# UNIVERSITY OF AGDER

# Climate Change, Migration and Conflict

A Case Study of Kilosa District, Tanzania

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University of Agder, 2014

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**DECLARATION BY CANDIDATE**

I, Eyassu Jemal Boku hereby declare that this thesis: Climate Change, Migration and Conflict: A Case Study of Kilosa district, Tanzania is my original work and has not been previously submitted either as a whole or in part to any institution of higher learning for any kind of award.

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# Abstract

This thesis discusses the impacts of climate change on rural and urban households in Kilosa district and focuses on investigating the linkage between climate change, migration and conflict in the district.

Different scholars argue that climate change is a fundamental threat to sustainable development in developing countries unless vital actions taken before the warming planet threatens to put prosperity out of reach of millions and roll back decades of development. Moreover, academics and security analysts have warned for some time now that climate change threatens water, food security, and the allocation of resources. Such impacts could further allege to increase forced migration, raise tensions and trigger conflict.

Sub-Saharan Africa is one of the most vulnerable regions in the world to climate change because of widespread poverty and limited adaptive capacity. Moreover, future climate change is likely to pose severe impact in a developing country like Tanzania because of weak socioeconomic structures and agrarian economy.

Tanzania is already under stress from series of climate change impacts, especially, in its arid and semi-arid regions. The study area, Kilosa district, is one of the climate change and variability-prone areas in the country. The environmental challenges within the district and in the neighboring areas have had an adverse impact on the development endeavors in the region. The district has also experienced high rates of frequent human mobility and conflict.

Hence, the research findings show how climate change affects the livelihood of rural and urban households by instigating human mobility and conflict in Kilosa district. It also discusses climate change adaptation strategies and conflict resolution initiatives in the study area.

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# Table of Contents

## List of figures

## List of tables

## List of appendices

## Abbreviations and Acronyms

CBD   -      United Nations Convention on Biological Diversity

CCAP  -      Climate Change, Agriculture and Poverty Alleviation Project

CDM   -      Clean Development Mechanism

CIA    -      Central Intelligence Agency (USA)

FAO   -      Food and Agriculture Organization of the United Nations

FC     -      Foundation Coalition, USA

FGD   -      Focus Groups Discussion

GDP   -      Gross Domestic Product

HUDESA-    Human Development Strategies Association, Kilosa

IFRCRCS-   International Federation of Red Cross and Red Crescent Societies

IOM   -      International Organization for Migration

IPCC   -     Intergovernmental Panel on Climate Change

IPCC WGI-  Intergovernmental Panel on Climate Change Working Group I

LDCs  -     Least Developed Countries

MPEE -      Tanzanian Ministry of Planning, Economy and Empowerment

NASA -      National Aeronautics and Space Administration

NBS   -      Tanzanian National Bureau of Statistics

NGOs -      Non-Governmental Organizations

NWURT-     National Website of United Republic of Tanzania

NRC   -      US National Research Council

REDD -      United Nations collaborative initiative on Reducing Emissions from Deforestation and Forest Degradation

SRS    -     Stratified Random Sampling

SUA   -      Sokoine University of Agriculture

TFCG -      Tanzania Forest Conservation Group

TNCCS-     Tanzanian National Climate Change Strategy

UNDESA-   United Nations Department of Economic and Social Affairs

UNEP -      United Nations Environment Program

UNFCCC-   United Nations Framework Convention on Climate Change

UNGOKI-   Union of Non-Government Organizations in Kilosa

UNHCR-      United Nations High Commissioner for Refugees

UNICEF-      United Nations International Children's Emergency Fund (currently The United Nations' Children's Fund)

UNRWA-      United Nations Relief and Works Agency

URT-      United Republic of Tanzania

USNRC-      United States National Research Council

WBCS -      World Bank country Study

# Chapter One

*This chapter consists of six sections. The first section focuses on the background information about climate change-induced migration and conflict in general and Tanzania in particular. The second and third sections discuss the objective of the study and the research questions. The importance of the study and the methodologies employed in the study are mentioned in the fourth and fifth sections. The last section discusses the thesis outline.*

## 1. Introduction

### 1.1. Background of the Study

Planet Earth has become the concern of everyone (Philander, 2008). Since the Earth formed more than four billion years ago, its climate has periodically shifted from warm to cool and back again-sometimes dramatically (Hardy, 2003). However, for the last few decades, our planet has been heating up very fast mainly due to man-made factors. Global warming poses negative impacts on our society and the ecosystem in a broad variety of ways.

The Intergovernmental Panel on Climate Change (IPCC) has stated in its latest 2014 assessment report that African ecosystems are already being affected by climate change, and future impacts are expected to be substantial (Niang and Ruppel, 2014). According to the report, it is likely that land temperatures over Africa will rise faster than the global land average, particularly in the more arid regions. In order to adapt to the recurring environmental changes, human beings usually follow three different strategies: stay in place and do nothing, accepting the costs; stay in place and adapt to changes; or leave the affected areas (Reuveny, 2007). According to Reuveny (2007), most of the African countries are less able to mitigate or adapt to environmental changes due to poverty, low level of technological advancement, and high dependence on natural renewable resources.

While environmental change has long been known as one of the main factors of migration, until recently it has been conspicuously marginal in migration research (Tacoli, 2011). In part, this is because the interest has focused primarily on the socioeconomic factors of migration. However, facing severe environmental problems, people in least developed countries (LDCs) may have to leave affected areas, which, in turn, may cause conflict in receiving areas (Reuveny, 2007).

In Tanzania, the impacts of climate change are already being felt across the country and are projected to increase both in frequency and severity leading to severe socio-economic implications (TNCCS, 2012). The country has experienced both climate induced and non-climate induced migrations for decades. According to Deshingkar et al. (2012), Tanzania has a long history of rural-rural and rural-urban migration, including significant labor recruitment from neighboring countries to provide a workforce for plantation agriculture (Drimie et al. 2009). On the other hand, climate variability has also had an implication for the mobility of both the pastoralists and the farmers. Studies revealed that farmers and pastoralists in the Morogoro Region in Tanzania frequently move temporarily or permanently to the location where farming conditions are favorable and where pastureland is available (Paavola, 2008).

Kilosa district, the study area of this research, is one of the districts in Morogoro Region that is affected by climate change impacts. There is also continued human mobility and conflict in the district due to different factors. According to Benjaminen et al. (2009), the conflict culminated in the killing of thirty-eight farmers in Rudewa Mbuyuni village on the 8th of December 2000, for example, has highly publicized in the daily press in Tanzania, where it became known as 'the Kilosa Killings'. Tanzania Daily News, one of the online news portals in the country, has mentioned this incident as the worst conflict between the pastoralists and farmers the country has ever experienced (Msasanuri, 2012).

This study will assess the perception of the rural communities about climate change impacts, human mobility and conflict in the district and it will try to find out whether climate change is the driving factor of migration in the district or not. The research will also identify climate change adaptation strategies and the reactions taken by the local government to address human mobility and conflict in the district.

## 1.2.  Research Objective

Tanzania is known as one of the peaceful countries in the Sub-Saharan Africa. However, John (2011), argues that the occurrence of violent conflicts in recent years challenges the peace enjoyed by Tanzania since independence. In Kilosa District in 2008, for example, recurrent conflict between pastoralists and farmers has taken the life of eight people and more than 832

villagers fled to the neighboring villages (John, 2011). Hence, the main objective of the study is to find out whether climate change impacts on the recurrent migration and conflict linkages in the district or not. It can also examine how climate change has been affecting the permanent human settlement in the district and what measures have been taken by the concerned bodies to solve climate change, migration and conflict in Kilosa District. Moreover, the research has the following specific objectives;

- To identify the perceived causes of climate change that could create environmental challenges in the district.
- To find out the extent on which local communities have experienced climate change impacts during the last few decades.
- To identify linkages between human mobility and conflict between farmers and pastoralists.
- To investigate the relationship between climate change, migration and conflict.
- To examine the climate change adaptation and conflict mitigation strategies adopted by households, local government and NGOs to reduce and/or alleviate migration and conflict.

## 1.3. Research Questions and Hypothesis of the Study

Research questions:
In order to meet the objective of this study, the following questions were asked.

- ∗ To what extent have local people experienced climate change during the last few decades?
- ∗ What are the perceptions among the local people regarding the causes of climate change?
- ∗ How does climate change affect the livelihood of the local households?
- ∗ What are the strategies followed by the local households to adapt to climate change?
- ∗ To what extent does the effect of climate change cause human mobility and conflict in Kilosa district?

* How does the local government and NGO's, working with climate change, human mobility and conflict issues, respond to climate induced migration and conflict?

Following are the three hypotheses of the study:

H1.     The change in the environment due to global warming has affected the life of the rural and urban communities in the Kilosa district through different ways.

H2.     Climate related impacts have driven the recurrent human mobility and conflict in the district.

H3.     The actions taken by the local government, NGOs and other responsible bodies in solving environmental, human mobility and conflict were not sufficient.

## 1.4.     Importance of the Study

The study is of great importance for academia and policy makers to generate new knowledge-based development strategies that might solve human mobility and conflict which probably instigated due to climate change impacts in Kilosa district. This research is also expected to produce reasonable evidence that could show whether climate change impacts have contributed to human mobility and conflict in the district or not.

On the other hand, the research findings expected to help other researchers in the same subject area to get a better understanding about climate change, migration and conflict in Kilosa district, and identify new areas of research.

## 1.5.     Methodology in Brief

This study is intended to examine the extent to which the rural and urban poor communities in Kilosa district have been affected by climate change. It further investigates whether climate change induced migration is linked to conflicts. A case study is employed to better equip the researcher to meet the intended research objectives. The quantitative and qualitative research approach has been chosen.  The necessary data for the study has been collected through participant observation and semi-structured interviews. Besides, three focus group discussions were held to obtain more information about the impact of climate change on migration patterns and conflict at the community. Secondary data will also expect to fill any information gap that

may not be obtained from primary sources. The sample of the study includes 160 farmers and pastoralist. Moreover, 24 local government and NGO employees that are directly or indirectly working with climate change, migration and conflict in Kilosa district were included in the sample.

## 1.6. Thesis Outline

The study is organized into seven chapters. Chapter 1 presents the background of the study, followed by research objective, research questions and hypotheses. The first chapter also describes the importance of the study and methodology in brief. Chapter 2 has three parts; the first part provides a brief overview about the Republic of Tanzania, the second part is about climate change impacts and the last part is a brief introduction to Kilosa district. Chapter 3 contains the literature review and theoretical framework for the study. In this chapter, relevant theories, concepts and the theoretical framework of the study will be presented. Chapter 4 introduces the methodology and strategies that are used in the research. Empirical findings of the research are stated in chapter 5 while, in chapter 6, the findings are analyzed with the support of the theoretical framework of the thesis. Conclusions and recommendations of the overall research will be found in chapter 7.

# Chapter Two

*Chapter two has three parts: The first part provides an overview about the United Republic of Tanzania. Part two discusses climate change challenges in the country. The last part introduces the study area, Kilosa district.*

## 2. Area of the Study

### 2.1. The United Republic of Tanzania

The United Republic of Tanzania is located in Eastern Africa between longitude $29^o$ and $41^o$ East, Latitude $1^o$ and $12^o$ south (NWURT, 2012). See Figure 1. The country was formed out of the union of two sovereign states namely Tanganyika and Zanzibar. It occupies a total area of 947,300 square kilometers, and its capital city is Dodoma while the largest city and principal port of the country is Dar Es Salaam. In 2013, the country has an estimated total population of 49 million (CIA, 2014).
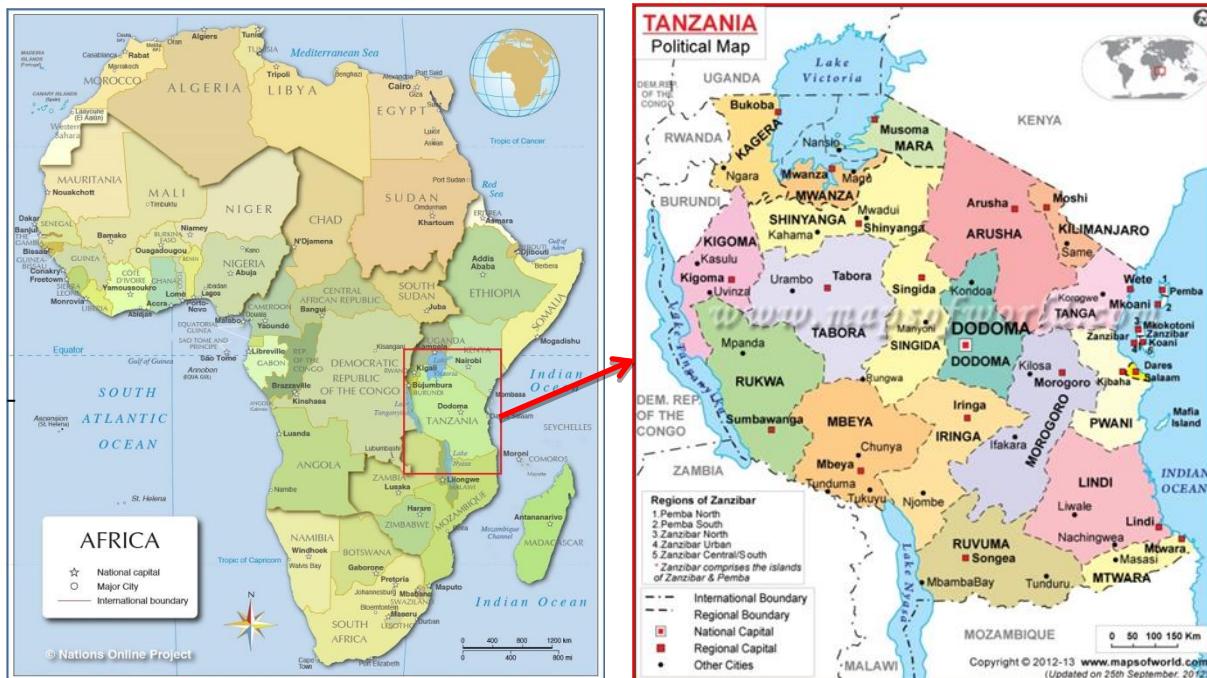


**Figure 1: Map of Africa and Tanzania**
*Source: Maps of World (2014)*

Tanzania has a spectacular landscape of mainly three physiographic regions; namely the islands and the coastal plains to the east, the inland saucer-shaped plateau, and the highlands. The Great Rift Valley that runs from north-east of Africa through central Tanzania is another landmark that adds to the scenic view of the country. The country has the largest concentration of wild animals. It also has pristine sandy beaches and Africa's highest and snow-capped mountain, Mt. Kilimanjaro (NWURT, 2012).

## 2.2. Climate Change in Tanzania

Tanzania is one of the East African states which are experiencing climate change. The vegetation anomaly image by (NASA, 2005), for example, shows that most of the regions in the central, northern and northeastern parts of the country falls under the dry and drought-withered vegetation map which rings Lake Victoria and other parts of East Africa. See Figure 2.
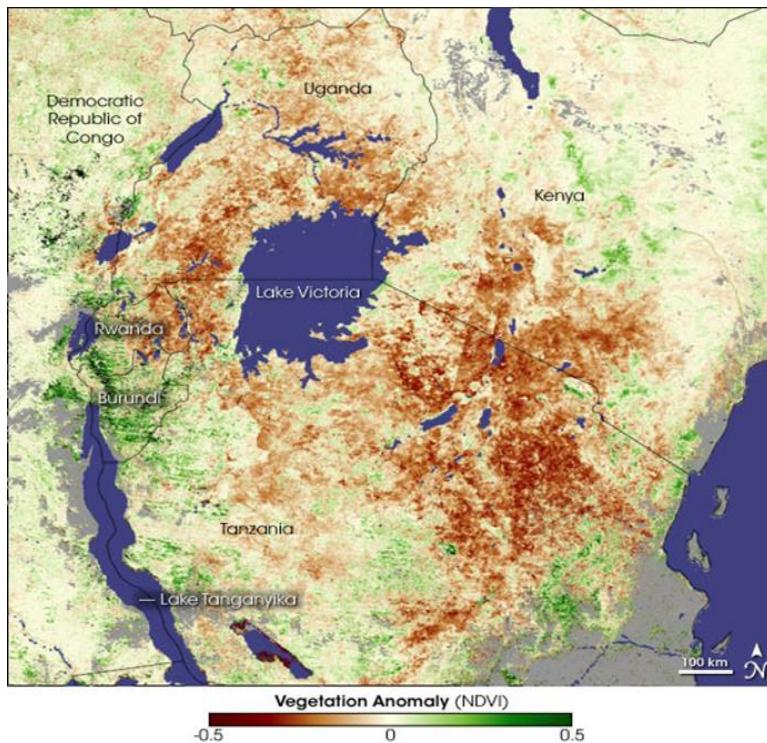


**Figure 2: Drought in East Africa March, 2005**
  *Source: -NASA, 2005 NASA*

The image shows the vegetation anomaly distribution in 2005 in eastern Africa.  Regions that are drier than they were between 2000 and 2004, such as Morogoro Region in Tanzania are brown,

while areas with thicker, healthier vegetation are green. As the image illustrates, A vast area of land in some countries in eastern Africa have been plunged into drought over the past decade. In this region, drought means more than economic loss, for many it means famine. According to Relief Web reports, (NASA, 2005) up to 30,000 people were hungry in 2005 in northern Tanzania, which has been dry in 2003 and 2004. Figure 3 illustrates Kilosa district was relatively green and the neighboring places to the west of the district fall under drought-withered vegetation map.
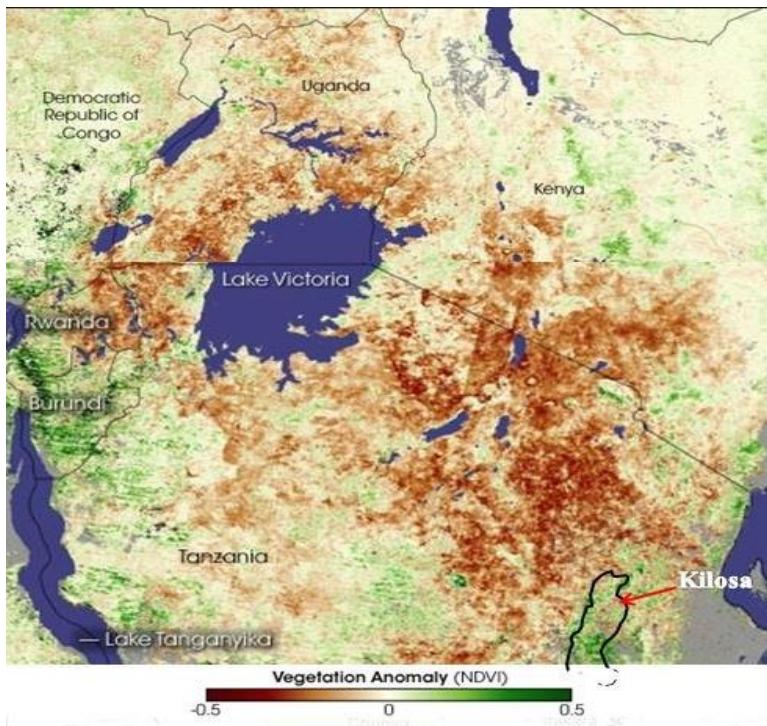


**Figure 3: Kilosa in the East African drought map of March, 2005**
*Source: Source: -NASA, 2005 NASA (Kilosa was marked on the map by the author)*

On the other hand, Figure 4 shows that extreme precipitation events over most of the mid-latitude land masses and over wet tropical regions will very likely become more intense and more frequent by the end of this century, as global mean surface temperature increases (Stocker et al., 2013).

Trends for the East African region show a general increase in precipitation projected into the future, with many models indicating an intensification of heavy rainfall especially during the wet

seasons (ACCI, n.d.). Such environmental phenomenon could seriously affect countries that are mostly relying on rain-fed agriculture. According to World Bank County study (WBCS), Tanzania is one of the African countries where agriculture is predominantly rain-fed and that rainfall is quite variable (WBCS, 2000).
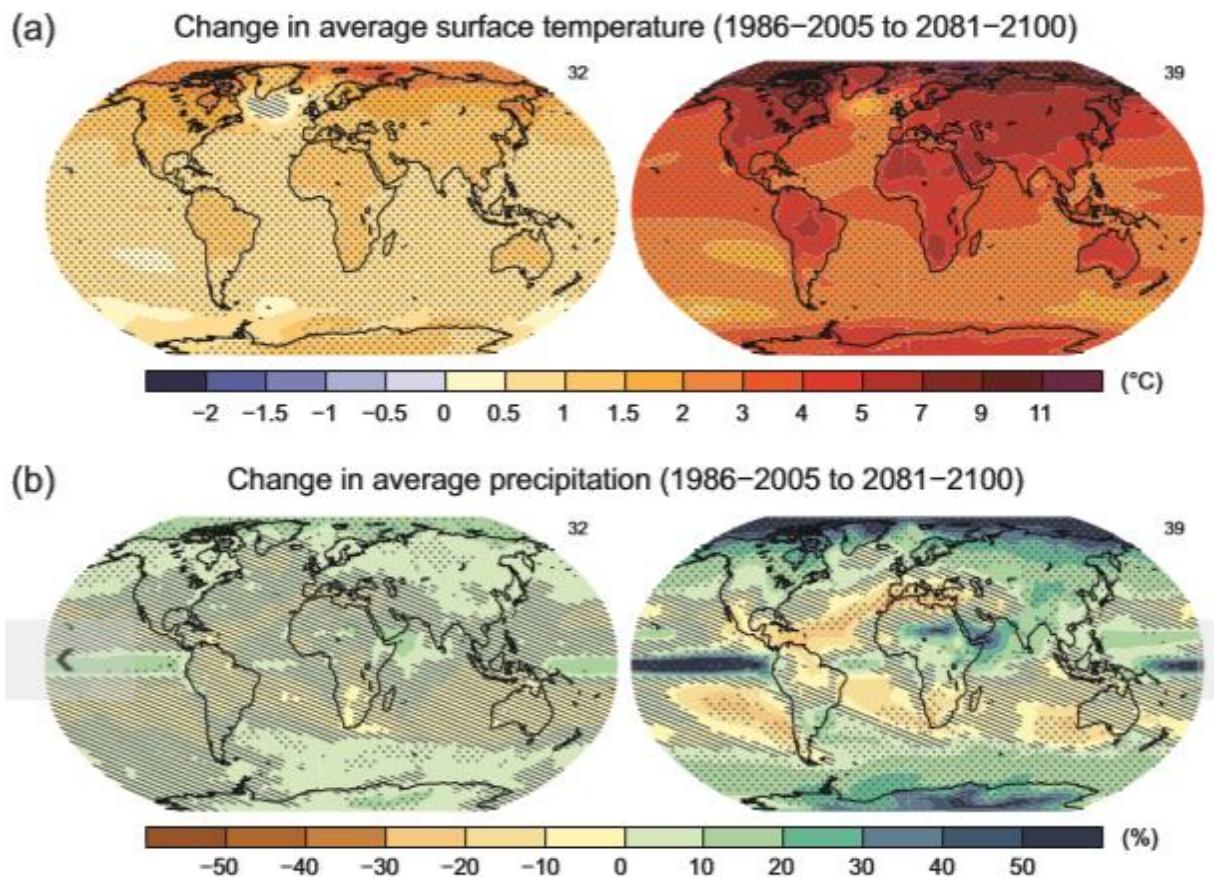


**Figure 4: Surface temperature and precipitation difference 1986 - 2005 and 2081 - 2100**
*Source: Stocker (2013)*

Agriculture in Tanzania accounts for more than one-quarter of GDP provides 85% of exports, and employees about 80% of the workforce (CIA, 2014). In addition, the main source of livelihood in semi-arid areas in the country, nearly eighty percent of the land in Tanzania is used for pastoralism and agro-pastoralism (Shem, 2010). Moreover, pastoralism plays an important role in the economy of Tanzania. According to United Republic of Tanzania (URT, 2012) as cited in (Mushi, 2013) livestock sector generates a quarter of agricultural GDP in the country. Apart from the supply of meat and other animal products, pastoralism makes productive use of a

large percentage of the available dry lands where the scarcity and variability of its natural resources has few alternative uses (Mung'ong'o and Mwamfupe, 2003).

However, climate variability has affected livestock production in the country. According to Shemsanga et al. (2010), deaths of large numbers of livestock due to lack of water and pasture has been of repeated occurrence in Tanzania hence threatening livelihood of pastoralists in the country. As a result, (Shayo, 2006, URT, 2007) as cited in Shemsanga et al. (2010), pastoralists are forced to relocated to places where pasture and water are available. The growth of the livestock population has also led to increased movement of large herds of livestock to areas which traditionally had few livestock, such as Mbeya, Iringa, Morogoro, Rukwa and Coast Regions, creating serious land use conflicts and violence between pastoralists and crop farmers.

## 2.3. Kilosa District, Morogoro
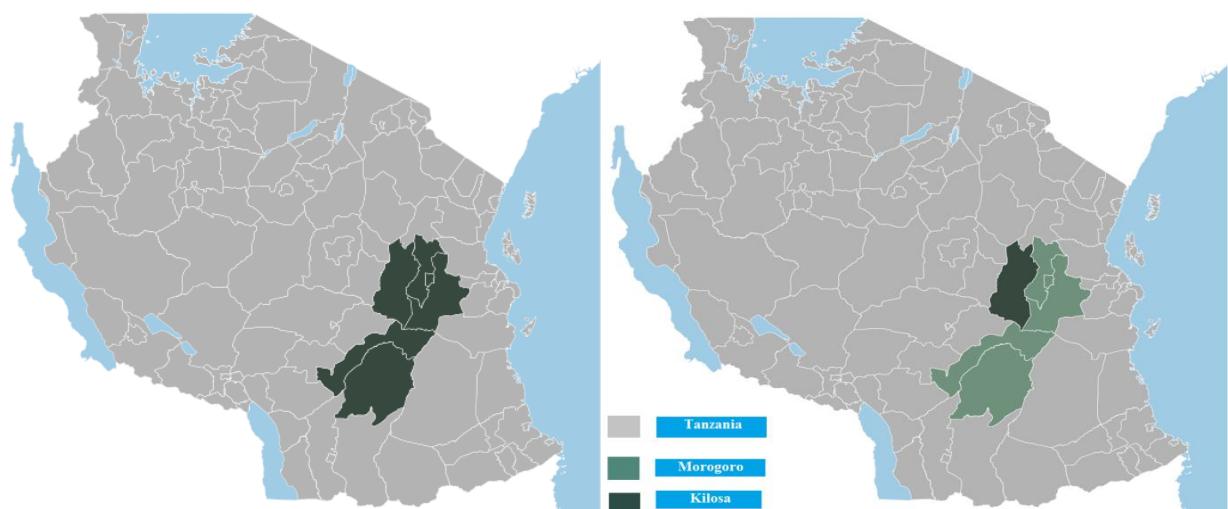


**Figure 5: Map of Morogoro region and Kilosa district**
*Source: Wikipedia, October 2013*

### 2.3.1. Location and Administration

Kilosa District is one of the seven districts in the Morogoro region of Tanzania. See Figure 5. It is located about 270 km to the west of the commercial capital Dar Es Salaam and situated between latitude 5°55' and 7°53' south and longitudes 36°30' and 37°30 east, with an altitude ranging between 300-600 meters above sea level. Other districts in Morogoro region include; Morogoro district, Morogoro municipality, Kilombero district, Ulanga district, Mvomero district

and Gairo district. Kilosa district covers 14,918 square kilometers with a total population of about 631,186 people (Kilosa district 438,175 + Gairo district 193,011)[1]. Kilosa neighbors the following districts Kilindi (Tanga region) and Kiteto (Manyara region) to the north; Mvomero to the east; Kilombero and Kilolo (Iringa region) to the south, Mpwapwa (Dodoma Region) to the west and Kongwa (Dodoma) to the South West.

According to Kilosa district statistical office report, the district has nine administrative divisions, which are in turn subdivided into 46 wards and 161 registered villages. Kilosa town, 96 km west of Morogoro town, is the district's administrative center. See Figure 6.



**Figure 6: Kilosa town**
        *Source: Author (04, 2014)*

### 2.3.2. Physiography, Hydrology and Soil

Topography within Kilosa district is variable. The central and southern flood plains of the Wami, Mkata and Ruaha rivers stand at 400m in elevation, while the cultivation steppe in the north around Gairo reaches 1100m. The highest parts of the district are found in the Ukaguru, Rubeho and Vindunda mountains, which form an almost continuous north-south spine along the western side of the district and reach an elevation of 2200m. The district is divided into three ecological and six agro-economic zones (MPEE, 2007). The three ecological zones include the flood plain, the plateau and the mountains or upland zones. The floodplain consists mainly of flat and undulating topography that extends to the foothills at about 550m above sea level.

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[1] Gairo district was a division of Kilosa district before March, 2012

### 2.3.3. Climate

Kilosa district's rainfall is of a typical region and is largely bi-modal with 'short rains' in November/January and 'long rains' in March/May with a peak in April. The average annual rainfall varies from year to year and between ecological zones. The average yearly rainfall is 1000mm-1400mm is common in the southern flood plains, whilst Gairo in the north averages 800-1100mm. However, the mountain forest areas can receive up to 1600mm annually.

Kilosa is susceptible to floods due to Mkondoa river that divides the area into two parts (UNICEF, 2013). In January, 2010, heavy rainfall in the district has displaced a total of 23,980 people and a number of houses in the affected areas of Kilosa have collapsed as a result of flooding (IFRCRCS, 2010). According to UNICEF (2013), the causes of floods in Kilosa Township include; deforestation, river siltation and climate change. Developing countries are disproportionately affected because they lack resources, infrastructure, and disaster preparedness systems (Watson et al., 2007). Flood risks increase with deforestation and people are vulnerable to floods depending on their assets, their level of preparedness and support from disaster prevention and preparedness organizations (Webersik, 2010).

Apart from the effect of floods, a study conducted by Mushi (2013) revealed that the frequency of drought in Kilosa district has been increasing since the last decade. All over the district, the dry period extends from June to October. The average annual temperature is typically 25°C in Kilosa town with extremes in March (30°C) and July (19°C).



**Figure 7: Ilonga Agricultural Research Institute, Meteorology**
*Source: Author (2014)*

According to the meteorological data obtained from Ilonga Agricultural Research Institute (Figure 7), the district has almost similar annual temperature for the past 40 years. The district, however, has obtained an erratic pattern of rainfall for the described periods. See Figure 8 and 9.
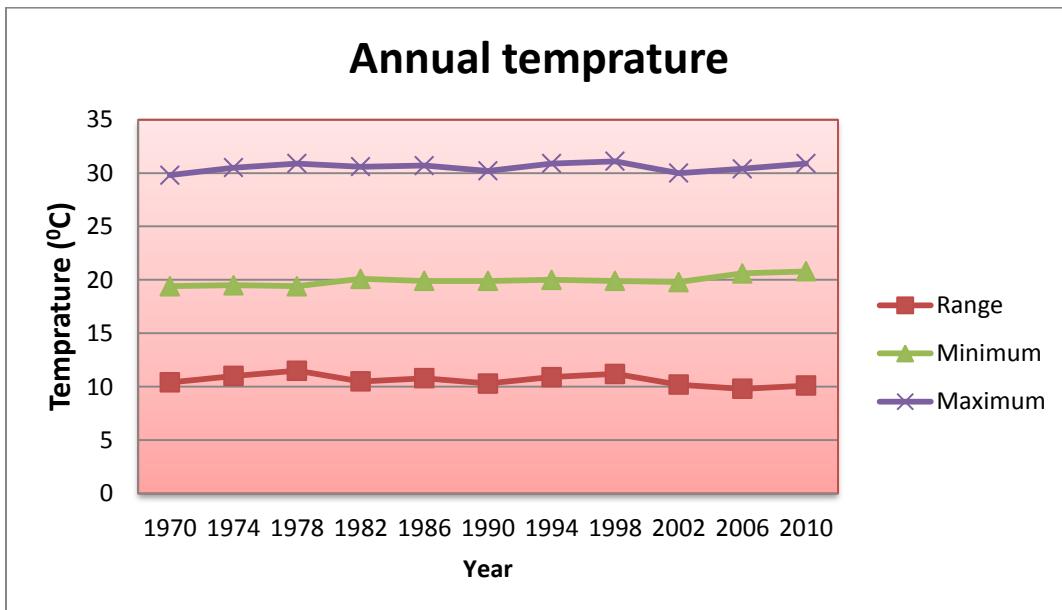


**Figure 8: Annual temperature in Kilosa district, 1970 - 2010**
*Source: Ilonga agricultural research institute (2014)*
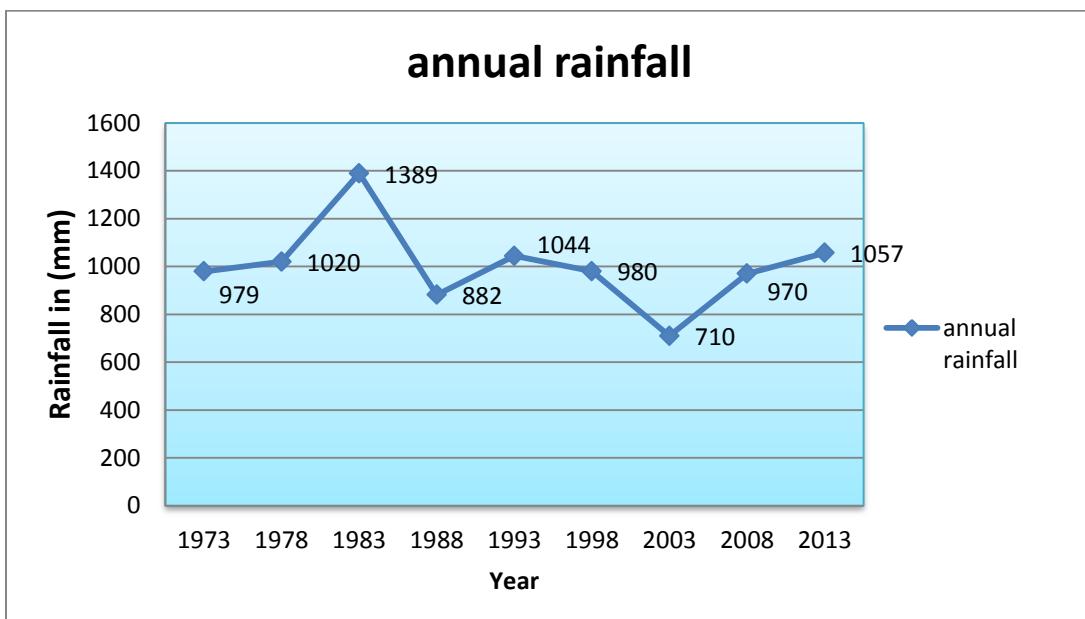


**Figure 9: Annual rainfall in Kilosa district 1973 - 2013**
*Source: Ilonga agricultural research institute (2014)*

### 2.3.4. Demography

Kilosa district has a population of just below half a million in the year 2000. See Table 1. However, the district's population increased by 29% within ten years. According to the 2012 census, Kilosa district has a total population of 631,186 as shown in Table 2 (NBS, 2014). The main ethnic groups in the district are the Sagara, Kaguru, Kwiva, Vidunda and some few Gogo tribes (Ako, 2001).

| S/N | DIVISION | NO. OF WARDS | NUMBER OF VILLAGES | POPULATION | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | | Male | Female | Total |
| 1 | ULAYA | 2 | 9 | 11030 | 10873 | 21903 |
| 2 | KILOSA | 4 | 1 | 12652 | 13479 | 26131 |
| 3 | GAIRO | 5 | 30 | 55539 | 59360 | 114899 |
| 4 | MAGOLE | 6 | 41 | 52480 | 52291 | 104771 |
| 5 | MIKUMI | 7 | 23 | 50308 | 46781 | 97089 |
| 6 | NONGWE | 3 | 13 | 13534 | 13885 | 27419 |
| 7 | KIMAMBA | 5 | 15 | 21652 | 22180 | 43832 |
| 8 | KIDETE | 2 | 13 | 10092 | 9907 | 19999 |
| 9 | MASANZE | 3 | 16 | 16914 | 16556 | 33470 |
| DISTRICT TOTAL | | 37 | 161 | 244201 | 245312 | 489513 |

**Table 1: Kilosa district population, 2002**

*Source: Population and Housing Census-Kilosa Statistics Office*

| S/N | DIVISION | NO. OF WARDS | NUMBER OF VILLAGES | POPULATON | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | | Male | Female | Total |
| 1 | ULAYA | 2 | 9 | 13,809 | 13,527 | 27,336 |
| 2 | KILOSA | 4 | 1 | 16,621 | 17,804 | 34,425 |
| 3 | GAIRO | 5 | 30 | 62,915 | 67,855 | 130,770 |
| 4 | MAGOLE | 6 | 41 | 73,473 | 73,576 | 147,049 |
| 5 | MIKUMI | 7 | 23 | 56,748 | 55,964 | 112,712 |
| 6 | NONGWE | 3 | 13 | 30,291 | 31,950 | 62,241 |
| 7 | KIMAMBA | 5 | 15 | 26,147 | 26,941 | 53,088 |
| 8 | KIDETE | 2 | 13 | 12,183 | 12,367 | 24,550 |
| 9 | MASANZE | 3 | 16 | 19,397 | 19,618 | 39,015 |
| DISTRICT TOTAL | | 37 | 161 | 311,584 | 319,602 | 631,186 |

**Table 2: Kilosa district population, 2012**

*Source: 2012 census, NBS*

### 2.3.5.  Human Mobility and Conflict in the District

Kilosa is strategically located on the railway line that links Dar Es Salaam with Tabora and Kigoma (Baker, 1990). The strategic location of the district has contributed in part for a better economic development in the area. Baker (1990) argues that the establishment of sisal and cotton-plantation during the colonial era had also added further motivation to the regional economy and it attracted a large number of labor force to migrate towards Kilosa district.

There is also a high migration rate from the neighboring places towards the district due to environmental challenges in arid and semi- arid areas. Barnett and Adger (2005) as cited in (Brown and Crawford, 2009), argue that the influx of migrants into new areas has been a significant factor in many conflicts over environmental resources. Such evidence has been observed in the Kilosa district in the last few decades. Due to  a recurrent conflict between farmer and pastoralist communities, the district is often considered in different reports and in the national newspaper articles as an area of land scarcity and conflicts (Benjaminen et al., 2009).

Since 1996, Tanzania has over the years, been experiencing a series of poor harvests leading to losses of productive assets for many households in Dodoma region (Actalliance, 2012), and the recent migration wave towards Kilosa district has mostly originated from this region. In the past few years (Ngana et al., 2010), pastoralists from major livestock centers in Dodoma region like, Dodoma, Mpwapwa and Kongwa districts had increasingly moved into Kilosa for pasture and for relatively sufficient water when compared to their community of origin. See Figure 10.
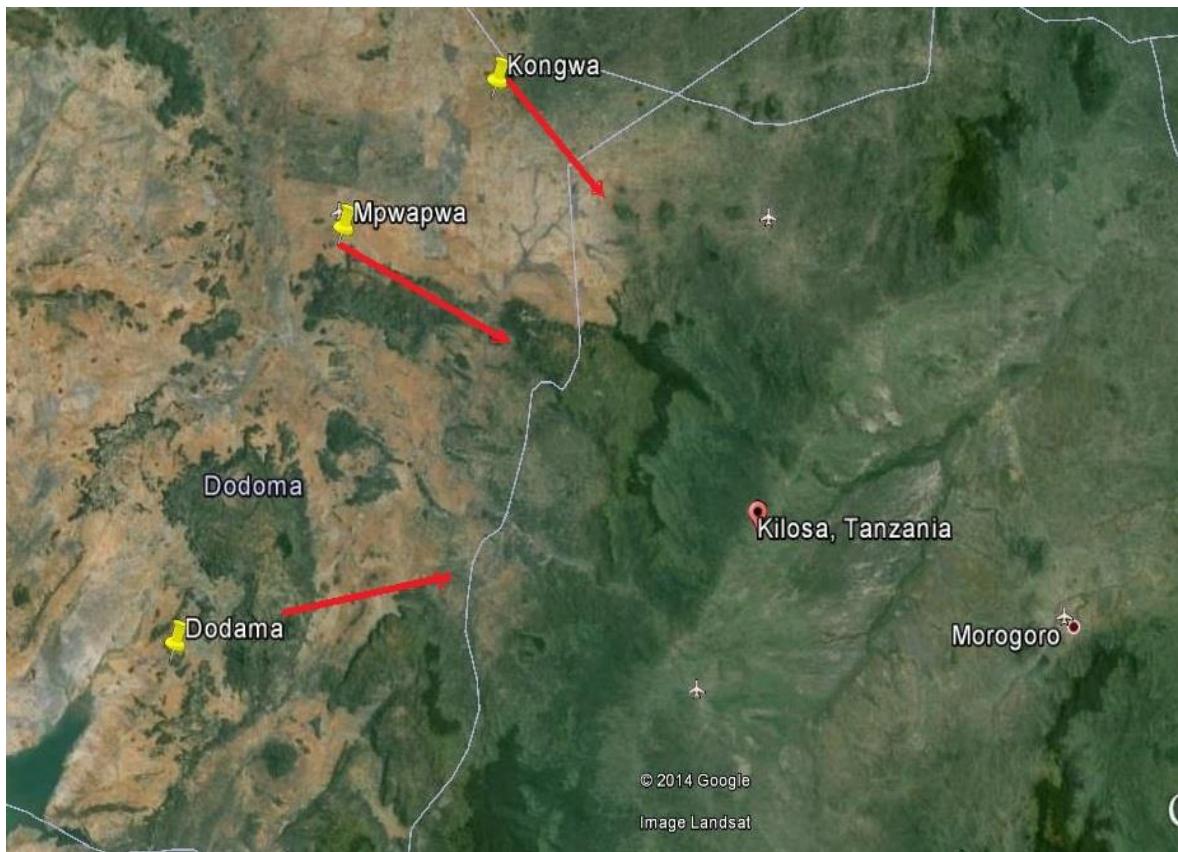
**Figure 10: Influx of pastoralists towards Kilosa district (Google earth, 2014)**
*Source: Marked by the author*

# Chapter Three

*This chapter will provide literature on the research topic. The chapter is divided into five sections, and the first three sections provide a general overview over climate change and climate change adaptation and mitigation strategies adopted by the Tanzanian government. Section four focuses on climate change-induced migration and conflict. The last section summarizes a theoretical framework from which three hypotheses are derived to find answers for the identified research problems.*

## 3. Literature Review

### 3.1. Climate Change an Overview

Climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (United Nations, 1992). Human activities generate several different greenhouse gases that contribute to climate change (Hardy, 2003). According to Hardy, in the past 150 years and especially during the last few decades, humans greatly increased the concentration of atmospheric $CO_2$.
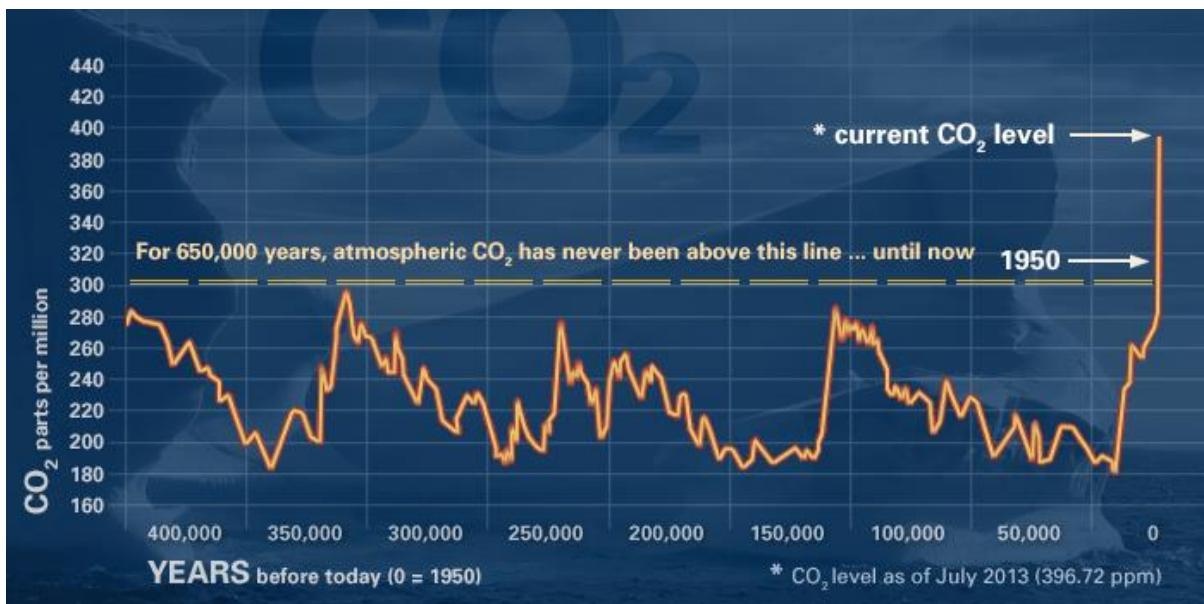


**Figure 11: Evidence of a change in $CO_2$ concentration**
*Source: NASA, 2013 NASA*

Figure 11 shows that, there has been a sharp increament in the level of $CO_2$ concentration between 1950 and 2013 compared to the change in the level of CO2 concentration before 1863, i.e., 150 years ago. Different scholars argue that human activities, largely the burning of fossil fuels (coal, oil, and gas), are responsible for most of the climate change currently being observed (USNRC, 2012). Deforestation and forest degradation, on the other hand, contribute to atmospheric greenhouse-gas emissions through combustion of forest biomass and decomposition of remaining plant material soil carbon (Van der Werf et al., 2009). According to the IPCC fifth assessment report of 2013, from 1750 to 2011, CO2 emissions from fossil fuel combustion and cement production have released 365 [335 to 395] Giga tons of Carbon (GtC) to the atmosphere, while deforestation and other land use change are estimated to have released 180 [100 to 260] GtC. This results in cumulative anthropogenic emissions of 545 [460 to 630] GtC (Stocker et al., 2013).

## 3.2. The Impact of Global Climate Change in Tanzania and Other Developing Countries

Climate change and climate variability are challenges that already face many African countries. Holmes, 2008 as cited in Brown and Crawford (2009), argues that the UN estimates nine out of every ten disasters in Africa are climate related. Floods, famines, droughts, diseases and conflicts are wreaking havoc in poor countries and are set to do untold damage as climate change accelerates (Hulme, 2009).

Even though climate change impacts will eventually manifest themselves in unpredictable singular events; such as storms, floods, or droughts, the increase in magnitude and frequency of such events can be predicted, and the consequential need for local populations to leave regions that suffer from increased risk can be foreseen (Scheffran et al., 2012).

The effects of climate change are expected to be greatest in developing countries in terms of loss of life and relative effects on investment and the economy (McCarthy et al., 2001). According to the Tanzanian national climate change strategy report (TNCCS, 2012), the risks associated with climate change are already evident in various economic sectors essential for Tanzania's livelihood and sustenance, including water resources, energy generation, food security, ecosystems/biodiversity and human health.

## 3.3. Climate Related Impacts in Kilosa District

Environmental damage has become evident in many parts of Kilosa district (Mung'ong'o and Mwamfupe, 2003). According to Mung'ong'o and Mwamfupe (2003), soil compaction and increased salinity was noted in many water points in the district, and this can be attributed to the concentration of livestock in smaller areas. Moreover, the situation is noted whereby some farmers in the district have been forced to abandon part of their farmlands because of soil compaction and increased salinity.

### 3.3.1. The Impact of Climate Change on Agriculture and Food Production

According to the USA National Research Council, the stress of climate change on farming may threaten global food security (USNRC, 2012). Agriculture, which provides a livelihood for about three-quarters of Africa's population, is mainly rain-fed. Severe and prolonged droughts, flooding, and loss of arable land due to desertification and soil erosion are reducing agricultural yields and causing crop failure and loss of livestock (Tadesse, 2010). Although an increase in the amount of $CO_2$ in the atmosphere favors the growth of many plants, it does not necessarily translate into more food. Crops tend to grow more quickly in higher temperatures, leading to shorter growing periods and less time to produce grains (USNRC, 2012). Moreover, plants usually start to wilt in their early stage of growth if temperature is too high.

### 3.3.2. The Impact of Climate Change on Water Resources

Climate change and variability are likely to impose additional pressures on water availability, water accessibility and water demand in Africa (IPCC, 2007). A number of countries in Africa have already experienced considerable water stress as a result of insufficient and unreliable rainfall that changes rainfall patterns or causes flooding.

Moreover, if rainfall is shaping economic conditions in sub-Saharan African countries, then change in rainfall patterns indirectly induced by anthropogenic emissions can be associated with the outbreak of civil violence (Webersik, 2010).

### 3.3.3. The Impact of Climate Change on Biodiversity

The Secretariat of the Convention on Biological Diversity (CBD) has stated, in its 2009 report that "climate change is a rapidly increasing stress on ecosystems and can exacerbate the effects

of other stresses" (SCBD, 2009). Climate change already has noticeable impacts on biodiversity. Projected future changes are likely to result in changes in the distribution of species and ecosystems, and overall biodiversity loss (UNEP, 2013). According to SCBD (2009), in Kilosa and other districts in Morogoro region, reduced river flow and increased flooding has been attributed to deforestation in the mountains, and it has been suggested that effective management of soil, forests and water resources are needed as adaptation measures, along with improved social capacity.

## 3.4. Climate Change Adaptation Strategies in Tanzania

In response to the growing concern of the negative impacts of climate change and climate variability on the country's social, economic and physical environment, the Tanzanian government has undertaken several efforts including the Initial National Communication to the UNFCCC in 2003, Clean Development Mechanism (CDM) Guide for Investors in 2004, preparation of the National Adaptation Program of Action in 2007 and undertaking a Quick Scan on the Impacts of Climate Change in 2009 (TNCCS, 2012). The government has also adopted National Climate Change Strategy in 2012.

### 3.4.1. Climate Smart Agriculture

'Climate smart agriculture' is a term that has emerged since 2010 to describe agricultural systems designed to simultaneously improve food security and rural livelihoods and support climate change adaptation and mitigation efforts (Shames et al., 2012). The system is aimed at integrating climate change in agriculture and make agriculture adapts to climate change (CCAP PARTNERS, 2013).

In some remote villages in Kilosa and other districts in Morogoro region, people knew little of alternative farming techniques until the Food and Agriculture Organisation of the United Nations (FAO) and the local Sokoine University of Agriculture (SUA) started a project to introduce climate smart agricultural techniques in 2010 (Makoye, 11.2013). In Morogoro region, livelihood diversification has been the main strategy for living with climate variability (Paavola, 2008). According to Paavola (2008), the literature on agricultural development and sustainable livelihoods mentions four main livelihood strategies adapted by agricultural households as a response to climatic and other stresses.

- *Agricultural extensification* involves taking new units of land for low-input cultivation. Extensification can also create a portfolio of plots with different risk attributes to manage risks and help to avoid financial risks of intensive agriculture.

- *Agricultural intensification*, involves the application of more labor on a unit of land, because of population pressure and a surplus of labor, to achieve greater productivity.

- *Livelihood diversification* involves the creation of a portfolio of farming and non-farming livelihoods.

There are some NGOs which are directly involved in climate change adaptation programs in the country. For example, the Howard G. Buffett Foundation supports conservation of agricultural projects with adaptation and mitigation benefits in Tanzania (Shames et al., 2012). At district level, Kilosa district authorities have commended initiatives taken by five non-governmental organizations to improve agricultural production in the district through 'climate smart agriculture' (Kitabu, 2014). According to Kitabu (2014), a new agricultural system is being piloted in three villages of Kisongwe, Ibingu and Lunenzi in the district. See Figure 12.



**Figure 12: Training on climate smart agriculture, Lumbiji ward in Kilosa district**
*Source: Ipp media (2014)*

Moreover, CCAP PARTNERS (2013) argue that, Kilosa district has put in place the land use plan, and the district already entered into practicing modern farm system in bench or ladder step terraces especially in highlands and steep slope farms.

### 3.4.2. Biodiversity Conservation

The UN-REDD Program is the United Nations collaborative initiative on Reducing Emissions from Deforestation and Forest Degradation (REDD) in developing countries (UN-REDD, 2009). Implementing REDD activities in areas identified as having both high biodiversity value and high carbon stocks can provide co-benefits for biodiversity conservation and climate change mitigation (SCBD, 2009).



**Figure 13: REDD project and TFCG office, Kilosa**
*Source: Author (2014)*

The Tanzania Forest Conservation Group (TFCG) has also initiated a partnership project in 2009 to be implemented in Kilosa and Lindi-rural districts in Tanzania. The Lindi-rural district is in coastal Tanzania and includes parts of the Eastern African coastal forest biodiversity hotspot. Kilosa district, on the other hand, is in the Eastern Arc Mountains, part of the Eastern Afro-montane biodiversity hotspot. The project is a five-year project which was launched in September 2009. The project is financed by the Ministry of Foreign Affairs of the Government of Norway (TFCG, 2009).

### 3.4.3. Sustainable Water and Flood Management

Erratic rainfall in combination with high heat-flow and over-exploitation of ground water imparts stress on the water resources (Bhuiyan et al., 2009). In addition, the more erratic rainfall pattern, resulting in increased flood events; the lack of proper recharge later decreases stream flows.

Proper water harvesting and conservation during the rainy season, therefore, could enhance the increment of water supply and reduction of vulnerability (Kumar et al., 2014). Otherwise, a decrease in river discharge together with population growth and poverty will expose more people who are mostly agrarian to water scarcity (Webersik, 2010).

In Kilosa district, the government has initiated some projects like Ilonga community-based river source management to maintain the regular flow of the river. Moreover, there are 67 water committees in the district to manage efficient use of water supply (Ngana et al., 2010). However, (Ngana et al., 2010), there are also ethnically based water use conflicts between farmers and pastoralists living in the same area.

Flooding has been also one of the climate change-related challenges in Kilosa district. There are several flood coping strategies that people in Kilosa district use to mitigate the impacts of the floods. One of them is planting of water reed (Matete) along the Mkondoa River basin (UNICEF, 2013). According to UNICEF (2013), another coping strategy that is used by the people in Kilosa has been to evacuate during floods to higher ground particularly Uzunguni area. Moreover, training has been also provided to the communities about how to respond during flood periods.

### 3.4.4. Migration as Climate Change Adaptation Strategy

Climate change will fundamentally affect the lives of millions of people who will be forced over the next decades to leave their villages to seek refuge in other areas (Scheffran et al., 2012). In the developing world, migration is one of a variety of survival strategies pursued by families either simultaneously or consecutively with other coping strategies (Hastrup and Olwig, 2012). Some scholars argue that the migration could enable an agricultural household to transform its opportunity set and associated risks.

## 3.5. Migration and/or Human Mobility

Migration refers to the act of moving from one place to another (Hastrup and Olwig, 2012). According to Hastrup and Olwig (2012), migration is not viewed as an exceptional event that can be explained with reference to single causal factors, but rather as a possible course of action that can be evoked under varying circumstances. Mobility, on the other hand refers to all forms of

territorial movement by people at different spatial and temporal scales (Tankou, 2014). Tankou (2014) argues that mobility has two type, either short term mobility between different dwelling sites or long term mobility between different areas (Kelly, 1992). According to Webersik (2010) people in the past periods had the possibility to move to less densely populated regions but nowadays, population densities have dramatically increased and arable land has become more limited. This has further challenged the free mobility of agrarian communities in certain parts of the developing world.

The figures released by the Geneva-based Internal Displacement Monitoring Centre (IDMC) show that there were 28.8 million Internally Displaced Peoples (IDPs) around the world in 2012 as a result of conflict, persecution and natural disasters (UNHCR, 2014). According to UNHCR (2014) the region with the largest total number of IDPs in 2012 was Sub-Saharan Africa, which was hosting 10.4 million, an increase of 7.5 percent compared with the year 2011.

Migration in Tanzania is not a new phenomenon as the history of rural-rural and rural-urban migration dates from precolonial and colonial periods (Wejnert, 2011). However, the migration pattern in the country nowadays has been getting more complex. In addition, to the cultural labor movements in search of the better life, migration due to environmental factors has been widely observed in the country. Webersik (2010), argues that compared to the common categories of economically or politically motivated migration, environmental migrants are a new phenomenon in certain parts of the world. On the other hand, the effects of climate change on migration depends crucially on the socioeconomic situation of the people concerned (Black et al., 2011). Distinctions should be made, however, between local and long distance migration, as well as between temporary and permanent migration (Paavola, 2008).

### 3.5.1. Permanent Migration

Permanent migration and temporary movements form part of the same continuum of population mobility in time and space (Bell and Ward, 2000). In practice however, the literature on these two forms of movement have developed almost entirely in isolation. See table 3.

Permanent migration generally represents a response to events in the life course, such as marriage, family formation and dissolution, changes in employment (Bell and Ward, 2000).

Displacement and relocation programs by governments could also force people to leave their community permanently.

In Tanzania, the wildlife conservation and villagization programs have forced the Maasai pastoralists to move permanently from their area of origin. Nowadays, much of the traditional Maasai land is subject to conflicting land uses, such as tourism (Brown et al., 2009). According to Brown et al. (2009) the displacement has caused conflicts in Kilosa district, and six people were killed between January and August, 2009. Moreover, about 50 pastoralist families, who considered as they have entered the district illegally at that time, were forced to move out of the district without any proper assistance and given no alternative land possibilities. Although, people in Tanzania have the right to move from place to place, moving with livestock needs permission in certain areas. Daily-News, Tanzanian online news portal, has published on 03.09.2012 that Kilosa District Executive Director (DED), Mr. Lameck Masembejo, has called upon ward councilors in the district to make sure that no livestock enter their respective wards without permission, to stop conflicts between pastoralists and farmers (Juma, 2012).

### 3.5.2. Temporary/Seasonal Mobility

Compared with permanent migration, temporary mobility has a number of distinctive features (Bell and Ward, 2000). According to (Bell and Ward, 2000), temporary mobility is perhaps most readily defined as the complement of permanent migration: that is, as any form of territorial movement which does not represent a permanent, or lasting, change of usual residence. In Kilosa district, the Maasai community used to have practiced a seasonal mobility of livestock, which was made possible due to the abundance of land and low population (Mung'ong'o and Mwamfupe, 2003). According to Mung'ong'o and Mwamfupe (2003), this type of migration has been in tune with the ecological realities of dry land areas where rainfall and grazing are subject to high risk and seasonal variability. Moreover, such traditional drought coping strategy has been allowing the vegetation to be renewed every year, and it has had a positive effect on the environment.

The current movement by the Maasai community however, has an adverse effect on the environment and it is of complex because the migrants often originate from very different socio-

ecological zones and have to adapt to new land management system (Mung'ong'o and Mwamfupe, 2003).

| | Type of movement | |
|---|---|---|
| | **Permanent migration** | **Temporary mobility** |
| **Definition** | Permanent change of usual residence | Non-permanent move of varying duration |
| **Key concepts** | | |
| • **Usual residence** | Integral concept | Less centrality |
| • **Return** | No intention to return | May involve a return 'home' |
| **Key dimensions** | | |
| • **Duration** | Lasting relocation | Varying duration of stay |
| • **Frequency** | Single transition | Generally a repetitive event |
| • **Seasonality** | Minor seasonal variation | Large seasonal variation |

**Table 3: Comparing permanent migration with temporary mobility**
*Source: (Bell and Ward, 2000)*

## 3.6. Migration and Conflict

### 3.6.1. Climate Induced Migration

Global climate change conditions are expected to prompt human migration, adding another layer of complexity in our planet. This is due to migration and mobility that could be affected by both extreme weather events and slow-onset drought, land degradation and desertification (Tacoli, 2011).

Climate change and its impacts will affect a growing number of people, and migration hotspots around Africa are likely to increase (Brown and Crawford, 2009). Climate change will cause population movements by making certain parts of the world much less viable places to live: by causing food and water supplies to become more unreliable; undermining livelihoods; through flooding that reduces available land; and by increasing the frequency and destructive power of storms (Brown, 2008b). This in turn may force large numbers of people to leave their homes and communities (Brown and Crawford, 2009).

According to IOM and UNDESA (2012), the relation between environmental or climate change, migration and development is receiving increasing attention from policymakers. Moreover, as our warming world changes, increasingly marginal environments will force growing numbers of nomadic, semi-nomadic transhumant, and fixed pastoral people to abandon the old paths for an uncertain future (Hastrup and Olwig, 2012). The trend in net migration over time reflects the tumultuous history of the continent, particularly that of Sub-Saharan Africa, where migration rates have fluctuated widely in the last three decades and a half for most countries. Understandably countries that experienced large-scale conflict and war contributed to the periodic instability in the net movement of people from Africa (Shimeles, 2010).

### 3.6.2. Migrations, Due to Non-Climate Related Factors, and Conflict

Migration and human mobility can also exist due to other factors rather than environmental threats. People displaced when activities like plantation agriculture, large dams, and wildlife Conservation limit people's access to important resources through resettlement or migration (Mung'ong'o and Mwamfupe, 2003). The poor are especially displaced by the rich and powerful who take the poor people's land by legal or extra-legal means.

On the other hand, prospects for a better life certainly is one of the most important factors behind people's decision to migrate, but it is not sufficient (Shimeles, 2010). The tracking of individuals to new locations proves crucially important for assessing welfare changes among the baseline sample. A research study made in Kagera, one of the regions in Tanzania shows that the average consumption change of individuals who migrated was more than four times greater than that of individuals who did not move. Those who had moved out of Kagera by 2004 experienced consumption growth that was 10 times greater compared with those who remained in their original community (Beegle et al., 2011). However, Brown and Crawford (2009), argue that past experience has revealed usually that migration can increase the likelihood of conflict in transit and target regions (WBGU, 2007) as cited in (Brown and Crawford, 2009).

### 3.6.3. Conflict and Conflict Resolution Techniques

According to Foundation Coalition (Foundation Coalition, n.d.) conflict may be defined as a struggle or contest between people with opposing needs, ideas, beliefs, values, or goals. On the other hand, people have different uses for resources such as forests, water, pastures and land, and

want to manage them in different ways (Engel and Korf, 2005). Engel and Korf (2005) argue that such differences can lead to a conflict when;

- There is competition over material goods, economic benefits, property or power
- The parties believe that their needs cannot be met, and
- Parties perceive that their values; needs or interests are under threat.

It was broadly stated that a properly managed conflict resolution technique should be implemented in order to solve conflicts raised on commonly used natural resources. Conflict management entails clarifying the options from all perspectives, searching for mutually acceptable options or negotiating compromises, monitoring the outcomes and enforcing compliance (Campbell and Sayer, 2003). According to Engel and Korf (2005), the basic premise of negotiation and mediation techniques for natural resource management is the acknowledgment of the immense diversity of social/cultural characteristics and interests among people. Governments and concerned organs usually develop and implement conflict resolution techniques to solve conflict problems. However, policies, programs and projects themselves can serve as sources or arenas of conflict, even though their intention is to reduce conflicts or improve livelihoods (Engel and Korf, 2005). A study conducted in Burkina Faso revealed that efforts to restructure landholding have had unintended consequences as individuals and groups manipulate meanings and representations about rights to land and land management strategies in order to lay claim to land (Gray, 2002).

In Kilosa and other districts where a recurrent conflict occurs, the government of Tanzania intervened by evicting all pastoralists from cultivators' villages to settlements designated for pastoralists alongside with the establishment of village conflict resolution committees. Unfortunately, the areas designated for pastoralism experienced periodic water shortages, especially during the dry season. In such a condition, experience show that pastoralists tend to move livestock to farming designated areas for water and pasture, an approach that provoke the crop farmers (Monela and Abdallah, 2007).

## 3.7. Theoretical Framework

In this section, some of the theoretical findings in relation to the study will be discussed. First, it is theorized that climate change occurs due to both natural and manmade factors. According to USNRC (2012), human activities, especially the burning of fossil fuels (coal, oil, and gas), are responsible for most of the climate change currently being observed. In addition, deforestation is the second largest anthropogenic source of carbon dioxide to the atmosphere, after fossil fuel combustion (Van der Werf et al., 2009).

Second, it is theorized that Africa is one of the most vulnerable continents to climate change and climate variability (IPCC, 2007). According to McCarthy et al. (2001), the effects of climate change in Africa are expected to be highest in terms of loss of life and relative effects on investment and the economy. Agriculture, which provides a livelihood for about three-quarters of Africa's population, is mainly rain fed. Climate change factors are reducing agricultural yields and causing crop failure and loss of livestock (Tadesse, 2010). A growing body of literature generated since the fourth assessment report of IPCC (AR4) suggests that climate change in Africa will have an overall modest effect on future water scarcity relative to other drivers (Niang and Ruppel, 2014). Deforestation, on the other hand not only increases the amount of CO2 in the atmosphere but also disrupts the local ecosystem. In the Morogoro region of Tanzania, for example, there is a reduction of river flow and an increase in flooding due to deforestation in the mountains (SCBD, 2009).

Third, it is described that there are different, climate change adaptation and mitigation strategies like biodiversity conservation, sustainable water management, climate smart agriculture and migration. The Tanzanian government has adopted a National Climate Change Strategy to adapt to climate change impacts and to enhance the resilience of ecosystems and public awareness on climate change. The UN-REDD program and the Tanzania Forest Conservation Group have launched a project to reduce deforestation and forest degradation. Addressing forest degradation is important because degradation leads to loss of carbon and biodiversity, decreases forest resilience to fire and drought, and can lead to deforestation (SCBD, 2009).

Fourth, it is theorized that migration is one of the climate change adaptation strategy. However, human beings can also migrate due to other factors that have no relation with climate change.

According to Hastrup and Olwig (2012), migration is not viewed as an exceptional event that can be explained with reference to single causal factors, but rather as a possible course of action that can be evoked under varying circumstances. People sometimes migrate from one place to another searching for a better life. However, research studies have usually revealed that migration can increase the likelihood of conflict in transit and target regions (WBGU, 2007); Brown and Crawford (2009).

This study is therefore, conducted to identify the main climate change challenges in Kilosa district, Tanzania and to understand the perception better among the local people about climate change, migration and conflict. The study will also discuss how migration is related to environmental change in the district and how migration could cause conflict among pastoralist and farmers in the district. The households' perceptions concerning conflict resolution technics and climate change adaptation strategies followed by local government and NGOs, has been also discussed in the study. This research also investigates the responses taken by the local government and by local and international NGOs to address climate related impacts and to enhance sustainable rural development in the region.

A similar study was conducted by Njiru (2012) in Kenya concerning climate change induced migration and conflict. According to Njiru, as cited in Scheffran et al. (2012), environmental migration of communities between countries such as Kenya and Ethiopia could strain already fragile relations between governments. The study also shows that increasing global temperatures are having adverse socioeconomic effects on pastoral communities in Kenya, and there is a dispute in the area over precious resources caused by climate change.

On the other hand, a study conducted in East Africa revealed that the relationships between climate variability and conflict are complex and the effects of climate factors are mediated by location and time period (O'Loughlin et al., 2012).
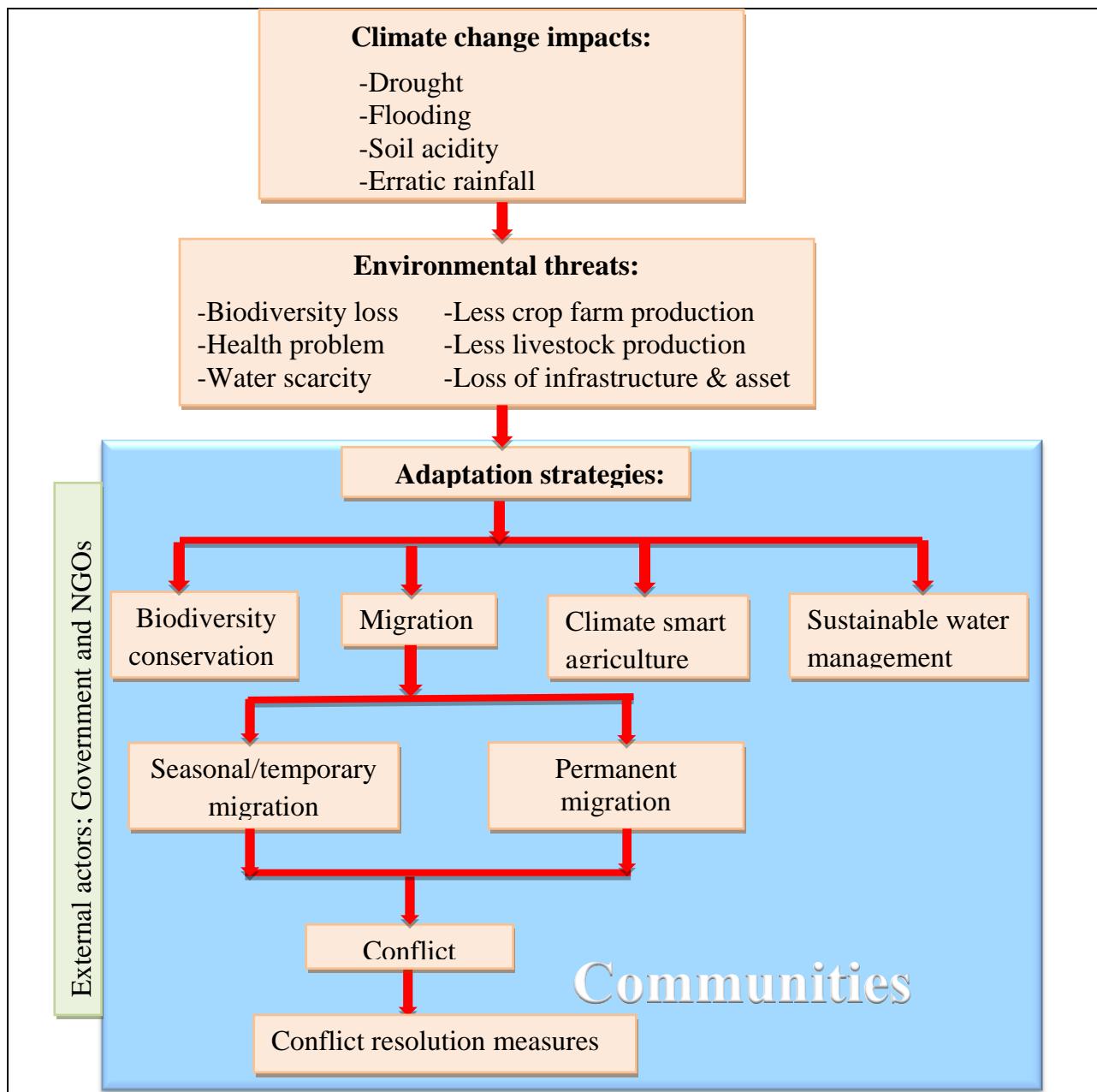
**Figure 14: Theoretical application**

*Source: Author*

Figure 14 is a flow chart that illustrates the theoretical framework adopted from the reviewed literature. It also gives a visual impression of how the study has been organized.

# Chapter Four

*Chapter four has six sections. The first three sections discuss how the research approach is designed and how the respondents are selected. The fourth section focuses on data analysis. Issues concerning ethical evaluation and consideration are mentioned in the fifth section. The last section discusses the challenges faced during the entire research period and other limitations of the study.*

## 4. Methodology

Methodology is a systematic way to solve a problem, or it is a science of studying how research is to be carried out (Rajasekar et al., 2013). This study employs both quantitative and qualitative approaches. According to Bryman (2012), quantitative data involve the collection of numerical data to show the relationship between theory and research as deductive and a predilection for a natural science approach and having an objectivist conception of social reality. On the other hand, qualitative data tends to be concerned with words rather than numbers (Bryman, 2012). Moreover, qualitative research frequently entails the reconstruction of events by asking interviewees to think back over how a certain series of events unfolded in relation to the current situation (Bryman, 2012). The employment of mixed method was, therefore, considered to produce valuable data concerning the impacts of climate change and climate change induced migration and conflict.

The study has employed mixed method by setting different variables at the household level, and it has also designed to investigate the perception of the community about climate change and human mobility in the district. Mixed model research will also help the researcher to conduct a survey and use a questionnaire that is composed of multiple closed-ended or quantitative type questions on one hand and several open-ended or qualitative type questions on the other hand (Mishra, 2005).

## 4.1. Research Design

The research is conducted using a case study research design method at the household level. The rationale for choosing a case study approach is that it allows the researcher to allocate all the

time and resources on a specific study. Case study implies also that the study will be more detailed and it entails an intensive analysis of a single case, such as a single community and it is concerned with a particular nature of the case in question (Bryman, 2012). Moreover, a case study method was chosen as it is more appropriate for both the quantitative and qualitative research methods. According to Bryman (2012), case studies are sites for the employment of both quantitative and qualitative research.

## 4.2.    Sampling Techniques

### 4.2.1.   Sampling Methods



**Figure 15: Morogoro-Kilosa road, during the rainy season**
*Source: Author, 2014*

Kilosa district is one of the districts in Morogoro region with poor road infrastructure. Most of the villages in the district are hard to access during the rainy season as shown in figure 15. Besides, detailed information about the district's climatic condition was limited.   This was one of the challenges the researcher has faced while mapping the sample size in the proposal.

The researcher was able to settle on the best sampling method, and he was able to map the sampling area after he had a brief discussion with his co-supervisor on his arrival in Dar Es Salaam.

This study has employed purposive and convenience sampling methods to identify study sites in the district. The idea of employing convenience sampling was initiated due to the problem faced by the researcher to access some of the villages in the district, i.e., most of the villages in Kilosa district have poor road connections and some of the villages are not accessible during the rainy season. See Figure 16.

On the other hand, the main criteria to select study sites was a secondary data from district office that shows villages with a high record of environmental challenges such as flooding, drought, soil acidity and erratic rainfall. Besides, villages with a high record of human mobility and rate of conflict incidence were also considered when compiling a sample of the study site. Once the study sites were identified, stratified random sampling and purposive sampling were applied for quantitative data and qualitative data respectively. Bryman (2012) argues that stratified random sampling will help the researcher to exhibit a proportional representation of the entire population in the study site. On the other hand, one of the advantages of stratified random sampling is that it ensures the resulting sample will be distributed in the same way as the population in terms of the stratifying criterion (Bryman, 2012).

For the purposive sampling, the researcher has selected the sampling units with direct reference to the research questions being asked (Bryman, 2012). Different household members, ward executive officers, specialized government employees and NGO representatives at the district level have been included in the sample.
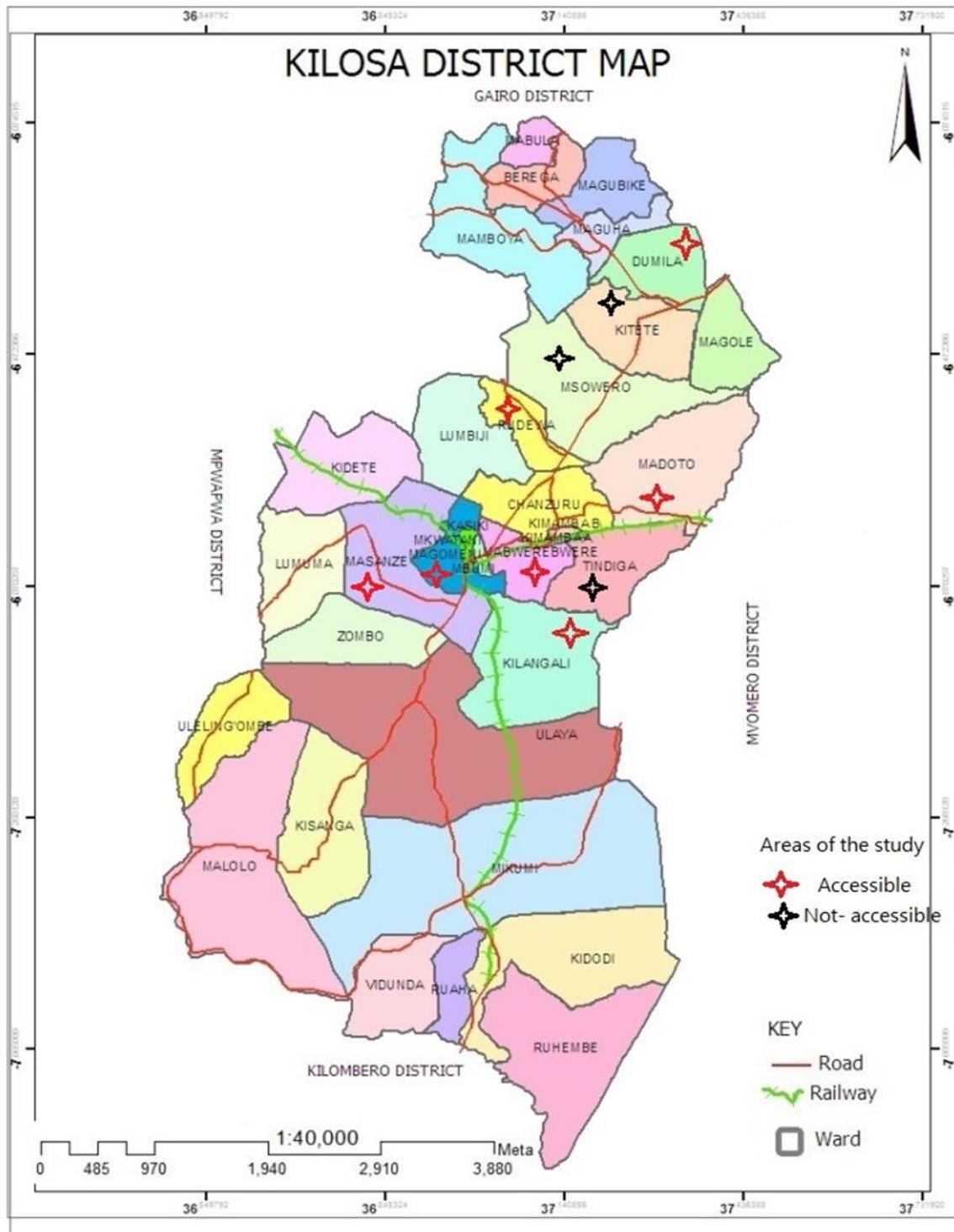
**Figure 16: Kilosa district map and study sites**

*Source: Kilosa district statistics office (2014), the study sites, were marked by the author*

### 4.2.2. Sample Size

The sample size of the study considers 160 households in Kilosa district and 24 government and NGO employees. Two interview guides were made, one for the households and a second for government and NGO employees in the district.

For the first interview guide, there has been a plan to include nine villages and one urban center in the study. But due to lack of transportation access, two of the villages were not covered under the study. See Figure 16. 16 semi-structured interviews each in seven villages and one urban center were held. The respondents from each selected village include a proportion number of farmers and pastoralists.

Under the second interview guide, 10 specialized government employees and 6 NGO representatives and eight ward executive officers were interviewed. Moreover, three focus group discussions were conducted; two at a rural site and one in Kilosa town in order to get more information about the case under investigation. The sample size and the complete list of the respondents are summarized in the two tables below.

| Conflict prone ward | No. of villages in the ward | Villages selected by PS[2] and CS | No. of total population in the village | No. of respondents selected by SRS[3] | Sampled proportion % |
|---|---|---|---|---|---|
| Madoto | 3 | 1 (Mbwade) | 1,337 | 16 | 1.20 |
| Rudewa | 6 | 1 (Rudewa Mbuyuni) | 3,627 | 16 | 0.44 |
| Dumila | 3 | 1 (Dumila) | 18,357 | 16 | 0.09 |
| Msowero | 5 | 1 (Msowelo) | 10,749 | 16 | 0.15 |
| Kitete | 5 | 1 (Mfulu) | 2,761 | 16 | 0.58 |
| Kilangali | 4 | 1 (Kivungu) | 4,457 | 16 | 0.36 |
| Masanze | 4 | 1 (Changarawe) | 3,229 | 16 | 0.50 |
| Mabwerebwere | 4 | 1 (Kondoa) | 1,564 | 16 | 1.02 |
| Chanzuru | 4 | 1 (Chanzulu) | 3,617 | 16 | 0.44 |
| Kilosa town/Magomeni | 8 | 1 (Mbwamaji) | 3,852 | 16 | 0.42 |
| **Total** | **46** | **10** | **53,550** | **160** | **0.30** |

**Table 4: List of the respondents (Households)**

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[2] PS (Purposive Sampling) and CS (Convenience Sampling)
[3] SRS (Stratified Random Sampling)

| S/N | Organization | No of respondents | Position |
|---|---|---|---|
| 1 | District Community Development Office | 1 | Development Officer |
| 2 | Ward Offices | 8 | Ward, executive officers (WEO) |
| 3 | TFCG (Tanzania Forest Conservation Group) | 1 | Officer |
| 4 | District Natural Resource Office | 1 | Expert |
| 5 | District Statistics Office | 1 | Department head |
| 6 | Water Resource Management Department | 1 | Expert |
| 7 | District Land Management Department | 1 | Department head |
| 8 | REDD (Reducing Emissions from Deforestation and forest Degradation) | 3 | Experts |
| 9 | Ilonga Agricultural Research Institute | 1 | Executive director |
| 10 | UNGOKI (Union of Non-Governmental Organization Kilosa) | 1 | Head administrator |
| 11 | District Agriculture & Livestock Office | 3 | District representative Crop farm extension officer Livestock expert |
| 12 | HUDESA (Human Development Strategies Association) | 1 | Head Executive Officer |
| 13 | District Forestry Department | 1 | Forest officer |
| Total Respondents | | 24 | |

Table 5: List of the respondents (Government & NGOs)

## 4.3. Data Collection Methods

The data gathering process was held over a period of one month. Kumar (2011) argues that before the researcher start obtaining the information from potential respondents it is imperative that he/she makes sure of the respondents';

- Motivation to share the required information
- Clear understanding of the questions
- Possession of the required information

The researcher has tried to motivate the respondents by inviting beverages and has made some pre-data collection studies in order to meet the above-mentioned objectives. The interviews were carried out at district offices, at the ward administrative office and at some marketplaces where pastoralists were located. An interpreter was involved in the interviews held in the ward

administrative office and at marketplaces. The researcher traveled to remote places where the pastoralists could easily contact. See Figure 17. Arranging interviews with organizations and persons working in agriculture, livestock, land use management and conflict resolution was more difficult. However, the interview process improved after a researcher's co-supervisor had made a contact with the responsible official at the district level.



**Figure 17: Kivungu village, Kilosa**
                    *Source: Author, 2014*

For this study, both primary and secondary data sources were used. The primary data sources were structured and semi-structured interviews, focus group discussion and participant observation provided most of the information about the impact of climate change at the household level and the relationship between climate change, migration and conflict. Secondary data sources have also been gathered in order to fill any information gap that might not be obtained from primary sources.

### 4.3.1. Semi-Structured Interviews

Prior to the formal interview session, a pilot test was carried out in Kilosa town to identify the time needed for one interview and to make sure all questions in the interview guide were understandable. The pilot test has indicated that it was necessary to modify some questions and to include additional questions in the interview guide.

A semi-structured interview technique was chosen because it could be applicable for both quantitative and qualitative parts of the research. According to Bryman (2012), semi-structured interviews refer to a type of interview where the interviewer usually has some freedom to ask further questions in response to what are seen as significant replies (Bryman, 2012). Bryman also argues that when a researcher is beginning the investigation with a fairly clear focus, rather than a very general notion of wanting to do research on the topic, it is likely that the interviews will be semi-structured ones, so that the more specific issues can be addressed.

### 4.3.2. Focus Groups Discussions

The use of focus group discussions was not planned in the research proposal. However, after arriving in the study area, it became apparent that this method would be suitable for examining the interaction between different employees from different government sectors, and between community members at the ward administrative level about climate change, migration and conflict.

Focus groups typically emphasize a specific theme or topic that is explored in depth (Bryman, 2012). The employment of focus group discussions has helped the participants to share their thoughts easily about the topic under investigation. There was an agreement between the researcher and the participants that if any disagreements observed, the focus group itself could solve the issue.

However, almost all the participants in the group discussions had similar ideas and experiences about climate change, migration and conflict issues. One of the challenges the researcher faced during the group discussion at the ward level was that the interpreter could not able to translate all parts of the discussion and there was a break between discussions so as to give enough time for the interpreter.

**1<sup>st</sup> Focus group discussion – District officials**

The first Focus Group Discussion (FGD) was held at the district office. Representatives from crop farming, livestock, community development, water resource management, the land department, and forestry were involved. Moreover, one representative from each Human Development Strategies Association (HUDESA) & Union of Non-Government Organizations in Kilosa (UNGOKI), two representatives from the REDD project office were also involved in the FGD.



**Figure 18: Kilosa district office**
*Source: Author, 2014*

**2<sup>nd</sup> Focus group discussion – Masanze Ward level officials & Community representatives**

The second FGD took place in the Changarawe village with a presence of two ward executive officers, agricultural extension worker, community development officer and village executive officers. Representatives from the farm and the pastoralist communities in two wards namely Kilangali, and Masanze were also involved in this FGD.

**Figure 19: Changarawe village, Masanze ward, Kilosa**
        *Source: Author, 2014*

Hence, the participants invited by the authority, were from various sectors. The purpose of this FGD was to listen to the voice of local residents, which is an important information channel. The participants were asked about the perceived causes of climate change in the district, the challenges they have been facing, seasonal rainfall, number of pastoralists immigrating and reason of migration, conflict, conflict resolution measures/techniques and long-lasting solutions.

**3rd Focus group discussion – Kimamba Ward level officials & Community representatives**



The third FGD took place in Kimamba-B ward with a presence of ward executive officers, agricultural extension worker, community development officer, and village executive officers. Two farmers and two pastoralists from two wards namely Madoto and Kimamba were also involved in this FGD.

**Figure 20: Kimamba - B ward office, Kilosa**
        *Source: Author, 2014*

The participants invited by the authority were from various sectors. This FGD had the same purpose, and the same questions as in the first and second FGDs. In the FGDs which were held at

ward level (the second and third FGD), there was a challenge that few members dominated the discussion. Besides, members from pastoralists were less confident to speak because they thought any criticism may reach the government and they might not get any public services that they are seeking for.

### 4.3.3. Observations

Moving around the villages which were identified by district administrative officials as conflict-prone areas and observing the environmental and social conditions has provided the researcher with valuable information and experience. According to Bryman (2012) the participant observer would seem to be better placed for gaining a foothold on social reality. Because, as Sarsby (1984: 96) argues, cited in Bryman (2012), every field situation is different and initial luck in meeting good informants, being in the right place at the right time and striking the right note in relationships may be just as important as skill in technique.



**Figure 21: Land use conflict in Magomeni ward, Kilosa**
*Source: Author, 2014*

The researcher, for example, came across a conflict spot in Magomeni ward while traveling to Masanze ward. See Figure 21. He observed people trying to solve land use conflicts through

arbitration. Participant observation can be therefore very intrusive in people's lives in that the observer is likely to take up a lot more of their time than in an interview (Bryman, 2012).

### 4.3.4. Review of Documents

Secondary data that are of very relevance to the study have been gathered to obtain a basic understanding about climate change, migration and conflict in Kilosa district. For this study, documents were collected from both the governmental and non-governmental sectors. As Bryman (2012) argues, documents reveal something about an underlying social reality, so that the documents that an organization generates (minutes of meeting, newsletters, mission statements, job definition and the like) are viewed as representations of the reality of that organization. Moreover, secondary sources describe past phenomena based on primary sources. The data obtained from secondary sources has been used by organizing and linking it to the primary sources. Working exclusively with secondary sources is not advisable as the researcher may merely repeat the mistakes contained in those sources and fail to provide a new, independent perspective on past events (Rubin and Babbie, 2010).

## 4.4. Data Analysis

The data analysis stage is fundamentally about data reduction – that is, it is concerned with reducing the large corpus of information that the researcher has gathered so that he or she can make sense of it (Bryman, 2012). The study has an aim to find out the relationship between climate change, migration and conflict in Kilosa district. Hence, bivariate analysis has been employed to examine either the migration problem in the district was linked to climate or not. Bivariate analysis has also employed to find out the correlation between migration and conflict in the district. According to (Bryman, 2012), this type of data analysis is concerned with the analysis of two variables at a time in order to uncover whether or not the two variables in quantitative data are related.  Bryman (2012), also argues that exploring relationships between variables means searching for evidence that the variation coincides with variation in another variable.

For the bivariate analysis part some parts of the data from the first semi-structured interviews, which have conducted at the household level, were analyzed in SPSS. Although most topics in

the interviews were developed prior to the field work, some change in pattern and categories of data has emerged during the data collection period. According to the information gathered through the first semi-structured interviews, only four impacts were identified by the respondents as the main environmental challenges. Hence, based on the information from data collection, the study has found it is necessary to create dummy variables to evaluate the extent to which each and every identified environmental challenge has a relationship to migration problems in Kilosa district.

According to Jaggia and Kelly (2012), a 'dummy variable' is defined as a variable that takes on values of 0 or 1. It is commonly used to describe a qualitative variable with two categories. The dummy variables created here will show when and why the farmers and pastoralists in the district prefer migration as climate change adaptation measure for the main environmental challenges they have mentioned. Accordingly, there are four independent variables, drought, flooding, soil acidity and erratic rainfall.

**Dependent variable**:

Category 01: Temporarily migrated
Category 02: Permanently migrated
Category 03: Not migrated

**Independent variables:**

$D_D$ = 1 (Those who have chosen drought as the main environmental challenge)
 0 (Those who have not chosen drought as the main environmental challenge)

$D_F$ = 1 (Those who have chosen flooding as the main environmental challenge)
 0 (Those who have not chosen flooding as the main environmental challenge)

$D_S$ = 1 (Those who have chosen soil acidity as the main environmental challenge)
 0 (Those who have not chosen soil acidity as the main environmental challenge)

$D_E$ = 1 (Those who have chosen erratic rainfall as the main environmental challenge)
 0 (Those who have not chosen erratic rainfall as the main environmental challenge)

Moreover, a thematic analysis has been also employed for this study. Thematic analysis is one of the most common approaches to qualitative data analysis and the search for themes is an activity that can be discerned in many if not most approaches to qualitative data analysis (Bryman, 2012). According to Braun and Clarke (2006) as cited in Cutriz and Curtis (2011), a thematic analysis does not require detailed theoretical knowledge of approaches such as grounded theory and discourse analysis. Rather, it can be used with different theoretical frameworks so may be more suited to beginning researchers.

The use of thematic analysis involves three distinct stages: Stage I, deciding on sampling and design issues; stage II, developing themes and a code; and stage III; validating and using the code (Boyatzis, 1998). Accordingly, the study has applied the above-mentioned stages in the analysis part where thematic analysis has been used.

Moreover, prior to the data analysis stage, data cleaning process was made to make sure that the collected data is valid and reliable to provide meaningful results. Verma (2013) argues that the first step in data analysis is to improve data quality. Therefore, it is very important to organize the data on paper first before preparing the data file for analysis. In addition, the need for data cleaning is centered around improving the quality of data to make them 'fit for use' by users through reducing errors in the data and improving their documentation and presentation (Chapman, 2005). It was obtained, for example, different information about a place called 'Gairo.' A secondary data from the Tanzanian National Bureau of Statistics shows that 'Gairo' is an independent district in Morogoro region since March 2012, while a secondary data obtained from the Kilosa district agriculture office shows as 'Gairo' is one of the divisions in Kilosa district.

## 4.5. Ethical Evaluation and Considerations

As with any research, it is important to ensure that those providing the information are doing so voluntarily and knowingly. According to Rubin and Babbie (2010), a major tenet of research ethics is that participation must be voluntary. No one should be forced to participate. All participants must be aware that they are participating in the study, be informed of all the consequences of the study, and consent to participate in it. Hence, all interviews were conducted

anonymously, and this was made clear to the interviewees. In addition, the researcher has made clear the nature of the study and his neutrality from the start.

The researcher has considered that the universal ethical precepts should never be broken (Bryman, 2012). According to Kirby et al. (2006), ethical procedures are generally understood as protections for participants, but they are also protections for researchers and others involved in the research. Ethical principles revolve especially around four main areas (Bryman, 2012);

- Whether there is harm to participants

- Whether there is a lack of informed consent

- Whether there is an invasion of privacy

- Whether deception is involved

The researcher has ensured that the focus group discussions, the participant observation and the interview techniques have been held in a way that could not harm the participant. Besides, confidentiality of the respondents has also been respected. Moreover, the researcher had made contact with the responsible organs in order to get the required research permission prior to the research process.

## 4.6.  Limitations and Challenges

The main challenge under this study happened during the research permit and visa application periods. During the research proposal stage, the researcher had planned to do the field work from the beginning of January to the end of February 2014 and to submit the final thesis seminar in June 2014.  However, the delay of the Embassy of Tanzania to issue the necessary visa forced the researcher to change the fieldwork schedule. This has caused a further postponement of the submission day.

The data collection was conducted from the end of March 2014 through the beginning of May 2014, i.e., during the main rainy season in the district. Throughout the rainy season, some of the villages which were identified as the target sample area were not accessible because of poor road infrastructure. All the villages in Tindiga ward, for example, were not accessible. See Figure 16. Moreover, some wards like Msowero and Kitete located along the main road between Morogoro

and Kilosa town, with identified villages of the case study; Msowelo and Mfulu respectively, were found far apart from the main road system, and hence difficult to access.

On the other hand, some villages in the Kilangali ward were only accessible by 4WD vehicle during the rainy season. And following the researcher's co-supervisor's sincere discussion with the district officials, a 4WD vehicle was obtained from the district agriculture office to collect the required data from the identified village. Some other villages covered in the study were accessible only by motor bicycles and the muddy and slippery road forced the researcher to spend time on travelling. Moreover, most of the pastoralists are living away from village administration centers. Hence, the researcher travelled to market centers and other places where pastoralists are residing. This condition has also forced the researcher to reduce the planned time for the interview session.

Moreover, the language barrier was another major challenge. It was not possible to interview either the farmers or the pastoralists without an interpreter. Moreover, some pastoralists could not understand Kiswahili and some of them also consider a Kiswahili speaker as a member of government and they were afraid that the interpreter may inform the government body about any criticism against the government. It was difficult to find an interpreter from the Maasai speaking pastoralists who could speak English. Hence, there is an assumption that some information may be missing in the interpretation process.

In addition, local government officials and administrators have been usually busy and the researcher had to wait a long time to interview them. In a nutshell, time and budget constraints have also affected the in-depth study of the research.

# Chapter Five

*In this chapter, the empirical findings in relation to the research objective are presented. In the first part, the information obtained from the households (pastoralist and farmers) is covered. The second part will present the information obtained from the government and non-government organization employees. And, the last part focuses on the information collected via focus group discussions and observations.*

## 5. Findings

### 5.1. Findings from the Farmers and the Pastoralists

The findings presented here have been collected from seven villages and one urban administration in Kilosa district, namely Mbwade, Rudewa-Mbuyuni, Dumila, Kivungu, Changarawe, Kondoa, Chanzulu and Mbwamaji (Kilosa town). In the above mentioned eight sample study areas, 24 female and 81 male respondents were interviewed. The interviews have been based on a semi-structured interview guide including 35 questions, see appendix 1.
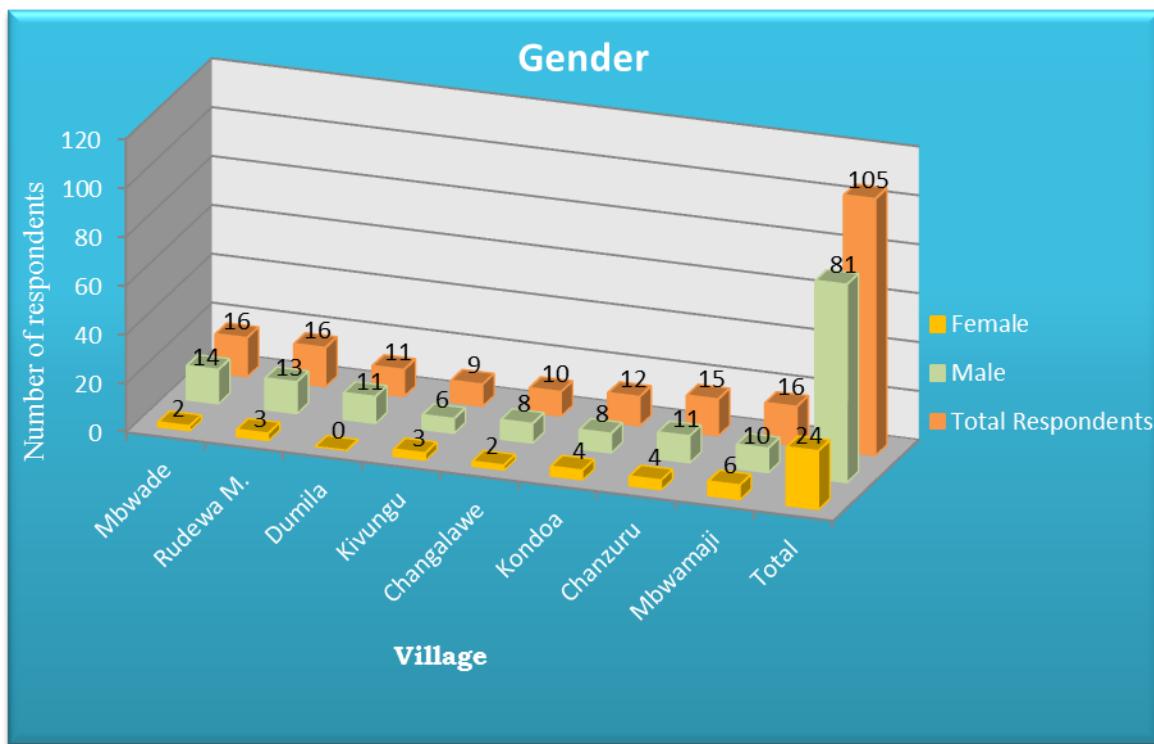


**Figure 22: Gender composition of the respondents**

As it is stated in figure 22, only 24 (22.9 %) of the respondents are female. This is due to, most of the pastoralists interviewed at the village administration centers and market areas were male pastoralists. In addition, the researcher has preferred to balance the respondents between farmers and pastoralists rather that male and female. This is due to the following two reasons: First, pastoralists and farmers have a different point of views concerning environmental challenges and second, the conflicts in the district have been between these two communities. Hence, almost half of the respondents covered under the study are pastoralist, most of them were migrants to the district due to certain factors in their community of origin. See Figure 23.
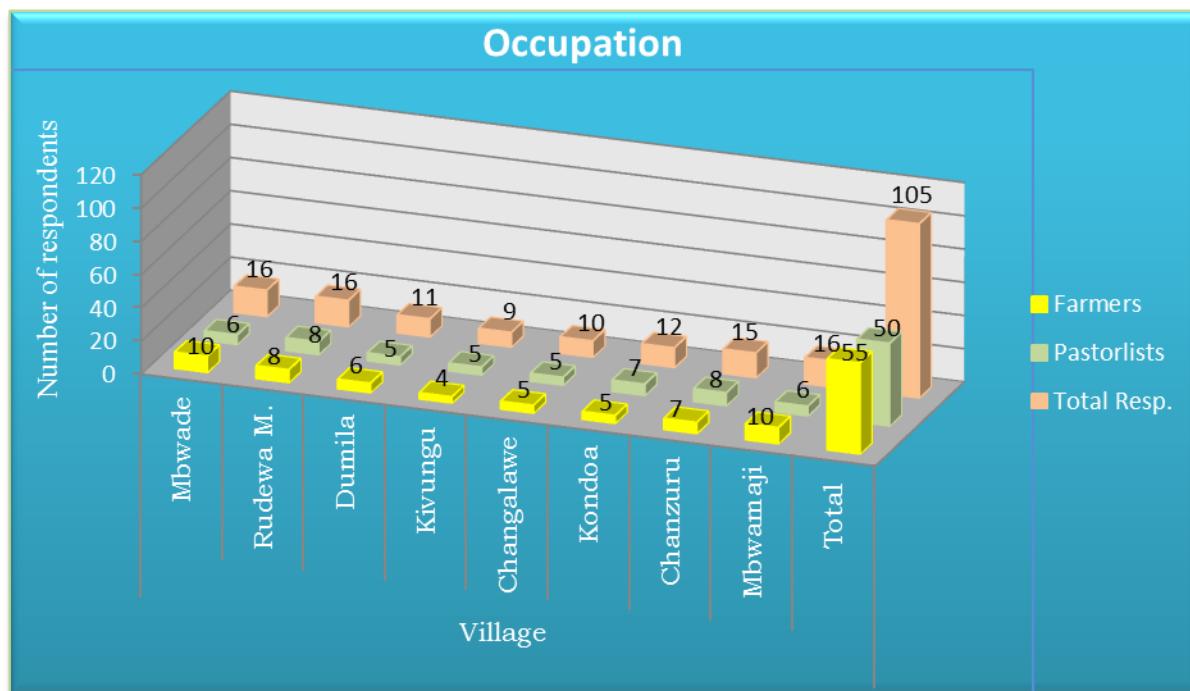


**Figure 23: Occupation of the respondents**

Although it is considered as one of the main conflict-prone areas in the district, Tindiga ward was excluded from the sample study after a brief discussion with the district officials concerning accessibility. There was a plan to do 16 interviews in each village and one urban center. However, the researcher could not reach some villages before noon, and this forced him to make only 105 interviews out of the planned 128 interviews. Hence, the discussion under this section focuses on the information obtained from 105 respondents.

The findings under this part will be presented in different categories. Namely: *the causes and impacts of climate change, climate change adaptation strategies, migration as an adaptation strategy, and conflict and conflict resolution techniques.*

### 5.1.1. The Perceived Causes and Impacts of Climate Change

The respondents were asked if they know and/or if they self-experienced any climate related impacts in the district or the areas of their origin. Almost 95 % of the respondents replied that they knew about climate change, and all of them replied that they were affected by different environmental challenges. Most of them mentioned overgrazing and deforestation as the main causes of environmental change.

Asking them about what they consider as the primary or as the main environmental challenge, the answer fell into four categories; drought, flooding, soil acidity and erratic rainfall. See figure 24 below. Almost the entire pastoralist sample population mentioned drought as the main environmental challenge, and that they had faced drought before they migrated to the Kilosa district. By contrast, most of the farmers claimed flooding as the main environmental challenge that has been inducing temporary mobility in the district. Moreover, some farmers who migrated permanently to Kilosa mentioned soil acidity as the main factor to leave their community of origin.

Erratic rainfall was also mentioned by the respondents as one of the major environmental challenges they faced. According to the respondents, the rainy season in Kilosa district used to start in January and stay throughout May in the past decades. But since currently, the time span of the rain is short, and they are getting sometimes heavy rain causing flooding in their village. Some of the farmers pointed out that they had a problem to prepare their farmland on time because of the unpredictability of the rainfall. And sometimes, their farm products washed away by flooding before harvesting. See Figure 25.
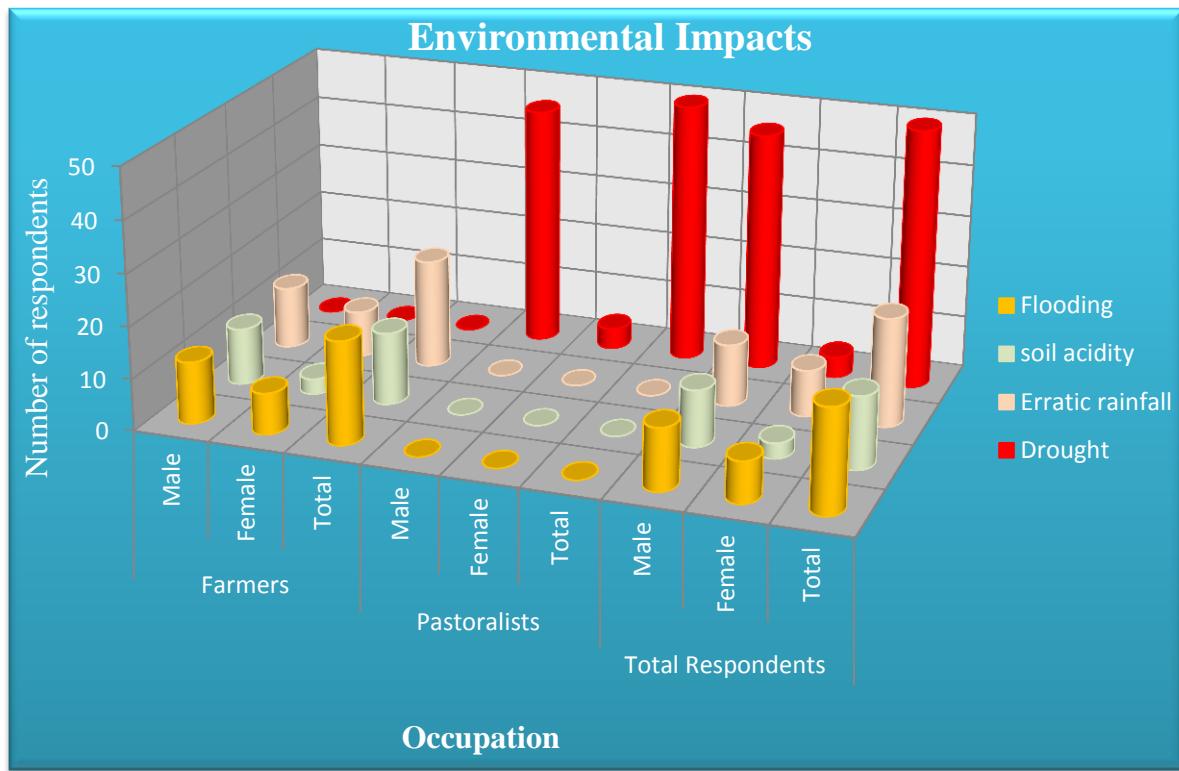
**Figure 24: Major environmental impacts identified by the respondents**



**Figure 25: Flooding in Kilosa district**
*Source: Author (2014)*

The respondents mentioned out the changes in the environment have affected their life in different ways. Among others, water shortage, health-related problems, fixed asset loss, loss of

infrastructure, poor farming product and poor livestock product were listed by them. They have also stated that they had incurred more expenses due to the change in the environment.

### 5.1.2. Climate Change Adaptation Strategies

Climate change adaptation strategies cited by the respondents include ground-water development, climate smart agriculture, and check dam construction, planting of trees and migrating to another place. Migration to another place took the highest proportion, i.e., 39% of the respondents migrated permanently and 15.2% migrated temporarily due to climate related factors. Few respondents have also said they did nothing independently, but they have been participating in projects and programs held by local government and NGOs concerning climate change adaptation strategies.

### 5.1.3. Migration as an Adaptation Strategy

Kilosa had abundant water resources and land few decades ago when compared to the neighboring Dodoma region. This was the main reason for some of the respondents' migration towards the district. See Figure 26. However, different scholars argue that the district has been also facing climate change impacts like drought, flooding and erratic rainfall (Mushi, 2013, IFRCRCS, 2010, UNICEF, 2013).



**Figure 26: A pastoralist in Dumila ward, Kilosa district**
*Source: Author (2014)*

Out of the 67 respondents, who have experienced either permanent migration or temporary mobility, only 9 (13%) of them migrated due to non-climate related factors. The rest 58 (87%) migrated to Kilosa district or moved from place to place within the district due to climate related factors. And they consider migration as a climate change adaptation strategy. See Table 6 below.

Among the 9 pastoralist respondents who migrated to the district due to non-climate related factors, 7 said they had a large number of livestock and they have got information that it was possible to buy pasture land in Kilosa district.  On the other hand, the rest 2 pastoralist left their community permanently because their land was taken by a conservation reserve program and their relatives who migrated to the district few years ago allowed them to stay with them and use their pasture land.  On the other hand, 36% of the respondents have never migrated.

| | Occupation | | | % |
|---|---|---|---|---|
| | **Farmers** | **Pastoralists** | **Total** | |
| Permanent migration due to environmental impacts | | | | |
| **Soil acidity** | 3 | 0 | 3 | 2.9 |
| **Drought** | 0 | 37 | 37 | 35.2 |
| Permanent migration due to other factors | | | | |
| **Excess livestock number** | 0 | 7 | 7 | 6.7 |
| **Forcefully relocated/ to meet relatives** | 0 | 2 | 2 | 1.9 |
| Temporary mobility due to environmental impacts | | | | |
| **Flooding** | 17 | 0 | 17 | 16.2 |
| **Drought** | 0 | 1 | 1 | 0.9 |
| Temporary mobility due to other factors | | | | |
| **Other factors** | 0 | 0 | 0 | 0 |
| **Migrated respondents total** | 20 | 47 | 67 | 63.8 |
| Never migrated | | | | |
| **Respondents never migrated** | 35 | 3 | 38 | 36.2 |
| **Total** | **55** | **50** | **105** | **100** |

**Table 6: Reasons for migration**

Respondents who migrated due to drought and soil acidity have no intention to return to their community of origin because their previous land has already deteriorated due to several factors. They usually migrated during the dry season, June to late October. However, respondents who migrated due to flood disaster mentioned they sometimes leave their communities during the main rainy season in the district, March to May or they might just move to the highland areas if the flooding affected only the areas alongside river banks. They usually return when the situation improved.

Concerning the age group of the respondents, most of the respondents who experienced migration are from two age groups. 24 (35.8%) out of 67 migrated respondents are from 38-47 age groups, and 19 (28.4%) of them are from 48-57 age groups. See Figure 27 below.
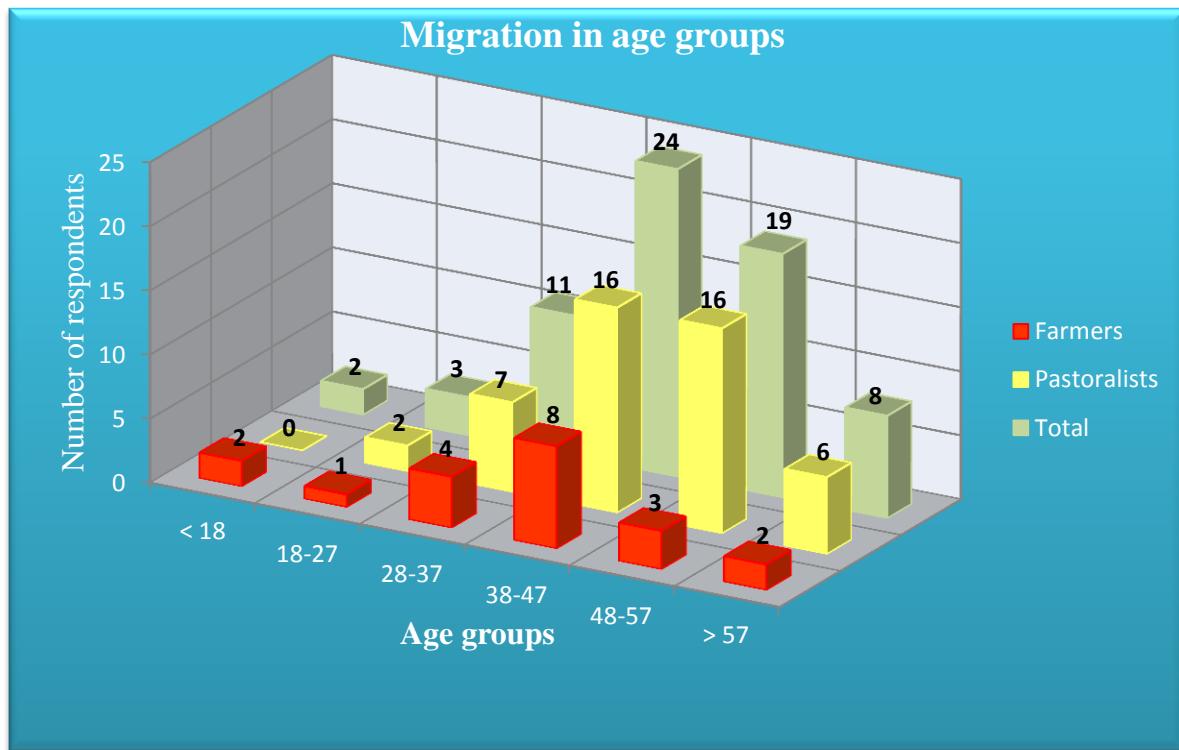


**Figure 27: Migration in age group of respondents**

In terms of education, more than two thirds of the migrated respondents, 45 out of 67 have never attended school. And only one respondent who fulfilled secondary education, migrated due to flooding. See Figure 28.
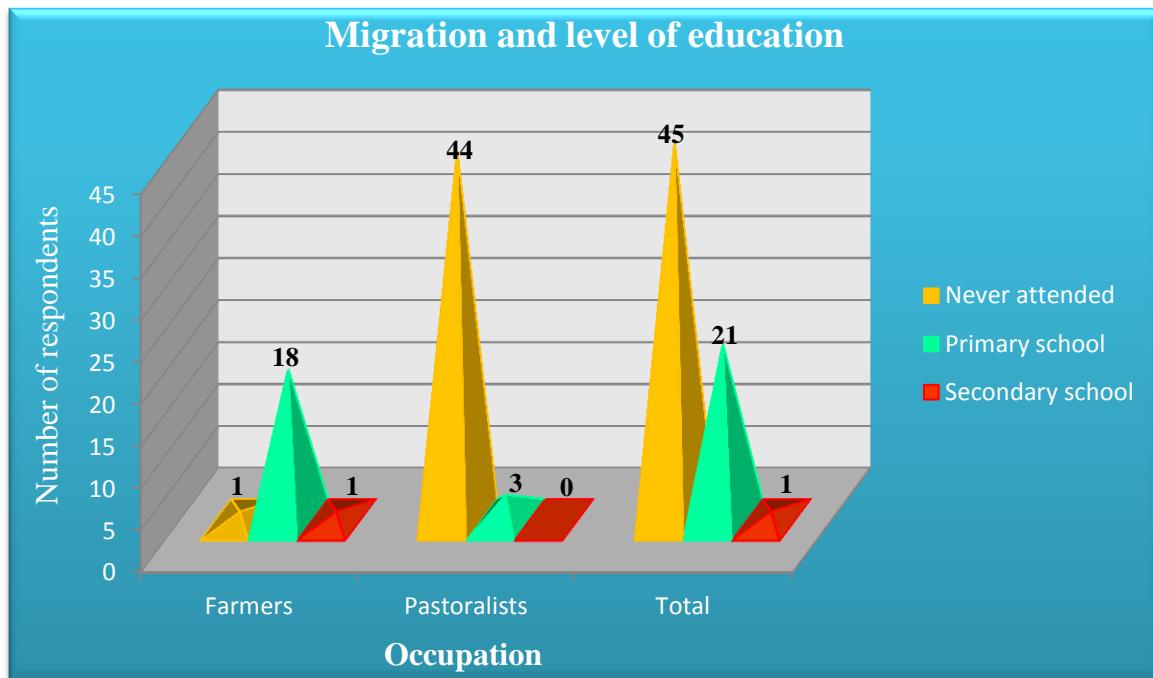
**Figure 28: Migration and respondents' level of education**

### 5.1.4. Conflicts and Conflict Resolution Techniques

Conflicts in the district happen due to different factors. Almost all of the respondents who involved in a conflict mentioned the scarcity of natural resource as the main reason of conflicts in the district. Poor land management and weak conflict resolution techniques were other factors stated by the respondents as a source of conflicts. Unstructured land demarcation has also forced the pastoralists to cross farmland and destroy crop while searching for water. Lack of basic education and training among the pastoralists about how to manage livestock and pastureland is also considered as an indirect cause of conflicts in the district.

A pastoralist informs a police if his/her livestock destroys crop farm. Then the police contact the agriculture or crop farm officer to estimate the cost of the farm destroyed. After that compensation will be paid through the district court process. Farmer respondents believed such a process could motivate the pastoralists to destroy farmland repetitively because pastoralists would not face prosecution if they could afford to pay compensations. Although the compensations paid could reflect the loss of the crop, the respondents consider there is always a risk of being injured or killed in a conflict. Moreover, the court process usually takes long time to decide on the compensations.

Asking them about their satisfaction with the actions taken by local government and NGOs to solve the conflict, all of the respondents said as they were unsatisfied. Provision of education to the pastoralists and follow the enforcement of laws and bylaws considered by most of the respondents as a very vital step in bringing a long-lasting solution to their communities.

The farmers suggest pastoralists should respect land use regulation. They should change the approach, keeping their livestock on their relatives' compound during day times and grazing their cattle on farmland and protected areas during night times. Moreover, the farmers claim they should get priority on the bush-land previously owned by state farms and the land given to investors should be legally distributed to the surrounding communities. Two respondents have said pastoralists must be expelled from the farmers' villages without any pre-conditions.

The pastoralist on the other hand, suggest that local government should register them as legal dwellers in the village or in the urban area they are living now, and they should get access to services for their families and livestock. The government should also buy their excess cattle during drought times, so they can keep the rest in a good condition on their land. Otherwise, they might force to involve continuously in all possible actions, like negotiating with village administrators.

## 5.2. Findings from Governments and NGOs Employees

The findings presented here have been collected from local government and NGOs in Kilosa district. Eight representatives from eight ward offices, ten representatives from eight district government offices and six representatives from four NGOs, a total of 24 respondents were interviewed. The interviews have been based on a semi-structured interview guide including 25 questions, see appendix 2.

About two thirds of the respondents attended higher education, i.e., 50% have a first degree or above, and 21% graduated with a college diploma. See Figure 29. Respondents' high educational status has helped the researcher to interview them without the need of an interpreter and the respondents also easily understood the research questions and the objectives of the study. According to Gideon (2012), the more educated a respondent is, the more likely they are to respond and could understand the intent of the question.
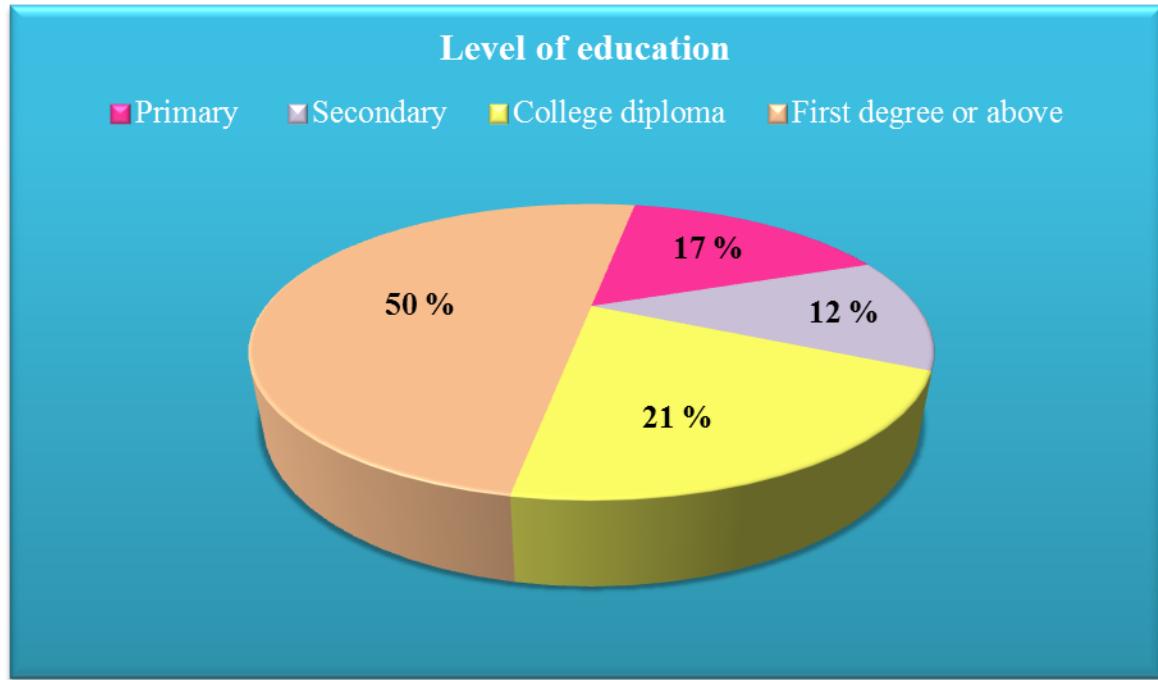
**Figure 29: NGO and government office respondents' level of education**

The findings under this part will be presented in the following categories: *the causes and impacts of climate change, climate change adaptation strategies, migration as an adaptation strategy, and conflict and conflict resolution techniques.*

### 5.2.1. Causes and Impacts of Climate Change

The respondents both from non-government and local government offices have the same opinion that deforestation and land degradation have caused environmental challenges in Kilosa district. Almost all of the respondents mentioned erratic rainfall as the main challenge following by flooding and drought respectively. The district has been gaining almost the same amount of rainfall, but the rainy season has gotten short in the last few decades. Most of the respondents said heavy rainfall in a short period has been causing flooding, especially in the western parts of the district. The respondents also stated high prevalence of waterborne diseases like cholera and the destruction of infrastructures due to flooding.

### 5.2.2. Climate Change Adaptation Strategies

There is a commencement of climate change adaptation programs in the district. The respondents mentioned that there are some programs like climate smart agriculture, training to the pastoralists (usually provided by the Sokuine University of Agriculture), drinking water development, tree plantation, construction of gabion and flooding management. However, the respondents have different opinions concerning the ongoing climate change adaptation strategies because the actions, especially those by the local government are not adequate to address the environmental challenges.

All of them agree that the existing poor agricultural practices in most of the villages in the district and poor flood management system should be improved. 18 respondents (75%) said some programs that promote modern agricultural practices and planting of domestic species, and environmentally friendly trees should be widely implemented. Moreover, producing cassava and sweet potato in relatively dry areas should be adopted because those plants do not demand too much water. 25% of the respondents have also said creating awareness about climate change impacts and to introduce other income generating activities could help the households to persist with the changing environment. One respondent explained if pastoralists organized in association and deliver milk to milk processing companies, they could able to feed their herds during drought times.

REDD in collaboration with the Tanzania Forest Conservation Group has projects in 14 villages in the district. The communities covered by the project have been getting training how they should focus on shifting cultivation rather than clearing forest to prepare a new farm land. Respondents from the REDD and Tanzania Forest Conservation Group (TFCG) project, explained that creating awareness about forest development and forest use, mass mobilization, introducing beekeeping and tea plantation could help biodiversity conservation and could create income generating alternatives for the households in the district, especially for those who are producing charcoal as an additional income generating activity.

Local NGOs in the district have also different climate change adaptations and environmental protection programs, Human Development Strategies Association (HUDESA) for example, has an objective to concern itself with the improvement of agricultural production through climate

smart agriculture and launching environmental protection like planting of trees. See appendix 4, section 3.2. The Union of Non-Government Organizations in Kilosa (UNGOKI), on the other hand, obtained funding from UNDP and it has been helping households in three villages in developing fishponds near rivers and has been working on other environmental protection programs. In 2013, the organization had a forest development project through environmentally friendly income generation activities. See appendix 5.

Water reservation was another climate change adaptation strategy mentioned by the respondents. Conservation of spring water and rivers could help both the farmers and pastoralists. There are also projects that focus on building structures across gully, such as gabions, check dams and u-shapes which tend to accumulate soil, hence makes the gully-heal and planting vegetation like Sativa and elephant grasses facilitate quick healing of the gully.

Asking them whether the actions taken by the local government and NGOs so far appear satisfactory or not, all the respondents replied as not satisfactory and claimed budget constraints as the main challenge in implementing the intended climate change adaptation programs.

### 5.2.3. Migration as an Adaptation Strategy

Most of the respondents described there was a high migration and mobility in the 1990's towards the district, but the rate has been decreasing since currently due to climate related impacts in the district. According to the respondents, most of the immigrants are the pastoralist Sukuma and Maasai tribes.  In addition, some farmers in certain places relying on rain-fed agriculture have also migrated. But, farmers who are using irrigation usually do not migrate except those who were affected by recurrent flooding.

Migration by pastoralist occurs during the dry season from July to January, and almost all of the pastoralists migrated permanently to the district. Some farmers migrated either permanently or seasonally both during the dry season and rainy season. According to the respondents, migration has also increased the rate of unemployment around Kilosa town and challenged social services provided by the urban administration.

The respondents have also discussed what they thought as a solution to address migration. The first point was to provide training to the farmers how they could develop their land and to the

pastoralist how they could keep a small amount of livestock. The other solution raised was to organize households into groups and provide loan so they can develop an additional income without the need to migrate to other places. This could further help the farmers to buy fertilizer and environmentally friendly seed. The pastoralists, on the other hand, could able to feed their livestock during dry seasons.

### 5.2.4. Conflicts and Conflict Resolution Techniques

The respondents described that there is a high number of conflicts during the dry season from July to January in the district, and the conflicts are mostly between pastoralists and farmers. A respondent from Agriculture and Livestock Department stated, there were 83 conflicts in six villages, namely Kilangali, Malui, Madudu, Miyombo, Kivungu and Magomeni from July to September 2013. And 53 conflicts were also registered in five villages namely Tindiga, Miyombo, Kivungu, Chanzuru and Kilangalim from October to December 2013.

Other conflicts in the district include conflicts between investors and villagers, conflicts between national parks and dwellers and conflicts between two neighboring villages. There is a frequent conflict in Magomeni ward between an investor and villagers. The investor, named Mr. Robert, runs a farm called, M/S Mees Estates Limited. But, this person has been using additional farmland that does not belong to him. The government has tried to solve the conflict by taking some portion of land from the investor and distribute to the villagers.  However, both parties the investor and the villagers were not satisfied yet.

The respondents put different sentiments about the main reasons of conflicts in the district. Among others, poor land management was mentioned by all respondents. The district mean carrying capacity of the pasture is 2.5 AU/Ha (Animal Unit per Hectares) and the regulation allowed only one additional cattle/year per household. However, the regulation is not wholly functional.  By the end of 2012, only eight villages in the district were registered as pastoralist villages and the regulations concerning pastoralism appear only in those villages. This regulation was functioning at the time this data was collected even if almost all the villages in the district that were registered as farming villages were full of livestock. The respondents claimed absence of pastoralist regulation in the farm villages has created persistent conflict.

There is a land in the district previously owned by state farms during the colonial era and up to the late 1970's. The land became bush-land, and both the pastoralists and the farmers expressed interest to own the land after their land affected by certain environmental problems. The government failed to distribute the land properly, and conflicts usually occur between the pastoralists and the farmers. In addition, the occupation of some wetland areas by foreign investors for large-scale farming has also named by the respondents as one of the main sources of conflict in the district. See Figure 30.



**Figure 30: Large scale farm in Kilosa owned by foreign investors**

Lack of specific regulations and systems how pastoralists could access water for the cattle has also forced the pastoralists to cross farmland and destroy crops. This is a recurring case of conflict incidents in the district.

High corruption and poor enforcement of the law in the district is the other source of conflict. The respondents mentioned that some village administrators usually take bribes and allow one pastoralist to stay in the village. Then, other pastoralists join with a large number of cattle to stay or keep their cattle, and they go for grazing on others' land during the night time.

Lack of coordination among the concerned bodies is another problem. The respondents claimed that  the district commissioner, police, agriculture department, land management and other concerned organizations in the district should cooperate to enforce the law and bylaw which limits, for example, the movement of livestock and the carrying capacity of a particular village.

The respondents agreed that the incentive to the livestock keepers like veterinary service, education, health should be facilitated, and demarcation of boundaries between pasture and farmland should be set in the villages. The budget constraints, both in the government and local NGOs, should be also solved to provide more trainings to the affected communities and to implement the entire climate change adaptation programs.

Asking them about the existing conflict resolution techniques, all of the respondents replied as it was not satisfactory. The district has already formed a conflict resolution committee, but the committee has not been functional.

## 5.3. Results of Focus Group Discussions

The findings presented here have been collected from two community level focus group discussions (FGDs) in Kimamba and Masanze wards and one district level FGD. An average of 10 participants involved and sixteen questions were raised in each group discussion. See appendix 3. The similarities of findings from each FGD allowed the researcher to organize the results collectively.

The participants in the FGDs mentioned that they know about climate change and they have been facing different environmental challenges. Overgrazing, deforestation, and population growth were revealed as the main causes of environmental change in the district. The district's population grew by 29% within ten years, from 2002 to 2010. See Table 2. Asking them the environmental challenges they have been experiencing, erratic rainfall and flooding mentioned by the respondents as the main challenges in the district followed by drought and soil acidity respectively.

The above mentioned factors have posed impacts on their livelihood in certain ways. Most of the participants who involved in the two community level FGDs mentioned that the expenditures in the communities have been increasing. Because, farmers nowadays should buy more environmentally friendly selected seeds, herbicides, pesticide, and fertilizer when compared to their expenses few years ago. On the other hand, pastoralists have more expenses for veterinary services and to access drinking water. Although there are some climate change adaptation programs in the villages, the results were not that much satisfactory because the impacts have

been beyond the capacity of individual households. The respondents also claimed they faced environmental challenges throughout the year because both drought in the dry season and flooding in the wet season seriously threat the availability of drinking water.

The participants in the FGDs have also stated that the flooding has been destroying infrastructure posing an adverse impact in the development efforts. Health related issues also discussed that cholera and malaria have been causing serious illness and death because stagnant water is a favorite place for mosquitoes and other waterborne diseases. Water shortage is another point raised by the participants.

There are currently no projects funded or supported by NGOs in Kimamba and Madoto wards and the action taken by government to solve environmental challenges in the wards considered as unsatisfactory. In Masanze and Kilangali wards, HUDESA has a project to help poor households generate environmentally friendly incomes like beekeeping and fish ponds. However, the communities in the two wards seek more actions from the government and NGOs. HUDESA produced and distributed 60 bee hives in Gairo district for three villages Ikwamba, Mtega and Lumbiji, 20 for each village. The association has also constructed 12 fish ponds in the above mentioned three villages, four fish ponds for each village and fingerlings placed into the ponds. The participants in the Kilangali FGD consider a similar project should be done by HUDESA in their respective wards.

Concerning the number of pastoralists migrated to their villages and to the district in general, all of them agreed that the number of migrants has been increasing and most of them are coming from three districts in Dodoma region namely, Dodoma, Mpwapwa and Kongwa districts. But it was difficult to specify the exact number because most of the pastoralists have not yet registered as a resident in the villages or the district as a whole.

Conflicts occur recurrently in the district. All the farmers and pastoralists participated in the discussions have claimed they have involved directly or indirectly in a conflict. Conflicts occur not only between farmers and pastoralists but also between large-scale farmers (investors) and small-holder farmers and between land conservation centers and small-holder farmers. However, all of the participants argue that the conflict between farmers and pastoralists is more common in the district.

Conflicting parties in rural areas usually try to solve conflicts through arbitration before it reached a court process. If it reached the court process, an officer from agricultural office represented to calculate the destroyed crop so that the indicted party should pay compensations.

According to the information from the livestock officer, there is a plan to establish a new conflict resolution committee at the district level, especially to bring a long-lasting solution for the pastoralists.

The committee will include;

1. Two pastoralists' representatives from each pastoralist village
2. One farmers' representative from each division
3. Two representatives from livestock office
4. One representative from district commissioner's office
5. Two representatives from two religious affiliations, Muslim and Christian

# Chapter Six

*This chapter discusses the analysis part, and it has three sections. The first part discusses the first hypothesis, i.e., if the change in the environment due to global warming has affected the life of the rural and urban communities in Kilosa district. The second part focuses on the analysis of issues related to hypothesis two, if the recurrent human mobility and conflict in the district has been driven by climate related factors or not. The final part is about hypothesis three if the actions taken by the local government, NGOs and other responsible bodies in solving environmental, human mobility and conflict were satisfactory or not.*

## 6. Analysis

Bivariate analysis is employed in most of the analysis part and chi-square test has been used to investigate the impacts of climate change on the pastoralists and the farmers and to identify the significance of the relationship between climate change, migration and conflict in the study area. The rationale for employing chi-square analysis is that, it is a useful technique to see if there is a relationship between two ordinal variables, two nominal variables, or between an ordinal and a nominal variable. According to the American University (2010) if the asymptotic significance is less than 0.05, the relationship between the two variables is statistically significant. Besides, thematic analysis employed to obtain additional results from the findings.

### 6.1. Climate Related Impacts in the District

The first hypothesis was the change in the environment due to global warming has affected the life of the rural and urban communities in Kilosa district. The hypothesis supported by the theoretical framework of the study that climate change impacts such as drought, flooding, soil acidity and erratic rainfall could affect rural and urban communities.

Climate related impact can cause either biodiversity loss, health issues, water shortage, poor farm and livestock production, loss of infrastructures and assets or a combination of two or more of these threats. Furthermore, these environmental threats could affect the livelihood of the households in different ways. Research question 1, 2, 3 and 4 will be answered in this section under the first hypothesis.

# I. The extent local people have experienced climate change during the last few decades

The research finding shows that the communities in Kilosa district display knowledge about climate change. Almost all of the respondents mentioned that they had already experienced several climate related impacts. Some of the impacts have been more significant and more frequently mentioned than others as they have been affected the livelihood of both the urban and rural dwellers. In addition, the findings obtained through the interviews of government and NGO employees indicate the impacts identified by the households are among the most significant in the district. Even though both the farmer and the pastoralist communities have been affected by different climate change impacts, the main environmental threat identified by the respondents has statistically significant relationship with his/her occupation. See Table 7.

**Occupation of the respondents and main environmental impact cross tabulation**

| | | | The main environmental impact experienced by the respondents | | | | Total |
|---|---|---|---|---|---|---|---|
| | | | Drought | Flooding | Soil acidity | Erratic rainfall | |
| Occupation of the respondents | Farmers | Count | 0 | 20 | 14 | 21 | 55 |
| | | % within occupation of the respondents | 0.0% | 36.4% | 25.5% | 38.2% | 100.0% |
| | Pastoralists | Count | 50 | 0 | 0 | 0 | 50 |
| | | % within occupation of the respondents | 100.0% | 0.0% | 0.0% | 0.0% | 100.0% |
| Total | | Count | 50 | 20 | 14 | 21 | 105 |
| | | % within 0ccupation of the respondents | 47.6% | 19.0% | 13.3% | 20.0% | 100.0% |

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 105.000ᵃ | 3 | .000 |
| Likelihood Ratio | 145.323 | 3 | .000 |
| Linear-by-Linear Association | 75.135 | 1 | .000 |
| N of Valid Cases | 105 | | |

a. Zero cells (0.0%) have expected count less than 5. The minimum expected count is 6.67.

**Table 7: Relationship between environmental threat and occupation of the respondents**

All of the pastoralist respondents (100%) claimed drought as the main environmental threat they have faced so far, even though they have been also affected by flooding different times. The farmer respondents, on the other hand, mentioned erratic rainfall, flooding and soil acidity as the main environmental challenges respectively.

In the chi-square test, table 7, the $p$-value = 0.000 which is less than 0.05. This bivariate analysis shows that there is a statistically significant relationship between the occupation of the rural households and the environmental impact they had faced in the last few years at least at the 5% significance level.

The district's meteorological data of the last thirty years indicate the district has almost similar temperature, but the rainfall pattern was markedly erratic and unpredictable. The research outcomes show that drought is the major climate related impact faced in the district and the neighborhood places, where the pastoralists came from, followed by erratic rainfall, flooding and soil acidity. The district has been recurrently affected by flash floods. Strong rainfall in neighboring districts has overfilled upstream feeding into Mkondoa River that then burst its banks on Kilosa plains.

In the aftermath of the floodings, the communities in the district have been also facing critical health problems. This is because the stagnant water could be favorable for malaria and other water-born diseases like cholera. In addition, the respondents mentioned out both flooding and drought has been posing adverse impacts on the supply of drinking water and on crop production in the district.

In the villages where an incidence of drought was high, there was poor livestock production and in those villages where soil acidity and erratic rainfall were the main environmental threats, there was a poor farm production. Moreover, there was destruction of infrastructure in the villages affected by flooding. See Figure 31.
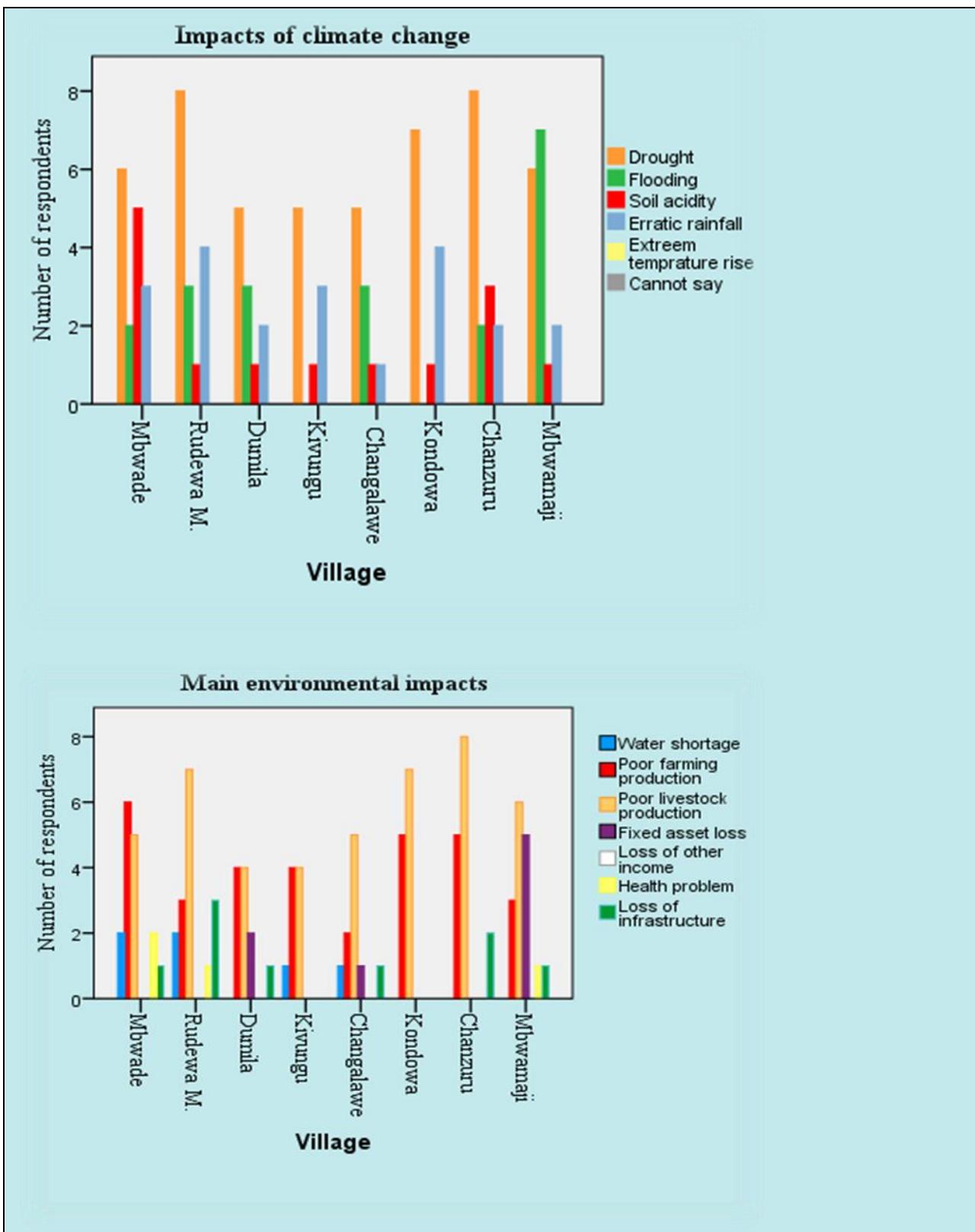
**Figure 31: Comparison of climate change impacts and environmental threats in each village**

## II.     *The perceptions of local people concerning causes of climate change*

The respondents have different attitudes concerning the causes of environmental change. For some of the respondents, it was difficult to name at least one of the cause of climate change, even if they had already observed a change in the environment. According to the findings obtained, deforestation, overgrazing, and population growth together with the global warming effects have caused a series of environmental challenges in the rural and urban households in the district. Ilunga Agricultural Research Institute's executive director mentioned that they have been faced climate variability rather than climate change in the district.

## III.     *How does climate change affect the livelihood of the local households?*

According to the data obtained from NBS and Kilosa district statistics office, the population of the district in 2002 was 489,513, and the district population has increased by 28.94% within ten years. Most of the pastoralists were not included in this data because they were not allowed to be registered as dwellers in the district. Few respondents claimed the rapid population growth in the district has resulted in high competitions for natural resources. However, the majority of the respondents declared that the main problems in the district were associated with climate related factors. The change in the environment had reduced water availability, farm and livestock products. Besides, some respondents named that they had lost their assets due to flooding and they have been incurred more expenses for the past few years.
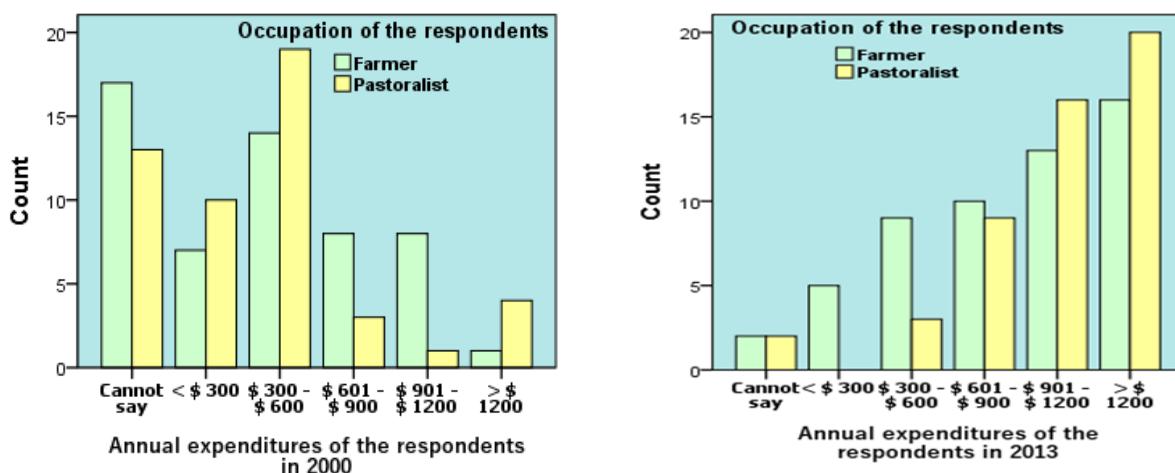


**Figure 32: Comparison of annual expenditure 2000 and 2013**

The respondents said that they had more expenditure in 2013 when it compared to their expenditure in the year 2000. See Figure 32. The figure also indicates there was an increment in the households' level of expenditures. The respondents mentioned different factors for the increment of their expenditures. The majority of the respondents' expenditures increased to more than US$ 1,200 in 2013, but most of them had expenditures of between US$ 300 - US$ 600 thirteen years ago. Among the farmer respondents, only 31% of them had expenditures of more than US$ 600 in 2000. But in 2013, 71% of them had expenditures more than US$ 600. More recently, it became more difficult for farmers to produce farming products in a subsistence way. They need to buy drought-resistant seeds and other agricultural inputs like fertilizer, herbicides and pesticides. Poor productivity of their land forced them to incur those additional expenses. Sometimes they could not produce enough because they might lose farm products due to drought or excess rainfall. They also need to buy food for their dependents if their farmland washed away by flooding as food is usually not sufficient.

The majority of the pastoralist respondents declared drought as the main threat to their livelihood. The change in the environment has affected their life in different ways, and they have incurred more expenses in the last few years. Although there were more farmers than pastoralists whose expenditures in 2000 were between US$ 601 and US$ 1,200, the number of pastoralists was higher for the same amount of expenditures in the year 2013. The pastoralists can move freely from place to place within in the country, but moving with livestock is not allowed in some regions and districts. Hence, if they migrated to other places out of their community of origin, they had to pay bribes for village administrators to get pastureland for their livestock, and they had to pay for veterinary services. The compensation for a destroyed farm by their livestock while crossing in search of water is also getting an extra cost for them.

Most of the time the flooding destroyed infrastructures in the district, and it became difficult for rural households to transport farm products to market places. Cholera and malaria are other health threats faced by some households in the aftermath of flooding.

## IV.    *The strategies followed by local households to adapt to climate change*

The first hypothesis supported by the theoretical framework argues for different climate change adaptation strategies like, biodiversity conservation, climate smart agriculture, sustainable water

management. Migration is also a climate change adaptation strategy followed by most of the developing countries, even if the implementation and follow-up differ from one country to the other.

The respondents have implemented different climate change adaptation strategies like climate smart agriculture, groundwater development, check dam construction and environmentally friendly tree plantation. Some respondents took no action, and the majority of the pastoralist migrated out of their community of origin in response to the environmental challenge. Besides, seasonal migration has been experienced in the district due to over-bank and flash flooding occurred in the district for several times.

**Respondents' climate change adaptation strategies and occupation of the respondents cross tabulation**

| | | | Occupation of the respondents | | Total |
|---|---|---|---|---|---|
| | | | Farmers | Pastoralists | Total |
| Respondents' climate change adaptation strategies | Climate smart agriculture | Count | 27 | 0 | 27 |
| | | % within occupation of the respondents | 49.1% | 0.0% | 25.7% |
| | Check dams construction | Count | 5 | 0 | 5 |
| | | % within occupation of the respondents | 9.1% | 0.0% | 4.8% |
| | Ground water development | Count | 3 | 4 | 7 |
| | | % within occupation of the respondents | 5.5% | 8.0% | 6.7% |
| | Forest development | Count | 2 | 0 | 2 |
| | | % within occupation of the respondents | 3.6% | 0.0% | 1.9% |
| | Migrate to a better place | Count | 3 | 45 | 48 |
| | | % within occupation of the respondents | 5.5% | 90.0% | 45.7% |
| | Others | Count | 3 | 0 | 3 |
| | | % within occupation of the respondents | 5.5% | 0.0% | 2.9% |
| | No action at all | Count | 12 | 1 | 13 |
| | | % within occupation of the respondents | 21.8% | 2.0% | 12.4% |
| Total | | Count | 55 | 50 | 105 |
| | | % within occupation of the respondents | 100.0% | 100.0% | 100.0% |

<div align="center">**Chi-Square Tests**</div>

| | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) | Point Probability |
|---|---|---|---|---|---|---|
| Pearson Chi-Square | 83.151[a] | 6 | .000 | .000 | | |
| Likelihood Ratio | 106.267 | 6 | .000 | .000 | | |
| Fisher's Exact Test | 95.337 | | | .000 | | |
| Linear-by-Linear Association | 19.120[b] | 1 | .000 | .000 | .000 | .000 |
| N of Valid Cases | 105 | | | | | |

a. 8 cells (57.1%) have expected count less than 5. The minimum expected count is 0.95.
b. The standardized statistic is 4.373.

**Table 8: Relationship between occupation and climate change adaptation strategy**

The chi-square test in the table 8 shows the *p*-value 0.000 which is less than 0.05. But the *p*-value has not been used because there are eight cells (57.1%) that have expected count of less than 5. See note 'a' below the chi-square table. Hence, it is important to see the third row, Fisher's Exact Test, to test if there is an evidence of a relationship between the variables. The analysis, therefore, shows that there is a statistically significant relationship between the occupation of the respondents and the climate change adaptation strategy at least at the 5% significance level.

## 6.2. Migration and Conflict

This section will discuss the second hypothesis, and it will address research question 5. The second hypothesis was if the recurrent human mobility and conflict in the district has been driven by climate related factors or not. The hypothesis is supported by the theoretical framework of the study that migration is one of the climate change adaptation strategies. Moreover, it is one of the responses taken by people for environmental challenges they have been facing.

### 6.2.1. Climate Induced and Non-Climate Related Migrations

Both permanent migration and temporary mobility are common in Kilosa district. Pastoralists usually migrate from the neighboring places toward the district and stay permanently. Migration in the district often resulted in conflict between the newcomers and the existing dwellers in that particular area. Conflict could happen if resources are limited and different parties have an interest in a particular issue like land. In most of the developing countries in rural places, both

the farmers and pastoralists need land for farming activities or pasture respectively. Besides, different scholars argue that poor land management systems might also result in a conflict (Gray, 2002, Engel and Korf, 2005). Hence, in the area where resources like land and water are limited, it is more likely that conflict could happen between different parties.

Documents revealed that the migration towards the district was high in the 1990's. However, the rate has been decreasing since currently due to climate related impacts in the area. Most of the pastoralists are from Dodoma, Mpwapwa and Kongwa districts. According to the research finding, more than 50% the respondents migrated either permanently or temporarily in the last few years. Among the pastoralist respondents, 47 out of 50 migrated towards the district and most of them left their community permanently. The two main pastoralist groups migrating to the district are Maasai and Sukuma, and they mentioned that they had left their community of origin during the dry season. Only 9 out of the migrated 47 pastoralists stated non-climate related factors as the reason for their migration.

On the other hand, most of the farmer respondents usually migrate seasonally due to flooding during the wet season. But three farmers, who have been relying on rain-fed agriculture, migrated permanently due to soil acidity. Farmers in the district who are using irrigation were more productive and have not been forced to leave the community except in the case where they move temporarily to higher places to escape flooding.

The correlation table, table 9 shows that the Pearson correlation of occupation of the respondents with the type of migration they have experienced is significant at 0.01 level.

**Correlations**

| | | Occupation of the respondents | Type of Migration |
|---|---|---|---|
| Occupation of the respondents | Pearson Correlation | 1 | .856** |
| | Sig. (2-tailed) | | .000 |
| | N | 105 | 67 |
| Types of Migration | Pearson Correlation | .856** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 67 | 67 |

**. Correlation is significant at the 0.01 level (2-tailed).

**Table 9: Correlations of occupation with types of migration**

73

The respondents identified four main environmental challenges in the district namely, drought, flooding, soil acidity and erratic rainfall. Most of the identified impacts had relationships with migration and forced the respondents to leave their community of origin either permanently or temporarily. The pastoralists and the farmers have a different opinion in prioritizing the main environmental challenge they have been facing. While drought considered as the main environmental threat among the pastoralists, the farmers claimed erratic rainfall, flooding and soil acidity respectively as the main environmental challenges in the district.

## 1. *Drought*

Drought is the main environmental threat for the pastoralists even if they pointed out they have been also affected by flooding disasters. Most of them consider drought as the main reason for migration. See Table 10. On the other hand, farmers in Dumila and Rudewa villages mentioned drought, but its effects were not as severe as erratic rainfall and flooding. Moreover, the latter two have been occurring recurrently in the district and had posed impacts on their livelihood. The government and NGO employees also mentioned that drought in Kilosa and neighboring districts has been occurring more recently and has been posing negative impacts on the households.

**Drought, type of migration and occupation of the respondents cross tabulation**

| Occupation of the respondents | | | | Type of Migration | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | Seasonal migration | Permanent migration | Not migrated | Total |
| Farmers | Drought | Others | Count | 17 | 3 | 35 | 55 |
| | | | % within type of migration | 100,0% | 100.0% | 100.0% | 100.0% |
| | Total | | Count | 17 | 3 | 35 | 55 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |
| Pastoralists | Drought | Others | Count | 0 | 9 | 3 | 12 |
| | | | % within type of migration | 0,0% | 19.6% | 100.0% | 24.0% |
| | | Drought | Count | 1 | 37 | 0 | 38 |
| | | | % within type of migration | 100.0% | 80.4% | 0.0% | 76.0% |
| | Total | | Count | 1 | 46 | 3 | 50 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |

| Total | Drought | Others | Count | | 17 | 12 | 38 | 67 |
|---|---|---|---|---|---|---|---|---|
| | | | % within type of migration | | 94.4% | 24.5% | 100.0% | 63.8% |
| | | Drought | Count | | 1 | 37 | 0 | 38 |
| | | | % within type of migration | | 5.6% | 75.5% | 0.0% | 36.2% |
| | Total | | Count | | 18 | 49 | 38 | 105 |
| | | | % within type of migration | | 100.0% | 100.0% | 100.0% | 100.0% |

**Chi-Square Tests**

| Occupation of the respondents | | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|---|
| Farmers | Pearson Chi-Square | .[b] | | |
| | N of Valid Cases | 55 | | |
| Pastoralists | Pearson Chi-Square | 10.312[c] | 2 | .006 |
| | Likelihood Ratio | 9.631 | 2 | .008 |
| | Linear-by-Linear Association | 8.704 | 1 | .003 |
| | N of Valid Cases | 50 | | |
| Total | Pearson Chi-Square | 61.672[a] | 2 | .000 |
| | Likelihood Ratio | 75.169 | 2 | .000 |
| | Linear-by-Linear Association | 5.577 | 1 | .018 |
| | N of Valid Cases | 105 | | |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.51.

b. No statistics are computed because Drought is a constant.

c. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .24.

**Table 10: Drought and migration**

According to the respondents from the government office, the drought in the neighboring Dodoma region has been sterner, and it has forced pastoralists in the region to migrate towards Kilosa district.

Out of the 49 respondents who migrated permanently, 76% migrated due to drought impacts. The chi-square test on table 10 shows that there is a very strong evidence of a relationship between drought and permanent migration at least at the 5% significance level for the model computed using all respondents, *Number of valid cases (N) =105*. See 'Total' section. Chi-square = 61.672, df = 2 and asymptotic significance (2-sided) = 0.000 which is < 0.05. The table also shows that there is a relationship between drought and migration by pastoralist, *Number of valid*

*cases (N) = 50*, chi-square = 10.312, df = 2 and asymptotic significance (2-sided) = 0.006. But, the table could not state the significance level because there are four cells (66.7%) in the table that have an expected count of less than 5. In order to estimate the significance level in the Pearson chi-square, the percentage of the cells that have an expected count of less than five should not exceed 20%. On the other hand, the table shows that drought and migration by a farmer are independent variables and no significance statistics are computed for the two variables.

## 2. *Flooding*

High risk of flooding is the second highest environmental threat that has been causing mobility in Kilosa district. Heavy rainfall in a short period seriously affected, especially the farmers by washing away farmland and destroy assets. The communities in the district who are affected by flooding usually left temporarily their villages or they just move to higher places within their villages where the flooding could not reach. There is a strong relationship between flooding and temporary mobility of the farmers in the district. See Table 11.

Out of the 18 respondents who migrated temporarily, 94% migrated due to flooding impacts. The chi-square test on table 11 shows that there is a very strong evidence of a relationship between flooding and temporary mobility at least at the 5% significance level for the model computed using all respondents, *Number of valid cases (N) =105*. See 'Total' section. Chi-square = 98.040, df = 2 and asymptotic significance (2-sided) = 0.000 which is < 0.05.

**Flooding, type of migration and occupation of the respondents cross tabulation**

| | | | | Type of Migration | | | |
|---|---|---|---|---|---|---|---|
| Occupation of the respondents | | | | Seasonal migration | Permanent migration | Not migrated | Total |
| Farmers | Flooding Others | | Count | 0 | 3 | 35 | 38 |
| | | | % within type of migration | 0.0% | 100.0% | 100.0% | 69.1% |
| | | Flooding | Count | 17 | 0 | 0 | 17 |
| | | | % within type of migration | 100.0% | 0.0% | 0.0% | 30.9% |
| | Total | | Count | 17 | 3 | 35 | 55 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |
| Pastoralists | Flooding | Others | Count | 1 | 46 | 3 | 50 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |
| | Total | | Count | 1 | 46 | 3 | 50 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |
| Total | Flooding | Others | Count | 1 | 49 | 38 | 88 |
| | | | % within type of migration | 5.6% | 100.0% | 100.0% | 83.8% |
| | | Flooding | Count | 17 | 0 | 0 | 17 |
| | | | % within type of migration | 94.4% | 0.0% | 0.0% | 16.2% |
| | Total | | Count | 18 | 49 | 38 | 105 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |

**Chi-Square Tests**

| Occupation of the respondents | | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|---|
| Farmers | Pearson Chi-Square | 55.000[b] | 2 | .000 |
| | Likelihood Ratio | 68.021 | 2 | .000 |
| | Linear-by-Linear Association | 50.764 | 1 | .000 |
| | N of Valid Cases | 55 | | |
| Pastoralists | Pearson Chi-Square | .[c] | | |
| | N of Valid Cases | 50 | | |
| Total | Pearson Chi-Square | 98.040[a] | 2 | .000 |
| | Likelihood Ratio | 85.267 | 2 | .000 |
| | Linear-by-Linear Association | 57.285 | 1 | .000 |
| | N of Valid Cases | 105 | | |

a. 1cells (16.7%) have expected count less than 5. The minimum expected count is 2.91.
b. 2 cells (33.3%) have expected count less than 5. The minimum expected count is .93.
c. No statistics is computed because Flooding is a constant.

**Table 11: Flooding and migration relationship**

The table also shows that there is a relationship between drought and mobility of the farmers, *Number of valid cases (N) = 55*, chi-square = 10.312, df = 2 and asymptotic significance (2-sided) = 0.000. However, the table could not state the significance level because there are two

cells (33.3%) that have an expected count of less than 5. In order to estimate the significance level in the Pearson chi-square, the percentage of the cells that have an expected count of less than five should not exceed 20%. On the other hand, the table shows that flooding and migration by a pastoralist are independent variables and no significant statistics are computed for the two variables.

### 3. *Soil acidity*

The third climate related factor that induced migration in Kilosa district is soil acidity. Even though they are few, all the farmers who mentioned soil acidity as the main environmental threat, have also migrated permanently out of their community of origin.

**Soil acidity, type of migration and occupation of the respondents cross tabulation**

| Occupation of the respondents | | | | Type of Migration | | | |
|---|---|---|---|---|---|---|---|
| | | | | Seasonal migration | Permanent migration | Not migrated | Total |
| Farmers | Soil acidity | Others | Count | 17 | 0 | 35 | 52 |
| | | | % within type of migration | 100.0% | 0.0% | 100.0% | 94.5% |
| | | Soil acidity | Count | 0 | 3 | 0 | 3 |
| | | | % within type of migration | 0.0% | 100.0% | 0.0% | 5.5% |
| | Total | | Count | 17 | 3 | 35 | 55 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |
| Pastoralists | Soil acidity | Others | Count | 1 | 46 | 3 | 50 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |
| | Total | | Count | 1 | 46 | 3 | 50 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |
| Total | Soil acidity | Others | Count | 18 | 46 | 38 | 102 |
| | | | % within type of migration | 100.0% | 93.9% | 100.0% | 97.1% |
| | | Soil acidity | Count | 0 | 3 | 0 | 3 |
| | | | % within type of migration | 0.0% | 6.1% | 0.0% | 2.9% |
| | Total | | Count | 18 | 49 | 38 | 105 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |

**Chi-Square Tests**

| Occupation of the respondents | | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) | Point Probability |
|---|---|---|---|---|---|---|---|
| Farmers | Pearson Chi-Square | 55.000[c] | 2 | .000 | .000 | | |
| | Likelihood Ratio | 23,286 | 2 | .000 | .000 | | |
| | Fisher's Exact Test | 19.124 | | | .000 | | |
| | Linear-by-Linear Association | .398[d] | 1 | .528 | .610 | .293 | .068 |
| | N of Valid Cases | 55 | | | | | |
| Pastoralists | Pearson Chi-Square | .[e] | | | | | |
| | N of Valid Cases | 50 | | | | | |
| Total | Pearson Chi-Square | 3.529[a] | 2 | .171 | .219 | | |
| | Likelihood Ratio | 4.674 | 2 | .097 | .219 | | |
| | Fisher's Exact Test | 2.367 | | | .286 | | |
| | Linear-by-Linear Association | .223[b] | 1 | .637 | .694 | .465 | .277 |
| | N of Valid Cases | 105 | | | | | |

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .51.

b. The standardized statistic is -.473.

c. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .16.

d. The standardized statistic is -.631.

e. No statistics is computed because Soil acidity is a constant.

**Table 12: Soil acidity and migration**

According to chi-square result in table 12, the Fisher's exact test shows that (Farmers section) there is a statistically significant relationship between farmers who affected by soil acidity and the probability of their migration at least at the 5% significance level. The statistical result is not significant for the entire sample because there are very few cases of cells under soil acidity.

### 4. *Erratic rainfall*

Erratic rainfall described as one of the climate related impact being experienced in the district. However, its relationship with migration in the district was not significant, i.e., none of the

respondents claimed erratic rainfall as a cause of migration. Table 13 shows that migration and erratic rainfall are independent variables.

**Erratic rainfall, type of migration and occupation of the respondents cross tabulation**

| Occupation of the respondents | | | | Type of Migration | | | |
|---|---|---|---|---|---|---|---|
| | | | | Seasonal migration | Permanent migration | Not migrated | Total |
| Farmers | Erratic rainfall | Others | Count | 17 | 3 | 35 | 55 |
| | | | % within Type of Migration (M) | 100.0% | 100.0% | 100.0% | 100.0% |
| | Total | | Count | 17 | 3 | 35 | 55 |
| | | | % within Type of M | 100.0% | 100.0% | 100.0% | 100.0% |
| Pastoralists | Erratic rainfall | Others | Count | 1 | 46 | 3 | 50 |
| | | | % within Type of M | 100.0% | 100.0% | 100.0% | 100.0% |
| | Total | | Count | 1 | 46 | 3 | 50 |
| | | | % within Type of M | 100.0% | 100.0% | 100.0% | 100.0% |
| Total | Erratic rainfall | Others | Count | 18 | 49 | 38 | 105 |
| | | | % within Type of M | 100.0% | 100.0% | 100.0% | 100.0% |
| | Total | | Count | 18 | 49 | 38 | 105 |
| | | | % within Type of Migration | 100.0% | 100.0% | 100.0% | 100.0% |

**Chi-Square Tests**

| Occupation of the respondents | | Value |
|---|---|---|
| Farmers | Pearson Chi-Square | .[a] |
| | N of Valid Cases | 55 |
| Pastoralists | Pearson Chi-Square | .[a] |
| | N of Valid Cases | 50 |
| Total | Pearson Chi-Square | .[a] |
| | N of Valid Cases | 105 |

a. No statistics is computed because Erratic rainfall is a constant.

**Table 13: Erratic rainfall and migration**

### 5. *Migration due to non-climate related factors*

Migration in Kilosa district has also happened due non-climate related factors. Seven pastoralists had a large number of herds and migrated to the district because they thought it was easy to buy pastureland. Besides, expansion of conservation centers and national parks have also contributed

their part to the migration of rural households. According to the research findings, two respondents were victims of conservation projects or protected area outreach programs in the district, and they were forced to leave their community. The relationship between migration and non-climate related factors specified by respondents as a reason for leaving their villages has shown in table 14.

Although both the protected area out each program and excess number of livestock could cause migration, the number of respondents who claimed those factors as the main reason of mobility is very insignificant, i.e., only 13% the migrated respondents fell under this category. The others, 87% categorized under climate induced migration.

The chi-square test also shows there is evidence of a relationship between non-climate related factors and permanent migration, but no strong significance since there are 3 cells (50.0%) under the total sample section which have expected count of less than 5. The minimum expected count is 1.54.

**Non-climate related factors, type of migration and occupation of the respondents cross tabulation**

| Occupation of the respondents | | | | Type of Migration | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | Seasonal migration | Permanent migration | Not migrated | Total |
| Farmers | Non-climate | Others | Count | 17 | 3 | 35 | 55 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |
| | Total | | Count | 17 | 3 | 35 | 55 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |
| Pastoralists | Non-climate | Others | Count | 1 | 37 | 3 | 41 |
| | | | % within type of migration | 100.0% | 80.4% | 100.0% | 82.0% |
| | | Non-climate | Count | 0 | 9 | 0 | 9 |
| | | | % within type of migration | 0.0% | 19.6% | 0.0% | 18.0% |
| | Total | | Count | 1 | 46 | 3 | 50 |
| | | | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |
| Total | Non-climate | Others | Count | 18 | 40 | 38 | 96 |
| | | | % within type of migration | 100.0% | 81.6% | 100.0% | 91.4% |

| | | | | | |
|---|---|---|---|---|---|
| Non-climate | Count | 0 | 9 | 0 | 9 |
| | % within type of migration | 0.0% | 18.4% | 0.0% | 8.6% |
| Total | Count | 18 | 49 | 38 | 105 |
| | % within type of migration | 100.0% | 100.0% | 100.0% | 100.0% |

**Chi-Square Tests**

| Occupation of the respondents | | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) | Point Probability |
|---|---|---|---|---|---|---|---|
| Farmers | Pearson Chi-Square | .[c] | | | | | |
| | N of Valid Cases | 55 | | | | | |
| Pastoralists | Pearson Chi-Square | .954[d] | 2 | .621 | .688 | | |
| | Likelihood Ratio | 1,662 | 2 | .436 | .688 | | |
| | Fisher's Exact Test | .779 | | | 1.000 | | |
| | Linear-by-Linear Association | .220[e] | 1 | .639 | 1.000 | .608 | .504 |
| | N of Valid Cases | 50 | | | | | |
| Total | Pearson Chi-Square | 11.250[a] | 2 | .004 | .003 | | |
| | Likelihood Ratio | 14.689 | 2 | .001 | .001 | | |
| | Fisher's Exact Test | 10.227 | | | .004 | | |
| | Linear-by-Linear Association | .712[b] | 1 | .399 | .464 | .273 | .134 |
| | N of Valid Cases | 105 | | | | | |

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 1.54.
b. The standardized statistic is -.844.
c. No statistics are computed because Non-climate is a constant.
d. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .18.
e. The standardized statistic is -.469.

**Table 14: Migration due to non-climate related factors**

*Migration, level of education and age group*

Level of education has an effect on the decision by a person either to stay and to adapt to the changing environment or to migrate. The research revealed that out of the 49 respondents who migrated permanently, 43 of them, all are pastoralists, have never attended school. And from the 43 pastoralists, only 9 migrated due to non-climate related factors. All the others migrated due to climate related impacts. Some scholars argue that it could be difficult to provide information or training for a person never attended school. A study by Wamsler et al. (2012) about climate change, adaptation and education revealed that formal education is considered to have a positive

effect on people's, awareness and understanding of the existing risk, access to information on risk reduction, acceptance and adequate use of institutional support and the way of coping (by improving their own risk-reduction strategies).

In addition, out of the total 67 respondents who migrated either seasonally or permanently, 36% and 28% of them are in the 38-47 and 48-57 age groups. This implies that older people are more vulnerable to climate change, and it could be difficult for them to learn new adaptation strategies.

### 6.2.2. Conflicts in Kilosa District

Conflicts in Kilosa district usually happen due to certain factors, and the conflicting parties are of different types. Conflicts in the district arise between livestock keepers and farmers, between investors and villagers, between conservation centers and communities in the surrounding, and in once incidence between two villages.

Table 15 shows that out of the 46 migrated pastoralists 95.7% of them affected by or involved in conflict, and one pastoralist from three never migrated pastoralist respondents has also been involved in conflict. On the other hand, out of the 20 migrated farmers 70% involved in or affected by conflict. 12 out of 35 never migrated farmers have also been affected by conflict.

In overall, while 92% of pastoralist respondents have affected by or involved in conflict, the percentage of farmer respondents who involved in or affected by conflict is only 47.3. This implies that there is nearly 50% more chance for a pastoralist respondent to be involved in conflicts.

**Affected by or involved in conflict, respondent ever migrated and occupation of the respondents cross tabulation**

| Occupation of the respondents | | | | Respondent ever migrated | | |
|---|---|---|---|---|---|---|
| | | | | Yes | No | Total |
| Farmers | Has a respondent affected by or involved in conflict | Yes | Count | 14 | 12 | 26 |
| | | | % within respondent ever migrated | 70,0% | 34,3% | 47,3% |
| | | No | Count | 6 | 23 | 29 |
| | | | % within respondent ever migrated | 30,0% | 65,7% | 52,7% |

83

| | | | | | | |
|---|---|---|---|---|---|---|
| | Total | | Count | 20 | 35 | 55 |
| | | | % within respondent ever migrated | 100,0% | 100,0% | 100,0% |
| Pastoralists | Has a respondent affected by or involved in conflict | Yes | Count | 45 | 1 | 46 |
| | | | % within respondent ever migrated | 95,7% | 33,3% | 92,0% |
| | | No | Count | 2 | 2 | 4 |
| | | | % within respondent ever migrated | 4,3% | 66,7% | 8,0% |
| | Total | | Count | 47 | 3 | 50 |
| | | | % within respondent ever migrated | 100,0% | 100,0% | 100,0% |
| Total | Has a respondent affected by or involved in conflict | Yes | Count | 59 | 13 | 72 |
| | | | % within respondent ever migrated | 88,1% | 34,2% | 68,6% |
| | | No | Count | 8 | 25 | 33 |
| | | | % within respondent ever migrated | 11,9% | 65,8% | 31,4% |
| | Total | | Count | 67 | 38 | 105 |
| | | | % within respondent ever migrated | 100,0% | 100,0% | 100,0% |

**Table 15: Occupation of respondents and conflict incident**

The majority of the conflicts registered in the district were between farmers and pastoralists. The research study revealed that the entire respondents who involve in conflicts claimed scarcity of land as the main source of conflict. Poor land management and poor conflict resolution practices also took second and third places respectively.

Most of the respondents who have migrated mentioned they have also involved directly or indirectly in a conflict in different times. Out of the respondents who have claimed drought as the main environmental threat, 95% have involved in a conflict.

Apart, all respondents who migrated due to soil acidity and 65% of the respondents who migrated temporarily due to flooding disaster have also been affected by conflict. See Table 16.

**Affected by or involved in conflict and the reason for migration cross tabulation**

| | | | Reason for migration | | | | Total |
|---|---|---|---|---|---|---|---|
| | | | Drought | Flooding | Soil acidity | Others | |
| Has a respondent affected by or involved in conflict | Yes | Count | 36 | 11 | 3 | 9 | 59 |
| | | % within reason of migration | 94.7% | 64.7% | 100.0% | 100.0% | 88.1% |
| | No | Count | 2 | 6 | 0 | 0 | 8 |
| | | % within reason of migration | 5.3% | 35.3% | 0.0% | 0.0% | 11.9% |
| Total | | Count | 38 | 17 | 3 | 9 | 67 |
| | | % within reason of migration | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) | Point Probability |
|---|---|---|---|---|---|---|
| Pearson Chi-Square | 12.056[a] | 3 | .007 | .011 | | |
| Likelihood Ratio | 11.263 | 3 | .010 | .008 | | |
| Fisher's Exact Test | 8.921 | | | .016 | | |
| Linear-by-Linear Association | .361[b] | 1 | .548 | .585 | .305 | .033 |
| N of Valid Cases | 67 | | | | | |

a. 5 cells (62.5%) have expected count less than 5. The minimum expected count is .36.

b. The standardized statistic is -.601.

**Table 16: Type of migration and conflict incident**

The chi-square test on table 16 shows in the Fisher's exact test has the p-value of asymptotic significant (2-sided) of 0.016 which implies there is a very strong evidence of a relationship between migration and conflict at least at the 5% significance level.

## 6.3.    Local Government and NGOs' Actions

This last section discusses issues related to the third hypothesis, if the actions taken by the local government, NGOs and other responsible actors in solving environmental challenges, human mobility and conflicts in the district have been satisfactory or not. The hypothesis is supported by the theoretical framework of the study that governments and NGOs initiate and implement

different strategies in order to help communities to cope up with the environmental challenges and to enhance sustainable development in the study area. Moreover, the above-mentioned parties could also involve in solving migration and conflict issues in the district. This section will address the last question of this research.

The findings obtained via interviews of the households, the government and NGO employees and through FGD discussions concerning the actions of government and NGOs show that there are different programs followed by local government and NGOs to address environmental issues in the district.

The government has been giving trainings on climate smart agriculture in some villages. Some pastoralists, on the other hand, have attended training organized by Sokoine University of Agriculture about how to increase livestock productivity in a small area and how to generate additional income. Dam constructions, plantation of Sativa and elephant grasses have been also done in areas where there was high soil erosion. Moreover, there is an initiation of producing some environmental friendly plants like cassava and sweet potato.

REDD and TFCG have forest development programs in different villages in the district. Besides, they have been providing trainings on how to obtain additional income from beekeeping and tea plantation while developing and protecting forests in the area. The training has been targeting some of the households in the district who mostly rely on their income on producing and selling of charcoals.

Local NGOs like HUDESA and UNGOKI also have environmental protection programs in some villages. Plantation of trees, beekeeping and development of fish ponds has been done so far by these local NGOs.

Almost all of the respondents, however, agree that the actions taken by local government and local NGOs were not satisfactory. The respondents mentioned the government actions have been addressing environmental issues only in some villages, and the programs were not retained for a long period. The government officials acknowledged the opinions of the household respondents, and they claimed budget constraints for the poor reaction by the government so far.

Local NGOs on the other hand, mentioned that they have a lot of environmental protection programs on paper, but practically, their program has not reached the entire villages because they were not successful in obtaining funding from donor organizations.

The findings also exhibit that there was much migration, especially in the 1990s into the district. High population growth and high migration rate have been creating challenges in the district, and the local government has tried to control the number of livestock entering the district to reducing the migration influx. Moreover, training has also been provided to households how to increase productivity of their land rather than migrating to another place. Local households, however, doubt the enforceability of the government law at a village level because still a lot of pastoralists come and stay in the district paying bribes to village administrators.

On the other hand, the government has been following different strategies to address conflicts, and a lot of suggestions have mentioned by the households, the local government and NGO employees. The findings show that arbitration is the commonly used conflict resolution technique in the district. To solve conflicts arising between farmers and pastoralist, the conflicting parties usually negotiate and reach into consensus before the case forwarded to a legal process. But, if they did not reach into an agreement, the government would get involved and the case will be seen by a conflict resolution committee or forwarded to the court.

The respondents pointed out that the conflict resolution committee in the district is rather ill-functional and only focuses on a settlement of compensation for the lost property and it poorly reacts in assuring that conflicts do not occur again in the future. Moreover, the farmer respondents are not satisfied with the actions of the conflict resolution committee, given the lack of long-lasting resolution as pastoralists continue destroying farmlands as they can afford to pay compensations.

# Chapter Seven

## 7. Conclusions and Recommendations

*This chapter has two sections. The first section provides conclusions drawn from the study conducted to verify the validity of the three hypotheses of the research. Based on the acceptance or rejection of the hypotheses, then answers will be provided for the main research problem of the study. The second section gives recommendations where the research has identified limitations with regard to the literature review.*

### 7.1. Conclusions

The environment in Kilosa district is changing. The main environmental challenge the households in the district have been facing includes erratic rainfall, flooding, drought and soil acidity. The households in the district mentioned that the rain in the past few years have been mostly started very late and ended earlier than the normal rain periods. The 'long-rain' season in the district usually starts in March and ends in May, and the 'short-rain' season starts in November and ends in January. Since recently, the rain sometimes starts at the end of March and ends in the beginning of April. And, it sometimes extends to June. The irregularity of the rain has adversely affected the subsistance rain-fed agriculture.

On the other hand, heavy rainfall have been recurrently caused flooding both in the towns and villages. Flash floods, which originated in neighboring districts, have been also instigating a massive challenges on farming land, fixed assets of the households and infrastructure in the district. The flooding further has favored for prevalence and spreading of malaria and other waterborne diseases.

Soil acidity is another environmental threat faced by the household in some parts of Kilosa district. Drought in the Dodoma region and some other parts of the district has also posed negative impact on the livelihood of the rural and urban households.

Although the environment changed equally for everyone, the effects are different for pastoralists or farmers. The majority of the farmers in Kilosa district rely on rain-fed agriculture and the unpredictability of the rain in the past few years seriously affected their livelihood. Hence, erratic

rainfall has been the main environmental threat to the farmers in the district. For pastoralists, drought was the key challenge. The drop in water and pasture condition in their communities resulted in poor livestock production and it further forced them to leave their community. Both the farmers and pastoralists have had greater expenses in 2013 compared to the year 2000. Farmlands became less productive, and the farmers need to buy more of drought resistance or selected seeds, fertilizer, herbicides and pesticides. Pastoralists who migrated to Kilosa district also had more expenses for veterinary services and for buying pastures. Moreover, they also pay more bribes to some village administrators to keep their cattle in the district.

While the study cannot confirm whether the changing environment in the district is due to climate change or climate variability, the challenges are a real threat to the rural and urban households in the district. The study is, therefore, acknowledging the first hypothesis of the study that the change in the environment has affected the life of the rural and urban communities in the Kilosa district through different ways.

The second hypothesis is if climate related impacts have driven the recurrent human mobility and conflict in the district. Drought, flooding, erratic rainfall and soil acidity cited by respondents as the main environmental challenges in the district. In order to capture the relationship between the above-mentioned environmental threats, human mobility and conflicts in the district, dummy variables were created and tested independently in a chi-square table.

The results show that some of the pastoralists from Dodoma, Mpwapwa and Kongwa districts, who had seriously affected by drought, have migrated permanently towards Kilosa. The new place was considered by the pastoralists as it had plentiful pasture when it was compared with their communities of origin. Flooding, on the other hand, has forced people to migrate from place to place on a temporary base within the district. Although only a few cases are observed, soil acidity has also been claimed as a cause of permanent migration among farmers.

The study revealed that some pastoralists who had a large number of livestock were forced to leave their communities, not because of environmental challenges, but due to low carrying capacity of their pastureland. Government's protected area outreach programs have also claimed by respondents as the factors that instigate forced migration in the district.

According to the findings, drought was the main environmental factor that forced people to move from place to place, flooding took the second highest number followed by soil acidity. The chi-square test result shows that there is a strong relationship between each of the above-mentioned environmental impact and migration in the district. Besides, the three impacts together took 87% of the migration cases of the respondents compared with 13% for non-climate related factors.

The chi-square test result also confirmed most of the conflicts registered in the district have a relationship with climate related impacts. There is likely for a climate migrant to be affected or involved in a conflict. This is because out of the 58 respondents who migrated due to climate related factors, 86% have also involved in or affected by a conflict.

Based on the above discussions the study is accepting the second hypothesis that climate related impacts in the district have driven human mobility and conflicts.

The local government, on the other hand, has provided training to farmers and pastoralists on climate smart agriculture and for better productivity of livestock respectively. Moreover, there were water and soil conservation programs in the district to reduce flooding and to maintain and improve water quality of both surface and ground water resources. The government has also introduced environmentally friendly plants in some villages. However, all the 161 villages in the district have not benefited from such programs. Besides, the actions taken by the government were not equivalent to the rapidly changing environment.

REDD and TFCG forest conservation projects made a significant contribution to the maintenance of biodiversity-ecosystem in some parts of the district. In addition to tree plantation, the REDD project has provided training on forest use and development to communities in the vicinity of the projects. However, REDD and TFCG projects have a very narrow scope and limited only to 14 villages in the district. Local NGOs such as HUDESA and UNGOKI have tree plantation, bee keeping and fishpond development programs, but the scope of their programs have also been limited like that of the REDD and TFCG projects.

The respondents considered the actions, especially by local government are not satisfactory. Both the government and local NGOs have claimed budget constraints as the main challenge and said

it is beyond their capacity to implement climate change adaptation programs in each and every village in the district.

The communities and government in the district believed that high population growth with the influx of pastoralists has made the current environmental threats more complex because of high competition for natural resources. The local government has tried to control the arrival of excess livestock to the district but there is weak enforcement of laws and bylaws and pastoralists from other districts continually migrating towards the district. The further influx of pastoralists has been causing recurrent conflicts between the farmers and the pastoralists. Although conflicts in the district occur between conservation centers and the dwellers in the surrounding area and between two villages, most of the registered conflicts in the district in the past few years were between farmers and pastoralists.

The government usually focuses on settling conflicts for a temporary base, such as compensations for the affected party. There is no attempt by the government to provide long-lasting solutions like, making boundaries between farms and pastureland and providing pastureland for the pastoralists. Moreover, lack of livestock crossings has forced the pastoralists to cross farmlands and destroy crops. The respondents in general, consider the actions by local government to solve migration and conflicts in the district as unsatisfactory.

Therefore, based on these findings and observation the study acknowledged the third hypothesis that the actions taken by the local government, NGOs and other responsible bodies in solving environmental, human mobility and conflicts were not sufficient.

## 7.2. Recommendations

Having summed up the main findings of the study, the following recommendations are suggested.

In order to reduce climate related impacts in Kilosa, the local government and NGOs should develop and implement climate change adaptation strategies that could match with the rapidly changing environment. The training on climate smart agriculture and income diversification, which already commenced in some villages should be expanded and introduced to all villages in the district where environmental impacts are more severe.

The farmers should learn how to increase output from the exiting farmland rather than clear forests and cultivate new land. Moreover, creating awareness about forest use and forest development could enhance the ecosystem conservation and rural development endeavors in the region. Environmentally friendly plants, on the other hand, could increase productivity, but those plants or selected seeds should be available for all of the farmers for an affordable price.

Irrigation development, agricultural extensification, agricultural intensification and livelihood diversification could help farmers to reduce soil acidity, to use the surplus of labor in a small unit of land and to achieve better productivity.

The government should introduce an integrated flood risk management program in places where floods occur recurrently. And, the road system should better withstand flooding. A better road system could promote market accessibility for rural households.  Moreover, a good road system could enhance easy distribution of agricultural inputs, expansion of veterinary services, and easy interaction between rural development experts and the communities.

The government and other interested stakeholders should provide more training to the pastoralists on how to increase animal production (meat and milk) from  a small number of livestock. Moreover, providing alternative pastureland and introducing other income generating activities for pastoralists are highly recommended.

Corruptions should be made illegal and the government should follow the enactment of law to control livestock movements between the neighboring region and Kilosa district. Besides, working in collaboration with the administrators in the neighboring districts could also help the pastoralists from being marginalized by the local government in Kilosa.

Moreover, the government should share the bush-land in the district, which previously was owned by state farms between the farmers and pastoralists in a reasonable way. In addition, it is advisable prioritizing the need of the households in the district rather than providing land to foreign investors. The study shows that such strategies could solve land shortage problems and help the authorities to come up with a long-lasting solution to the land use disputes in the district.

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# Appendices

## Appendix 1: Interview guide: Local households

Target: Kilosa district…………………….……village households.

Data collection techniques: Semi-structured interview

Sampling: Stratified random sampling

Name of interviewer (*compulsory*): ……………………………………..

Name of interviewee (*optional*): …………………………………………

Date:……………     Interview code:……     Name of community: ……………...............

Demographics

1. Sex

   ☐ (1) Male       ☐ (2) female

2. Age

   ☐ (1) Below 18 years    ☐ (3) 28 – 37    ☐(5) 48 – 57
   ☐ (2) 18 – 27    ☐ (4) 38 – 47    ☐(6) 58 – Above

3. Marital status

   ☐ (1) Single    ☐ (3) divorced    ☐ (5) widow

   ☐ (2) Married    ☐ (4) separated

4. Number of dependents

   ☐ (1) 1 – 3    ☐ (3) 7 – 10
   ☐ (2) 4 – 6    ☐ (4) more than 10

5. Level of education

   ☐ (1) Never attended    ☐ (2) primary school    ☐ (3) secondary school or above

6. Duration of stay in the community

   ☐ (1) Since birth    ☐ (3) 6 – 10    ☐ (5) 16 – 20

   ☐ (2) 1 – 5    ☐ (4) 11 – 15    ☐ (6) 21 – Above

7. Occupation

☐ (1) Farmer ☐ (3) trader ☐ (5) other
☐ (2) Pastoralist ☐ (4) unemployed
If other, please specify……………………………………………….

8. Annual expenditures

*8.1. In 2000*

☐ (1) Cannot say ☐ (3) $ 300 - $ 600 ☐ (5) $ 901- $ 1200
☐ (2) Below $300 ☐ (4) $ 601 - $ 900 ☐ (6) above $ 1200

*8.2.In 2013*

☐ (1) Cannot say ☐ (3) $ 300 - $ 600 ☐ (5) $ 901- $ 1200

☐ (2) Below $300 ☐ (4) $ 601 - $ 900 ☐ (6) above $ 1200

Basic socioeconomic information

| Description | Measurement | 2000 | 2013 |
|---|---|---|---|
| Availability of food | (1) Unsatisfactory | | |
| | (2) Cannot say | | |
| | (3) Satisfactory | | |
| | (4) Most satisfactory | | |
| Crop farm production | (1) Unsatisfactory | | |
| | (2) Cannot say | | |
| | (3) Satisfactory | | |
| | (4) Most satisfactory | | |
| Livestock production | (1) Unsatisfactory | | |
| | (2) Cannot say | | |
| | (3) Satisfactory | | |
| | (4) Most satisfactory | | |
| Other income | (1) Unsatisfactory | | |
| | (2) Cannot say | | |
| | (3) Satisfactory | | |
| | (4) Most satisfactory | | |
| Drinking water | (1) Unsatisfactory | | |
| | (2) Cannot say | | |
| | (3) Satisfactory | | |
| | (4) Most satisfactory | | |
| Housing Status | (1) Cannot say | | |
| | (2) Temporary | | |
| | (3) Permanent | | |

Objective 1:

∗  *The perceived causes and effects of climate change*

9.  In your opinion, what are the causes of climate change in your community?

   …………………………………………………………………………………………………

   …………………………………………………………………………...... .

10. What is/are the main environmental challenges you have faced so far?

   ☐ (1) Drought          ☐ (3) soil acidity          ☐ (5) extreme temperature rise

   ☐ (2) Flooding          ☐ (4) erratic rainfall          ☐ (6) cannot say

Objective 2:

∗  *The extent on which local communities have experienced climate change impacts*
∗  *How climate change affects the livelihood of the local people*

11. How often the above mentioned impacts occur in your community?

   ☐ (1) Rarely          ☐ (3) once a year          ☐ (5) cannot say
   ☐ (2) Once in 2 -5 years  ☐ (4) two or more times a year

12. Has climate related factor posed any impact on your livelihood?

   ☐ (1) Yes                  ☐ (2) no
   If yes, go to the next question. If no, go to question number 14.

13. In your opinion, how could climate related factors affect your livelihood

   ☐ (1) Water shortage      ☐ (3) loss of infrastructure  ☐ (5) poor farming production

   ☐ (2) Health problem      ☐ (4) fixed asset loss        ☐ (6) poor livestock production

   ☐ (7) Loss of other incomes
   Any other, please specify…………………………………………..

Objectives 3 & 4

∗  *The perceived cause of migration and conflict in the district*
∗  *The linkages between human mobility, and conflict between farmers and pastoralists*

14. In your opinion, what are the causes of migration in your community?

   …………………………………………………………………………………………………

   …………………………………………………………………………… .

15. How often migration occurs in your neighborhood

☐ (1) Rarely ☐ (2) yearly ☐ (3) every two years or above

Any other, please specify……………………………………………….

16. Have you ever migrated in your life?

☐ (1) Yes ☐ (2) no

If yes, go to the next question. If no, go to question number 24.

17. What factors contribute to this migration?

☐ (1) Drought ☐ (3) soil acidity ☐ (5) conflict

☐ (2) Flooding ☐ (4) erratic rainfall ☐ (6) looking for better welfare

☐ (7) Others

18. Have you ever moved out of your community of origin?

☐ (1) Yes ☐ (2) no

If yes, go to the next question. If no, go to question number 21.

19. What was your main occupation before leaving your community of origin?

☐ (1) Farmer ☐ (3) student ☐ (5) unemployed

☐ (2) Pastoralist ☐ (4) trader

Any other, please specify……………………………………………….

20. Which year did you leave home?

☐ (1) This year ☐ (3) 6 – 10 years ago

☐ (2) 2 – 5 years ago ☐ (4) > 10 years

Any other, please specify……………………………………………….

21. If you just moved to escape temporary hazards, which season did you leave home?

☐ (1) Summer ☐ (3) winter

☐ (2) Autumn ☐ (4) spring

22. How long have you stayed in exile before returning back home?

☐ (1) < 3 months ☐ (3) 7 – 12 months

☐ (2) 3 – 6 months ☐ (4) more than one year

23. How does your migration affect your livelihood or education (if student)?

……………………………………………………………………………………………………………………
…………………………………………………………………………………... .

24. Have you ever experienced conflict in your community?

☐ (1) Yes          ☐ (2) no
If yes, go to the next question. If no, go to question number 30.

25. In your opinion, what are the causes of conflict in your community?

……………………………………………………………………………………………………………………
………………………………………………………………………………………... .

26. How often conflict occurs in your community?

☐ (1) Rarely          ☐ (3) more than twice a year
☐ (2) Yearly          ☐ (4) seasonally
If seasonally, which season? …………………………………………………
Others, Please specify…………………………………….....................

27. Have you ever involved in or affected by a conflict?

☐ (1) Yes          ☐ (2) no
If yes, go to the next question. If no, go to question number 30.

28.  What was the reason for the start of the conflict?

☐ (1) Scarce natural resource     ☐ (3) Ethnicity          ☐ (5) others
☐ (2) Religion                          ☐ (4) trade competition
If other, please specify…………………………………..

29. What were the effects of the conflict on your livelihood?

……………………………………………………………………………………………………………………
……………………………………………………………………………….… .

Objective 5

∗  *Climate change adaptation strategies followed by local households, local government &*
   *NGOs*

30. What are your actions to adapt to environmental impacts?

☐ (1) Climate smart agriculture        ☐ (5) migrates to another place
☐ (2) Check dam construction          ☐ (6) others
☐ (3) Ground water development        ☐ (7) no action at all
☐ (4) Forest development

31. What do you think the level of NGOs' involvement to solve climate related impacts?

☐ (1) Cannot say        ☐ (3) fair        ☐ (5) most satisfactory
☐ (2) Unsatisfactory    ☐ (4) satisfactory

32. In your opinion, what is the reaction of government to solve climate related impacts?

☐ (1) Cannot say        ☐ (3) fair        ☐ (5) most satisfactory
☐ (2) Unsatisfactory    ☐ (4) satisfactory

33. In your opinion, what is the reaction of government to solve migration?

☐ (1) Cannot say        ☐ (3) fair        ☐ (5) most satisfactory
☐ (2) Unsatisfactory    ☐ (4) satisfactory

34. In your opinion, what is the reaction of government to solve conflicts?

☐ (1) Cannot say        ☐ (3) fair        ☐ (5) most satisfactory
☐ (2) Unsatisfactory    ☐ (4) satisfactory

35. In your opinion, what should be done to solve environmental challenges?

………………………………………………………………………………………………
………………………………………………………………………………………………
…………………………………………………………………………………….......  .

36. In your opinion, what should be done to solve migration?

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………………………………………………………………………………………………
……………………………………………………………………………………..…… .

37. In your opinion, what should be done to solve conflicts in your community?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………..…… .

38. Do you have any other idea or comments you may want to add?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………...……. .

## Appendix 2: Interview guide: Government and NGO employees

Target: …………………………….

Data collection techniques: <u>Semi-structured interview</u>          Sampling: Purposive

Name of interviewer: ……………………………………………………..
(*Compulsory*)
Name of interviewee: ……………………………………………………..
(Optional)

Date:……………     Interview code:……          Department: ……………...............
Demographics

1. Sex          □ (1) male          □ (2) female

2. Age

   □ (1) Below 18 years    □ (3) 28 – 37          □ (5) 48 – 57
   □ (2) 18 – 27          □ (4) 38 – 47          □ (6) 58 – Above

3. Level of education

   □ (1) Primary school    □ (3) college diploma
   □ (2) Secondary School  □ (4) first degree and above

Objective 1:

∗ *The perceived causes and effects of climate change*

4. In your opinion, what are the causes of climate change in Kilosa district?

   ……………………………………………………………………………………………
   ……………………………………………………………………………………………
   ……………………………………………………………………………………………
   …………………………………………………………………………… .

5. What is/are the main impacts of climate change?

   □ (1) Drought    □ (3) soil acidity/poor farm land    □ (5) extreme temperature rise
   □ (2) Flooding   □ (4) erratic rainfall

Objective 2:

∗ *The extent on which local communities have experienced climate change impacts*
∗ *How climate change affects the livelihood of the local people*

6. How often the above mentioned impacts occur in the district?

☐ (1) Rarely      ☐ (3) two or more times a year

☐ (2) Once a year      ☐ (4) once in two to five years

7. In your opinion, how could climate change affect the livelihoods of the locals

☐ (1) Water shortage    ☐ (3) loss of infrastructure    ☐ (5) poor farming production

☐ (2) Health problem    ☐ (4) fixed asset loss    ☐ (6) poor livestock production

☐ (7) Loss of other incomes

Any other, please specify……………………………………………

Objectives 3 & 4

∗ *The perceived cause of migration and conflict in the district*
∗ *The linkages between human mobility, and conflict between farmers and pastoralists*

8. In your opinion, what are the causes of migration in Kilosa district?

…………………………………………………………………………………………

…………………………………………………………………………………………

……………………………………………………………………………..…… .

9. How often migration occurs in the district?

☐ (1) Rarely      ☐ (2) every two years or above      ☐ (3) yearly

Any other, please specify……………………………………………

10. What factors contribute to this migration?

16 (a) push factors

☐ (1) Drought    ☐ (3) soil acidity/poor farm products    ☐ (5) poor income

☐ (2) Flooding    ☐ (4) poor livestock products    ☐ (6) conflict

16 (b) Pull factors

☐ (1) Better income      ☐ (2) better welfare system
Any other, please specify…………………………………………..

11. How could migration affect the livelihood of the households in the district?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………...… .

12. Have you ever experienced conflict in Kilosa district?

☐ (1) Yes                ☐ (2) no
If yes, go to the next question. If no, go to question number 17.

13. In your opinion, what are the causes of conflict in the district?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………... .

14. How often conflict occurs in the district?

☐ (1) Rarely             ☐ (3) more than twice a year
☐ (2) Yearly             ☐ (4) seasonally
If seasonally, which season? ………………………………………….
Others, Please specify……………………………………......................

15. What do you think the main reason for the start of the conflict?

☐ (1) Religion           ☐ (3) scarce natural resource          ☐ (5) others
☐ (2) Ethnicity          ☐ (4) trade competition
If other, please specify…………………………………………………

16. What were the effects of the conflict on the livelihood of households in the district?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………...… .

Objective 5

* *The climate change adaptation strategies adapted by the households, local government and NGOs*
* *Migration and conflict resolutions*

17. What are the climate change adaptation strategies by local households in Kilosa district?

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………………………………………………………………………………………………
………………………………………………………………………………………....... •

18. What climate change adaptation strategies have been followed by the government in the district?

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…………………………………………………………………………………………… •

19. What are the government actions to solve migration in the district?

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20. What are the government actions to solve conflicts in the district?

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21. What are the actions taken by NGOs to solve climate related impacts in the district?

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22. In your opinion, what should be done to solve environmental impacts?

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23. In your opinion, what should be done to solve migration in your district?

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24. In your opinion, what should be done to solve conflicts in the district?

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25. Do you have any other idea or comments you may want to add?

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………………………………………………………………………………………………
………………………………………………………………………...… .

Date _____

Location_____

Focus Groups_____

1. Do you know about climate change?

2. What are the causes for the change in the environment?

3. Have you experienced any environmental challenges? Seasons?

4. How could these challenges affect your livelihood? Your district?

5. What were the measures you/ your organization had taken to adapt climate change impacts?

6. Is the number of pastoralists migrating towards your village/ the district increasing?

7. Have you ever experienced conflict?

8. What were the main reasons for the conflicts?

9. What is your opinion about the change in the number of pastoralists in the district?

10. What are the conflict resolution techniques followed in your village?

11. Do you think the government climate change adaptation programs are successful?

12. Do you think the government action to solve migration and conflict is satisfactory?

13. What do you think should be done to solve  environmental challenges?

14. What should be done to solve migration?

15. What should be done to solve conflicts?

16. Do you have any other ideas or comments?

# CONSTITUTION
## OF

### HUMAN DEVELOPMENT STRATEGIES ASSOCIATION

#### PART ONE

1.0. PREAMBLE / STATUS / NAME / ADDRESS.

1.1. PREAMBLE:
Whereas, the Government policy insists on self help, participatory, planning, Community collaborative efforts, exchange of experience for sustainable Economic and social Development: we the Residents of Kilosa District on General meeting held at Kimamba on 26th June 2001 have seriously considered and agreed to form Human Development Strategies Association HUDESA so as to cater for the development of the area. HUDESA shall carry out and manage its affairs in ascendance with this constitution.

1.2. STATUS: The Association shall be a Non profit and Non Governmental, Deriving its functions and operations from the will of its members.

1.3. NAME: Human Development Strategies Association ( HUDESA).

1.3. ADDRESS: The main Office of the Association shall be in Kimamba, Kilosa District, its postal Address shall be Human Development Strategies Association.

P.O.BOX 20,
Email hudesaf @ yahoo.com. cell phone 0784 663991/879046.
Kimamba.
Kilosa District
Morogoro Region
TANZANIA

1.5. Vision: Hudesa wants to see a society with high and sustainable socio – economic development where legal and human Rights for all persons are respected.

1.6. Mission statement: Hudesa is determined and dedicated improving the living standard of children, youth and adults with a gender perspective in Kilosa District through lobbying and advocacy, awareness creation to the community on legal and human rights economic empowerment of all persons, carrying out research

i

documentation and dissemination of information on the status of children, youth, and adult in Kilosa District, fighting the spread of HIV/ AIDS and other calamities amongst all persons.

Realizing that it is not easy to pursue this mission alone HUDESA will work in partnership with other like minded individuals and organizations both at national and global level.

PART TWO.

2.0. **OBJECTIVES:**

3.1.. The main objectives of the Association is to foster Social – Economic development of the people of Kilosa District by having Central Organization, which will act as a focal point for co-coordinating development activities carried out in the District by the member of the Association.

3.2. The association will concern itself with the following activities;

3.2.1. Improvement of Agriculture production through better knowledge / understanding and improved techniques.

3.2.2. Design and launch programmes for Environmental protection for example tree planting etc.

3.2.3 Improve the position and status of Youth in the Society major measures shoutd ve to 'Gui mays on how to improve their economic position.

3.2.4.Improve the position and status of Children – major measures should be to fight against child labour.

3.2.5. Improve the position and statuses of old people.

3.2.6. Improve primary School Education through increased and systematic strengthening of physical and personnel resources and through creating a more positive attitude towards education among the Residents.

3.2.7. Improve health care through strengthening of physical and personnel resources for preventing as well as curetive public health.

3.2.8. To act as an intelligence centre in both social and economic of the Association.

3.2.9. To organize meeting, seminars, workshops, exchange visits and study tours aimed at fostering aims and objective of the Association.

3.2.10.To print, publish and broadcast through the media inclusive of its own journals, books magazines and the like.

3.2.11. To liaison, co-operate and work together with other associations both in Tanzania and elsewhere having more or less similar aims and objectives to those of the Association.

3.2.12. To mobilize, disburse and supervise the use of funds of the Community felt needs.

3.2.13. To procure funds in support to community Project. In order to attain this The Association shall impose members fees and annual contribution. It may as well receive donations, grants, loans from government bodies, Parastal Organizations, Non Governmental organizations and Private individual or other whether based in Tanzania or elsewhere.

2

112

UNION OF NON GOVERNMENTAL ORGANIZATIONS KILOSA (UNGOKI)

P.O. Box 41  KILOSA MOROGORO TANZANIA

Cell: +255 0784 663991/ 879046

E-mail *ungoki2006@yahoo.co.uk* REG.NO.12NGO/1697

## ANNEX E

## FINAL REPORT

**CONTRACTOR**

UNION OF NON GOVERNMENTAL ORGANIZATIONS KILOSA (UNGOKI)

P.O.BOX 41,KILOSA MOROGORO TANZANIA

PERSON IN CHARGE OF  THE FINAL REPORT:MR. DAVID M.C.SEMWENDA

**IDENTIFICATION OF THE PROJECT**

NAME OF THE PROJECT:INCREASING  FOREST COVER THROUGH ENVIRONMENT FRIENDLY INCOME GENERATING ACTIVITIES IN KILOSA.

AGREEMENT NUMBER:TZ/SCP/OPS/TZ/STAR/BD/12/23

TYPE OF THE PROJECT:PROJECT FINAL REPORT

LOCATION:KILOSA DISTRICT

START-UP DATE:  1st JANUARY 2013  COMPLETION DATE:13st DECEMBER 2013

**PARTICIPANTS/BENEFICIERIES**                                          CAPACITY

**BUILDING/TRAINING**

NUMBER OF FEMALES :                                          17

NUMBER OF MALE :                                          33

NUMBER OF CHILDREN :                                          200

**BUDGET AND FINANCE**

TOTAL PROJECT COSTS                              TZS    62,364,102/=