

**EFFECTS OF CHANGES IN TEMPERATURE AND RAINFALL
PATTERNS ON COMMUNITIES AROUND JINJA DISTRICT, UGANDA**

BY

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DECLARATION

I, **EINYU FELIX** declare that this dissertation is my original work and to the best of my knowledge it has never been submitted to any institution of higher learning for any academic award.

EINYU FELIX

Date: _____

APPROVAL

I certify that this dissertation is for the student in the name of Einyu Felix, and that all the content in this piece is purely out of his own effort. I also approve that any other content used to modify, compile or connect issues in his research were clearly referred to, both in-text and in references.

Professor Isabirye Moses

Date: _____

Dr. Bob Alex Ogwang

Date: _____

DEDICATION

This work is dedicated to my Mother, and my family members especially Esadu Fidel and Jerry Junior Einyu.

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LIST OF ABBREVIATIONS AND ACRONYMS

ABC	Atmospheric Brown Clouds
FAO	Food and Agricultural Organization
FBCT	Factor Behind Changes in Temperature
GDP	Gross Domestic Product
GEF	Global Environment Fund
GHG	Green House Gas
IGP	Indo-Gangetic Plain
Impn	Implication
IPCC	Inter-governmental Channel on Climatic Change
LDV	Light Duty Vehicles
LST	Lake Surface Temperature
LUSE	Land Use Patterns
NASA	National Aeronautics and Space Administration
NMC	National Meteorological Center
SSTs	Sea-Surface Temperature
UND	University of Northern Dakota
UNEP	United Nations Environmental Program
US	United States
USA	United States of America

ABSTRACT

This study assessed the effect of changes in temperature and rainfall patterns on communities in selected areas of Lake Victoria Basin around Jinja. It was conducted following unsteady temperature and rainfall patterns with unexplained effects and thus no appropriate responses. The specific objectives of study were; to identify factors behind the changes in temperature and patterns of rainfall, to establish implications of the changes in temperature and rainfall patterns on communities, to establish land use patterns that can help to harmonize observed changes in temperature and rainfall patterns and to suggest measures that can be adopted to respond to the effect of changes in temperature and rainfall patterns. A cross sectional survey design was adopted for this study with the aim of collecting data from a sample of 346 respondents in three months. Data was entered into Statistical Package for Social Sciences (SPSS) and results generated automatically. It was established that changes in temperature and patterns of rainfall was largely natural and man's activity mainly burning of fossil fuels in agricultural areas. Changes in temperature and rainfall patterns are associated with drought and floods which result in loss of life and influence growth of crops. The communities around Lake Victoria basin who are victims of changes in temperature and rainfall patterns are advised to plant more trees, desist from depositing industrial waste in water and to seek more information about climate change and the associated impacts. It was therefore recommended that communication be made on a wide scale to inform communities about the effect of climate change to minimize the effects, there is need for investing in new infrastructure, or radically upgrading existing highways and transmission lines, would help cut greenhouse gas emissions and drive economic growth in developing countries. Finally but not the least, community should be sensitized against cutting down trees and balancing the amount of wood taken out with the amount of new trees growing.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Over the last few decades, weather and climate extremes have diverse effects on human society and infrastructure (Katz, Parlange, & Tebaldi, 2003). Trends in indices of climate extremes have been studied for the South Asian region using high-quality records of daily temperature and precipitation observations. Generally, changes in the frequency of temperature extremes over South Asia are what one would expect in a warming world; warm extremes have become more common and cold extremes less common (Emily, Barry, & Keim, 2014).

Land use changes can significantly contribute to overall climate change because vegetation and soils act as a carbon sink, storing carbon dioxide that is absorbed through photosynthesis (Alberge, 2013). Therefore, when the land is disturbed, greenhouse gases such as stored carbon dioxide, methane and nitrous oxide are emitted, re-entering the atmosphere leading to global warming. The clearing of land can result in soil degradation, erosion, and leaching of nutrients; which can also possibly reduce its ability to act as a carbon sink and unable to store carbon. These later resulting additional carbon dioxide in the atmosphere thus, increasing on the total amount of greenhouse gases (Crowley, 2000).

Climate change effects in terms of rainfall, temperature and evapo-transpiration in turn lead to changes in the environment (Chen, et al., 2010). The impacts of climate change have further affected water balance, increasing disparity between demand and supply of water creating need for planning of water resources (Guo et al., 2002).

1.2 Problem Statement

The severity and frequency of changes in rainfall and temperature observed in several parts of the world have caused climate related socio-economic challenges. These socio-economic challenges keep on differing according to geographical location of the areas in question. Lake Victoria Basin is one of such areas with constant changes in rainfall and temperature. These changes result into various socio-economic challenges, which are not clearly established, and thus no measures are put in place by either government or development partners. If no efforts are made to investigate about this, certain challenges related to climate change can easily be ignored, thus posing difficulty in bringing about socio-economic development. The present study was based on this realization and was designed to document the correlates of changes in temperature and rainfall, challenges brought about by changes in temperature and rainfall to communities around selected areas plus the ways in which these communities can ably respond to the effects of changes in temperature and rainfall.

1.3 General Objective

This study examined the effects of changes in temperature and rainfall patterns on communities in selected areas around Lake Victoria Basin

1.4 Specific Objectives

This study was guided by the following specific objectives;

- a) To identify factors behind the changes in temperature and patterns of rainfall around Lake Victoria Basin.
- b) To find out the implications of changes in temperature and rainfall patterns on communities around Lake Victoria Basin.
- c) To establish land use patterns that can help to harmonize observed changes in temperature and rainfall patterns around Lake Victoria Basin

- d) To suggest measures that can be adopted to respond to implications of changes in temperature and rainfall patterns on communities around Lake Victoria Basin

1.5 Research Questions

The study answered the following research questions;

- a) What factors are behind the changes in temperature and patterns of rainfall around Lake Victoria Basin?
- b) What are the implications of changes in temperature and rainfall patterns on communities around Lake Victoria Basin?
- c) What land use patterns can help to harmonize the changes in rainfall patterns and temperature around Lake Victoria Basin?
- d) What measures can be generally adopted to respond to implications of changes in temperature and rainfall patterns on communities around Lake Victoria Basin?

1.6 Conceptual framework

Independent Variable

Dependent Variable

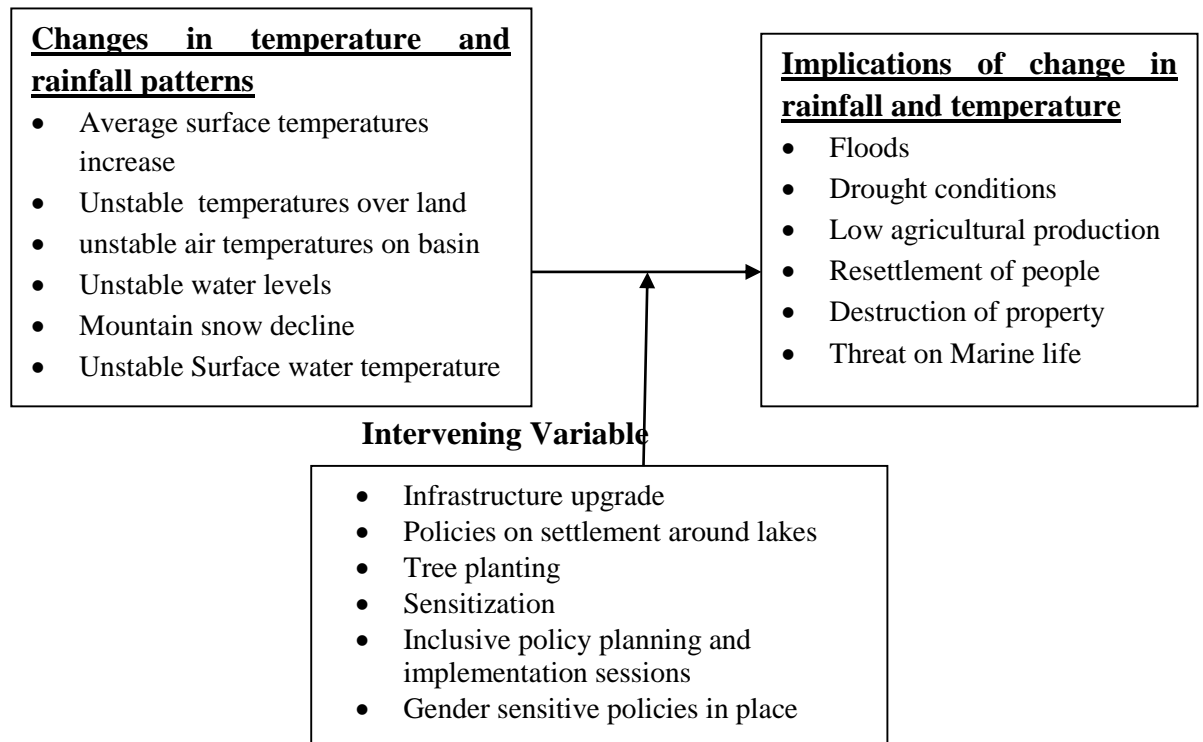


Figure 1: Conceptual framework

The conceptual framework shows that changes in temperature and rainfall have significant implications on populations in the Lake Victoria basin. Specifically, changes in temperature depict average surface temperature increase, unstable temperatures over land, unstable air temperatures, unstable water levels, snow rise and unstable surface water temperature. The results of these are floods, drought conditions, low agricultural production, resettlement of people, destruction of property and threat to marine life. However, the positive or negative state of climate affairs based on the illustration is based on factors such as; infrastructure upgrade, policies on settlement, tree planting, sensitization, inclusive policy planning and implementation sessions, and gender sensitivity.

1.7 Scope of the study

The study was conducted in areas around Lake Victoria basin particularly in Masese division, Kimaka areas, Mpumudde, Kakira parts, Bugembe and Njeru. It tackled

issues related to factors behind changes in temperature and rainfall patterns, the implications of these changes on communities, patterns of land use that can stabilise temperature and rainfall changes then the general measures that could be adopted to stabilize temperature and rainfall patterns around Lake Victoria. The study population involved people who work in industries around Lake Victoria, those who practiced agriculture around the basin and some people who conduct private businesses in the area. The study was conducted for a period of two months.

1.8 Significance of the study

Climate change effects such as droughts and floods are already threatening the socio-economic survival of many developing countries such as Uganda (Katz, Parlange, & Tebaldi, 2003).

Future advances in patterns of these effects would be very devastating to Uganda and many developing countries if no concrete action is taken to cope with the future changes thus a need for the study.

Climate models for projections of future climate are constantly undergoing improvements and new insights into the various atmospheric processes have constantly been integrated into these models which have substantially increased model performance (Wilson, 2010). In addition, increased computing power has enabled model developers to increase model resolution (Ibid). It is thus necessary to conduct an informative study to that effect.

Relatively small scale processes can now be simulated and downscaled with improved skill (Georgole, 2010). It is therefore necessary to frequently update the available information on extreme climate events with the availability of projection datasets so as to provide highly skilled information for early warning systems.

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