

**BUSITEMA
UNIVERSITY**
Pursuing Excellence

**FACULTY OF NATURAL RESOURCES AND
ENVIRONMENTAL SCIENCES**

THE DEPARTMENT OF NATURAL RESOURCES ECONOMICS

**CLIMATE CHANGE ADAPTATION STRATEGIES OF
SMALLHOLDER FARMERS: THE CASE OF KAKOOGA SUB-
COUNTY, NAKASONGOLA DISTRICT, UGANDA**

By

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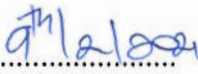
**This Dissertation is submitted to the Directorate of Graduate Studies,
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award of a degree of Master of Science in Climate Change and Disaster
Management of Busitema University**

FEBRUARY 2021

DECLARATION

I, **Erick Kizito** do hereby declare that this research project has been developed through my efforts and has not been submitted to Busitema University or any other institution of higher learning for the award of a Master's degree or any other qualification.



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DEDICATION

This work is dedicated to my late father Kaaya Kizito and the entire family who endured a lot of hardships during my absence. I sincerely thank their prayers that gave me strength and courage to complete my study successfully.

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LIST OF ACRONYMS

CH ₄	methane
CO ₂	Carbon dioxide
CRU	Climate Research Unit
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization
GCMs	Global Climate Models
GDP	Gross Domestic Product
GHG	Greenhouse gas
ICPAC	IGAD Climate Prediction and Application Centre
IPCC	Intergovernmental Panel on Climate Change
Km	Kilometre
LDCs	Least Developed Countries
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MWE	Ministry of Water and Environment
NAPA	National Adaptation Programme of Action
NCCP	National Climate Change Policy
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organisations
NOAA	National Oceanic and Atmospheric Administration
RCPs	Representative Concentration Pathways
RCMs	Regional Climate Models
S/C	Sub County
UBOS	Uganda Bureau of Statistics
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNMA	Uganda National Meteorology Authority
IWMI	International Water Management Institute
CSA	Climate Smart Agriculture
USAID	United States Agency for International Development
PET	Potential Evapotranspiration
SWS	soil water storage

ABSTRACT

Uganda is an agrarian country dominated by subsistence farming which is highly vulnerable to climate change. This study was therefore carried out to assess the different adaptation strategies used by smallholder farmers' in response to climate change and variability in Kakooge Sub-county, Nakasongola district. The specific objectives were to; (1) analyse potential evidences of climate change based on water storage, drought stress and smallholder farmer's perception of climate change; (2) identify existing adaptation strategies and (3) determine the factors influencing farmers' level of adoption. Primary data was collected from 150 smallholder farmers using survey questionnaires. Monthly Rainfall and Potential Evapotranspiration data was sourced from UNMA and the ICPAC website for downscaling. In data management I generated frequency distribution tables, graphs and came up with other statistical conclusions. According to the findings, it was observed that drought stress in Kakooge has increased over the past years. Water storage had varied, with less water stored in the June, July and August seasons. The humid months of October and November stored more water in most years. This was largely due to the long rains experienced during this season. Smallholder farmers' perceptions of climate change were consistent with the analysis results for the existing potential evidences of climate change. Farmers recognized that temperatures had increased over time and there were persistent droughts. This is closely similar to the drought stress computations. Results also confirmed that the respondents believed climate change was real and mainly caused by human activities. Deforestation, charcoal burning and swamp drainage for agriculture were stated to be the most common causes. Some of the adaptation strategies employed by smallholder farmers included mixed cropping, agroforestry, crop diversification and change of planting dates. Most of the farmers who practiced agroforestry and crop diversifications said they were effective practices. Farm size, education levels, access to credit and information on climate change were found to be the factors that influenced engagement in adaptation strategies. From the study results, it can be concluded that Nakasongola district is becoming more water stressed as the water storage potential has declined and the drought periods are becoming frequent.

Key words: *Climate change, Drought stress, Water storage, Climate change adaptation strategies.*

CHAPTER ONE: INTRODUCTION

1.1 Background

Climate change is defined as any change in the average weather conditions of a place observed over time, whether due to natural variability or as a result of human activity. Adaptation is the modifications in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates damage or exploits beneficial opportunities (IPCC, 2014). According to the Intergovernmental Panel on Climate Change (IPCC), adaptive capacity is the ability of a system to adjust to climate change, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences of climate change (IPCC, 2013). The current pace of changes in the global climate mainly due to human inducements calls for assessing climate change impacts, adaptation planning, implementation of adaptation technologies and monitoring for a sustainable production and livelihoods improvement for smallholder farmers. If adequate food supply is to be sustained in Sub Saharan Africa, smallholder farmers need to be helped to build resilience to climate change shocks as they dominate the agricultural sector.

It must now be accepted that climate change challenge is multidimensional and global. Its impacts cut across all sectors and cannot be restricted to national geographical boundaries. Projections by the IPCC indicate that if greenhouse gas emissions continue to rise at their current rate, the world will be faced with a catastrophic future in the form of sea-level rise, shifts in growing seasons, biodiversity loss, as well as increased frequency and intensity of extreme weather events (IPCC, 2013). According to IPCC, the global forecasts show that climate change continues to impact negatively on agriculture and other priority sectors for human survival, agriculture output and water for Africa will reduce (IPCC, 2007). Smallholder farmers are greatly affected due to their dependence on nature to derive their livelihoods (Ingram et al., 2008). In sub-Saharan Africa, climate shocks and extremes are likely to increase crop failure levels leading to food insecurity, low incomes and poor health (IPCC, 2008). Prolonged droughts have increasingly affected both smallholder crop and livestock productions in the Eastern part of Africa which includes Uganda (IPCC, 2014). The Fifth IPCC Assessment Report presents strong evidence that warming over land across Africa has increased over the last 50–100 years (IPCC, 2013). Surface temperatures have increased by 0.5–2°C over the past hundred years

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