in their farms, protect, water, and nurture such seedling for maturity. Even of recent there is the principle of conservation where already standing trees are protected from destruction.
- c) **Annual Tree Planting Campaign:** - This has a nation wide dimension backed up by Government Policies. A great number of kilometers of roadside planting has been achieved under this exercise. Because of direct Government Involvement, this exercise has recorded great success in the state.
- d) **Shelter Belt Establishment:** - the establishment of conventional shelter belt has been observed technically to be most effective of protection the soil by thereby arresting the menace desertification. However, the work result of the Arid zone Afforestation Programme, Ecological Disaster Relief Programme, Forestry Service Drought and Desertification Control state Environmental Protection Programme have tremendously achieved a lot in this direction.

## **CHAPTER THREE**

### **INTRODUCTION**

#### **3.0.1 METHODOLOGY**

The nature and framework of the research work coupled with the constraint of the study. Questionnaires were used as an appropriate and veritable tool for getting first hand information. In addition to questionnaire, reconnaissance survey and personal interview were carried out to broaden the volume of cogent information to be collected. The fore mentioned techniques or method gave opportunity for adequate data collection.

#### **3.0.2 QUESTIONNAIRE**

Structured or fixed response questionnaires containing fifty relevant questions were designed and distributed for farmer and other state holders residing in the locality of a study. One hundred (100) questionnaires were distributed around September 2003. And eighty-five, (85) were filled and return. The respondents were restricted to some response options. A question is asked number of response were supplied from these. The respondents were expected to pick any that best suite his/her response. The questions asked had direct bearing on the activities responsible for desertification in the area. Due to the high percentage of illiteracy in the area, the questions were verbally

translated into their own local language for proper comprehension, and some of questionnaire issue to other stakeholder were not return due to unavoidable circumstances.

### **3.0.3 RECONNAISSANCE**

A reconnaissance survey was carried out in the area of interest (Birnin-Kebbi local government). The survey took place around September 2003. Some of the town visited includes Ambursa, Gwadangwagi, Bullasa, Kola, Kardi and Gulube. The surrounding environment and the interior place where most of these activities take place were visited. The survey enables the physical observation and assessment man's activities such as intensive farming, bush burning, deforestation, and animal rearing e.t.c. The survey involves watching and evaluating the causes and effect of desertification in the area. The inventory of the physical environment was done. The survey present ample opportunity of observation the real appreciation of the menace of desertification first information relating to desertification were obtained picture were taken to serve as sign and prove confirming the cause and effect of desertification.

### **3.0.4 PERSONAL INTERVIEW**

Farmers and other stakeholders were personally interviewed about issues of paramount concern to the research. The interviews involves

eliciting information from farmers with large hectares of land were specifically interview, individual involved both firewood and timber trade were also interviewed. A great deal to give more adopted in communication probing question were asked to give more details about the theme of the research work. The research work received a lot of information from interview methods.

### **3.0.5 OTHER SOURCES**

Materials and data of relevant empirical works form books; Journals and research papers were collected and scrutinized. In order to have justified data. Desertification cut across all as such, a lot of research work have been documented about it Journals and research reports that well extensively on desertification were used.

### **3.0.6 SAMPLING TECHNIQUES**

Random sampling techniques were adopted for the research work. The questionnaires were distributed randomly to different farmers, firewood traders on other state holders in the research locally.

### **3.0.7 DATA ANALYSIS TECHNIQUES**

Data analysis was strictly on frequency percentage method. The frequency percentage method was adopted due to its adequacy, simplicity and relative ease of interpretation and presentation.

## CHAPTER FOUR

### 4.0 DATA PRESENTATION AND ANALYSIS

This chapter presents the result analysis and discussion of finding

#### CAUSES OF DESERTIFICATION

**TABLE 4.1 TYPE OF GRAZING SYSTEM**

GRAZING SYSTEM	FREQUENCY	NO OF COWS	PERCENTAGE
Zero grazing	10	5	11.76%
Free grazing	62	100	72.95%
Semi-intensive	13	82	15.29%
<b>TOTAL</b>	<b>85</b>	<b>187</b>	<b>100%</b>

Sources survey data 2003.

72.92 of the respondent adopt free grazing, 15.29% of the respondents adopt semi intensive grazing and 11.76% adopt zero grazing (Table 4.1).

**TABLE 4.2 HECTARE OF GRAZING LAND USED**

HECTARE	FREQUENCY	NO OF COWS	PERCENTAGE
3	65	100	76.95%
4	7	82	8.24%
6	8	70	9.65%
<b>TOTAL</b>	<b>85</b>	<b>252</b>	<b>100%</b>

Sources Survey Data 2003.

76.95% of the respondent raise about 100 number of cows on only 3 hectare of grazing land, 9.65% of the respondent raise about 70 number of cow on 4 hectare of grazing land, 8.24% of the respondent raise about 82 number cow on 6 hectare of grazing land. (Table 4.2)

**TABLE 4.3 MANAGEMENT PRACTICE APPLICATION**

MANAGEMENT	FREQUENCY	PERCENTAGE
Manure application	20	23.35%
Fertilizer application	25	29.41%
Non application	45	47.06%
<b>TOTAL</b>	<b>85</b>	<b>100</b>

Sources survey data 2003.

47.06% of the respondent apply neither fertilizer nor manure application, 29.41% of the respondents apply fertilizer application, 23.35% of the respondents apply manure application to replenish soil fertility. (Table 4.3)

**TABLE 4.4 TYPE OF AGRICULTURAL ACTIVITY**

TYPE	FREQUENCY	PERCENTAGE
Crop Production	40	47.06%
Animal production	20	23.35%
Both	25	29.41%
<b>TOTAL</b>	<b>85</b>	<b>100</b>

Sources survey data 2003.

47.06% of the respondents are involved in crop production, 23.35% of the respondents are involved in animal production and 23.35% of the respondents are involved in both. (Table 4.4)

**TABLE 4.5 HECTARE OF LAND CULTIVATES**

HECTARE	FREQUENCY	PERCENTAGE
1 Hectare	13	15.29%
More than 1 hectare	45	56.22%
3 hectare	27	33.16%
<b>TOTAL</b>	<b>85</b>	<b>100</b>

Sources survey data 2003.

56.22% of the respondent cultivates more than 1 hectares of land, 33.16% of the respondent cultivate 3 hectare of land, 15.29% of the respondent cultivate 1 hectare of land. (Table 4.4)

**TABLE 4.6 LAND CLEARING**

METHOD	FREQUENCY	PERCENTAGE
Manual	30	35.29%
Mechanical	10	12.29%
Bush burning	45	52.94%
<b>TOTAL</b>	<b>85</b>	<b>100</b>

Source survey data 2003.

52.94% of the respondents adopt bush-burning method of clearing land, 35.29% of the respondents adopt manual method and 12.29% adopt mechanical method (Table 4.6)

**TABLE 4.7 SOIL FERTILITY**

CONDITIONS	FREQUENCY	PERCENTAGE
Poor soil fertility	40	47.05%
Low soil fertility	30	35.29%
Absent of soil fertility	15	17.64%
<b>TOTAL</b>	<b>85</b>	<b>100%</b>

Source survey data 2003,

47.05% of the respondent indicate that the condition of soil fertility in this locality is very poor 35.29% of the respondent indicate that is very low and 17.64% that soil fertility is absent. (Table 4.7)

**TABLE 4.8 FERTILIZER APPLICATION**

NUMBER OF BAGS	FREQUENCY	PERCENTAGE
1	35	29.41%
2	10	11.76%
3	50	58.84%
<b>TOTAL</b>	<b>85</b>	<b>100 %</b>

Source survey data 2003,

58.84% of respondent apply three bags of fertilizer on their land, 29.41% of the respondent apply 1 bag of fertilizer on their land. 11,76% of fertilizer apply 2 bags of fertilizer on their land. (Table 4.8)

**TABLE 4.9 SOURCE OF ENERGY**

NUMBER OF BAGS	FREQUENCY	PERCENTAGE
Firewood	60	71%
Kerosene	15	18%
Gas	10	12%
<b>TOTAL</b>	<b>85</b>	<b>100 %</b>

Sources survey data 2003.

71% of the respondent used firewood as a source of energy, 18% of the respondent used kerosene as a source of energy and 12% of the respondent used gas as a source of energy. (Table 4.9)

**TABLE 4.10 MANAGEMENT PRACTICE**

MANAGEMENT	FREQUENCY	PERCENTAGE
Afforestation	20	23.35%
Re-forestation	25	29.41%
Non –practice	40	49.06%
<b>TOTAL</b>	<b>85</b>	<b>100 %</b>

Source survey data 2003.

47.06 of the respondent apply neither afforestation nor re-afforestation practice, 29.41% of the respondent apply re-afforestation practice 23.35% apply afforestation for replace the felling trees (Table 4.10)

**TABLE 4.11 FIRE WOOD TRADE**

<b>FIRE WOOD TRADE</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
Yes	60	70.50%
No	25	29.41%
<b>TOTAL</b>	<b>85</b>	<b>100 %</b>

70.85% of the respondent involved in firewood trade, 29.41% of the respondent does not involved in firewood trade (Table 4.11)

**TABLE 4.12 EDUCATIONAL LEVEL**

<b>EDUCATION</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
Literate	30	35.21%
Illiterate	55	64.71%
<b>TOTAL</b>	<b>85</b>	<b>100 %</b>

Survey data source 2003.

Show that 64.71% of the respondents are illiterate and 35.29% of the respondents are literate. (4.12)

#### 4.13 FINDINGS

From table 4.1 show that 72.95% of the respondent adopt free grazing system and from table 4.2 show that 91.76% of the respondent raise about 100 numbers of cows on only 3 hectare of land for grazing. This implies that grazing is one of the major causes of desertification, because a lot of natural resource likes grasses, shrubs and leaves of trees are collected frequently for feeding animals. The natural resources suffer tremendous abuse.

From table 4.4 show that 47.06% of the respondent are involved in crop production and from table 4.5 about 56.22% of the respondent cultivate more than one (1) hectare, when compare with table 4.6 where 52.94% of the respondent adopt bush burning as a method land clearing land, under this, point that more hectares of land are cleared in order to have land in order to have land for agricultural activities and bush burning in this locality causes a lot of harm to land e.g by reducing the land soil fertility and by polluting it.

From table 4.7 show that 47.05% of the respondent indicated that the condition of soil fertility in the locality is very poor, and from table 4.8 indicate that 58.84 of the respondent apply three bags of fertilizer on one hectare of the land, this implies that the majority of the farmers adopted intensive system of farming and this lead to loss of soil fertility in the study area.

From table 4.9 show that about 71% of the respondent used firewood as a source of energy and from 9-10 47.06% of the respondent do not apply both afforestation and re-afforestation practice to replace the felling trees by this comparison it show that firewood as a source of energy at home is another major cause of the desertification, the firewood consumption rate is frightening and cause a lot of problem to natural environment. The use of firewood is a common phenomenon in virtually all homes in rural area.

From table 4.11 show that 70.58% of the respondent involved in firewood trade and from table 4.12 show that 64.71% of the respondent are illiterate, from this lack of environment education and awareness is another cause of desertification.

## **CHAPTER FIVE**

### **5.0 SUMMARY, CONCLUSION AND RECOMMENDATION**

It is highly imperative and pertinent to note that the cause of desertification is a complex and intricate factors revolving round a man and its activities. Lack of understanding of natural system and the interaction between various earth surface processes and the impact of human activities and to manage resource in sympathy with natural environment make desertification as serious problem from the research work, it is obvious that over-cultivation, overgrazing, firewood consumption and bush fire are the basic cause of desertification in Birnin kebbi local government.

### **5.1 CONCLUSION**

Based on the research finding people in this locality engage in crop production, animal production and this requires extremely large hectares of land. Land clearance generally involves bush burning, cutting of shrub and tree in order to make heaps, this alone account for desertification in the area. The land is seriously distributed in act of making heaps. In a nutshell, the over cultivation of crops implies through land clearance. In the quest to increase farming land, big forest are cleared bare and this pave way for degradation.

Firewood consumption ranked second in the cause of desertification as shown from the study virtually all the people in the area

depend on firewood as the source of energy at home. Some residents are involved in selling of firewood and this accounts for some degree desertification.

Firewood gains supremacy over other fuel resource because it cost less and at times got free from the surrounding. The rate and scale of bush fires in the area of study is another major causes of desertification. Bush fires are very fast and could destroy vegetation within small time. The frequent burning of bushes adds to the already existing problems of desertification. Hunters are used to burning bush to kill animals and in advertently causing or increasing the scale of desertification. Lazy farmers do set bush on fire as a means of land clearance. Burning forest and woodland to create agricultural land is evidently seen. Animals grazing or over-grazing is seen to be one of the factors compounding the issue of desertification. Animals are allowed to graze freely on vegetable cover and within small time the land is left bare. Consistent grazing has a cumulative effect on the incidence of desertification

The poverty level of the people affects their perception of resources and proneness of society to extract natural resources at levels which may be ultimately injurious for the ecosystem, other source of fuel are expensive and the poor man can only afford firewood because of its cheapness.

## 5.2 RECOMMENDATION

- The Birnin-Kebbi local government, should involved in afforestation and re-afforestation programmed in order to mitigate the incident of desertification.
- Media house & national orientation agency should be involved in creating environmental education and awareness.
- Law to conserve existing vegetation that is by leaving regeneration should be enacted.
- The Birnin – kebbi local government should launch campaign against indiscriminate felling of trees, frequent bush burning, overgrazing e.t.c.
- Traditional rulers, youth club, NGO, and public media should be involved in environmental protection and improvement.
- There is the need to provide logistics staff and funds to intensify the proper environmental monitoring
- From now onwards due to unavoidable circumstances, establishment of shelter belts or similar protective coverage in critical area should be done.
- The state government should enact laws to conserve existing vegetation that is by leaving natural regeneration during farmland clearing as practice in other countries.

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# **SAMPLE OF QUESTIONNAIRE** **CAUSES AND EFFECT OF DESERTIFICATION ON THE** **ENVIRONMENT**

## **PERSONAL DATA**

1. Occupation.....
2. Age .....
3. Sex.....
4. Education.....

## **RESEARCH QUESTIONNAIRE**

1. For how long have you been in this locality?  
(a) Less than five years (b) Less than Ten years (c) More than  
Twenty years (d) More than Thirty years.
2. What is your major occupation?  
(a) Faming (b) Civil service (c) Fishing (d) Rearing
3. What often types of economic business do you engaged yourself  
in?  
(a) Rearing animals (b) Faming (c) Firewood trade (d) Hunting
4. Do you engage yourself in grazing activity?  
Yes ( ) No ( )
5. If yes, what types of grazing system do you use for animals?  
(a) Zero grazing (b) free grazing (c) semi intensive.
6. If there any grazing land in Birnin Kebbi Local Govt.?  
Yes ( ) No ( )

7. Did government allocate any grazing land for your animals?  
Yes ( ) No ( )
8. How many hectare of grazing land do you have?  
(a) 500 hectare (b) 400 hectare (c) 300 hectare (d) Nil.
9. Do you apply and management practice to reduce grazing?  
Yes ( ) No ( )
10. If yes what types of management practice?  
(a) Shifting grazing (b) Rotational grazing
11. Do you engage yourself in any agricultural activity?  
Yes ( ) No ( )
12. If yes what types of agricultural do you engage?  
Yes ( ) No ( )
13. What size of hectare of land do you cultivate or put in use?  
(a) 1 hectare (b) More 1 Hectare (c) Nil
14. What types of farming system do engage in?  
(a) Shifting cultivation (b) Intensive farming (c) Mixed farming
15. Do you clear vegetation on the land  
Yes ( ) No ( )
16. If yes, what types of clearing method do you adopt?  
(a) Manual (b) Mechanical (c) Bush burning
17. What type of crop do you cultivate?  
(a) Rice (b) G. Corn (c) Millet (d) Maize
18. Have you ever change the type of crop you cultivate?  
Yes ( ) No ( )

19. If yes, what are the reasons for change?  
(a) Poor fertility (b) Drought (c) Low rainfall
20. How often do you burn the vegetation?  
(a) Twice annually (b) Four times annually (c) As many as possible
21. What can you say about soil fertility in Birnin Kebbi L.G.A?  
(a) Poor soil fertility (b) Low soil fertility (c) absent of soil fertility
22. If poor, do you apply fertilizer on your land?  
Yes ( ) No ( )
23. If yes, how many bag of fertilizer you apply on your land?  
(a) One bag (b) Two bags (c) Three bags
24. What is your source of energy?  
(a) Gas (b) firewood (c) Kerosene
25. Give an estimate of the firewood you use monthly?  
(a) Half pick-load (b) One pick-load (c) More than one pick-load
26. What is the source of wood?  
(a) From the surrounding vegetation (b) Interior part  
(c) From other part
27. How many forest reservation do you have in Birnin Kebbi?  
(a) One (b) More than Two (c) More than Three.
28. How many trees you plant monthly?  
(a) Two (b) More than Two (c) Nail
29. Do you pay for cutting down trees?  
Yes ( ) No ( )

30. Are you in to sawmill business?  
Yes ( ) No ( )
31. How many timber do you cut down in a trip?  
(a) Fire (b) Four (c) Ten.
32. Do you pay for timber you cut down?  
Yes ( ) No ( )
33. Have you notice any change as result of cutting down trees?  
Yes ( ) No ( )
34. If yes. What sort of change you notice?  
(a) Harmattan attack 9b) soil erosion (c) Flood
35. Do you practice afforestation?  
Yes ( ) No ( )
36. Do you know that indiscriminate filing down of trees can cause desertification on the environment?  
Yes ( ) No ( )
37. If there any awareness campaign against cutting down of trees in L.G.A.?  
Yes ( ) No ( )
38. Do you practice deforestation with preference?  
Yes ( ) No ( )
39. Did Birinin Kebbi Local Govt. involve in any tree planting campaign  
Yes ( ) No ( )
40. Do you engage in construction business?  
Yes ( ) No ( )

41. If yes, what system of construction do you engage?  
(a) Traditional (b) Modern construction (c) Both.
42. In modern house construction, what materials do you use?  
(a) Clay, Wood and Grasses (b) Sand and stone (c) Nil.
43. Where do you obtain the construction material?  
(a) Within the environment (b) Outside the environment
44. Do you know that indiscriminate removal of such materials is of a great problem to the environment?  
Yes ( ) No ( )
45. Can you give an account of the number of rooms you construct in every dry season?  
(a) Less than five (b) More than five (c) Less than ten
46. Have you ever experienced flood in this area?  
Yes ( ) No ( )
50. If yes, how serious is it happening?  
(a) Very serious (b) Not all that serious (c) Nil.