

**SOIL EROSION: A MAJOR CAUSE OF LAND  
DEGRADATION IN MINNA AND  
ENVIRONS, CAUSES, EFFECTS  
AND SOLUTIONS**

*BY*

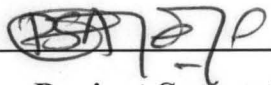
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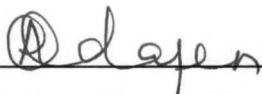
**MARCH, 2002.**

## CERTIFICATION

This is to certify that this project was carried out and presented by Garba Zakari .W. of the Department of Geography, post graduate school, Federal University of Technology, Minna Niger State.

  
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**External Supervisor**

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**Date**

## DEDICATION

To the beloved memory of my Late Father and Mother, Mal. Garba Wase and Fatima Garba.

And to my wife Fatima Zakari and my children, Abubakar (Baba) Illiyasu, Halima, Fatima (Mummy) and Hadiza.


## ACKNOWLEDGEMENT

My gratitude and praise to Almighty Allah for sparing my life to attain this height in educational pursuit.

I am greatly indebted and grateful to my supervisor Dr. Akinyeye .P. Shola for taking time and pains in guiding me through in the course of producing this work. His constructive criticism suggestions and encouragement helped in shaping the work.

Acknowledgement must also be made of the Head of Department Dr. M.T. Usman for his constant advice in the course of study, same profound appreciations of lecturers in the department whose efforts and guidance has enriched me a lot and considerably.

In the Niger State Ministry of Agriculture and Natural Resources my sincere gratitude goes to the Deputy Director of Forestry Department Alhaji Idris A. Ja'agi and his colleagues who untiringly assisted me with relevant materials and discussions on my assignment.

  
8/4/2002

## **ABSTRACT**

This project work endeavours to investigate the ravaging consequence of Soil Erosion and to ascertain the causes, effects and to proffer envisaged solutions to ameliorate the problems of land degradation in Minna and Environs.

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# CHAPTER ONE

## 1.0 INTRODUCTION

1.1 **WHAT IS EROSION:** Erosion is the washing away of the top surface soil particle and so leading to the loosening of soil texture and structure and thus causing infertility and consequently desertification through deforestation. It is obvious that due to the numerous human activity on land, its surface is deemed to change, more so as this human activities comprising of farming methods, Geological, mining, excavations, drilling for oil etc. could have serious positive or negative impact on the soil surface so affect it's texture, productivity and conservation, procedure which could avert sheet and gully erosion or their impact on both land and man (society).

There are few causes of erosion, these factors are rainfall, wind and human activities such as overgrazing, deforestation (burning of bushes or cutting Down of trees for fuel uses, unchecked farming activities leads to loosening of soil particles at the surface level and so makes it easier for rainfall and other agents of soil erosion to wash same away when raindrops and flow carrying these soil particles along and causing the surface to remain bare, unprotected, uncovered as plants could no longer grow on such tempered soil or environment and this leads to a tendency of erosion or of the place being eroded if rain falls or when wind blows shifting or carrying the soil particles away.

## 1.2. STATEMENT OF THE PROBLEM

Inspite of erosion being an age old problem, nevertheless it is presently taking a new dimension because of it's impact and consequences which inherently causes and arouses feelings of concern considering the fact that many productive farm lands which are once turning into unproductive areas due to human and animal unchecked activities on land which consequently renders

much portions of land barren from either exhaustion, deforestation, pollution of our water resources and even air which all contribute to global warming which inturn affects us and the land's productivity and capacity to retain and produce forth fruits therein.

The magnitude of the problem of erosion is more appreciated now because of the dwindling produce from our corroborated efforts at farming to feed the teaming population which is daily becoming a near mirage, regardless of our efforts at both mechanized and commercialized farming the soil which is tilled and ploughed day in day out, should be properly managed like every other resources to allow us have or derive maximum benefit from it for our sustenance.

### **1.3. AIMS AND OBJECTIVES**

The main objectives of this study are:-

- i. To observe and ascertain the causes of erosion in Minna and environs.
- ii. To estimate the effects of erosion in the study area.
- iii. To proffer and recommend ways of finding solution to ameliorate erosion problems in the area.

### **1.4. JUSTIFICATION FOR THE STUDY:-**

It is imperative and necessary more so now that most land (areas) are being used for different purposes regardless of what they are designated for and because of uncontrolled Human and Animal activities. These has necessitated the urgent desire and need to sought for a lasting solution to this serious problem which must be tackled now.

## 2.0. SCOPE OF STUDY

### LOCATION AND GENERAL DIMENSION

Minna comprises of the areas between Maikunkele in the northern part of Chanchaga close to Pago in the southern part and Gurusu close to Maitumbi in the eastern part to Kpakungu in the western part with Minna town down on the valley of the Paida Mountain stretching far to the North-Eastern part of the town and a gentle slope forming a hilly part of the town to the South-West part of the town.

Minna is the capital of Niger State and it lies at the central North-East part of the state, it was recently splitted into two local Government areas with the former local Government Headquarters now for the eastern part and that of the western part at Chanchaga.

It has an area of 73.360Km of Savannah grassland with an average rainfall yearly of a maximum of 1300mm and a minimum of 900-100mm, a conducive climate and favourable weather throughout the year, its inhabitants were mostly farmers with a large number of the population who presently constitute civil servants invariably complimenting the tremendous efforts of the now mostly suburb dwelling farmers due to the effects of urbanization and industrialization.

The areas initially listed consisting of Maikunkele to Chanchaga near Pago and from Gurusu near Maitumbi to Kpakungu are areas conducive and favourable for farming purposes, these hitherto had been the acronym for Minna which is known to be synonymous with farming of staple crops among which are Yam, G/corn, Maize and even animal husbandry, it's land is humous and mostly loamy favourable for most traditional crops.

The emergence of the civil servant cadre is changing events in the area as most parts of the land that was hitherto carefully tended for farming is now obviously turning to avenues and fields for other activities inimical with good land use e.g. minning activities, excavations, urbanization and its twin brother

of industrialization and consequently deforestation or desertification set in which relatively leads to erosion.

Minna lies on a valley bed at the eastern end from Gurusu, a hilly part to the north with a gentle slope from the Western and Southern parts and most of its environs are prospective farmlands which due to its situation and location is prone to erosion because with constant farming activities uphill or downhill and other various human activities, the soil particles is seriously tempered with hence they become loosen and rainfall or wind could wash away or move away the topmost surface of the soil due to constant farming or other Human and Animal activities.

The topmost part of the soil around Minna and its environs being on a slope is conditioned (prone) to being shifted, moved and washed away leaving the topsoil bare and unprotected or uncovered if the grasses are equally tempered with, hence making it vulnerable to erosion which if not adequately checked and stopped will degenerate into serious gully erosion from minor sheet erosion as signs already abound to the seriousness and complicated nature of the problem coupled with the large population explosion in Minna and it's environs.

# MAP SHOWING MINNA AND ENVIRONS



- STATE CAPITAL
- LOCAL GOVERNMENT HEADQUARTERS
- \* VILLAGES

MMM MOUNTAIN

~~~~~ DRAINAGE SYSTEM

~~~~~ RIVERS

Source: Department of Lands and  
 Survey, Minna

# MAP SHOWING MINNA AND ENVIRONS



## KEY

- STATE CAPITAL
- LOCAL GOVERNMENT HEADQUARTERS
- \* VILLAGE
- ~~~~ MOUNTAIN
- ~~~~ DRAINAGE SYSTEM
- ~~~~ RIVERS

## CHAPTER TWO

### 2.0 INTRODUCTION

#### THE STUDY AREA

#### 2.1. LOCATION AND GENERAL DIMENSION

Minna is located in Niger State and it is the capital of the State, which is in the middle belt of Nigeria on latitude  $8^{\circ} 15'N$  to  $11^{\circ} 25'N$  and longitude  $4^{\circ} 30'E$  to  $7^{\circ} 25'E$ .

It lies on a valley bed (i.e. lowland) bordered to the East by Paida Mountain stretching eastwards towards Maitumbi and Northwards towards Maikunkele village, to the West and the Southward is a highland, with an area essentially savannah and quite conducive for farming though prone to erosion effect with its rich soil capable of sustaining huge agricultural activities for both food and cash crops.

Minna and environs is prone to erosion due to its historical farming background as constant tilling and ploughing of the soil particles (land) uphill or downhill hence the soil particles loosens and Rainfall or wind could wash or move away the top soil surface because of the Human and Animal activities consequently which obviously has rendered the soil loose, detach, tempered with and unprotected as well.

#### 2.2. GEOLOGY, TOPOGRAPHY AND DRAINAGE SYSTEM

The geology of Minna and Environs is/ made up of a bed of crystalline rocks of the basement complex with about 20% and the remaining 80% covered by Arable land and food vegetation cover with rich soil for farming.

The dominant topography of Minna is that it is in the valley of highland and generally in the River Niger valley with ranges of isolated hills and the main rivers are Chanchaga with its source from river Kaduna. River green



(Rafin green) and two other streams now forming part of the built drainage system in the town.

The topmost part of the soil around Minna, being on a slope is conditioned (prone) to being shifted, moved and eventually washed away into the drains, making the topmost part of the soil eroded and leaving the soil bare without soil or vegetation cover and unprotected, when the grasses are equally tempered with, it becomes vulnerable to erosion which if not adequately checked and stopped, will degenerate into serious gully erosion from sheet erosion as already prevail the seriousness and complicated nature of the problem coupled with the effects of the activities of a large population explosion in Minna and its attendant inevitable consequence on the land and particularly the soil.

Rafin green (river green) and the two streams that passes through the town which are now all properly constructed with drainage systems all flowing into them only to have its outflow southwards of Minna in Kpakungu usually is or gets flooded. All rubbish, refuses, sewage and scrabs of machines etc thrown into these water ways aid and causes erosion in the town as the soil is washed down the slope into most gutters or drainage system which inturn exacerbate the possibility of erosion in many areas.

The establishment of forest Reserves (areas restricted for conservation) in Minna and it's environs boundaries sometimes ago presently contributed immensely to conserving the soil around Minna but the indiscriminate cutting down of trees as fuelwood and burning of bushes. The activities of people who desperately need sand for construction purposes digging for sand just any where and at the end leaving hollow places without being filled also aids the possibility of erosion to take place including other numerous human activities detrimental to land conservation efforts and which could have terrible effects on soil cover and causing land degradation as the dangerous consequences of soil erosion sets in obviously caused by Human activities other natural

phenomena like Rainfall and wind which easily washed off the topsoil particles or blow off topmost soil particles resulting from the loose nature of the soil particles due to bush burning, over-grazing land clearing and because of the general effects of urbanization and industrialization, the Forest Reserves at Chibieni, Kuchigbe, Dakun, Zontwilo, Gunu, Shakwatu, Gurusu, Bosso and Maikunkele all contributed greatly towards conserving the soil. Plants were planted tended and nurtured into maturation from late 1950s to early 1960s. While lately a considerable land mass is overgrown by fuel wood which forms a break to the forceful wind and helps conserve the soil from erosion, despite the elaborate drainage system built in the 1990s. the careless felling and cutting down of trees which hitherto helps to conserve the soil gives way to open treeless space prone to erosion from the various agencies such as Rainfall and the strong wind that blow off soil particles and nutrients (land) which is the source of livelihood to many people such as farmers.

### **2.3. CLIMATIC CHARACTERISTICS**

Minna lies within a region which has a tropical Savannah climate with distinct wet and dry season, the wet season occurs in the high sun period. The state is invaded by two distinct air masses, one from the north-dry and continental in origin, the sahara air mass. The other is from the Atlantic in the south-Moist cool and equatorial maritime in nature. The weather depends to a large extent on the airmass which covers this area and its depth.

Annual Rainfall distribution pattern shows a maximum of 1300mm rainfall and minimum of 900-1000mm. The raining season is between April and October covering a period of six months. The month of September has the maximum rainfall. A monthly rainfall value in excess of 400mm occur in Minna and environs.

## 2.4. SOIL AND VEGETATION

The parent material as well as the topographical position are the main factors that influence the character of soil in Minna and environs. The soil being underlain by sandstones and basement complex have loamy and sandy loam texture and is of moderate fertility. These soil are well drained and have high water infiltration rate. The basement is of granite and gneises and has a surface texture of loamy sand to sandy loam. Drainage may be poor in areas with high clay or where the soil is shallow, the soils are moderately deep and well drained. The vegetation of Minna and environ consists of open savannah. The Fadamas of the larger rivers support open savannah with occasional streams covered with dense riparian woodlands or gallery forest.

It is pertinent to note the grasses are between 0.8 to 3.5 metres high. The trees are scattered, short boled brand leafed with some up to 16.5 metres in height. Trees such as shea. Bulter (*Butyra spemum Parki*) tamarind. (*Tamarindus indica*). Locust bean and the rubber climber (*Landdolphia heudelotti*) are common drier areas, vegetation consist of low orchard bush with a scatter of shade trees like baubale silk cotton and shea butter, Deleb palms are common along valleys of rivers which are identified by dense growth of wood land; the composition of the vegetation and it's character are often caused by variations in soil types, topography, ground water situation and human interference.

## CHAPTER THREE

### 3.0. RESEARCH METHODOLOGY

#### 3.1. INTRODUCTION

The research to this study is empherical and inductive. Primary and secondary data were collected on rainfall, water flow in the rivers, streams, drainage systems and the frequency and velocity of wind that blow in and around Minna and environs. Parametric and non-parametric test were applied in the analysis, Questionnaires were administered to asses human perception of the effects of erosion in the localities.

#### 3.2. DATA COLLECTION

Rainfall data (monthly rainfall amount) were collect from local government Headquarter of Minna as available from 1970 to 1999. River flow data of discharge, the sevemers of the wind in the areas of study were collected between 1970 to 1999 from major gauging station and records of Niger State. Questions on causes, effects and solution of erosion was randomly administered in the five centers e.g town and villages in the area. At least 80 questionnaires were administered in each locality (center).

#### 3.3. METHOD OF DATA ANALYSIS:

For computational analysis, conventional statistical method were used. Two measures of variability are employed in this study namely” Standard deviation and coefficient of variation. Standard deviation (SD) is the most common measure of variability as expressed as

$$S.D = \sqrt{\frac{\sum (X - \bar{X})^2}{n}}$$

n - 1

Coefficient of variation (CV) is expressed as

$$CV = \frac{SD}{X}$$

For cumulative frequency distribution of discharge are plotted against percentage of all events less than or equal to these values. This is obtained by ranking the annual discharged value according to their sizes which equally swells with the discharges from the drainage systems which reaches its peak too during the raining season and varies too seasonally due to changes or differences in amount of rainfall in the area.

Considering the frequency of reoccurrence of erosion in many areas due to the heavy or less rainfall and in view of these location and proneness to be eroded cartographic representation shall be used in order to show time sequence of occurrence of event as well as trend on variability. If the frequency of occurrence of any phenomenon is known, a graphic representation of such occurrence could be possible by use of simple line or bar graph. On this method, the frequency of occurrence is plotted as a dependent variable while the period of such occurrence is plotted as independent variable. This method is usefull in that it shows the pattern of variables of events over a period of time.

## CHAPTER FOUR

### 5.0. DATA ANALYSIS AND DISCUSSION

#### 5.1. ANNUAL EROSION PATTERN

For the purpose of this research one hundred and fifty (150) questionnaires were distributed to inhabitants of the area out of which one hundred and twenty were returned and collected to ascertain the causes, affects and solutions of soil erosion in their area.

**TABLE 4.1. DEPICTS HOW BUSH BURNING AID AND ABET SOIL EROSION**

|          | NO | %  |
|----------|----|----|
| Agree    | 75 | 63 |
| Disagree | 45 | 37 |

*Source:* Compiled by the author

From the interview carried out, it can be seen that 75 people agreed that bush burning plays a vital role in soil erosion and it represent 63% of the total people interviewed. (Table 4.1) The remaining 37% disagreed with the notion that it contribute to soil erosion.

**TABLE 4.2. SHOWS THE EFFECTS OF DEFORESTATION AS A FACTOR THAT INCREASES CHANCES OF SOIL EROSION**

|          | NO | %  |
|----------|----|----|
| Agree    | 85 | 71 |
| Disagree | 35 | 29 |

*Source:* Compiled by the author from field survey.

It can be observed from (Table 4.2) that 85 people agree that deforestation aggravates the situation and increases the chances of erosion, this represents 71% of the total number of people interviewed. (Table 4.2) also depicts vividly how the remaining 35 people who represents 21% of the total number of responses to questions raised disagree with the notion that it increases chances of soil erosion.

**TABLE 4.3 INDICATES WHETHER OR NOT THAT RAINFALL IS THE MAJOR CAUSE OF EROSION**

|                   | NO | %  |
|-------------------|----|----|
| Agree             | 20 | 17 |
| Strongly Agree    | 85 | 71 |
| Disagree          | 15 | 12 |
| Strongly Disagree | -  | -  |

*Source:* Compiled by the author from field survey.

It is pertinent to note that from the interviews carried out that 20 people agrees that rainfall is the major cause of erosion, this represent 12% of the total number of people interviewed while 85 people also strongly agrees that rainfall is the major cause of erosion this represents 71% of the total number of people interviewed.

Invariably the total percentage of those who agrees is 83% with a total number of 105 people.

Those who simply disagrees that Rainfall is the major cause of Erosion are 15 people representing 17% of the total number of people interviewed.

**TABLE 4.4. SHOWS THAT WIND ALSO AFFECTS AND SERIOUSLY INCREASE THE CHANCES OF SOIL EROSION**

|                   | NO | %  |
|-------------------|----|----|
| Agree             | 80 | 67 |
| Strongly Agree    | -  | -  |
| Disagree          | 15 | 12 |
| Strongly Disagree | 25 | 21 |

*Source:* Compiled by the Author from field survey.

From (Table 4.4.) It can be inferred that 80 people of the total number of 120 agrees that wind causes erosion and this represents 67% of those interviewed.

Representing 21% totaling 40 people representing 33% of the total number of people interviewed who disagrees that wind causes erosion.

The Effects of soil erosion on study area is better highlighted through the following tables:-

**TABLE 4.5 SHOWS THE MONTHS AND PERIOD WHEN EROSION IS MORE PREVALENT AND AT ITS PEAK.**

|          | No-Agrees | No-Disagree | %  |
|----------|-----------|-------------|----|
| JAN-FEB  | 5         | -           | 4  |
| MAR-AUG  | 90        | -           | 75 |
| SEPT-OCT | 20        | -           | 17 |
| NOV-DEC  | 5         | -           | 4  |

*Source:* Compiled by the Author from field survey.

From the (Table 4.5) it will noted that 5 people who represent 4% of the total number of people interviewed are of the opinion that erosion occurs in the



period between Jan to Feb while 90 people representing 75% says erosion is prevalent from March to August period. This is when rain play vital role in removing topsoil.

Out of a total of 120 people interviewed 20 people representing 17% says erosion is prevalent between Sept to Oct. and 5 people representing 4% says erosion occurs between Nov. to Dec. Eight percent (8%) are therefore of the opinion that soil erosion takes place mostly during the dry season. This is the period when wind erosion are probably of high magnitude in removing top soil. This is the period when the soil are unprotected and are left bare.

**TABLE 4.6. SHOWS HOW DISASTEROUS EROSION IS TO HOUSES/BUSINESS PREMISES OR FARM, BY CAUSING DAMAGES.**

|          | NO | %  |
|----------|----|----|
| Agree    | 90 | 75 |
| Disagree | 30 | 25 |

*Source:* Compiled by the Author from field survey.

From (Table 4.6) it can seen that erosion causes great havoc and damages to the environment, out of 120 people interviewed in the study area, 90 people representing 75% agrees with the notion that erosion causes damages to landed properties e.g. Houses/business premises and Farms.

It can be seen from the (Table 4.6) that 30 people representing 25% disagrees with the notion that erosion causes destruction to Houses and farms.

**TABLE 4.7. INDICATES BY STATISTICS WHETHER OR NOT EROSION CAUSES DESTRUCTION TO PUBLIC UTILITIES AND STRUCTURES.**

|          | NO | %  |
|----------|----|----|
| Agree    | 85 | 71 |
| Disagree | 35 | 29 |

*Source:* Compiled by the Author from field survey.

From (Table 4.7) It can be seen that out of 120 people 85 people representing 71% of them agrees that erosion causes destruction to public utilities and 35 people representing 29% disagrees with the notion that erosion causes destruction to public utilities and structures.

**TABLE 4.8 SHOWS PUBLIC AWARENESS AND RECOMMENDATION OF SOLUTION TO THE PROBLEM OF EROSION:- URBAN DEVELOPMENT BOARD AND SANITARY INSPECTORS MUST MAKE SURE ALL STRUCTURES CONFORM WITH GUIDELINES.**

|          | NO | %  |
|----------|----|----|
| Agree    | 85 | 71 |
| Disagree | 35 | 29 |

*Source:* Compiled by the Author from field survey.

This (Table 4.8) shows that 85 people representing 71% agrees that urban Development board must make sure every structure conforms with standard while 35 people representing 29% disagrees with the notion.

**TABLE 4.9 SHOWS THEIR NEED FOR SOIL CONSERVATION TECHNIQUES TO BE TAUGHT TO THE PUBLIC**

|          | NO | %  |
|----------|----|----|
| Agree    | 95 | 79 |
| Disagree | 25 | 21 |

From the (Table 4.9) it can be realized that public awareness of new conservation techniques need to be considered and taught to enable them solve this erosion problem.

**TABLE 4.10 SHOWS THE NEED FOR PROVISION OF CHEAPER AND MORE ACCESSIBLE SOURCES OF FUEL FOR DOMESTIC PURPOSE TO REPLACE FELLING OF TREES. E.G. KEROSENE BE MADE AVAILABLE ACCESSIBLE AND AFFORDABLE TOO.**

|          | NO  | %  |
|----------|-----|----|
| Agree    | 105 | 87 |
| Disagree | 15  | 13 |

Source: Compiled by the Author from field survey

This findings agrees with Adefalalu (1990) Observations that we must not underestimate the repercussion and consequences of bush burning and felling of trees for fuel wood.

Therefore conscientious efforts must be made at educating the public on the need for planting more trees as well as preserving the vegetation and forest resources as a means of conserving the natural resources, the habitat and our environment from depletion and degradation to avert the effects of erosion.

These observations are further corroborated by Halilu .H. Adamu et al (2000) on environmental problems, hence the public must be taught new

environmental protection and conservation techniques and supervision be carried out by relevant agencies.

## CHAPTER FIVE

### 5.1. SUMMARY, CONCLUSION AND RECOMMENDATION

From the study and analysis of data collected, it shows that a number of factors cause and determine the extent, pattern, characteristics and effects of erosion. Such factors include Bush burning, Rainfall and wind, the low educational level or attainment and the poor conservation habits of the people as well. It also shows from this study that erosion is more prevalent during the raining season periods which is from March to August and that population growth greatly influences, aid and increases chances of erosion due to ignorance of soil conservation techniques or better farming methods including lack of other sources of fuel for use in homes for domestic purposes.

Similarly, a contributory factor which aggravates the situation is the poor construction of structures in residential areas or industrial layout coupled with it, is the wrong allocation of sites e.g. land indiscriminately without due regard to suitability or without conformation to land use laws and regulations which is the underlying principle for guide to issuance or granting of certificate of occupancy to desirable applicants. On the necessity for planting tress and establishing a forest reservation area to encourage conservation processes seedlings should be readily provided for easy accessibility by the people and such efforts should be mostly encouraged during the early raining periods to reduce the burden of watering these plant as water is mostly occasioned by scarcity. It is pertinent that fuel for domestic purpose e.g. Kerosene be made available and at affordable prices to the majority of people to avert and bring to an end the felling of tress for fuelwood.

Farmers should be taught better techniques of ploughing and tilling the soil and they like all residents be encouraged to plant trees in their homes and on their business premises as well as on their farmlands.

The allocation of wrong and unsuitable sites for building of structures e.g. houses, industries etc be discouraged and stopped immediately, same with allocation of places as play ground fields or lawns, consideration be made of the vegetation and trees which have great considerable positive impact on the lives of all residents and inhabitant on an area.

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**FEDERAL UNIVERSITY OF TECHNOLOGY MINNA SCHOOL OF POST  
GRADUATE STUDIES DEPARTMENT OF GEOGRAPHY, POST  
GRADUATE DIPLOMA IN ENVIRONMENTAL MANAGEMENT**

**QUESTIONNAIRE**

The questions below are aimed at finding out the causes of soil erosion, its effects and solutions in Minna and environs.

You are hereby required to give candid answers to the questions as all responses will be treated in strict confidence please.

Thank you,

**TICK AND ANSWER APPROPRIATELY**

**SECTION I**

Demographic and social data of Respondent

1. Nationality: (Non-Nigerians only)
2. Age of Respondent (a) 15-25 ( ) (b) 26-35 ( ) (c) 36-45 ( ) (d) 46-55 ( )  
(e) 56-65 ( ) (f) 66 above ( )
3. Residential Address \_\_\_\_\_
4. Sex: (a) Male ( ) (b) Female ( )
5. Occupation (a) Employed ( ) (b) Self Employed ( ) (c) Unemployed ( )
6. Marital Status (a) Single ( ) (b) Married ( ) (c) Divorced ( )
7. Educational level (a) Uneducated ( ) (b) Primary level ( ) (c) Secondary level ( ) (d) Tertiary level ( )

**SECTION 2**

Awareness of the causes of Soil Erosion

- 8(a). Resident ( ) (b) Visitor ( )
- 9(b). Land Lord ( ) (b) Tenant ( )
- 10(a). Farmer ( ) (b) Hunter ( ) (c) Civil Servant ( ) (d) Self Employed ( )



11. How long are you resident in the area?  
(a) 1-5yrs ( ) (b) 6-10yrs ( ) (c) 11-15yrs ( ) (d) 16-20yrs ( ).
12. Bush burning aid and abet soil erosion.  
(a) Yes ( ) (b) No ( )
13. Deforestation or felling of trees increases chances of soil erosion.  
Yes ( ) No ( )
14. Rainfall is the major cause of erosion I strongly agree ( ) I agree ( ) I disagree ( ) I strongly disagree ( )
15. Wind also affects and seriously increase the chances of soil erosion. I strongly agree ( ) I agree ( ) I disagree ( ) I strongly disagree ( )
16. Lack of Drainage system causes erosion: Yes ( ) No ( )

### **SECTION 3**

#### **EFFECTS OF SOIL EROSION IN STUDY AREA**

17. How has soil erosion affected your occupation/Business/Trade etc.  
a) Negatively ( ) (b) Marginal ( ) (c) quite adversely (d) positively ( )
18. What is your monthly average income level (a) less than N19,000 ( ) (b) b/w10,000 and 20,000 ( ) (c) b/w 20,000-40,000 ( ) (d) 40,000 above ( )
19. What season do you consider more prone to erosion (a) Raining Season ( ) (b) dry wet/cool season ( ) (c) dry Hot season ( )
20. What months do you consider as the peak of erosion. (a) JAN-FEB ( ) (b) MAR-AUG ( ) (c) SEPT-OCT ( ) (d) NOV-DEC ( )
21. Soil Erosion has caused serious damages to my house/business premises/farm etc (a) I agree ( ) (b) I strongly agree ( ) (c) I disagree ( ) (d) I strongly disagree ( )
22. Erosion causes destruction to public utilities/structures etc.  
(a) I agree ( ) (b) I strongly agree ( ) (c) I disagree ( ) (d) I strongly disagree ( )

#### SECTION 4

### **PUBLIC AWARENESS/RECOMMENDATION OF SOLUTIONS TO THE PROBLEM OF EROSION**

23. Urban Development officials and sanitary inspectors must make sure that the land use law and regulations are appropriately applied

(a) I agree ( ) (b) I strongly agree ( ) (c) I disagree ( ) (d) I strongly disagree.

24. There is a need to teach conservation techniques to the public.

(a) I agree ( ) (b) I strongly agree ( ) (c) I disagree ( ) (d) I strongly disagree (c)

25. Cheaper sources of fuel for domestic use should be provided e.g. Kerosine to replace the felling of trees.

(a) I agree ( ) (b) I strongly agree ( ) (c) I disagree ( ) (d) I strongly disagree.