THE IMPACT OF RAINFALL VARIABILITY ON MAIZE PRODUCTION

A Case Study of Lapai Local Gov't Area of Niger State

BY

Zainab Adamu Saidu   As/10-44460 Geo-Econs

Ibrahim Abdullahi Saga As/10-44686 Geo-Sed

Maimuna I Muhammad   As-   49556 Geo-Econs

Hadiza Zubairu   As/10-49576 Geo-Econs

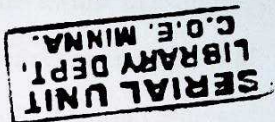Abdulqadir Ibrahim   As-10-49633 Geo—Econs

SCHOOL OF ART AND SOCIAL SCIENCES

DEPARTMENT OF GEOGRAPHY

Niger State College of Education, Minna.

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TITLE PAGE

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ZAINAB ADAMU SAIDU	AS/10/44460	GEO/ECONS
IBRAHIM ABDULLAHI SAGA	AS/10/44686	GEO/SED
MAIMUNA .I. MUHAMMAD	AS/10/49566	GEO/ECONS
HADIZA ZUBAIRU	AS/10/49576	GEO/ECONS
ABDULQADIR IBRAHIM	AS/10/49633	GEO/ECONS

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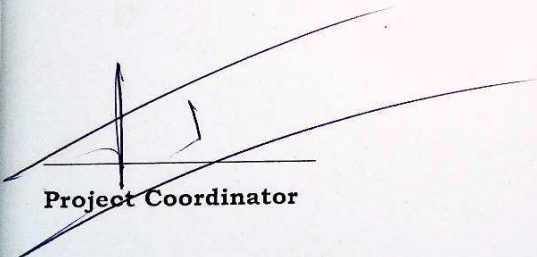
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APPROVAL PAGE

This is to certify that the research work has been approved in the partial fulfillment of the requirement for the award of National Certificate in Education (N.C.E) in social science for the school of Arts and Social Science, Niger State College of Education Minna.

_____   15/11/2013
Project Supervisor   **Date**

_____   15/11/13
Project Coordinator   **Date**

_____   _____
Head of Department   **Date**

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DEDICATION

This work is dedicated to our unforgetful lecturer who passed away on the 1st of October 2012 MallamSalihuMuye. We pray may Allah grant him Al-Jannatul Firdausi Amin.

ACKNOWLEDGEMENT

First and foremost our profound gratitude goes to Almighty Allah for granting us t6he ability, strength and knowledge to embark on this work successfully.

Secondly we acknowledge the effort of our supervisor MallamUsmanAdamuKuta for taking his time in guiding our work and gave us advices. We pray may Allah increase him in knowledge and blessed his family Amin.

Also we acknowledge the effort of project coordinator MallamNdakoNma and the entire lecturers in geography department and Economic as well.

Finally we must not conclude without acknowledge the effort of our heads of departments, the H.O.D geography Mr. JoashSakoma and H.O.D Economics Mr. Paul Kolo for their support.

ABSTRACT

The focus of the study is to make a vivid research on the "impact of rainfall variability on maize production. Chapter one of this research consist of the introduction that is the background to the study, statement of problem, the purpose of study, aim/objective of the study and importance of the crop which is maize. Chapter two narrate the reviewed of related literatures. Chapter three of this research explain the research methodology, that the method used by the researcher to collect data. Chapter four looks at the data analysis which was collected by the researcher. Chapter five includes the conclusion, recommendations and the bibliography.

TABLE OF CONTENT

CHAPTER ONE

1.0 INTRODUCTION

Rainfall is an important form of precipitation which resultfrom the cooling of the air as it rises higher in lower atmosphere. Rainfall is a form of precipitation in liquid state which is derived to form large droplets of water. Also rainfall is said to be water droplets from the atmosphere to the earth surface of the earth. Rainfall is also the total amount of rain that falls in a particular area in particular amount of time. Also it is describe as the release of excess condensed water vapour in the atmosphere in to the earth.

Variability of rainfall is the accumulated amount of rainfall from the planting to the harvest of crops.

Rainfall variability from season to season greatly affect soil water availability to crops productions especially maize, in this way it create a problem that has to be dealt with crop production risk. That is, variability of rainfall is of positive and negative effect it has a positive effect when the variability of the rainfall is moderate and also it has a negative effect when the rainfall variability is very low or very high.

Variability in seasonal rainfall is higher in the area with the smaller amount of rainfall.

Most maize growing area are located in the areas with the coefficient of variation (C.V) of season rainfall higher than 0.2mm. The rainfall requirement on maize production should be between 75m, 150cm per annum.

Surely water availability is the most critical factor for sustaining crop productivity.

1.1 STATEMENTOF PROBLEM:

The rainfall variability result to insufficient soil moisture surplus at the time of high need or demand, due to either cessation time, late onsetof rain or earlier than normal. Which immensely affect the maize cultivation in Lapai local government of Niger State.

These, therefore leads to high complains of no assistance is received from the government by the farmers, in-terms of loans and new varieties of crops in reference to 2010. About 80 percent of the farmers experience low cultivation due to lower than normal amount of rainfall in the area.

1.2   AIM AND OBJECTIVES OF THE RESEARCH

The aim of the research is to determine the impact of rainfall variability on maize production.

OBJECTIVES:

Theobjectives of the research is to:-

i.   Find out the negative effect of rainfall variability on maize production.

ii.   Know the importance of moderately variated rainfall on the total out-put of maize production.

iii.   To find out how irregularity of rainfall affects maize productionin the area.

iv.   Find possible solution to the negative effects of rainfall variability

1.3   SIGNIFICANCE OF THE STUDY

The significance of the research is to determine and actualized the impact of rainfall variability, the effective's control of the variability on maize production in Lapai Local Government of Niger State.

1.4   RESEARCH HYPOTHESIS:

i.   High Variability of rainfall result washing away of the upper most top soil, which renders germination of crops.

ii.   The moderately variated rainfall result to high cultivation of maize product after harvesting.

1.5 SCOPE AND LIMITATION OF THE RESEARCH:

The research is limited on rainfall variability, on maize production from some selected areas in Lapai Local gov't. due to nature of terrain ecological problem in some area we cannot covered all the Local government areas.

1.6 DEFINITION OF TERMS

Rainfall:-Is the form of precipitation in liquid state which is derived to form large water droplets.

Is the release of excess condensed water vapour in the atmosphere in to the earth surface.

Variability:-The fact of something being likely to vary negatively or positively.

Rainfall variability:- The accumulated amount of rainfall from planting to harvest of crop.

CV: Coefficient of Variation.

Cultivation:- Act of harvesting farm product.

2.0. LITERATURE REVIEW

2.1. Introduction:

The word maize derives from the Spanish form of indigenous Taino word for the plant, maize it is known by the other names around the world.

The maize plant is often 2.5m (metres) 8ft in height though some natural strains can grow 12m (40ft). The stem has the appearance of a bamboo cane and is commonly composed of 20 internodes of 18cm (7m) length –A leaf grows from each node which is generally 9cm (3.5in) in width and 120cm (4ft) in length.

Ears develop above a few of the leaves in the mid-section of the plant, between the stem and leaf, elongating by 3mm per day, to a length of 18cm (7in) (60cm/24 days is being the maximum observed in the sub species). They are female inflorescences, tightly enveloped by served layers of ear leaves commonly called husks. Certain varieties of maize have been bred to produce many additional developed ears. These are the source of the baby corn used as a vegetable in Asian Cusine.O. Iwena (2003).

The apex off stem ends in the tassel, an inflorescence of male flowers. When the tassel is mature and conditions are suitably warm and dry anthers on the tessel dehisce and release pollen. Maize pollen is anemophilous (dispersed by wind) and because of its large setting velocity, most pollen falls within a few meters of the tessel. *Wikipedia (2010)*

Planting density affects multiple aspects of maize. Modern farming techniques in developed countries usually rely on dence planting, which produces one ear per stalk. Stands of silage maize are yet denser and achieve a lower percentage of ears and more plant matter.O. Iwena (2003).

The maize plant (*Zea mays*) belongs to the grass family. It has long leaves and a stem as earlier said. At cob developed from a modified lateral branch derived from auscillary bud of the main stem. The husk of the female inflorescence is formed from modified leaves and this gives protection to the flower and a developing seeds.*A. Faniran and P. O. Okunjotifa (2005)*

In Nigeria Maize has probably been cultivated in part of northern zone, but it importance in the food economy dates from the early years of this country.

The varieties of crops consider indigenous were originally cultivated in part of the country before new types were introduce, such as NSI. Aaifitsolo and the various Mexican varieties.

Maize requires a wide range of well-drained soils, sandy loam to clayed. Loam which are rich in humus and a plant nutrient, either of alkaline or almost neutral. It require a minimum temperature of about 10° C and a maximum of about 46° C and it optimum temperature requirements is 33^oC -34^oC, good performance does not depend so much on the amount of rainfall but on distribution and does best on distribution of between 75-150cm per year. O. Iwena (2003).

2.2. Origin of Maize:

Maize is the domesticated variant of teosnite (the term "teosinte" describes all species and subspecies in the genus Zea, excluding *Zea mays ssp. Mays*). The two have dissimilar appearance, maize having a single tall stalk with multiple leaves and teosinte being a short, bushy plant. The difference between the two is largely controlled by differences in just two genes.*A. Faniran and P. O. Okunjotifa (2005)*

Several theories have proposed about the specific origin of maize.

1.   It is a direct domestication of a maxican annual teosinte, *Zea mays ppssp, par viglumis,*

In 2012, two percent [2%] representing one respondent harvested moderate maize crop, while eighteen percent [18%] representing nine [9] respondents have a high harvest at the end of the year.

4.11 Do you harvest all your crop at the same time considering that they are not planted at the same time. *A. Faniran and P. O. Okunjotifa (2005)*

Several theories have been proposed about the specific origin of maize.

1.   It is a direct domestication of a Mexican annual teosinte, *Zea mays spp, par viglumis*, native to the Balsas River Valley in South-Eastern Mexicao, with up to 12% of it genetic material obtained from *Zea mays spp.* Mexicana through introgression.

2.   It has been derived from hybridization between a small domesticated maize (a slightly changed form of a wild maize) and a teosinte of section luxuriates, either *Z.* Luxurians or *Z.* Diploperennis.

3.   It has undergone two more domestications either of a wild maize or of a teosinte.

4. It has evolved from a hybridization of *Z*. Diploperennis by Tripsacumdeotyloids.

In the late 1930s it was suggested that domesticated maize and a species of Tripsacum a related genus. This theory about the origin of maize has been refuted by modern genetic testing, which refutes Mangelsdorfs model and the fourth listed above.Paul M. D. (1934)

2.3 THE OCCURANCE OF RAINFALL VARIABILITY:

Variability of rainfall over an area has been a scourge of mankind even if area or region with copious rainfall.

Historically even drought are not uncommon, nor variability becomes a unique phenomenon to the sahelion region because according to many authors it is a recurrent climate phenomena in Africa particularly in Sudan-Sahel zonewhere most peasant farmers and herds man can recount tale of lean years due to local drought and even disasters. Years such as the early 1970s.Whenanimals and crops perished.wikipedia(2009)

Historian records suggested that rainfall variability have occurred frequently in the past and some of the more severe have been accompanied by famine.

Many authors (Allin, 1923 Grove 1983) have shown the occurance of rainfall variability in this zone several times within this country above. Major rainfall variability are believed to have occurred in 1913/15, 1940-41, 1948-49 and 1972-73, while minor have occurred between these 1963 and 1967-68, for instance Olofin(1984).

The establishment of many meteorological stations toward the end of 19th century provided a climatic record to more adequately describe the intensity and area covered of rainfall variability condition. Nicholson (1975,1981a,1982) provided a good summary of the recent rainfall variability.

According to him the Sub-Saharan regions suffered a tremendous drought in the 1910s, 1940s, 1968 and 1973. Nicholson (1975)

Also using rainfall data from various established station. historical evidence indicating that rainfall variability and farming conditions prevailed in different parts of present day Northern Nigeria in the year 1810-1837, 1847, 1847, 1855, 1863, 1873, 1888 to 1890. Fisher (1975)

Similarly according to Bovril (1971) rainfall variability appeared to have prevailed during the early part of the country in Western part of Nigeria.

Abdulmu'min (1984), has highlighted three drought episodes centered on 1918, 1942 and 1973 each lasting a span several years rainfall deficit.

The cause of rainfall variability is not clearly kwon. However, there are many theories on the cause of rainfall variability in Sudan-Sahelian drought to the global change in air pressure belts dating back to twenty to forty years (Lamb 1972).

According to these people, Sahelian rainfall has been predicated to decline by a chance in global pressure belts. The argument is based on the theory that a reduce gradient from the equator has resulted in the tropical maritime air masses which bring moisture to the Northern part of Nigeria, sweeping not less for North and consequently disposing a higher proportion of it rain near the equation. This is the evidence in the claimed rise in the equatorial East Africa Lakes parallel to Savannah drought.Allan (1971).

In addition, a study in the global distribution of rainfall normalized the period 1961-1964 showed the pattern with

increase rainfall in the middle latitude as just as near the equator, which rainfall was reduced over much of the desert zone particularly in the Southern fringes. Other explanation for the causes of rainfall variability include that Chavey (1978) who find theoretical justification for the area that destruction of vegetation by over grazing, so change the earth of the Sahel zone and thereby with albedo which intensively the atmospheric process to produce drought and so help to maintain the spread of desert. These therefore, explain the cause of rainfall variability in relation to the commutative act of human being. Therefore, if atmospheric circulation system changes such an area normally under ascending stable system it will experience reduce rainfall no matter the surface vegetation cover it.

Apeldom(1978) found out that many villages in the drought pure areas of Africa have religious connotation to the causes of rainfall variability. That rainfall variability occurred due to many sins. Also found out that evidence of this evidence of this religious connotation in the cause of many researches, since most of the attributes of rainfall variability could be ascribed to the high rate of crime in the country.

2.4 THE EFFECT OF RAINFALL VARIABILITY:

Irrespective of the causes of rainfall variability has had a tremendous effect on the society, both on human livestock and agricultural production. Wikipedia (2008)

In all, rainfall variability affected areas agricultural economy becomes apples on harvest continue to fall and livestock to die. A 1985 various state government in Nigeria esteemed the lost due to 1983-84 seasons.Wikipedia (2008).

According to Borno State Commissioner of Agriculture, the state lost about 864,600 tons of crops worth than 1.06 billion Naira due to rainfall variability and pests in 1994. The lost represent about 47% of the expected crop yield.Concord Newspaper (1994)

Environment affected compounded by certain human activities are so serious that only with massive effects and a return of normal rainfall, will the agriculture lands cover recover their described level of productivity. the soil of most of the rainfall variability affect are has become so hardened and ended that young plants even if sprouted, cannot survive as the land has become increasingly purchased and subject to erosion. Hydro
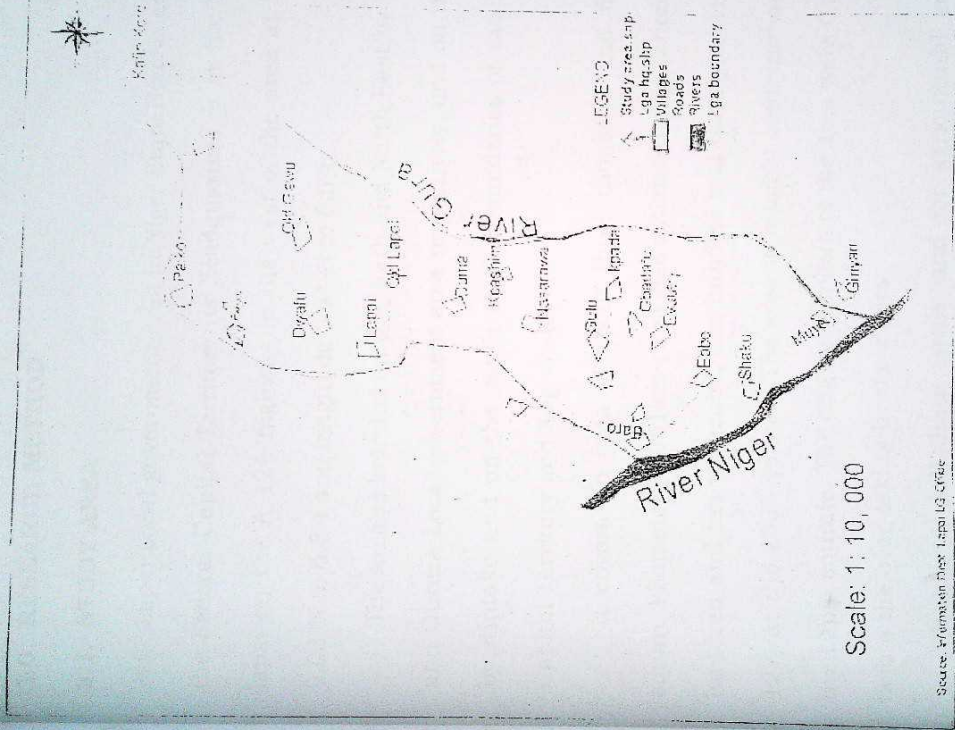
logically, the streams may either failed to flow or flow at highly decreased rate.Apolalorn (1978)

For instance Niger River was reported being a lots lowest for 10 years in 1982 (Thomas and bone 1983) and at its lowest for 60 years in 1985 (Aid 1983). This rainfall variability severally hindered dry season farming along the stream

Democratically, rainfall variability hasan everlasting consequence on the people. A large number of people suffered from malnutrition and diseases which lead to a famine in most of the rainfall variability affected area in Northern Nigeria. Daily time Newspaper (1996)

According to (Matimore 1983) the most serious rainfall variability famine was that1913 and 1973.

MAP OF LAPAI SHOWING THE STUDY AREAS

Scale: 1: 10, 000

LEGEND
Study area s.nip.
Lga hq.ship
Villages
Roads
Rivers
Lga boundary

River Gura

River Niger

Dyalu
Pazu
Evu
Gh Gawu
Qti Lapai
Duma
Kpaghi
Llapai
Nasarawa
Gulu
Kpada
Gbarbu
Evuzo
Eabo
Shatu
Mupa
Gimyari
Baro

Source Information Dept. Lapai LG Office

ADMINISTRATIVE MAP OF LAPAI SHOWING STUDY AREAS

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CHAPTER THREE

3.0. RESEARCH METHOD

3.1. STUDY AREA

Lapai Local government area in Niger State Nigeria adjoining the Federal Capital Territory its headquarters is in the town of lapai on the A 124 highway in the west of the area at latitude 9.03^oN to 6.3^ot and longitude 0.91^oN to 6.6^ot.

The area is boarded on the North and North East by Paikoro and Gurara Local government area respectively, and on the west by Kintako and on the south by the boundaries of the Federal Capital Territory and Kogi State.

It covers an area of about three thousand and fifty-one square kilometer ($3,051km^2$) and has estimated population of one hundred and ten-thousand, one hundred and twenty-seven, (110, 127) at the 2006 census. The area is roughly conterminous with the Lapai emirate. The original dwellers of the area were Guragyi's before the over-taking by the Nupes.

It has a well drain fertile land for agricultural activities which attract many farmers from various parts of the state and country at large. It also has a large market centre.

The dispensary area is located along Abuja road East to Agaie local government.

3.2. POPULATION

The population for the study here refers to the people in the area when the research is carried out.

The 2006 census, estimated the population of the area to about (110,127) one hundred and ten-thousand, one hundred and twenty-seven.

Therefore five area were selected in Lapai local government area of Niger state for the research work.

3.3. SAMPLING AND SAMPLING PROCEDURE:

The researcher will use the sampling technique; this is due to large population and terrain of the area, it is impossible for him to deal with each individual from the selected area.

Therefore the researcher will use the systematic sampling and simple random sampling techniques. In the systematic sampling numbers will be selected while all the other persons are systematically determine. In the simple random ensures that each and every individual has equal and independent chance of being selected.

3.4. INSTRUMENT FOR DATA COLLECTION:

The researcher is going to use two types of instruments for data collection. The instrument to be used by the researcher for the data collections are questionnaire and interviews.

The questionnaire to be used by the researcher is to elite information by distributing the questionnaire to respondents to reply in writing by ticking the response by himself. But also some of the questionnaires were to be asked orally because some of the farmers are illiterate.

The interview is a device to be used by the researcher to collect information from the respondents in a face to face contact through communication so as toconfirmed or reject the study.

3.5. VALIDITY OF THE INSTRUMENT:

The instrument for the data collection such as the question paper for the questionnaire and interview question was very screened and validated by a supervisor who is guiding the research work so as to ensure that the instrument measure what the researcher intends to measure for the research study.

3.6. METHOD OF DATA COLLECTION:

The researcher will personally visit the selected area in order to distribute the prepared questionnaire conducting interviews and making observations.
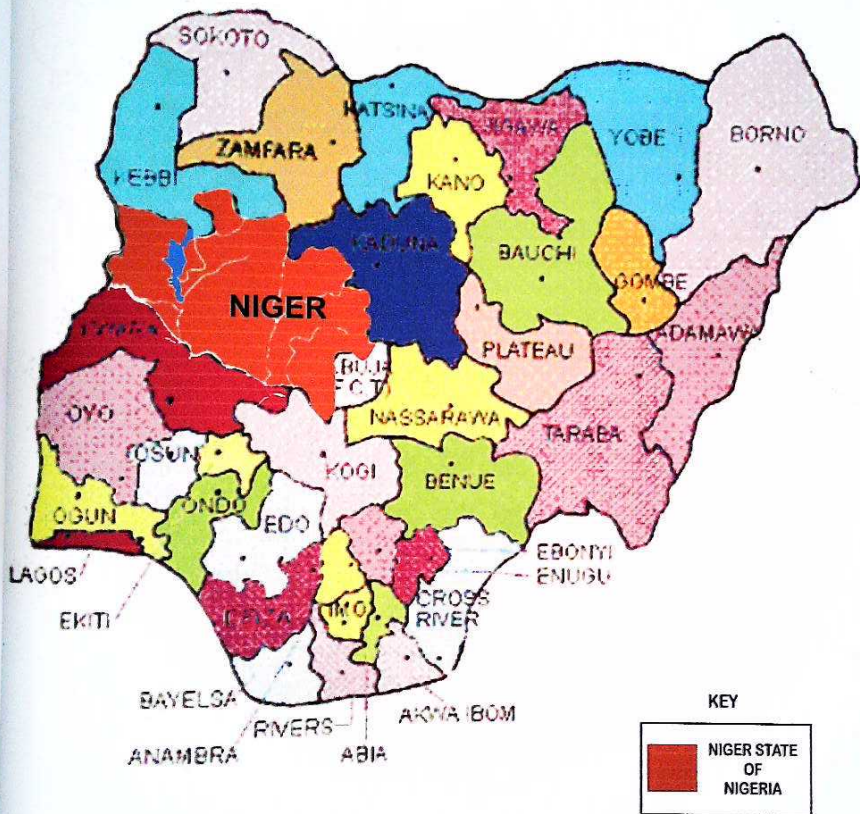
The prepared questionnaire is to distributed to most especially the professional farmers, local farmers, community leaders students and teachers.

Fifty questionnaires will be distributed among the selected areas and all were to be returned back instantly.
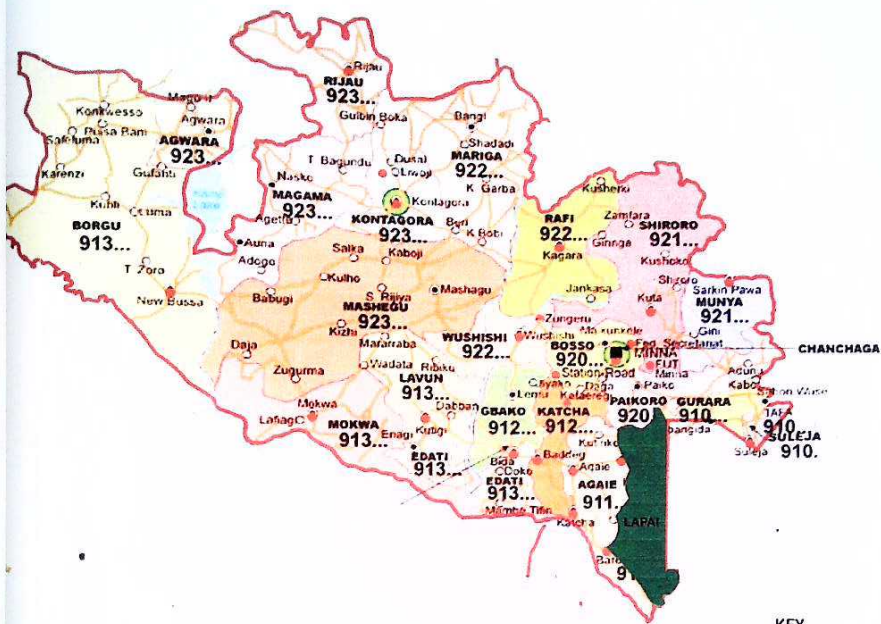
3.7 METHOD OF DATA ANALYSIS

The research data is to be analysed using simple addition andpercentages because fifty (50) questionnaires were to be distributed between the five selected areas. Ten (10) representing hundred percent (100%), that is to say when ten (10) questionnaires are distributed and respondent's response to the researcher hundred percent of the population have been covered.

MAP OF NIGERIA SHOWING NIGER STATE

KEY

NIGER STATE
OF
NIGERIA

MAP OF NIGER STATE SHOWING LAPAI LOCAL GOVERNMENT

KEY

LAPAI LOCAL
GOVERNMENT
AREA
OF NIGER STATE

ADMINISTRATIVE MAP OF LAPAI SHOWING STUDY AREAS

Source: Information Desk, Lapai LG Office

Scale: 1:10,000

River Niger

River Gurara

Ginyau

Muye

Cishetu

Gbabo

Gbanchu

Dabanko

Gulu

Baro

Nasarara

Kusobhe

Duma

Cul Lapai

Lapai

Dyatu

GR Lavun

Pato

LEGEND

Study area cap.

Lga hq.shp

Villages

Roads

Rivers

Lga boundary

CHAPTER FOUR

4.0. DATA PRESENTATION AND ANALYSIS:

This chapter devoted on the analysis and interpretation of the data collected from the professional farmers and community leaders of the selected areas in Lapai local government area of Niger State,through the use of questionnaire observation and interview. This chapter also give analysis on the impact of rainfall variability on maize production, it impact where there is high, low and moderate variation of rainfall at Lapai local government.

4.1. WHAT TYPE OF CROP DO YOU CULTIVATE?

OPTION	RESPONDENTS	PERCENTAGE
A	20	40%
B	10	20%
C	20	40%
Total	50	100%

Fig. 1.0

From figure (1.0) forty percentage (4%) representing twenty (20) respondents cultivated cereal crop, where twenty percent (20%) representing ten (10) respondents cultivate legumes, while forty percent (40%) representing (20) twenty respondents

cultivate both cereal and legumes crop. Where sixteen percent representing eight (8) respondents cultivated the proportion of 60:40 of cereal to legumes, fourteen percent (14%) representing seven (7) respondents cultivate on a proportion of 40"60 of cereal to legumes, six percent (6%) representing three (3) respondents on the proportion of 80:20 and lastly four percent (4) on a proportion of 50:50 of cereal to legumes. As shown in figure (1.1) below.
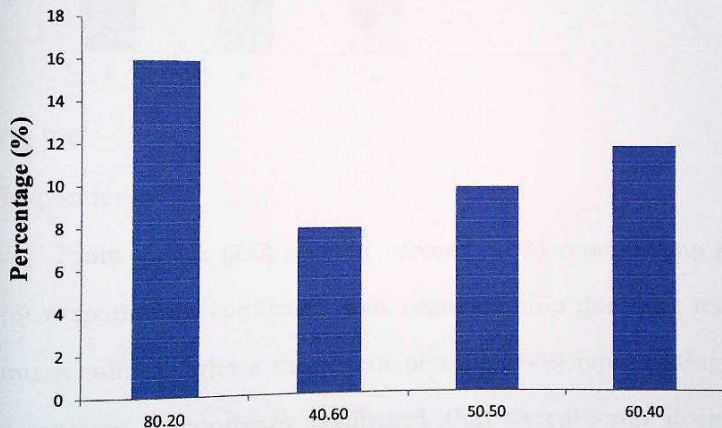

Fig 1.1

Proportion (Ratio)

4.2. BETWEEN LEGUMES AND CEREAL CROP WHICH ONE DOES NOT REQUIRED MUCH RAINFALL?
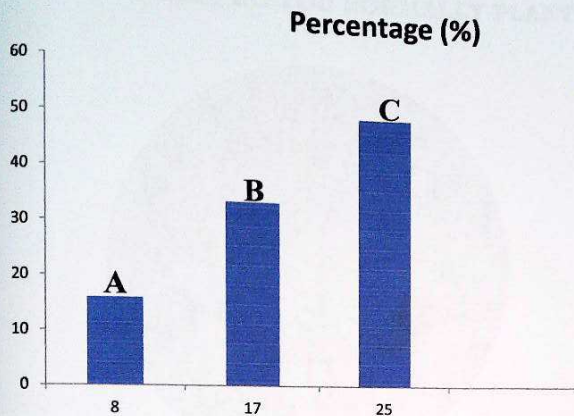
Percentage (%)

Fig 2.0

Respondents

From figure (2.0) sixteen percent (16%) representing eight (8) respondents confirmed that Legumes crop does not require much rainfall, where thirty-four percent (34%) representing (17) seventeen respondents confirmed that cereal crop does not require much rainfall, and also fifty percent (50%) representing twenty-five (25) respondents said that legumes and cereal crop require much rainfall.

4.2. BETWEEN LEGUMES AND CEREAL CROP WHICH ONE DOES NOT REQUIRED MUCH RAINFALL?
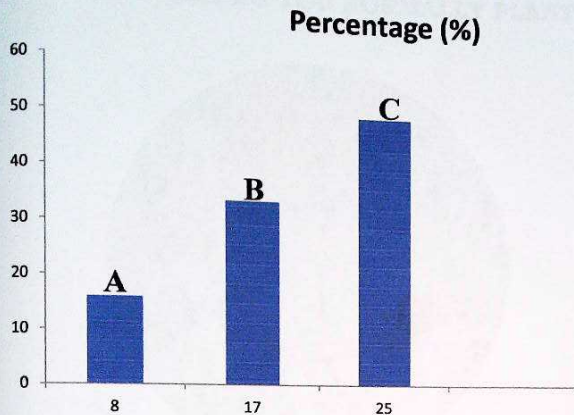

Percentage (%)

Fig 2.0

Respondents

From figure (2.0) sixteen percent (16%) representing eight (8) respondents confirmed that Legumes crop does not require much rainfall, where thirty-four percent (34%) representing (17) seventeen respondents confirmed that cereal crop does not require much rainfall, and also fifty percent (50%) representing twenty-five (25) respondents said that legumes and cereal crop require much rainfall.

4.3. WHAT TIME DO YOU NORMALLY PLANT YOUR CROP?

- 338.4^0 A. 94%
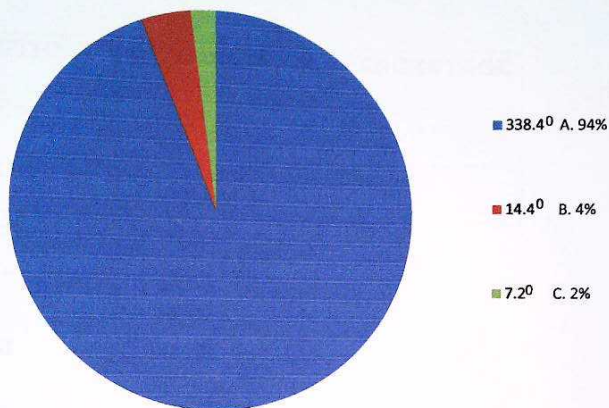- 14.4^0 B. 4%
- 7.2^0 C. 2%

Fig. 3.0

From figure (3.0) Ninety-four percent (94%) representing forty-seven (47) respondents plant there maize crop in the month of May, four percent (4%) representing two (2) respondents plant in the month of June and two percent (2%) representing one (1) respondents plant in the month of July.

4.4. WHEN YOU EXPERIENCE LOW RAINFALL DO YOU HAVE HIGH, CULTIVATION?

OPTION	RESPONDENTS	PERCENTAGE
YES	49	98%
NO	1	2%
Total	50	100%

Fig. 4.0

From figure (4.0) ninety-eight percent (98%) representing forty-nine (49) respondents have confirmed and strongly agreed that when there is low rainfall the cultivation is not high, where two percent (2%) representing one respondent disagree that when there is low rainfall the cultivation not high, that is low rainfall result to high cultivation.

4.5. WHEN THE ACCUMULATED AMOUNT OF RAINFALL IS VERY HIGH TO MAIZE IT RESULT TO HIGH CULTIVATION:

- 62% Disagreed   223.2
- 6% S/Agreed   21.6
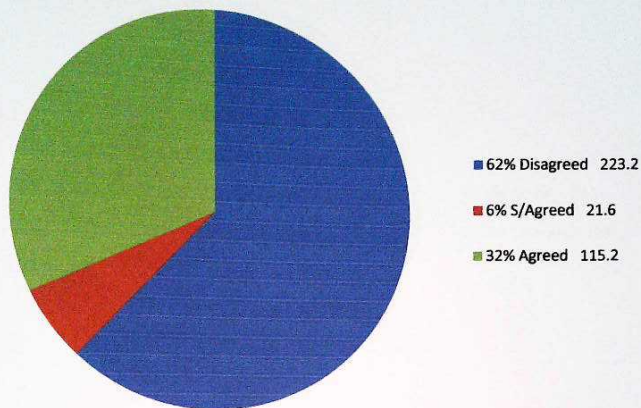- 32% Agreed   115.2

Fig. 5.0

From Pie Chart figure (5.0) six percent (6%) representing three(3) respondents strongly agreed that when the accumulated amount of rainfall is very high to maize it result to high cultivation, where thirty-two percent (32%) representing sixteen (16) respondents agreed that high accumulated amount of rainfall result to high cultivation. Also sixty-two percent (62%) representing thirty-one (31) respondents disagree that high accumulated amount of rainfall result to high cultivation.

4.6. MODERATELY RAINFALL ACCUMULATED AMOUNT RESULT TO HIGH CULTIVATION OF MAIZE:
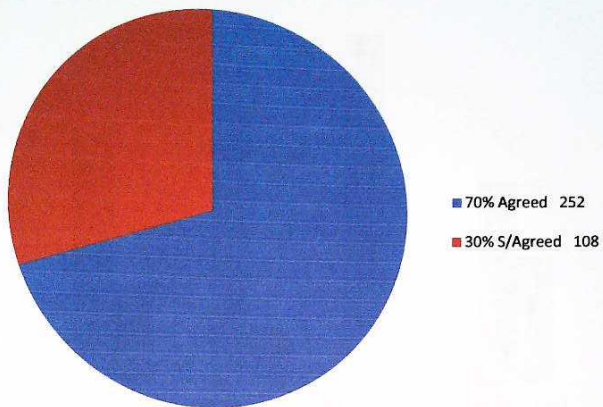

Legend:
- 70% Agreed 252
- 30% S/Agreed 108

Fig. 6.0

From figure (6.0) thirty percent (30%) representing fifteen (15) respondents strongly agreed that moderately rainfall accumulated amount result to high cultivation of maize, where seventy percent (70%) representing thirty-five (35) respondents agreed that moderately rainfall accumulated amount result to high maize cultivation.

4.7. WOULD YOU SPECIFY THE MONTH YOU PLANT MAIZE BETWEEN THE YEARS 2008 TO 2012:
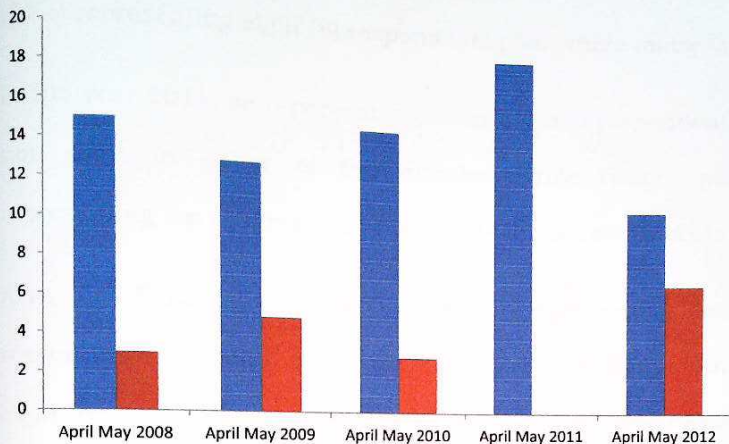
Fig 7.0

From the multiple bar-chart (figure 7.0) above, sixteen percent (16%) representing eight (8) respondents planted there maize crop in the month of April in 2008, in the same year four percent (4%) representing two (2) respondents plant in the month of May.

In 2009, fourteen percent (14%) representing seven (7) respondents planted there maize in April, while sixteen percent (6%) representing three (3) respondents plant in the month of May.

In 2010, four percent (4%) representing two (2) respondents plant in the month of April, while in the month of may sixteen percent (16%) representing eight (8) respondents plant there maize crop.

In the year 2011, zero percent representing non respondents did not plant in either of the months, while twenty percent representing ten (10) respondents' plants in the month of May.

Also in 2012, twelve percent (12%) representing six (6) respondents planted there maize in April, while in the month May eight percent (8%) representing four (4) respondents planted there maize.

4.8. HOW COULD YOU COMPARE THE RAINFALL FROM 2008 TO 2012?

Legend:
- 28.8^0 A. 8%
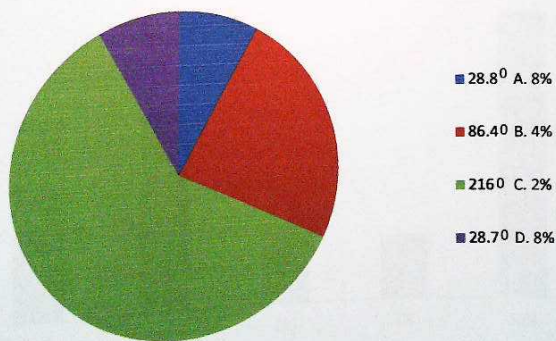- 86.4^0 B. 4%
- 216^0 C. 2%
- 28.7^0 D. 8%

Fig. 8.0

From figure (8.0) eight percent (8%) representing four (4) respondents says the rainfall from 2008 to 2012 were very much less than normal, twenty-four percent(24%) representing twelve (12) respondents says the rainfall were more than normal, where sixty percent (60%) representing thirty (30) respondents. Said that in comparing the rainfall of 2008 to 2012, the rainfall were all steadily normal and also eight percent (8%) representing four (4) respondents says that the rainfall were slightly low than normal.

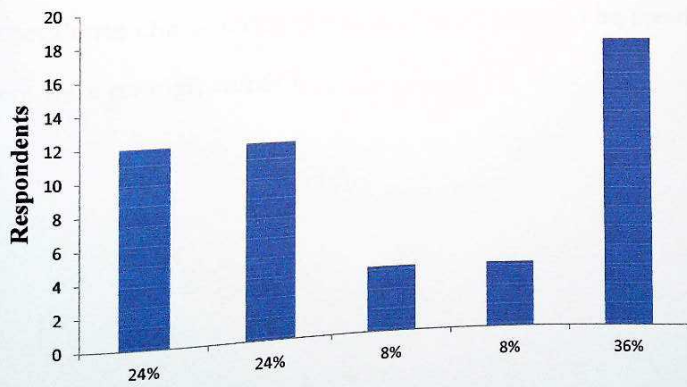## 4.9. HOW CAN YOU CHARACTERIZE THE RAINFALL PATTERN BETWEEN 2008 TO 2010 AND 2011 TO 2012?

Fig. 9.0

From figure (9.0) twenty-four percent representing twelve (12) respondents characterize the rainfall of 2008 to 2010 and that of 2011 to 2012 as, they all started lately and stops early. Twenty-four percent (24%)representing twelve (12) respondents also characterize the rainfall pattern of both years as, they started early and stops early.

Also eight percent (8%) representing four (4) respondents characterize the rainfall pattern as, from 2008 to 2010 the rainfall started lately and stops lately. Where eight percent (8%) representing also characterize the rainfall from 2008 to 2010 as, the rainfall started early and stops lately, also that of 2011 to 2012. The rainfall started lately and stops early.

The thirty-six percent (36%) representing eighteen (18) respondents characterize the rainfall of all years to be steady and there were enough rainfall.

4.10.   HOW COULD YOU CLASSIFY THE RATE OF HARVEST PER HECTOR FROM 2008-2012?
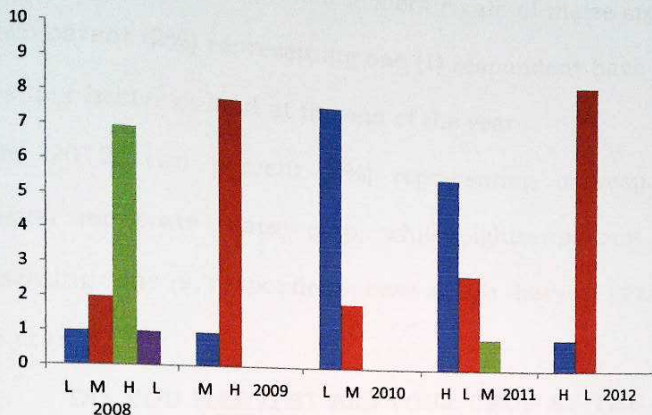
Fig. 10.0

From figure (10.0) in 2008 two percent (2%) representing one (1) respondent have low harvest of maize, at the same year four percent (4%) representing two (2) respondents have moderate harvest of maize. Also fourteen percent representing seven (7) respondents have high harvest per hector of maize yield.

In 2009 two percent (2%) representing one (1) respondents have low harvest, at the same year two percent (2%) representing one(1) respondents have a moderate harvests, and also sixteen percent (16%) representing eight (8) respondent have high rate of harvest hector at the end of the year.

In 2001 two percent (2%) representing six (6) respondents harvested little rate of maize, while six parent (6%) representing three (3) respondents harvested moderate rate of maize crop and also two parent (2%) representing one (1) respondent have a high harvest per hecter of land at the end of the year.

In 2012, two percent (2%) representing onerespondent harvested moderate maize crop, while eighteenpercent (18%) representing nine (9) respondents have a high harvest at the end of the year.

4.11. DO YOU HARVEST ALL YOUR CROP AT THE SAME TIME CONSIDERING THAT THEY ARE NOT PLANTED AT THE SAME TIME:

OPTION	RESPONDENTS	PERCENTAGE (%)
YES	4	8%
NO	46	92%
Total	50	100

From figure (11.0) eight percent (8%) representing four respondents harvested there maize crop at the same time considering they are not planted (92%) representing forty-six (46) respondents did not harvest there maize crop at the same time in considering they are not planted at the same time.

4.12 HOW CAN YOU IMPROVE HIGH CULTIVATION OF MAIZE WHEN THE ACCUMMULATED AMOUNT OF RAINFALL FROM PLANTING TO HARVESTING IS VERY LOW?
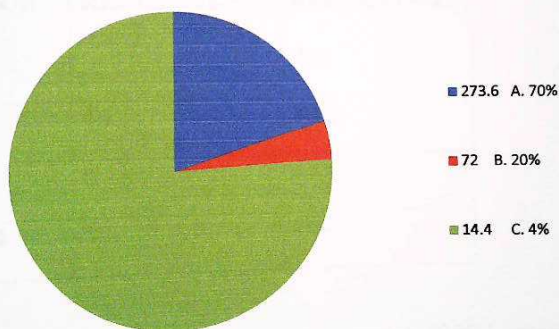

Fig. 12.0

From figure (12.0) seventy-six percent (76%) representing (38) thirty-eight respondents use irrigation system to improve high cultivation of maize when the accumulated amount of rainfall from planting to harvesting is very low. Four percent (4%)

(4%)representing two (2) respondents uses regular weeding and insecticide to improve high cultivationof maize, while twenty percent (20%) representing ten (10) respondents uses irrigation, fertilizer application, regular weeding and insecticide to improve high cultivation of maize when the accumulated amount of rainfall is very low from planting to harvesting.

4.13.   COULD YOU IDENTIFY THE YEAR YOU HAVE HIGH APPRECIATE HARVEST ATTRIBUTED TO RAINFALL:

OPTION	RESPONDENTS	PERCENTAGE (%)
YES	44	88%
NO	6	12%
Total	50	100

From figure (13.0)eighty-eight percent (88%) representing Forty-four (44) respondents have high appreciate harvest which is attributed to rainfall, where twelve percent (12%)representing six (6) respondents do not have any appreciate harvest attribute to rainfall.

4.14. WHICH YEAR COULD YOU REMEMBER YOU HAD VERY LOW CULTIVATION OF MAIZE DUE TO RAINFALL DEFICIENCY?

■ 129.6	None 36%
■ 57.6	2012 16%
■ 57.6	2011 16%
■ 14.4	2010 4%
■ 43.2	2009 12%
■ 57.6	2008 16%
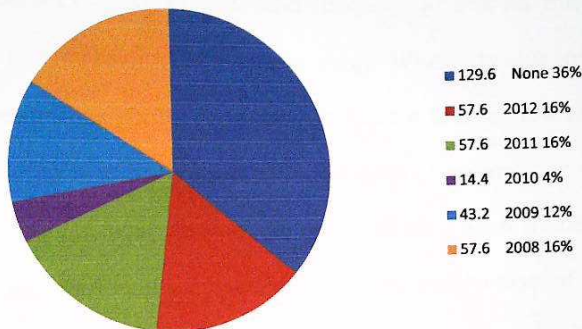
Fig. 14.0

From figure (14.0), sixteen percent (16%) representing eight respondents had low cultivation of maize in the year 2008 due to the rainfall deficiency. In 2009, twelve percent (12%) representing six respondents also had low cultivation of maize. In 2010 also four percent (4%) representing two (2) respondents experience low cultivation of maize due to rainfall deficiency. Where thirty-six percent (36%) representing eighteen (18) respondents could not remember the year they had low cultivation of maize due to rainfall deficiency.

4.15. WHAT CAUSES THE LOW CULTIVATION OF MAIZE CROP?

From figure (15.0), sixty percent (60%) representing thirty (30) respondents looks at pest and diseases attack as the main causes of low cultivation of maize crop. Where twelve percent (12%) representing six (6) respondents take a look at low rainfall as the cause of low cultivation of maize crop. Also another twelve percent (12%) representing six (6) respondents takes inadequate fertilizer and poor soil as the cause of low cultivation of maize crop. Also sixteen percent (16%) representing eight (8) respondents looks at flooding as the cause of low cultivation of maize crop in the area of Lapai local government.
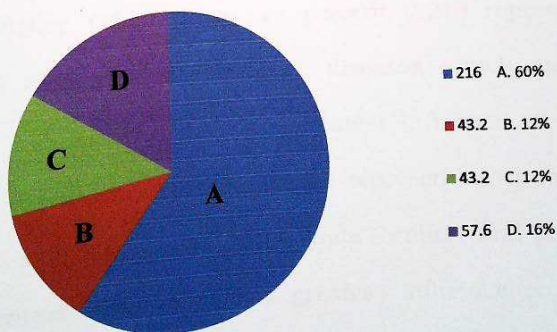
Fig. 15.0

4.16. WHICH OF THE FOLLOWING FACTOR ABOVE DO YOU THINK HAS THE GREATEST INFLUENCE ON MAIZE PRODUCTION
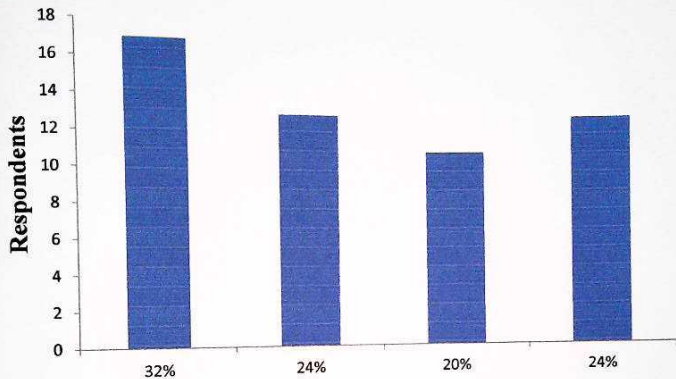
Fig. 16.0

From figure (16.0) thirty-two percent (32%) representing sixteen (16) respondents said pest, diseases attack and low rainfall are the factors that has greatest influence on maize production; Twenty-four percent (24%) representing twelve (12) respondents said low rainfall, inadequate fertilizer and poor soil are the greatest factor that has greatest influence on maize production. Where twenty percent (20%) representing ten (10) respondents said inadequate fertilizer, poor soil and floating are the greatest factors influencing the maize production. Also

twenty-four percent (24%) representing twelve (12) respondents said low rainfall, early cessation and floodingare the greatest factor that influences the production of maize.

4.17. RAINFALL HAVE HIGH ATTRIBUTE TO HIGH CULTIVATION OF MAIZE:

■ 8% S/Agreed   252

■ 2% Agreed   108
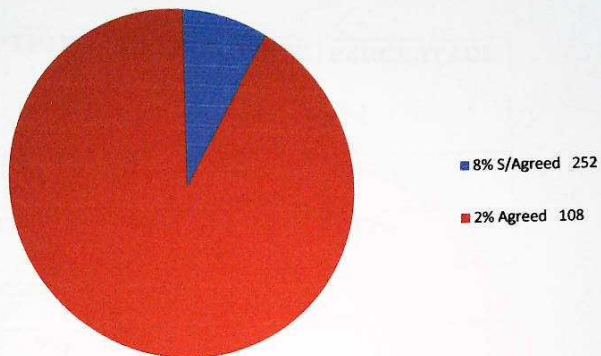
Fig.17.0

From figure (17.0) above eight percent (8%) representing four (4) respondents strongly agreed that rainfall have high attribute to high cultivation of maize. Where ninety-two percent (92%) representing forty-six (46)respondents agreed that rain fall have high attribute to high cultivation of maize crop.

4.18. DO YOU OBTAIN YOUR FERTILIZER AND INSECTICIDE FROM GOVERNMENT AGENCIES:

From figure (18.0), zero percent (%) representing none respondent obtained fertilizer from government agency. While   hundred percent (100%) representing (50) fifty

respondents do not obtain there fertilizer and insecticide from government agencies.

OPTION	RESPONDENTS	PERCENTAGE (%)
YES	0	0%
NO	50	100%
Total	50	100

Fig. 18.0

4.19. DID THE GOVERNMENT GIVE ANY ASSISTANCE WHEN THERE IS LOW OR HIGH RAINFALL.

OPTION	RESPONDENTS	PERCENTAGE (%)
YES	2	4%
NO	48	96%
Total	50	100

Fig. 19.0

From figure (19.0) four percent (4%) representing two respondents said government give assistance when there is low or high rainfall. While ninety-six percent (96%) resenting forty-eight (48) respondents said government did not use to give any assistance when there is low very high rainfall.

4.20. WHAT IS YOUR ATTRIBUTE TOWARD FARMING?
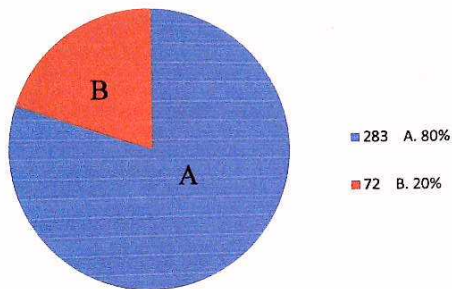

Legend:
- ■ 283 A. 80%
- ■ 72 B. 20%

Fig. 20.0

From figure (20.0) eighty percent (80%) representing forty (40) respondents encourage farming. While twenty percent (20%) representing (10) ten respondents discourage farming.

CHAPTER FIVE

5.0 SUMMARY CONCLUSION AND RECOMMENDATION

5.1 SUMMARY:

The research has showed that rainfall variability could result to drought. The need for rainfall is over emphasis as it has high cultivation of crop especially maize.

The drought cause by rainfall variability is composing of three types the metrological drought the agriculture and hydrological drought. The metrological drought refers significantly to lower than normal rainfall amount over a specific time.

The agricultural draughtthis will be the insufficient soil moisture surplus at the time of maximum demand due to either late onset of rain earlier than normal or cessation dates of the rainfall. Thus resulting in a shorter than usual length of the rainy season, it has been found that these characteristic of rainy season (that is length of the rainy season) is more useful for plants than shortage of absolute amount of record rainfall with short top root.

Hydrological drought this related more to declining underground water amount and thus lowers in of the water table.

The research has also show that metrological or human factor or combination of both may cause rainfall variability, from the metrological point of view, it has been established that increase in area and persistence of the subtropical high pressure belt in the late 1960 and early 1970 led to a south ward expansion of the A zone of anticyclones. Such phenomenon prevented the maritime air mass from penetrating far enough in land to bring rain   to the desert margined during successive years between 2008 and 2012.

Rainfall variability has a detrimental effect on agriculture and the state economy. It is a serious problem that is critical to cropping in the area (Lapai local government) since there is uncertainty about the onset and cessation dates of rainfall.

In recent time the effect of these two phenomenon's (i.e. the onset and cessation date) have on people the range from malnutrition to semi starvation insecurity and even death. However in the study area the effect has not been so severe to wrath death.

Thus the rainfall variability that results from 2008 to 2012 has affected resource as a result of low and poor yields of maize especially between 2010 and 2011. It has led to serious high price of maize in the market and place majority of the farmer in a difficult position as regard to payment of agricultural loans because of the yields.

5.2 CONCLUSION

Rainfall variability always result in low yield in Lapailocal government area of Niger state. The situation only intensified from 2008 when the variation of 30% in the area.

The effect of rainfall variability is severe and serious in the study area as compares with other part of the country especially where there is rainfall variability although much doesfall to mature or yield as desired.

However, rainfall variability affects farming activities. Hence there was always some reluctance on the part of farmers for the fear of early planting and experience sudden break.

In general the rainfall variability will continue to have a great impact on the region and the northern part of Nigeria, unless something remarkable is done by the Government and the

people themselves to adapt and check the situation example desertification.

5.3 RECOMMENDATION

The unchecked ravages of rainfall variation in the part of the state and the country in general over the years, testify to the inability of the people affected to take concrete active to be master of their environment. It has already caused terrible human suffering displacement malnutrition and starvation.

To make losses arising from agriculture to be more bearable in the study area in particular and in the northern part of the country in general the government must plan for the amelioration of drought and education of the main ones caused by the rainfall variability in the olden days,when extended family system was strong. Families do have a common way of self-guiding the effective of rainfall variability by way of assisting the most affected families, adoption of communal work, by expanding farmlands and mixed cropping. However, under over prevailing condition such strategies will not be sufficient to guarantee adequate food supply and maintaining family tradition due to rapid population growth and cost of living.

Therefore the research is here by putting forward some recommendation categorized in two forms the shorter recommendation and the long term recommendations. The short term recommendation are later for immediate needs of the farmers and the whole population affected in order to survive and the long term recommendation are to eliminate the effect of the phenomena by being combat ready for it.

SHORT TERM RECOMMENDATION:

As short term recommendation, the following are recommended.

Food aid:There should be national organized responses to flood, rainfall variability, in the affected areas, in forms of food and agency. The agency will distribute food among affected people anytime. The functions of food agency should include, the supply of seeds to former for the next planting season, this is due to the fact that most of the farmers can some or sell their meager planting. However, food aid will only succeed in helping people to barely survive from any form of rainfall variability and flooding.

Drought relief fund committee should be established at national and state levels where philanthropic individuals and organization can contribute to emergency relief fund. However,

people of proven characters and high integrity should be selected as member and they should co-ordinate the efforts with the food agency.

The government should make provision for agricultural loans to the farmers to sustain them over the difficult period and aid them in maize production. This loan should be given in a good time that is before the beginning of next raining season, and should be interest free.

The government should set out separate fund or vote in the yearly budget for settlement schemes to reduce hardship for the peoples from settlement schemes to reduce hardship for the people from drought prone area. This can be done especially where temporary shelter is expended for the victims.

LONG TERM RECOMMENDATION

As a long term to solution to the effect of rainfall variability. The followings are recommended.

Both federal and state government should embark on massive sinking of bore-holes and canalization schemes for irrigation farming during the day seasons and drilling purpose in the area. Network of earth dams should be constructed in the area where possible.

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There should be a research in to drought resistant and short term species of seed.

Proper storage community should be introduced to various farming community because most of the countries agriculture products are lost to the menace of insects, rodents' etc.Both on the pre and also the post harvesting stage. It is there for, imperative to adopt strategies of reducing food losses as a means of increasing food availability in case of drought.

There should be an early warning system by meteorologists to detect a meteorological drought and provide Impute to determine the phenomena. This individuals as well as government and agriculture agencies in the country sometimes to plan and take action to reduce the hunger and starvation associated with each drought year.

Finally government should embark upon desalination programmed where the ocean will pump water through pipeline to·the northern part of the country where drought is a perennials problem.

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Maize Production

APPENDIX

DEPARTMENT OF GEOGRAPHY

THE TARGET POPULATION OF THIS RESEARCH COMPRISES OF BOTH PREVILEGED AND LESS PREVILEGE PERSON IN LAPAI LOCAL GOVERNMENT AREA OF NIGER STATE.

QUESTIONNARE ON THE IMPACT OF RAINFALL VARIABILITY ON MAIZE PRODUCTION.

Dear respondents.

I am a final year students of the department of Geography carry out a research study on the above topic. In partial fulfillment of the award of NCE in Geography.

I will be very grateful if you will supply the required information to the most appropriate response to you in section A and B of the questionnaire. All responses will be treated confidentially and use purely for research purpose.

SECTION 'A' DEMOGRAPHIC DATA

Please tick the appropriate (   )

1. Sex: Male (   ) Female (   )

2. Religion: Islam (   ) Christian (   ) Traditional (   )

3. Marital status: Married (   ) Single (   ) Widow (   )

4. Occupation: Farming (   ) Business (   ) Civil servant (   )

Students (   )

5. Educational status: Educated (   ) Uneducated (   )

KEY

Strongly Agree	**SA**
Agree	**A**
Disagree	**D**
Strongly Disagree	**SD**

SECTION 'B'

Please Tick the Appropriate (   )

1. What type of crop do you cultivate?

(a) Cereal (   ) (b) Legumes (   ) (c) If in what proportion cereal to legumes. (i) 20:80 (   ) (ii) 80:20 (   ) (iii) 40:60 (   ) (iv) 50:50 (   ) (v) 60:40 (   ).

2. Between legumes and cereal crop which one does not required much rainfall (a) Cereal (   ) (b) Legumes (   ) (c) Both required much (   ) (d) Both do not (   ).

3. What time do you normally plant your crop? (a) May (   ) (b) June (   ) (c) July (   ).

4. When you experience low rainfall do you have high cultivation Yes (   ) No (   ).

5. When the accumulated amount of rainfall is very high o maize it result to high cultivation.

SA ( ) A ( ) D ( ) SD ( )

6. Moderately rainfall accumulated amount result to high cultivation of maize SA ( ) A ( ) D ( ) SD ( )

7. Would you specify the month you plant maize between the years 2008 to 2012. Please tick the appropriate Month.

Year	Month							
2008	April		May		June		July	
2009	"		"		"		"	
2010	"		"		"		"	
2011	"		"		"		"	
2012	"		"		"		"	

8. How could you compare the rainfall from 2008 to 2012

(a) Some are very much less than normally ( )

(b) Some are more than normal ( )

(c) They are all steadily normal ( )

(d) Some slightly low than normal ( )

9. How can you characterize the rainfall pattern between 2008

to

2010 and 2010- 2012.

i.   From 2008 to 2010 the rain started lately and stops early.

.ii.   From the above year its started early and stops lately

iii.   From 2010 to 2012 the rainfall started early and stops lately.

iv.   From the above years the rainfall started lately and stops early

v.   The rainfall is steady in all the years

vi.   There were enough rainfall all the years

(a) i and iii (   ) (b) ii and iv (   ) (c) I and iv (   ) (d) ii and iii (

) (e) v and vi (   )

10. How could you classify the yield (rate of harvesting perhecter) from the year 2008 to 2012. Tick the appropriate.

Year	Little	Moderate	High
2008			
2009			
2010			
2011			
2012			

11. Do you harvest all your crops at the same time considering that they are not planted at the same time.

Yes, (Give reason).........................

No, (give reason) ....

12. How can you improve high cultivation of maize when the accumulated amount of rainfall from planting to harvesting is very low (a) By irrigation (   ) (b) fertilizer application (   ) (c) Regular weeding and insecticide (   )

13. Could you identify the year you have high appreciate harvest attribute to rainfall.

14. Which year could you remember you hard very low cultivation of maize due to rainfall deficiency.

Please specify...........................

15. What causes the low cultivation of maize crop.

(a) Pest and disease attack (   )

(b) Low rainfall ( )

(c) Early cessation (   )

(d) Inadequate fertilizer and poor soil (   )

(e) Floading (   )

16. (use question 15 to answer 16)

Which of the following factor above do you think has the greatest influence on maize production?

(a) A and b (   )

(b) B and D (   )

(c) D and E (   )

(d) C, D and E (   )

(e) A,B and C (   )

17. Rainfall have high attribute to high cultivation of maize SA .

(   ) A (   ) D (   ) SD (   )

18. Do you obtain your fertilizer and insecticide from government

Agencies Yes (   ) No (   )

19. Did the Gov't any assistance when there is low or high

rainfall

Yes (   ) No (   )

20. What is your attribute towards farming (a) Encouraging (   )

(b) Discouraging (   )