

**ANALYSIS OF THE EFFECT OF CLIMATE VARIABILITY ON FOOD SECURITY  
OF RURAL FARMING HOUSEHOLDS IN OSUN STATE, NIGERIA**

**BY**

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### CERTIFICATION

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## DEDICATION

This thesis is dedicated to Almighty God, the Alpha and Omega, and my mother, MRS. C. O. ILORI; without them this programme would only be a mirage for me.

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TABLE OF CONTENTS	PAGE
AUTHORISATION TO COPY .....	ii
CERTIFICATION .....	iii
DEDICATION .....	iv
ACKNOWLEDGEMENT .....	v
TABLE OF CONTENTS .....	vii
LIST OF TABLES .....	xi
LIST OF FIGURES .....	xiii
ABSTRACT .....	xiv
CHAPTER ONE .....	1
1.0. INTRODUCTION .....	1
1.1. Background to the Study .....	1
1.2. Statement of the Research Problem .....	3
1.3. Objectives of the Study .....	<b>Error! Bookmark not defined.</b>
1.4. Justification .....	<b>Error! Bookmark not defined.</b>
CHAPTER TWO .....	<b>Error! Bookmark not defined.</b>
2.0. LITERATURE REVIEW .....	<b>Error! Bookmark not defined.</b>
2.1 Definition of Climate Change .....	<b>Error! Bookmark not defined.</b>
2.2 Climate Variability Vs. Climate Change .....	<b>Error! Bookmark not defined.</b>
2.3 Causes of Climate Variability and Change .....	<b>Error! Bookmark not defined.</b>
2.3.1 Natural Causes of Climate Change .....	<b>Error! Bookmark not defined.</b>
2.3.2 Human Causes of Climate Change .....	<b>Error! Bookmark not defined.</b>

2.4	Perception of Climate Variability and Change .....	<b>Error! Bookmark not defined.</b>
2.5	Impact of Climate Variability and Change on Nigerian Agriculture .....	<b>Error! Bookmark not defined.</b>
2.6	Impact of Climate Variability and Change on Food Security	<b>Error! Bookmark not defined.</b>
2.6.1	Impact of Climate Change on Food Availability	<b>Error! Bookmark not defined.</b>
2.6.2	Impact of Climate Change on Food Accessibility .....	<b>Error! Bookmark not defined.</b>
2.6.3	Impact of Climate Change on Food Utilization	<b>Error! Bookmark not defined.</b>
2.7	Policy Implications of Climate Change: Mitigation and Adaptation .....	<b>Error! Bookmark not defined.</b>
2.7.1	Mitigation of climate change .....	<b>Error! Bookmark not defined.</b>
2.7.2	Adaptation to Climate Change .....	<b>Error! Bookmark not defined.</b>
2.8	Empirical Review .....	<b>Error! Bookmark not defined.</b>
2.8.1	Empirical Review on Farmers' Perception of Climate Variability and Change .....	<b>Error! Bookmark not defined.</b>
2.8.2	Empirical Review on Linkage of Climate Variability and Food Security	<b>Error! Bookmark not defined.</b>
2.9	Conceptual Framework.....	<b>Error! Bookmark not defined.</b>
CHAPTER THREE.....		<b>Error! Bookmark not defined.</b>
3.0	RESEARCH METHODOLOGY .....	<b>Error! Bookmark not defined.</b>
3.1	Area of Study .....	<b>Error! Bookmark not defined.</b>



3.2	Methods of Data Collection .....	<b>Error! Bookmark not defined.</b>
3.2.1	Primary Data .....	<b>Error! Bookmark not defined.</b>
3.2.1.1	Sampling Procedures for Primary Data .....	<b>Error! Bookmark not defined.</b>
3.2.2	Secondary data .....	<b>Error! Bookmark not defined.</b>
3.3	Analytical Techniques .....	<b>Error! Bookmark not defined.</b>
3.3.1	Descriptive Statistics .....	<b>Error! Bookmark not defined.</b>
3.3.2	Linear Trend Model.....	<b>Error! Bookmark not defined.</b>
3.3.3	Standard Deviation.....	<b>Error! Bookmark not defined.</b>
3.3.4	Coefficient of Variation.....	<b>Error! Bookmark not defined.</b>
3.3.5	Food Security Index .....	<b>Error! Bookmark not defined.</b>
3.3.6	Multiple Linear Regression Model .....	<b>Error! Bookmark not defined.</b>
CHAPTER FOUR.....		<b>Error! Bookmark not defined.</b>
4.0.	RESULTS AND DISCUSSION.....	<b>Error! Bookmark not defined.</b>
4.1	Socio-economic Characteristics of Rural Farming Households	<b>Error! Bookmark not defined.</b>
	<b>defined.</b>	
4.1.1	Gender of the Respondents .....	<b>Error! Bookmark not defined.</b>
4.1.2	Age of the Respondents .....	<b>Error! Bookmark not defined.</b>
4.1.3	Marital Status of the Respondents.....	<b>Error! Bookmark not defined.</b>
4.1.4	Membership of Co-operative Group by Respondents..	<b>Error! Bookmark not defined.</b>
	<b>defined.</b>	
4.1.5	Access to Credit Facilities by Respondents...	<b>Error! Bookmark not defined.</b>
4.1.6	Level of Education of the Respondents.....	<b>Error! Bookmark not defined.</b>
4.1.7	Farm size of the Respondents .....	<b>Error! Bookmark not defined.</b>

- 4.1.8 Farming Experience of the Respondents ..... **Error! Bookmark not defined.**
- 4.1.9 Household Size of the Respondents ..... **Error! Bookmark not defined.**
- 4.1.10 Annual Income of Households..... **Error! Bookmark not defined.**
- 4.1.11 Access to Extension Agents and Frequency of Visits to the Respondents**Error!  
Bookmark not defined.**
- 4.2 Analysis of Temperature and Rainfall Records of Osun State from Meteorological  
Data..... **Error! Bookmark not defined.**
- 4.2.1. Maximum Temperature Trend of Osun State **Error! Bookmark not defined.**
- 4.2.2. Minimum Temperature Trend of Osun State. **Error! Bookmark not defined.**
- 4.2.3. Annual Rainfall Trend of Osun State ..... **Error! Bookmark not defined.**
- 4.3 Respondents' Perception of Climate Variability**Error! Bookmark not defined.**
- 4.3.1. Notice of Climate Variability According to the Respondents**Error! Bookmark  
not defined.**
- 4.3.2 Years of Noticed Climate Variability According to the Respondents ... **Error!  
Bookmark not defined.**
- 4.3.3. Awareness of the Respondents on Variability in Precipitation**Error! Bookmark  
not defined.**
- 4.3.4. Awareness of the Respondents on Variability in Temperature**Error! Bookmark  
not defined.**
- 4.3.5 Respondents' Statements on the Causes of Climate Variability..... **Error!  
Bookmark not defined.**
- 4.4 Food Security Statistics of Rural Farming Households in Osun State ..... **Error!  
Bookmark not defined.**

4.5. Multiple Linear Regression Analysis .....	<b>Error! Bookmark not defined.</b>
4.5.1 Multiple Linear Regression .....	<b>Error! Bookmark not defined.</b>
CHAPTER FIVE .....	<b>Error! Bookmark not defined.</b>
5.0. SUMMARY, CONCLUSION AND RECOMMENDATIONS	<b>Error! Bookmark not defined.</b>
5.1. Summary .....	<b>Error! Bookmark not defined.</b>
5.2. Conclusion .....	<b>Error! Bookmark not defined.</b>
5.3. Recommendations .....	<b>Error! Bookmark not defined.</b>
REFERENCES.....	<b>Error! Bookmark not defined.</b>
APPENDIX I: QUESTIONNAIRE .....	<b>Error! Bookmark not defined.</b>
APPENDIX II: CONVERSION FACTOR FOR ADULT EQUIVALENT UNITS.....	<b>Error!</b>
	<b>Bookmark not defined.</b>
APPENDIX III: CALORIE CONTENT OF SOME COMMON FOOD ITEMS CONSUMED IN NIGERIA.....	<b>Error! Bookmark not defined.</b>

### LIST OF TABLES

TABLE	TITLE	PAGE
1.	A priori Expectation for the Multiple Linear Regression Model .....	43
2.	Gender Distribution of the Respondents .....	45
3.	Age Distribution of the Respondents .....	47

4. Marital Status Distribution of the Respondents.....	49
5. Membership of Co-operative Group Distribution of the Respondents.....	51
6. Access to Credit Distribution of the Respondents.....	53
7. Level of Education Distribution of the Respondents.....	55
8. Farm size Distribution of the Respondents.....	57
9. Farming Experience Distribution of the Respondents.....	59
10. Household Size Distribution of the Respondents.....	61
11. Annual Income Distribution of the Households.....	63
12. Access to Extension Agents and Frequency of Visits Distribution of the Respondents..	65
13. Summary of Maximum Temperature Statistics in Osun State.....	67
14. Summary of Minimum Temperature Statistics in Osun State.....	70
15. Summary of Annual Rainfall Statistics in Osun State (mm).....	73
16. Notice of Climate Variability Distribution According to the Respondents.....	76
17. Years of Noticed Climate Variability Distribution According to the Respondents.....	78
18. Distribution of the Respondents' Awareness of Variability in Precipitation.....	80
19. Distribution of the Respondents' Awareness of Variability in Temperature.....	82
20. Distribution of the Respondents According to their Statements Based on the Causes of Climate Variability.....	84
21. Summary of the Food Security Statistics of Rural Farming Households in Osun State .....	86
22. Multiple Linear Regression Estimates Showing the Relationship between Climate Variability and Food Security of Rural Farming Households in Osun State.....	92

**LIST OF FIGURES**

<b>FIGURE</b>	<b>TITLE</b>	<b>PAGE</b>
1.	Conceptualization of Climate Variability Effect on Food security .....	34
2.	Map of Osun State Showing the Local Governments Sampled.....	36
3.	Osun State Annual Maximum Temperature Trend (1975-2008) .....	68
4.	Osun State Annual Minimum Temperature Trend (1975-2008).....	71

5. Osun State Annual Rainfall Trend (1975-2012)..... 74

**ABSTRACT**

This study examined rainfall and temperature trends in Osun State from meteorological data; and investigated the perceptions and understanding of the rural farmers on local climate variability. It also assessed the food security status of the rural farming households and analyzed the

relationship between climate variability and the food security of the rural farming households in the State with a view to examining the effects of climate variability on their food security.

Primary and secondary data were used for the study. The primary data were obtained from a total of one hundred and fifty rural farmers in six Local Government Areas (LGAs) of the State with the aid of well-structured and pre-tested questionnaires using multistage sampling technique. Annual time series data on temperature and rainfall in Osun State obtained from Nigeria Meteorological Agency (NIMET) were used as the secondary data. Data were analysed using descriptive statistics, trend analysis, food security index and multiple linear regression analysis.

Findings from this study showed that majority of the respondents were male (88.7%), married (84%), and with a mean age of  $40 \pm 12.83$  years. On the average, farm size was  $4.53 \pm 2.80$  hectares; household size was  $8 \pm 3.48$ ; years spent in school was  $7.65 \pm 4.87$  years; farming experience was  $30 \pm 16.19$  years while annual income was  $\text{N}674564.667 \pm 1390607.93$ . The average minimum temperature was  $21.21^{\circ}\text{C} \pm 0.61^{\circ}\text{C}$  with the lowest being  $19.16^{\circ}\text{C}$  which was recorded in 1997. The highest was  $21.94^{\circ}\text{C}$  and was recorded in 2008. This followed an increasing pattern of 1.03% per year. The maximum temperature was  $31.35^{\circ}\text{C} \pm 1.86^{\circ}\text{C}$  on the average,  $30.48^{\circ}\text{C}$  being the lowest recorded in 1986,  $32.21^{\circ}\text{C}$  the highest recorded in 1987 and also followed a similar increasing pattern of 2.02% per year. Total annual rainfall however followed a decreasing pattern (reducing at 5.4% per year) with a peak of 1865mm in 1984, lowest rainfall of 838.10mm was recorded in 1977 given an average of  $933 \pm 294.84$ mm. Descriptive analysis revealed that all the respondents came to be aware of climate variability as

they first noticed it  $9\pm 5.35$  years ago and through personal observation. Majority (50.7%) noticed a decrease in annual rainfall, an increase in temperature (68.7%), an increase in prolong frequency of drought (32%) and an increase in the intensity of rainfall (52.7%). The food security index analysis indicated that majority of the respondents (74.7%) were food insecure with the mean food security index and average daily per capita calorie consumption of  $0.944\pm 0.383$  and  $2123.38\pm 860.76$  kcal respectively. This signified that the rural population was food insecure. The multiple linear regression analysis showed that while sex and age negatively influenced food security, farming experience and total income had positive effects. Of the three climatic factors analysed, only frequency of drought was significant and had negative effect on food security.

The study concluded that food insecurity persists among rural farming households in Osun State and is being affected negatively by increase in the frequency of droughts.



## CHAPTER ONE

### 1.0. INTRODUCTION

#### 1.1. Background to the Study

Climate variability and change are the most severe problems that the world is facing today and they pose a more serious threat than global terrorism (King, 2004). Natural climate cycle and human activities have contributed to an increase in the accumulation of heat-trapping “greenhouse” gases in the atmosphere thereby contributing to increase in temperature in the global climate (global warming) (UNFCCC, 2007).

Climate variability is affecting the economic activities and welfare of the people all over the world. It is opined that the more an economic activity depends on the natural processes, the larger is the effect of climate variability on it. The enterprise most dependent on the natural processes is agriculture, particularly the traditional smallholder crop farming system. Hence, some of the most profound and direct impacts of climate change over the next few decades will be on agriculture and food systems (Brown and Funk, 2008).

Agriculture is one of the most vulnerable sectors to the anticipated climate variability. This is because climate still augments agricultural productivity in spite of the technological advances in the second half of the 20th century, including the Green Revolution. The predicted changes in

temperature and rainfall patterns will affect substantially the potential of agricultural production. The threat that climate variability and change pose to agricultural production does not only cover the area of crop production but also includes livestock and in fact the total agricultural sector.

Even though climate change and agriculture are interrelated processes that take place on a global scale (Jeremy, 2008), the manifestations and impacts vary locally. Climate change is a major threat to food security and livelihoods in Nigeria and many regions of the developing world, which are largely dependent on rain-fed and labour-intensive agricultural production (Parry *et al.*, 1999, 2004; IPCC, 2001a; Parry *et al.*, 2004).

Most of the farming practices among smallholder farmers in Nigeria are traditional and modified for generations. The farming system is a complex set of livelihood strategies of the poor depending heavily on social set up and natural resource endowments. The farmers, mostly illiterate or with low level of education depend heavily on their culture, habit and traditional practices to earn their livelihood without understanding the science behind their day to day decisions. Rapid change in the climate is however, making such traditional practices and indigenous knowledge obsolete in no time that costs heavily to these innocent farmers. Increasing temperature, declining and more unpredictable rainfall, more frequent extreme weather and high severity of pests and disease are among the more drastic changes that have impact on food production (Kotschi, 2007; Morton, 2007a; Parry *et al.*, 2007; Brown and Funk, 2008; Lobelle *et al.*, 2008).

Food security is an essential element of overall well-being. Increasingly, in the last decade attention has been focused on means of eliminating food insecurity and hunger world-wide. The 1992 international conference on nutrition and the 1996 World Food Summit both emphasized the critical need to decrease food insecurity and hunger globally. Food security exists when all people at all times have physical and economic access to sufficient, safe and nutritious (and some would add culturally acceptable and adequate), food to meet their dietary needs for an active and healthy life (World Food Summit, 1996).

The food price crisis of 2008 has led to the re-emergence of debates about food security (Wiggins, 2008) and its impact on prospects for achieving the first Millennium Development Goal (MDG) which aimed at reducing poverty and hunger. Apart from the shorter-term triggers leading to volatile food prices, the longer term negative impacts of climate variability and change on food security need to be taken very seriously

## **1.2. Statement of the Research Problem**

The fact that climate has varied in the past and will continue to vary in the future underscores the need to understand how farmers perceive climate variability. Awareness and perception of a problem such as climate variability and change shapes actions or inaction on the problem (Nzeadibe and Ajaero, 2010). In making informed decisions about climate variability and change, Olorunfemi (2009) is of the view that timely and useful information is necessary about the consequences of climate change and peoples' perceptions of these consequences. Therefore to enhance policy towards tackling the challenges that climate change poses to farmers'

wellbeing especially their food security, it is important to have knowledge of farmers' perceptions of variability. Studies have indicated that local farmers in Nigeria do perceive climate variability (Nzeadibeet *al.*, 2011; Adebayo *et al.*, 2012; Adesijiet *al.*, 2012; Emaziye, 2013; Luka and Yahaya, 2013). In fact Sofoluweet *al.* (2011) specifically reported that farmers in Osun State noticed that the climate was varying. A major weakness of these studies is that they did not compare the perceptions of the farmers with actual climate data from meteorological stations. This is important because farmers' perceptions of climate can differ from real climate data (Moyoet *al.*, 2012).

Climate is also posing a great threat to agriculture and food security in many of the poor, agriculture-based areas of sub-Saharan Africa (Shah *et al.*, 2008; Nellemann *et al.*, 2009). Rural agriculture is subjected to local variations in weather conditions and thus expected variations in income levels and then access to food (Omonona, 2009). Even in the absence of climate variability and change, poor agricultural output and widespread poverty have resulted in extensive and persistent food insecurity, with some studies showing that as many as 70%

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