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**ASSESSING THE VULNERABILITY OF PASTORAL COMMUNITIES TO FOOD INSECURITY  
IN THE FACE OF CLIMATE CHANGE. A Case Study of Moroto- Karamoja, Uganda**



A research project submitted to Van Hall Larenstein University of Applied Sciences in Partial Fulfilment of the requirements for the Degree of MSc. in Management of Development, specialization Rural Development and Food Security

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## **DEDICATION**

I dedicate this work to my beloved family; my wife Ms. Janet Awaso and my son Shadrach Atodu. Your encouragement, prayers and patience kept me strong throughout this study.

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## LIST OF ACRONYMS

ABEK	Alternative Basic Education for Karamoja
ACTED	Agency for Technical Cooperation and Development
DFID	Department for International Development
FAO	Food and Agriculture Organisation
FCS	Food Consumption Score
FEWS NET	Famine Early Warning Systems Network
FGD	Focus Group Discussion
GAM	Global Acute Malnutrition
HCVI	Hunger and Climate Vulnerability Index
HHS	Household Hunger Score
IPC	Integrated food security Phase Classification
IPCC	Intergovernmental Panel on Climate Change
IRIS	Institute of International Relations and Strategy
KIDP	Karamoja Integrated Development Programme
KLDF	Karamoja Livestock Development Forum
LC	Local Council
NDP	National Development Programme
NGO	Non-governmental Organisation
NRM	National Resistance Movement
SLA	Sustainable Livelihood Approach
SLF	Sustainable Livelihood Framework
UNDP	United Nations Development Programme
UNHS	Uganda National Housing Survey
USAID	United States Agency for International Development
VSLA	Village Saving and Loans Association
WFP	World Food Programme

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## ABSTRACT

This report presents a case study assessing the vulnerability pastoral communities to food insecurity in the face of climate change. The case study focuses on Moroto- Karamoja, Uganda. Karamoja region has the highest prevalence of poverty and food insecurity in Uganda and because climate change is a potential threat to achieving food security, especially in the world's most food insecure regions, there is need for assessment of vulnerability of Karamojong pastoralists to better understand food insecurity in the context of changing climatic conditions.

This study assesses food security outcomes of pastoralism, food security outcomes of pastoralism for different household categories (i.e. female headed vis-à-vis male headed households and '*poor*' vis-à-vis '*rich*' households) and differences that exist in household vulnerability in terms of Sensitivity, Exposure and Adaptive capacities in the face of climate change in Moroto-Karamoja pastoral communities. Structured (including Food Consumption Score, FCS) and semi-structured questionnaires were administered to 28 households, 4 key informant interviews, 3 Focus Group Discussions (FGDs) and Household Hunger Scale (HHS) was administered to 10 respondents selected randomly from FGD participants. The Sustainable Livelihood Framework (SLF) and Hunger and Climate Vulnerability Index (HCVI) were adopted for analysis of the data.

The results show that pastoralism remains the most feasible livelihood option as crop farming cannot guarantee food security due to unpredictable weather patterns. Findings from HHS show high prevalence of food insecurity among Karamojong pastoral households with 90% of the sampled households reporting a lack of resources to secure access to food. Female headed households are more food insecure than male headed households because they have limited access to and control over productive assets. All rich households are food secure; they have FCSs above the borderline (>42). 71.4% of poor households are stressed and food insecure. Exposure, Sensitivity and Adaptive capacity Indices show that female headed households are the most vulnerable category followed by the poor and the male headed households. Rich households are the least vulnerable to food insecurity and climate risks because they have a wide range of assets and alternative sources of income to depend on.

Vulnerability of Karamojong pastoral communities to food insecurity in the face of climate change can best be addressed through; facilitating implementation of sustainable and context specific livelihood alternatives, strengthening veterinary service delivery, prioritizing targeting of female headed households in food security interventions and introduction of inclusive long term social protection programmes for households who cannot cope with climate risks.

# CHAPTER ONE: INTRODUCTION

The first chapter of this thesis presents an introduction to the research problem and why the research was conducted on the specific research problem. Section 1.1 provides the background to study and is followed by section 1.2 which is the problem statement and significance of the study, section 1.3 provides research objective, section 1.4 provides research question and sub-questions and finally section 1.5 provides organisation of the study.

## 1.1 Background

This research focused on pastoralism because pastoralists are most affected by the effects of climate change. Karamoja region has the highest poverty and food insecurity prevalence in Uganda (UNHS, 2016; IPC, 2017) and because climate change is a potential threat to achieving food security especially in the most food insecure regions (Richardson et al., 2017), there is need for assessment of vulnerability of Karamojong pastoralists to food insecurity in the context of changing climatic conditions.

Karamoja region is located in the north eastern part of Uganda and comprises of seven districts namely; Moroto, Nakapiripirit, Amudat, Napak, Abim, Kotido and Kaabong. It consists of three major livelihood zones i.e. the pastoral, agro-pastoral and agricultural livelihood zones. This research focuses on Moroto district; Moroto is categorised under the pastoral livelihood zone. The pastoral area is covered by Savanah grasslands, vast rangelands with acacia tree species and shrubs and is characterized by highly variable rainfall distribution, making it inadequate for crop production.

Figure 1: Karamoja Region, Uganda



Source: Jordaan, (2014)

Pastoralism is the dominant livelihood system in Moroto, followed by more risky crop farming. Pastoralism in Uganda has always been unsuited for mainstream theories of state building and development and as a consequence Karamoja communities, were and are often still problematized in policy and practice as uncivilized, uncontrollable, and outside the system due

to their transient nature and independence (IRIS, 2017: p2-3). The weak institutions and marginalization from state building for a long time led to continuous vulnerability of these communities to insecurity due to cattle rustling, lawlessness, cross-border livestock disease outbreaks, poor livestock productivity and crop productivity and food insecurity. Karamoja experiences persistent food and nutrition insecurity with high rates of malnutrition i.e. poor food consumption rate of 5%-10%, 40%-50% low dietary diversity and GAM of 13.8% (IPC, 2017: p1).

Karamoja is classified as one of the world's poorest areas, with high rates of malnutrition and a disproportionate number of its 1.3 million inhabitants (82 percent) living in absolute poverty (USAID, 2017). Until recently, pastoralism has remained the dominant form of livelihood and lifestyle for the population of Karamoja, although recent pressures from the government to transform the Karamojong to agricultural livelihoods have resulted in significant changes to the pastoral landscape in the region (ACTED, 2016). Violence has been significantly reduced through disarmament of pastoralists by the National Resistance Movement (NRM) government, and with a strongly increasing population, the Karamojong have moved deeper into rural areas to take up farming. This is a new trend as previously violence associated with cattle raiding and reprisal killings kept the people of Karamoja in settlement areas in towns and near army barracks and police posts (IRIS, 2017; p4). Many of these pressures have multiple effects on the lifestyle of pastoralist communities, resulting in positive and negative changes. For example, those adopting agriculture are more food secure in "good years" with reliable rains compared to those not practicing crop farming, in 'bad years' crop producers are more vulnerable to the effects of climate change (ACTED, 2016).

While traditional pastoral livelihoods are well adapted to Karamoja's dry and increasingly unpredictable climate, the growing dependency on agriculture has made communities more vulnerable to rainfall variability and dry spells (MercyCorps, 2016). A number of food security assessments indicate Karamoja as the most food insecure region in Uganda. For example, with poor food consumption rate of 5%-10%, 40%-50% low dietary diversity and Global Acute Malnutrition (GAM) of 13.8% compared to central region which is seemingly better than the rest of the regions with low dietary diversity of <25% and GAM of <2% (IPC, 2017). The Karamojong's vulnerability to food insecurity dates back to the 1970s-80s, Biellik and Henderson (1981) report in the Lancet that Karamoja by 1980 had experienced three major famines in the second half of the 20<sup>th</sup> century.

Karamoja remains Uganda's poorest sub-region, with people largely dependent on cultivation and animal husbandry for their livelihoods in an environment characterized by drought, flash floods and prolonged dry spells (IRIS, 2017). Drivers of food insecurity in Karamoja (across the pastoral, agro-pastoral and agricultural livelihood zones) are the same and include; increased climate variability, endemic hazards to productivity – especially crop and livestock diseases and civil insecurity – including significant fluctuations in the incidence and prevalence of cattle raiding and other forms of theft (FEWS NET, 2010). Although pastoralism has remained the dominant source of livelihoods in Karamoja, it is clear there is a shift towards agro-pastoralism in the region as pastoralists are increasingly taking up agriculture in order to supplement their incomes and support food security at household level (ACTED, 2016).

This state of Karamoja has always attracted a lot of attention from the international community, international humanitarian aid agencies, government, researchers and other stakeholders prompting a lot of interventions aimed at alleviating poverty and improving food security. an example is, the Uganda state during Idi Amin's regime attempted to pacify Karamoja with former

Prime minister Milton Obote famously declaring, “We shall not wait for Karamoja to Develop” (IRIS, 2017).

The impacts of these interventions are arguably significant as communities still continue to be food insecure and poor because even those perceived to be food secure still remain vulnerable to food insecurity as a result of unpredictable rainfall patterns. This unpredictability has been found to undermine agricultural production, thereby threatening to aggravate food insecurity in Karamoja (Change *et al.*, 2017).

This prompts questions such as: In what ways are the development agencies, government and other stakeholders in development getting it wrong or right? Is it a question of using the right tools for a different job? Do the pastoralists have adequate capacity to deal with climatic shocks and stresses? Or Karamojong communities have just got adapted to living normally with hunger and food insecurity? This study is not aimed at answering all the above questions but seeks to examine how Karamojong pastoralists’ vulnerabilities affect household food security in the face of climate change.

## **1.2 Problem Statement and Significance of the Study**

### **1.2.1 Problem Statement**

Pastoralism forms the main livelihood in Karamoja with characteristic high levels of poverty estimated at 60.8%, and malnutrition of 13.8% compared to Kampala with the least poverty levels of 5.9% and malnutrition of less than 2% (IPC, 2017: p1); thus attracting interventions from various agencies worldwide. Karamoja Integrated Development Services-KIDS, a community based organisation in Moroto district has been implementing a number of projects with some still ongoing (mainly livelihood and food security projects).

Recent evaluations indicate that a majority of the Karamojong communities are food insecure and even those that are food secure are still vulnerable to food insecurity (IPC, 2017: p2). There is thus an urgent need to effectively contribute to the Sustainable Development Goals by improving food security and reducing poverty. However there is no adequate knowledge of how vulnerability of different pastoralists’ household categories influences food security of pastoralists’ households in the face of climate change. Such knowledge is essential and will contribute to improved targeting, planning, and design of food security.

### **1.2.2 Significance of the Study**

The study focuses on assessing vulnerabilities (sensitivity, exposure and adaptive capacity) in relation to household food security of Karamojong pastoralists. Knowledge of the above will facilitate accurate targeting of vulnerable groups with most effective food security interventions to reduce household vulnerability to food insecurity and/or the severity of its effects.

## **1.3 Objective**

The objective of this research is to examine how pastoralists’ livelihood system with its associated vulnerabilities influence the different household categories’ food security status and the differences that exist in their household vulnerability in terms of sensitivity, exposure and adaptive capacity in Moroto district, Uganda in the face of climate change.

## **1.4 Research Question**

The main research question this thesis aims to answer is; how does vulnerability of pastoral communities in the face of climate change influence household food security in Moroto district, Uganda?

### **1.4.1 Sub-questions**

In order to answer the main research questions three sub-research questions need to be answered:

- 1) What are the current food security outcomes of the Karamajong pastoralists' livelihood system in the face of climate change?
- 2) In what ways do food security outcomes differ between different pastoralist household categories? (Female headed vis-a-vis male headed, rich vis-a-vis poor).
- 3) What differences do exist in household vulnerability in terms of sensitivity, exposure and adaptive capacities in the face of climate change?

## **1.5 Organisation of the Study**

Chapter one presents the introduction (inclusive of the background), problem statement and significance of the study, general research objective, research questions and sub-questions and organisation of this thesis report.

Chapter two presents definition of terms, literature review on vulnerability to food insecurity, components of vulnerability, analysis of vulnerability to food insecurity, Sustainable Livelihood Approach and the analytical framework and tool i.e. Sustainable Livelihood Framework, (SLF) and the Hunger and Climate Vulnerability Index (HCVI) respectively.

Chapter three presents the methodology; research strategy, sample selection, data collection methods and analysis.

Chapter four describes findings of the study; food security outcomes of pastoralism, food security outcomes for different household categories and different vulnerabilities existing among household categories (rich, poor, male headed and female headed households).

Chapter five includes discussion of the findings and chapter six presents the main conclusions and recommendations.

## CHAPTER TWO: LITERATURE REVIEW

This chapter provides the literature review. The operationalization of key terms is given in section 2.1. Section 2.2 explains the concept of vulnerability to food insecurity, components of vulnerability are explained in section 2.3. Analysis of food security vulnerability is highlighted in section 2.4, explanation of the Sustainable Livelihood Approach in section 2.5 and finally, the analytical framework in section 2.6.

### 2.1 Operationalization/ Definition of Key Terms

To ensure uniformity and understanding of key terms used herein, the following definitions are provided.

#### A household

This study considers a household as including all the people who occupy a housing unit and feeding/ eating together. A housing unit in the case of Karamoja is a '*Manayatta*' an enclosed area consisting of one or more small huts. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated people who share living in the same '*Manyatta*'.

#### A community

A group of people with diverse characteristics who are linked by social ties, share common perspectives and engaged in related activities in a specific geographical setting (MacQueen *et al.*, 2001).

#### Karamojong

People living in Karamoja and consist of sub-ethnic groups e.g. Matheniko and Tepeth living in Moroto district, Pian and a small proportion of Pokot in Nakapiririt, Bokora in Napak, Pokot in Amudat, the Jie in Kotido, Ethur in Abim, Ngipore and Dodoth in Kaabong district. The term Karamojong and Karimojong have been used by different scholars to mean the same thing. For the purpose of consistency in this study, the researcher decided to only use '*Karamojong*'.

#### Food security

*"Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life"*, according to Napoli, Muro and Mazziotta (2011: p7).

#### Capacities

According to Oxfam (2012), Capacities is a combination of resources available in the community, attributes and strengths that can be used to attain intended goals.

#### Vulnerability

The conditions and characteristics of a community or asset that make it susceptible the damaging effect of climate variability (Oxfam, 2012: p4).

For the purpose of this study, Vulnerability is used in the perspective of pastoralists and their '*perceived vulnerability*' as a function of risks and their ability to manage those risks (Hazards + response = vulnerability).

### Adaptation

Adjustment of a system or community in response to damaging or expected climatic stimuli, while **Adaptive capacity** is the ability of a system or community to respond to expected or damaging climatic stimuli (IPCC, 2018).

### Pastoralism

*"Is defined by a specialization to take advantage of the characteristic instability of rangeland environments through strategic mobility; pastoralism finds an asset in the existence of dynamic variability in the dry lands, where sedentary agriculture or mixed farming find a problem in their lack of uniformity and stability"*, according to Kratli et.al. (2013: p42).

## 2.2 Vulnerability to Food Insecurity

Vulnerability is different from a risk in that the latter is used here to designate the potential of shocks and stresses to affect, in different ways, the food security status of communities, households or individuals (Gitz and Meybeck, 2012).

Sub-Saharan Africa (SSA) is the only region of the world in which chronic food insecurity and threats of famine remain endemic for most of the population and the number of malnourished people in SSA is steadily increasing (Devereux & Maxwell, 2001; Rukuni (2002) cited in Baro and Deubel, 2006). In a bid to reduce vulnerability as a pre-requisite for achieving global and national food security targets, research over the last four decades has moved from its initial formation within the natural hazards discipline (White and Haas, 1975; in FAO, 2013) to incorporate more socio-ecological perspectives.

### 2.2.1 Different Views on Vulnerability to Food Insecurity

The notion of vulnerability had first been applied to the context of poverty (Holzmann and Jørgensen, 2000), but it is increasingly acknowledged as an important approach for the analysis of food insecurity as well (Løvendal, Knowles and Horii, 2005). As a useful concept, vulnerability has been surrounded by debate in recent decades, with discussions including the ability to measure vulnerability statistically and even compare it between different groups and locations (FAO, 2013). Vulnerability is related both to the differential exposure and sensitivity of communities to stimuli such as climate change and particular adaptive capacities of those communities to deal with the effects or risks associated with the exposures (Smit and Wandel, 2006).

Løvendal et.al, 2004 define vulnerability as people's propensity to fall, or stay, below a pre-determined food security threshold. Vulnerable groups comprise people with common characteristics, who are likely to fall or remain below a certain welfare threshold in the near future. However, Oxfam looks at vulnerability as a set of characteristics and circumstances of a community or system that makes it susceptible to food insecurity as a result of the damaging effects of a hazard or the impacts of climate variability (Oxfam, 2012).

The level of vulnerability of a household or individual is determined by how weak or strong their livelihoods are, what occupational activities they are engaged in, how good their access is to a range of assets that provide the basis for their livelihood strategy and how useful their social

capital and different institutions are in providing social protection (Davis, Haghebaert and Peppiatt, 2004). In recent years, the concept “Vulnerability” to food insecurity has made its way onto the mainstream development agenda. It is a complex and multifaceted concept with little agreement across disciplines with regard to how it should be understood, characterized and studied (Raemaekers and Sowman, 2015).

Even if definitions of vulnerability are plentiful, the real difficulty has been in finding a robust analysis of vulnerability that is consistent with the basic tenets of risk analysis (Scaramozzino, 2006a). A diverse range of vulnerability and capacity assessment tools have been developed and field tested, mainly by NGOs and community-based organisations, with a particular emphasis on participatory and people oriented approaches (Davis, Haghebaert and Peppiatt, 2004).

## 2.3 Components of Vulnerability

Vulnerability to food insecurity has three (3) main components; Sensitivity, Exposure and Adaptive capacity. Skewed development processes associated with mismanagement of the environment, scarcity of livelihood options and poor governance for the poor and demographic changes are the main cause of high vulnerability (Cardona, 2012).

### 2.3.1 Sensitivity

Sensitivity is the extent to which an entity or community is affected or responsive to climate associated stimuli (sensitivity includes responsiveness to both destructive and beneficial climate stimuli) (Smit et.al, 1999, cited in IPCC, 2018). *“It is a term used by the Intergovernmental Panel on Climate Change (IPCC) to express the relationship between the human-caused emissions that add to the Earth’s greenhouse effect — carbon dioxide and a variety of other greenhouse gases — and the temperature changes that will result from these emissions”*, Chandler (2010).

Climate sensitivity tells us how much the earth’s temperature would rise if pre-industrial carbon dioxide concentrations were doubled (CSIRO and Australian Bureau of Meteorology, 2013).

The rising temperatures in Karamoja threaten to increase the frequency, intensity and duration of heat waves in the region, therefore reducing availability of water for crops and animals and this too undermines food security, however, a large majority of people in Karamoja, particularly women, are not aware that changes to the climate had been taking place over decades (Change *et al.*, 2017).

### 2.3.2 Exposure

Exposure is a collection of elements in which climate hazard events may occur in an area (UNISDR, 2009). Developing countries are considered to be particularly susceptible to climate change because of their exposures and sensitivities to climate-related extremes; especially because of their limited adaptive capacities to reduce the magnitude of effects of hazardous climate events (Pouliotte, Smit and Westerhoff, 2009).

Rainfall anomalies and delayed onset of the rainy season along with rising temperatures in pastoral areas, lead to impoverished grasslands, lack of feed and water, and heat stress to livestock (Mekuyie, Jordaan and Melka, 2018), making pastoralist livelihoods vulnerable to food insecurity due to reduced livestock productivity (Powell, 2010).

### 2.3.3 Adaptive Capacity

Capacity to adapt is still a novel concept to some, yet studies of adaptation to climate change have provided many insights but to date, have shown only moderate practical effect in reducing vulnerabilities of people to risks associated with climate change (Smit and Wandel, 2006). Adaptation to climatic change and variability is now a fundamental concern, and is receiving increasing attention both in the climate change research community and in the ongoing international negotiations dealing with climate change (Calandra *et al.*, 2016).

In Africa, livestock is a key factor to pastoralist and smallholder farmer livelihood (Lai, 2007). Change in climate and climate extremes are acknowledged as a vital challenge to pastoral production systems and alternative systems that are accessible to a household in order to make a living could determine the household's resilience at a given point in time (Mekuyie, Jordaan and Melka, 2018).

The common barriers to people's adaptive capacity include; the perceived lack of leadership by governments on climate change, existing governance and institutional arrangements, policy and regulatory issues, the uncertainty and lack of understanding of climate change (Patino, 2010).

Adaptation to climate change and risks occurs in dynamic contexts that vary over time, location and sectors (IPCC, 2018), these contexts are political, socio-economic, technological and biophysical in nature and a mix of such contexts determine the capacity of systems to adapt . More recent evidence shows that if adaptation processes are in line with development initiatives that reduce existing vulnerabilities and increase people's adaptive capacity in a broad sense, then this will bring immediate benefits as well as strengthen people's ability to deal with future threats (Burton *et al.*, 2002). Pastoralists adapt through diversification by creating a portfolio of livelihoods with different risk attributes so that drought risk can be managed in advance of moisture deficit and recovery is quicker and easier after the event (Opiyo *et al.*, 2015).

## 2.4 Analysis of Vulnerability to Food Insecurity

Decisions underlying sound food security policies, programmes and projects are based on a much broader set of parameters than is provided by food security or vulnerability analyses alone, requiring a comprehensive analysis of food security and vulnerability to ensure effective targeting and welfare gains (Lovendal *et al.*, 2004).

Whilst traditional food security analysis offers an ex-post view on who the food insecure are and why they are so (Lovendal and Knowles, 2006), there has been increasing awareness that the analysis of food insecurity should be carried out in a dynamic context (Scaramozzino, 2006a) by looking at it from a vulnerability perspective. Analysis using vulnerability approach can fully consider the associated food insecurity uncertainties in addition to providing an explicitly dynamic and forward looking way of analysing causes and more importantly, options for reducing food insecurity (Lovendal and Knowles, 2006; Scaramozzino, 2006a) precisely because it should be predictive (Livelihoods and Office, 2003).

According to Scaramozzino (2006a), most studies look at vulnerability to poverty rather than food insecurity to inform food security interventions but it is imperative to know that while the two concepts are related, the latter depends on analyzing factors that result in food insecurity in the first place, which may not always be consistent with factors which cause poverty. Some of the approaches that have been used to analyse food insecurity vulnerability include; social risk management framework (World Bank, 2005) and the entitlement approach (Sen, 1998). This

study applied the Sustainable Livelihood Approach and the Hunger and Climate Vulnerability Index (HCVI) to analyse vulnerabilities, strategies and food security outcomes of pastoralism in Karamoja-Moroto district, Uganda.

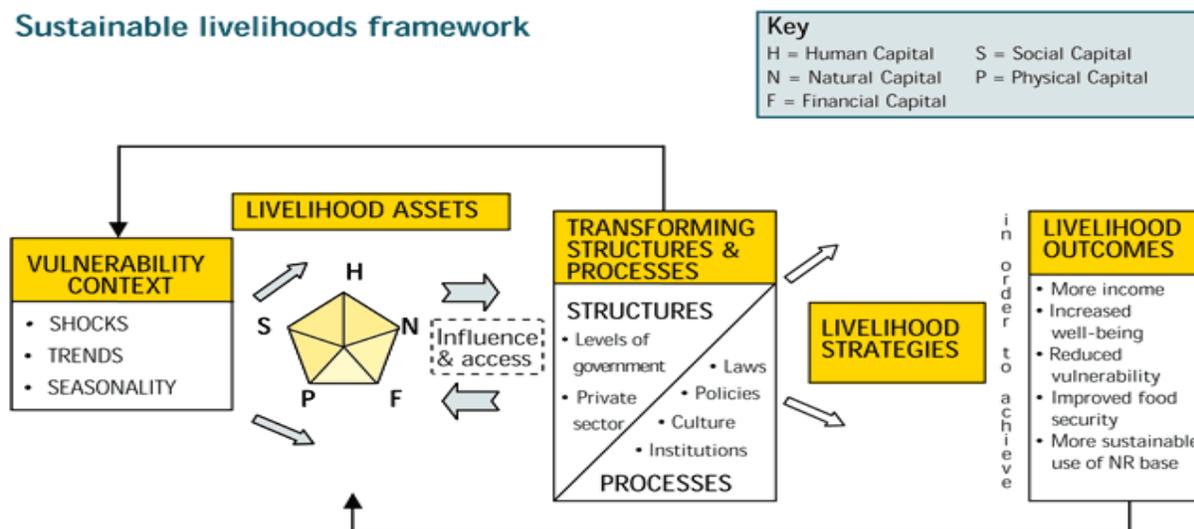
## 2.5 Sustainable Livelihood Approach (SLA)

This study will use the Sustainable Livelihood Approach. The concept of 'Sustainable Livelihoods' constitutes the basis of different 'Sustainable Livelihood Approaches' (SLA) and has been adapted by different development agencies such as the British Department for International Development (DFID, 2008). The approach employs a holistic perspective in the analysis of livelihoods to identify those issues of subject areas where an intervention could be strategically important for effective vulnerability reduction, either at the local level or at the policy level (Krantz, 2001).

There are three insights into poverty which underpin the Sustainable Livelihood Approach; the realization that while economic growth may be essential for poverty reduction, there is not an automatic relationship between the two, there is the realization that poverty is not just a question of low income, but also includes other dimensions such as food insecurity, state of vulnerability etc. and that the poor themselves often know their situation and needs best and must therefore be involved in the design of policies and project intended to better their lot (Krantz, 2001).

Three agencies i.e. UNDP, CARE and DFID use the SLA approach slightly differently (Krantz, 2001). The SL approach, at least as advocated by DFID, is closely related to the SL framework (Morton and Meadows, no date). DFID's SL framework is one of the most widely used livelihoods frameworks in development practice (DFID, 2008). Figure 2 below shows the Sustainable Livelihood Framework.

Figure 2: DFID Sustainable Livelihood Framework



Source: (DFID, 1999).

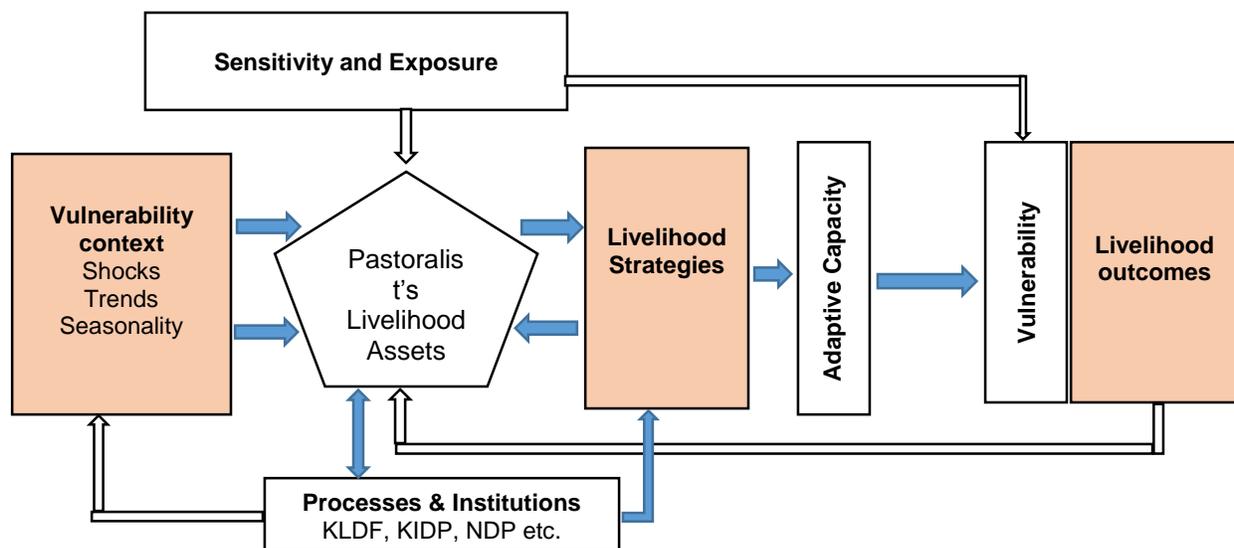
## 2.6 Analytical Framework

The research used the Sustainable Livelihood Framework as the main analysis framework and the Hunger and Climate Vulnerability Index (HCVI) (Richardson et al., 2018) was used to calculate vulnerability to food insecurity and the household was the unit of analysis.

### 2.6.1 Sustainable Livelihood Framework

As an analytical model closely linked to development programming, this study has adopted the Sustainable Livelihood Framework to shed light on pastoralism in three interrelated ways; 1) Conceptualizing the vulnerability context of the livelihood 2) Livelihood strategies used to cope with climate risks and 3) the Food security outcomes of a livelihood system (Morton and Meadows, no date). The figure below shows the conceptual framework used for analysis of pastoralists' livelihood.

Figure 3: Conceptual Framework Used in the Study



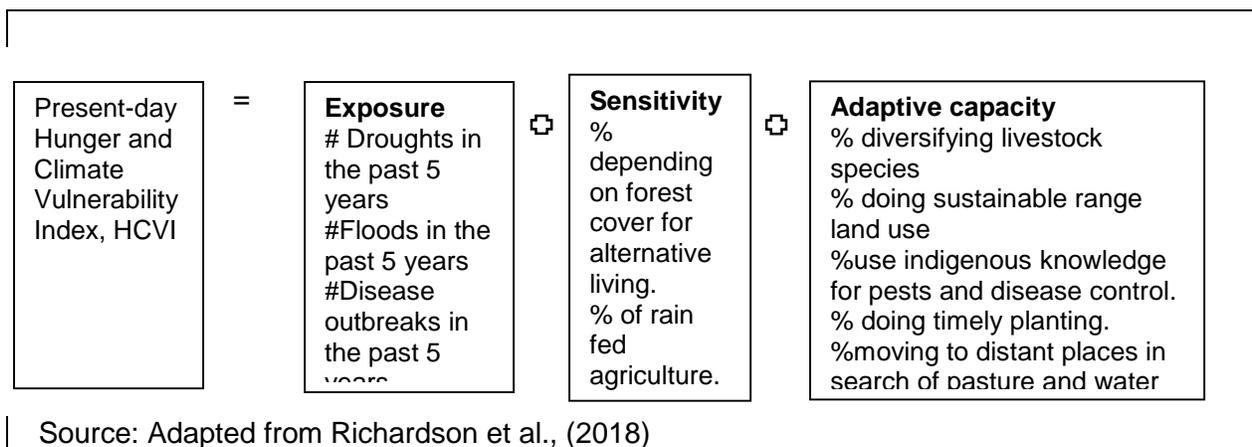
Source: By author, July 2018

### 2.6.2 The Hunger and Climate Vulnerability Index (HCVI)

In order to have a more holistic view and translate field data into policy relevant human food security outcomes, the Hunger and Climate Vulnerability Index was used. Hunger and Climate Vulnerability Index provides an assessment of Vulnerability to Food Insecurity as a result of climate events by combining information about exposure to present-day climate hazards (such as floods, droughts and storms), food security relevant measures of sensitivity and adaptive capacity, however, it does not assess how vulnerability could change under future climate change (Richardson *et al.*, 2018: p228).

It provides a relative measure of Vulnerability to Food Insecurity as a result of climate-related hazards (Richardson *et al.*, 2018: p329). Each of the above mentioned components (Sensitivity, Exposure and Adaptive Capacity) comprise of indicators selected based on field data and the assumption is that each component contributes equally to hunger and climate vulnerability regardless of the number of indicators in each component as indicated in figure 4 below.

**Figure 4: Hunger and Climate Vulnerability Index (HCVI) Model**



Indicators for Exposure (Number of times Droughts, Flood or Water logging and Disease outbreaks occurred in the past five years) , Sensitivity (Percentage depending on lateral resources especially forests, Percentage practicing rain-fed crop farming, Percentage changing to eat poor diets due to lack of food, Percentage reducing amount of food consumed per day and Percentage of assets lost due to climatic hazards and hunger) and Adaptive Capacity (Percentage of households doing livestock diversification, Percentage practicing sustainable rangeland use, Percentage using indigenous knowledge for pests/parasites and disease control, Percentage practicing timely planting of crops and Percentage moving to distant places with their livestock in search for pasture and water) as shown in table 1 below were recorded with respect to their maximum and minimum values.

Exposure, sensitivity and adaptive capacity components were calculated by averaging the recorded indicators. Hunger and Climate Vulnerability Index (HCVI) was then calculated by summing and averaging the components (Exposure, Sensitivity and Adaptive Capacity). So the values of HCVI range from 0 (Least vulnerable) to 1 (Most vulnerable).

**Table 1: Major Components, Indicators and their Functional Relationship with Vulnerability**

Components	Indicators	Assumptions
<b>Exposure</b>	# Droughts in the past 5 years.  #Floods or water logging in the past 5 years.  #Disease outbreaks in the past 5 years.	-Caused loss of assets (financial and natural). -Destroyed crop gardens, caused loss of property. -A number of diseases caused loss of livestock and humans.
<b>Sensitivity</b>	% Depending on forest cover for alternative living.  % Doing rain fed crop farming.	-There is dependency on existing natural vegetation and its being depleted. -People depend on farm output for food e.g. sorghum.

	<p>% Changing diet-eating residue+ buying food.</p> <p>% Reducing food consumption.</p> <p>% Of assets (mainly livestock) lost (sold, died or stolen etc.)</p>	<p>-People change feeding habits depending on food availability.</p>
<b>Adaptive capacity</b>	<p>% Diversifying livestock species.</p> <p>% Practicing sustainable range land use.</p> <p>%Using indigenous knowledge for pests and disease control.</p> <p>% Practicing timely planting.</p> <p>%Moving to distant places in search of pasture and water for livestock.</p>	<p>-Pastoralists keep different livestock species.</p> <p>-Pastoralists are aware of the benefits of rangeland use.</p> <p>-Have indigenous knowledge for livestock disease control.</p> <p>-Have been growing some crops and have capacity to establish gardens.</p> <p>-There is relative peace and security.</p>

Source: By author, July 2018

## CHAPTER THREE: METHODOLOGY

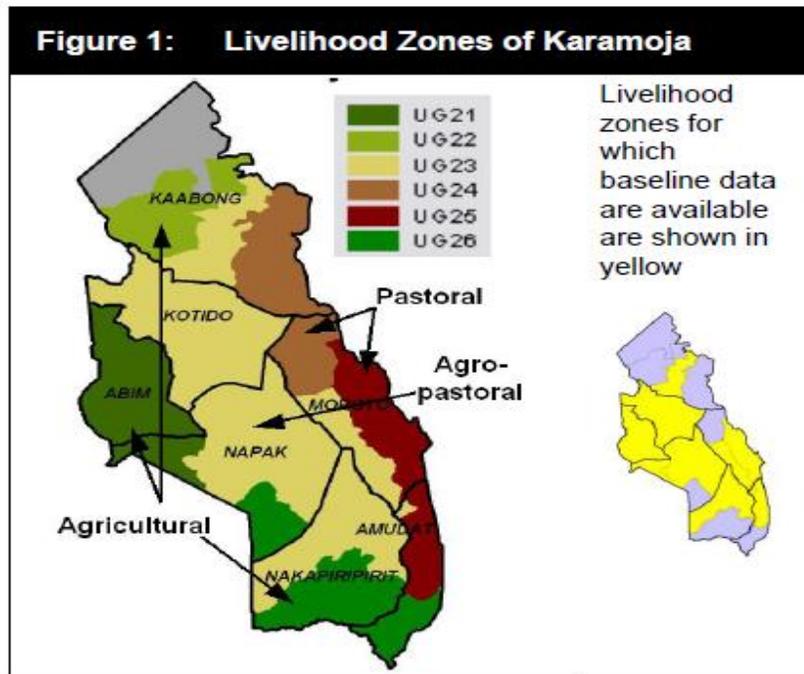
This chapter describes the study area in section 3.1, research strategy in section 3.2, sample selection procedure in section 3.3, sources of data in section 3.4, data collection methods and/or tools in section 3.5, triangulation in section 3.6, data analysis methods in section 3.7, ethical considerations in section 3.8 and section 3.9 presents limitations of the study.

### 3.1 Description of Study Area

Moroto district is situated in the Mid North Eastern Uganda between latitudes 1°53'N, 3°05'N and Longitudes 33°38'E, 34°56'E and at altitudes between 1,356m – 1,524m above sea level (UNDP, 2014: p1). It is bordered by Kenya to the east and four districts: Kotido to the north, Lira to the northwest, Katakwi to the west, and Nakapiripirit to the south. It is a semi-arid area characterized by unpredictable weather patterns, savannah rangelands with scattered acacia tree species and thorny bushes.

Moroto was selected because it's one of the three districts (the other two being Amudat and Kaabong) in Karamoja where pastoralism and livestock production is predominant and forms the main livelihood of communities in this area. It lies under Pastoral – semi arid zone characterized by a prolonged dry season and erratic rainfall and runs along the eastern border with Kenya, comprising parts of Kaabong, Moroto and Amudat districts (FAO, 2009: p1-3).

Figure 5: Livelihood Zones-Karamoja, Uganda



Source: FAO (2014).

According to the National Population and Housing Census, 2017 (p8-20) Moroto has a population of 103,432 people with 49,746 male and 53,686 female, constituting 48.1% and

51.9% of the total population respectively. In total there are 22,066 households; 76.1% male headed, 23.9% female headed and 0.8% child headed, Illiteracy rate is 84.4% among women and 69.7% among men. Of the total population, 78.4% are livestock keepers and involved in opportunistic crop cultivation. Livestock reared include cattle, goats, sheep and donkeys.

The area has a unimodal rainfall pattern with unpredictable dry spells from end of March to October, and a prolonged dry period from November to March (Jordaan, 2014, p. 92). Main crops grown are sorghum and sunflower on a small scale.

### **3.2 Research Strategy**

The research has adopted a case study approach applying both qualitative and quantitative approaches based on social constructivism and positivism respectively.

Qualitative methods such as focus group discussions, key informant interviews were used to gain a deep descriptive meaning of issues relating to vulnerability and household food insecurity.

Quantitative methods which include; Structured/ survey questionnaire in addition to Household Hunger Scale and Food Consumption Score were administered to selected respondents. A survey is a research method which is aimed at collection of data about constructs of the units of analysis so as to describe the constructs or discover the relationships between the constructs (Baarda, 2014: p46).

### **3.3 Sample Selection**

A key criteria in selecting sub-counties for undertaking the research was purposive. Rupa sub county from which the research was conducted is one of the two sub counties that are predominantly pastoral according to FAO (2009: p1). The other sub county which is predominantly pastoral in Moroto district is Tapac.

With the help of the parish chief, three (3) out of seven parishes in Rupa sub county were purposively selected basing on accessibility of the communities in terms of a fair condition of feeder roads and cooperativeness in terms of relative willingness to give information. For each of the three parishes three (3) villages were then randomly selected for Focus Group Discussions (FGDs). 30% of the participants of each FGD were randomly selected for administering the Household Hunger Score (HHS).

The Household Hunger Scale (HHS) is a simple indicator used to measure household hunger in food insecure areas (Ballard et al., 2011).

Seven (7) respondents for each of the four (4) household categories (i.e. rich, poor, female headed and male headed household categories) were identified with the help of the parish chief and Local Council (LC) 1 chairpersons for respective villages. Data on the rich, poor, female and male headed households was not readily available so, the researcher sought assistance and guidance of the parish chief and village Local Council 1 chairpersons in identifying the households for the above household categories. Household interviews for identified households were then conducted in four villages of the three (3) parishes selected above.

**Table 2: Sample Size of the Study**

Parish	Village	FGD Participants		Number HHS Questionnaires		Household Interviews, n=28	
		Female	Male	Female	Male	Female	Male
<b>Mogoth</b>	Atedewoi	05	05	02	01	04	03
<b>Pupu</b>	Pupu	-	-	02	01	04	02
	Kwamong	06	06	02	02	02	06
<b>Lobuneit</b>	Kadilakeny	08	04	-	-	06	01
<b>Total</b>		<b>19</b>	<b>15</b>	<b>06</b>	<b>04</b>	<b>16</b>	<b>12</b>

Source: Field data, July 2018

Household Hunger Scale questionnaire was administered to both male and female respondents because however much women were more likely to give reliable information than men as women are the ones always responsible food preparation at the household, the researcher believes men equally gave reliable information because they are the key decision makers in their households and most of them are always around their homesteads during day time lying under trees; resting from long nights spent in Kraals guarding their livestock, so they are aware of when there is food or no food in the household.

### 3.4 Sources of Data

Both primary and secondary data was used for this study.

#### Secondary Data

Secondary data was accessed from the library, online (electronic and internet sources) search using Google scholar, Greeni, Google books using key words (i.e. vulnerability, pastoralism, food insecurity and adaptive capacity in Karamoja). A review of food security outcomes of pastoralism in Moroto and Karamoja in general i.e. integrated food security phase classification (IPC) and food security assessments plus other unpublished works (reports) for the past 10 years gave an overview of the food insecurity status of pastoralists' households in Moroto district.

#### Primary Data

Primary data was collected from four (4) Key Informant Interviews, three (3) Focus Group Discussions, ten (10) Household Hunger Scale questionnaires administered to respondents selected randomly from FGDs and twenty eight (28) household questionnaires interviews: seven (7) questionnaires for each of the four (4) different household categories (i.e. the poor, rich, female headed and male headed households).

### 3.5 Data Collection Methods and Tools

Overall, data collection took a period of 20 days. Both qualitative and quantitative data collection tools were used during this study. Qualitative data collection tools that were used include; Key Informant Interviews and Focus Group Discussions. Quantitative data collection tools used include; Household Hunger Scale and survey questionnaire which also contained some semi-structured questions.

#### 3.5.1 Key Informant Interviews

Four key informants selected from local government and the local community were interviewed during the study. Some were interviewed before the household interview in order to get some

preliminary information about pastoralists' livelihoods, coping strategies adaptive capacities and households and the area in general. Other key informants were interviewed after the household interview in order to validate some of the findings from the households. The key informants were purposively selected by the researcher. Table 3 indicates the Key Informants interviewed. They are a group of people who demonstrated considerable knowledge on the topic under study.

**Table 3: Key Informants Interviewed**

<b>NAME</b>	<b>ORGANISATION</b>	<b>DESIGNATION</b>
<b>DR. JOHN ELANYU</b>	Moroto district local government	Senior veterinary officer
<b>WALEKIRA MOSES</b>	Rupa sub county local government	Production officer
<b>LOMONYANG MICHAEL</b>	Pupu village	LC. 1 chairperson
<b>LOMONGIN JOHN NAKIBUS</b>	Rupa sub county local government	Parish chief

Source: Field data, July 2018

**Picture 1: Key Informant Interviews, Moroto**



Source: Field data, July 2018

Three key informants were interviewed from their offices and the LC.1 was followed to his home and interviewed using unstructured questions.

### **3.5.2 Focus Group Discussions**

With the help of the parish chief, three (3) out of seven parishes in Rupa sub county were randomly selected and from the selected parishes, three (3) villages were then selected based on accessibility and cooperativeness in terms of relative willingness of the communities to give information. Topic list for FGDs was guided by the need to address research sub-question 1: *“What are the food security outcomes of pastoralism in pastoral communities of Moroto district in the face of climate change?”* The researcher took a sole responsibility in deciding on the topics of discussion. Refer to appendix 5 for Focus Group Discussion guide

**Table 4: Focus Group Discussion Participants**

Parish	Village	Female	Male
<b>Mogoth</b>	Atedewoi	5	5
<b>Pupu</b>	Kwamong	6	6
<b>Lobuneit</b>	Kadilakeny	8	4
Total		<b>19</b>	<b>15</b>

Source: Field data, July 2018

**Picture 2: Respondents during FGD in Kwamong Village-Rupa Sub-county**



Source: Field data, July 2018

### **3.5.3 Household Hunger Scale (HHS)**

After each Focus Group Discussion (FGD), 30% of the participants of participants from each FGD were randomly selected for administering the Household Hunger Score (HHS). Results from HHS addressed part of research sub-question 1: what are the food security outcomes of pastoralism in pastoral communities of Moroto district in the face of climate change?

### **3.5.4 Household Questionnaire Interviews**

Questionnaires containing structured and semi-structured questions were administered to twenty eight (28) households in total for the four selected villages in the three parishes of Rupa sub-county; seven (7) rich, seven (7) poor, seven (7) female headed and seven (7) male headed households. These were selected purposively with the help of the parish chief and LC 1 chairpersons of respective villages. A rich household is one with fifty (50) or more herds of cattle, a poor household is one without livestock or has less than 10 herds of cattle and a female headed household is one in which a woman is the key decision maker and the main provider of household needs. In Karamoja context, a household becomes female headed when the husband dies or becomes permanently disabled or when the wife has been abandoned by the husband, otherwise it may not apply to normal situations where both husband and wife are living together due to strong patrilineal cultural norms. Male headed households were selected from “*normal*” households, whose livestock ownership is above ten (10) and below fifty herds of cattle, according to the parish chief and the LC 1 interviewed.

Interviews were done at the respondent's "*manyata*" and all interviews were conducted in the local language (Nga'karimojong) and the average length of each interview was 40 minutes. Questions in the household questionnaire were structured to answer sub-research questions 2 and 3: In what ways do food security outcomes differ between different pastoralist household categories? and what differences exist in household vulnerability in terms of Sensitivity, Exposure and Adaptive Capacities in the face of climate change? In that order.

The household questionnaire was pre-tested in five (5) households before the actual data collection began.

The pre-test of the questionnaire revealed unanticipated problems such as specific wordings and relevance of some of the questions. It also helped the researcher to see if the interviewees understood the questions and if they were giving useful answers. After pre-testing, the questionnaire was revised; some of the questions were reframed, some were removed and others added with the help of key informants especially in the coping and adaptive capacity section. See appendix 4 for the household questionnaire.

### Picture 3: Interview with Rich Household Heads



Source: Field survey, July 2018

## 3.6 Triangulation

Triangulation was done to reinforce the data collected by observation during data collection process and non-structured interview of elders in the community in addition to probing during household interviews. The researcher also made follow-up non-structured interviews with Focus Group Discussion (FGD) participants especially women after the FGDs because most of them were reluctant to talk freely when mixed with men during FGDs.

## 3.7 Data Analysis

Both qualitative and quantitative data analysis methods were used for data analysis as indicated in the proceeding sections.

### 3.7.1 Data Recording

Primary data was recorded using note book for the responses from semi-structured interviews, phone recorder and pictures were taken. Structured questionnaires had spaces on which respondents could fill in their responses.

### **3.7.2 Qualitative Data Analysis**

Qualitative data are often a collection of fragments from conversations, reports of observations (Baarda, 2014: p153). This data was collected through semi-structured questions mixed into household survey questionnaires, observation and focus group discussions. Data was organised and structured into themes, categorised and outliers identified and clarified through key informant interviews. A descriptive interpretation was done to derive meaning from respondents' responses.

### **3.7.3 Quantitative Data Analysis**

Quantitative data was cleaned and analysed by descriptive statistics/ measures of central tendency such as mean, correlation and proportions in addition to graphs and tables to give graphical representation of the data using Statistical Package for Social Scientists (SPSS) and Microsoft-Excel.

## **3.8 Ethical Considerations**

Before any data collection activities began, the researcher first had to seek authorization from the office of the sub- county chief, Rupa Sub County. The purpose of the study was explained to the local authorities and the respondents. The researcher made sure there was informed consent before taking pictures and interview of respondents while assuring confidentiality of the information collected. Respondents real names were not included in the questionnaires unless with permission from them, especially for the key informants.

## **3.9 Limitations**

This study was a single case study and findings should not be generalizable across other socio-cultural settings. Research findings are highly relevant as to the situation in the 3 parishes and overall research findings and recommendations are relevant to the situation of especially the predominantly pastoral communities of Karamoja (Amudat, Moroto and parts of Kaabong).

This research had originally adopted a qualitative approach but because of need to ensure reliability of the study, the researcher also deliberately opted for quantitative data to counter possible bias associated with qualitative research.

Also, the sample space for household interviews was small and to make it more representative of the Karamoja pastoral communities, the Household Hunger Scale (HHS) was administered to 30% of the Focus Group Discussion (FGD) respondents selected at random after each FGD.

## CHAPTER FOUR: FINDINGS

Findings from the study are presented in this chapter. The findings are structured in line with each research sub-question. Section 4.1 presents the food security outcomes of pastoralism in the face of climate change. Outcomes for different household categories (rich, poor, female headed and male headed) are described in section 4.2. The final section, section 4.3, presents vulnerabilities that exist among different household categories in terms of Adaptive Capacity, Sensitivity and Exposure of the four household categories to climate risks and food insecurity.

### 4.1 Food Security Outcomes of Pastoralism in the Face of Climate Change

The research sub-question answered in this section is: *“What are the current food security outcomes of the Karamajong pastoralists’ livelihood system in the face of climate change?”*

To answer the research sub-question stated above, the following data collection sources were used: review of secondary data in section 4.1.1, Focus Group Discussions (FGDs) in section 4.1.2 and Household Hunger Scale in section 4.1.3. See appendix 6 for FGD guide and appendix 7 for Household Hunger Scale questionnaire.

#### 4.1.1 Food Security Outcomes from Secondary Data

Using secondary data review, the following food security outcomes in Karamojong pastoral households were found;

An inter-agency food security and nutrition assessment for Karamoja during the lean season in 2016 found that half (50 percent) of households were moderately or severely food insecure and were practicing crisis or emergency livelihood coping strategies (USAID, 2017). Almost half (47 percent) of households had food expenditure shares in excess of 65 percent of household expenditure; and about half (52 percent) of households had borderline or poor Food Consumption Scores.

The Integrated food security Phase Classification (IPC) reported that in the period, January 2017 to November 2017 Karamoja experienced a widening food consumption gap with deteriorating dietary diversity and high malnutrition rates (IPC, 2017: p1-3). The affected population included poor households with low meal frequency of up to 1 meal per day because of prolonged dry spells and low purchasing power due to food price increases (IPC, 2017).

#### 4.1.2 Food Security Outcomes from FGDs

This section describes relevance of pastoralism to household food security, pastoralism in the face of climate change and the future of pastoralism and livelihood options.

##### Relevance of Pastoralism

During Focus Group Discussions, the majority of participants (79%, see table 5 below), when asked how strong they agreed/disagreed with the statement *“Without pastoralism no food*

*security*” expressed that they “*strongly agreed*” with this statement. They mentioned that pastoralism plays a key role in ensuring pastoralists’ household food security and that livestock is the main source of income on which the majority of households depend in times of distress to save their household from hunger.

In addition, FGD participants mentioned that livestock products are a source of protein and important for children’s growth. “*I believe pastoralism is the only solution given the conditions in which we live! It is livestock that you can drive to other areas in search of pasture and water, you can’t take crops from the garden looking for places with enough rain*” (statement by the LC. 1 chairperson). A lady mentioned that “*For the crops we grow, it’s just by chance that they can grow to maturity and be harvested due to the unpredictable weather conditions: we are more sure of livestock securing our household food security than crops!*”.

**Table 5: Relevance of Pastoralism to Household Food Security**

<b>“Without pastoralism, no food security”</b>	<b>n =</b>	<b>%</b>
Strongly agree	27	79
Agree with reservation	2	6
Neutral	1	3
Disagree	4	12
<b>Total</b>	<b>34</b>	<b>100</b>

Source: Field data, July 2018

Two out of the 34 respondents (6%) ‘*Agreed*’ with the statement; “*Without pastoralism, no food security*” with some reservation. The reason they gave for this is that animals are not just easily sold to buy food, only in extreme situations of hunger they would do so. The majority of pastoralists, especially those proximate to trading centers, depend on selling firewood and charcoal and casual labor to earn some income to purchase food in times of hardship. In words of a Female FGD respondent;-

*“Yes I agree that pastoralism contributes to food security but things are changing these days, most times we are so stingy with livestock because we need these animals to multiply, we would rather starve or depend on the little livestock products we get from our livestock like milk, ghee etc. than to sell an animal to purchase food, Instead we resort to selling firewood and charcoal or even go for casual labor in case the season is bad; when the sorghum harvest is poor!”*

One out of 34 FGD respondents (3%) mentioned that he neither ‘*agreed*’ nor ‘*disagreed*’ with the statement “*Without pastoralism, no food security*”. He argued that both pastoralism and crop farming are equally good since both contribute to household food security.

Four out of 34 FGD respondents (12 %) said that they ‘*disagreed*’ with the statement “*Without pastoralism, no food security*”. They mentioned that pastoralism these days is losing relevance because animals are dying, animal numbers have reduced and people are finding alternative sources of livelihood as can be illustrated by the male FGD participant;-

*“I do not depend on livestock for food anymore because I no longer have livestock since I was raided 7 years ago, I now depend on casual labor, charcoal burning, selling firewood and growing some crops which I can harvest in case the weather conditions are favorable”.*

## Pastoralism in the Face of Climate Change

When asked what had kept them in pastoralism even amidst changing climatic conditions, twenty eight out of 34 FGD respondents (82%) said that pastoralism was the only feasible livelihood option for them as crop farming was no longer effective due to unpredictable weather patterns and that livestock acts as their wealth reserve and a livelihood security. *“It is to the kraal that one can run, get an animal, for example a cow and sell to fix pressing needs. Besides, it is in our tradition that a real man has to pay a large number of cattle as bride price and therefore we are bound by such norms to rear large numbers of livestock”*, said one FGD participant.

When asked what species of livestock they reared and why they reared them, all FGD participants (100%) said that they always had diversified livestock species reared in their households; Cattle, goats, sheep, donkeys and poultry. FGD respondents mentioned that they diversify livestock production to spread risks so that in case of any disease outbreak in one species, they would be able to survive on the other species. *“We keep many livestock species for livelihood security; in case of any outbreak of diseases and extreme weather conditions, some species may not be affected and therefore the family will survive on that, also because women in a household are culturally not allowed to own cattle, they can keep shoats and poultry while the men keep cattle”*.

Three out of 34 FGD respondents (9%) said they didn't have livestock but still concurred with arguments put forward by the majority on what livestock species they kept and why they kept many livestock species.

FGD participants added that livestock was pastoralists' major source of income and to address most of their challenges requiring expense of money an animal of a certain livestock species had to be sold depending on the magnitude of the problem as can be illustrated from the quote from the male FGD respondent;- *“We have various needs in a pastoralist household with varying solutions: you can't sell the whole bull just to buy books for a school going child, instead a wife can sell chicken to address such a simple need, also small animals multiply faster although larger animals are more valuable while others for example donkeys are used for transport therefore we get encouraged to keep all these species”*.

## Future of Pastoralism and Livelihood Options

When asked if they thought pastoralism would be as important for food security in the coming ten years as it were today, a majority of the FGD participants (59%) were confident that in the coming 10 years their livestock numbers will have multiplied because there is no longer cattle rustling; they expect therefore to be rich and able to provide for enough food for their households. *“On condition there is peace, security and reduced livestock disease outbreaks, am optimistic that my livestock will multiply and I will be more able to provide food for my household and hunger will be reduced”*, a male respondent said with a smile.

Fourteen out of 34 FGD participants (41%) as indicated in table 10, see pastoralism's contribution to household food security in the next 10 years with pessimism due to high prevalence of livestock diseases, inadequate veterinary services and increasing population pressure. A male FGD participant said, *“For as long as the livestock diseases persist without proper veterinary support from government, our animals will keep dying and our livelihood will be wiped out, the government should think of improving veterinary service delivery and sustaining the existing peace”*.

## Table 6: The Future of Pastoralism

<b>“10 years from now, Pastoralism will be as important for household food security as it is today”</b>	<b>n =</b>	<b>%</b>
Optimistic	20	59
Pessimistic	14	41

Source: Field data, July 2018

When asked what other livelihoods they have opted for besides livestock keeping, twenty nine out of 34 FGD respondents (85) said that charcoal and firewood selling was the most common alternative for income because it was the easiest activity communities could opt for even though they are very much aware of the environmental risks associated with deforestation. *“We are aware of the dangers of cutting down trees but what else can we do? We don’t have other easy option for survival”*, a FGD respondent said. Other livelihood activities the respondents said they were engaged in included; brick making, gold mining, quarrying, casual labor in nearby towns, Aloe Vera extraction because it has ready market and also used as medicine for both livestock and humans, and finally crop farming.

#### 4.1.3 Food Security Outcomes from Household Hunger Scale (HHS)

The Household Hunger Scale (HHS) was administered to 30% of FGD participants selected at random after each FGD held. The Household Hunger Scale (HHS) is a simple indicator used to measure household hunger in food insecure areas.

The HHS is different from other household food insecurity indicators in that it has been specifically developed and validated for cross-cultural use; meaning that the HHS produces valid and comparable results across cultures and settings so that the status of different population groups can be described in a meaningful and comparable way to assess where resources and programmatic interventions are needed and to design, implement, monitor, and evaluate policy and programmatic interventions (Ballard *et al.*, 2011: p1). See HHS in appendix 7.

**Table 7: HHS Sores of Respondents**

	<b>Response</b>	<b>n =</b>	<b>Male</b>	<b>Female</b>
Q1. <i>In the past 4 weeks/30 days, was there no food of any kind in your house because of lack of resources to get food?</i>	No	1	1	0
	Yes	9	3	6
Q1a. <i>How often did this occur?</i>	Rarely (1-2 times)	0	0	0
	Sometimes (3-10times)	8	3	5
	often (>10 times)	1	0	1
Q2. <i>In the past 4 weeks/30 days, did you or any household member have go to sleep at night hungry because there was not enough food?</i>	No	0	0	0
	Yes	10	4	6
Q2a. <i>How often did this happen?</i>	Rarely (1-2 times)	1	1	0

	Sometimes (3-10times)	5	2	3
	often (>10 times)	4	1	3
Q3. <i>In the past 4 weeks/ 30 days, did you or any household member go the whole day and night without eating anything at all because there was not enough food?</i>	No	4	3	1
	Yes	6	1	5
Q3a. <i>How often did this happen?</i>	Rarely (1-2 times)	2	0	2
	Sometimes (3-10times)	3	1	2
	often (>10 times)	1	0	1

Source: Field data, July 2018

Out of the Household Hunger Scale questionnaires administered, 9/10 respondents reported that in the past four (4) weeks/ one month from the time of the interview, they had instances when they had no food of any kind in their households due to lack of resources to acquire food. 1/10 respondents reported no instance when there was no food of any kind in their house due to lack of resources to get food. These findings are serious in that 90% of the sampled households reported a lack of resources to secure access to food.

For 8/9 respondents who reported to have had instances when they had no food of any kind in there households due to lack of resources, it only occurred sometimes (3-10 times) in the past one month before the interview. 1/9 respondents reported to have had instances when they had no food of any kind in there households due to lack of resources occurring often (more than 10 times) in the past one month.

100% of respondents interviewed reported that they or any of their household members had ever had to go to sleep at night hungry because there was not enough food in the house. This occurred rarely (1-2 times) to 10% of the respondents, sometimes (3-10 times) to 50% and often (more than 10 times) to 40% of the people in the past one month from the time of the interview. This indicates that almost all households experienced instances where there was not enough food.

60% of the respondents reported instances where they or any of their household members had to go the whole day and night hungry without eating anything at all because there was not enough food and this occurred rarely (1-2 times) to 20% of the respondents and sometimes (3-10 times) to 40% of the respondents. 40% of the respondents reported to have never experienced such in the past one month before the interview.

**Summary Findings**

According to the respondents, pastoralism remains the most feasible livelihood option as crop farming cannot guarantee food availability due to unpredictable weather patterns. Pastoralism contributes to household food security of over 80% of pastoralists.

There is high prevalence of food insecurity among Karamojong pastoral communities with over 40% of respondents reporting to have had instances where they or any of their household members had to go the whole day and night hungry without eating anything at all because there

was not enough food and this occurred sometimes (3-10 times) in the past four weeks preceding the time of the interview.

59% of respondents are optimistic that pastoralism will still remain very important in ensuring household food security of pastoralists in the next ten years; 41% see the future of pastoralism with pessimism because of high prevalence of livestock diseases without adequate veterinary services and increasing population pressure on land.

Communities are involved in unsustainable coping strategies like firewood and charcoal selling as alternatives for income.

## 4.2 Food Security Outcomes for Different Household Categories

The research sub-question answered in this section is: *“In what ways do food security outcomes differ between different pastoralist household categories? (I.e. female headed visa-vis male headed, rich visa-vis poor)”*.

To answer the research sub-question stated above, a household questionnaire with the Food consumption Score (FCS) incorporated in it was administered to twenty eight households to measure food consumption for male headed, female headed, poor and rich households. There was no available data on household categories but the researcher sought assistance and support of the local leaders in identifying the different household categories.

Two comparisons were made; female headed households vis-à-vis male headed households presented in section 4.2.1 and rich households vis-à-vis poor households presented in section 4.2.2.

### The Food Consumption Score and Threshold Values

The FCS is a composite score based on dietary diversity, food frequency, and relative nutritional importance of different food groups; it is a standardized and more transparent methodology which allows repeatable data analysis within a dataset (one analyst can easily reproduce the FCS on a dataset identical to that created on the same dataset by another analyst) and comparable analysis between datasets (World Food Programme, 2008: p5). The data presented herein represents a summary of Food Consumption Scores of the four household categories in Rupa sub county-Moroto, Uganda.

According to World Food Programme (2008: p9), once the Food Consumption Score is calculated, the thresholds for the food consumption groups should be determined based on the frequency of the scores and the knowledge of the consumption behavior in that community/region.

In administering the FCS, a majority of households scored the maximum value, 7 on consumption of vegetables and fruits whose main source was gathering (see appendix 1, food items 14 and 15). In this pastoral area, wild vegetables and fruits only grow during the rainy season and this means, there is no guarantee of continued consumption of wild vegetables and fruits as weather conditions are unpredictable. This prompted the researcher to shift the FCS thresholds and modified based on the context and consumption patterns of the household categories under study as indicated in table 8.

**Table 8: Adjusted FCS Thresholds**

FCS (WFP)	FCS (Adjusted)	Profiles
0-21	0-28	Poor
21.5-35	28.5- 42	Borderline
>35	>42	Acceptable

Source: Adapted from WFP (2008)

### FCS Scores

The FCS was administered to a total of twenty eight households (7 female headed, 7 male headed, 7 poor and 7 rich households).

One-fifth of the households (21.4%) interviewed have poor Food Consumption Scores, 25% are borderline and 53.6% have acceptable Food Consumption Scores. This means that just over half of the households (53.6%) are food secure and that the other half (46.4%) are vulnerable to food insecurity. 25% food insecure and 21.4% are stressed because they have poor Food Consumption Scores. See appendix 1 for calculated Food Consumption Scores of household categories and table 8 below for FCS frequencies.

**Table 9: Food Consumption Score Frequencies**

	Frequency	Percent	Valid Percent	Cumulative Percent
0-28 (poor)	6	21.4	21.4	21.4
28.5-42 Valid (Borderline)	7	25.0	25.0	46.4
>42 (Acceptable)	15	53.6	53.6	100.0
Total	28	100.0	100.0	

Source: Field data, July 2018

### FCS across Household Categories

Table 8 presents an overview of the FCS of different household categories.

#### Female vis-à-vis Male headed Households

Results from Food Consumption Score administered indicate that; more than 70% of female headed households lie in the poor and borderline FCS and only 28% of female headed households have acceptable Food Consumption Score in the consumption classification.

#### Rich vis-à-vis Poor Households

All rich households have acceptable Food Consumption Scores. 43% of poor households have poor FCS, 29% have borderline FCS and 28% have acceptable FCS. 14% of male headed households have poor FCS, 28% have borderline FCS and the rest have acceptable Food Consumption Scores.

**Figure 6: FCS Frequency Distribution for Household Categories**



Source: Field data, July 2018

#### 4.2.1 Female Headed vis-a-vis Male Headed Households

Approximately one-third (32%) of households in Karamoja are female headed; of these 81% are illiterate as compared to 68% of male heads of household and therefore female headed households are deemed to be highly vulnerable to food insecurity (Security and Assessment, 2017: p6). Since FCSs are used as proxies to indicate household food security status (WFP, 2008, p. 4), the Food Consumption Scores from the field data were used to reflect household Food Security status.

The field data collected indicates that 71% of female headed households have poor and borderline FCSs compared to 42.8% male headed households and therefore female headed households are more food insecure and vulnerable than male headed households as indicated in table 9.

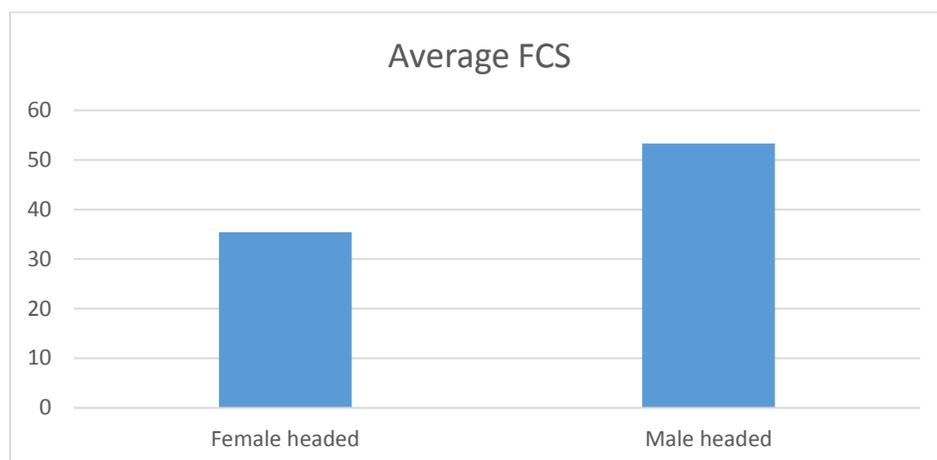
**Table 10: Mean FCS for Female Headed and Male Headed Households**

HH Category	Average FCS
Female headed	35.4
Male headed	53.3

Source: Field data, July 2018

Female headed households have a borderline mean FCS of 35.4 compared to male headed households with 53.3 mean FCS which is an acceptable FCS. From this observation, female headed households are more Food Insecure and Vulnerable than male headed households as seen in figure 8. However this should not mean that all male headed households are not food insecure; as 42.5% of male headed households have poor and borderline FCS; therefore food insecure.

**Figure 7: Mean FCSs for Female Headed and Male Headed Households**



Source: Field data, July 2018

#### 4.2.2 Rich Households vis-a-vis Poor Households

According to UNHS (2017, p.119), poverty in Karamoja sub-region is estimated at 60.8%; the highest when compared with for example Kampala with 5.6% poverty rate. Poor households therefore constitute the majority of households in Karamojong communities as compared to the rich households.

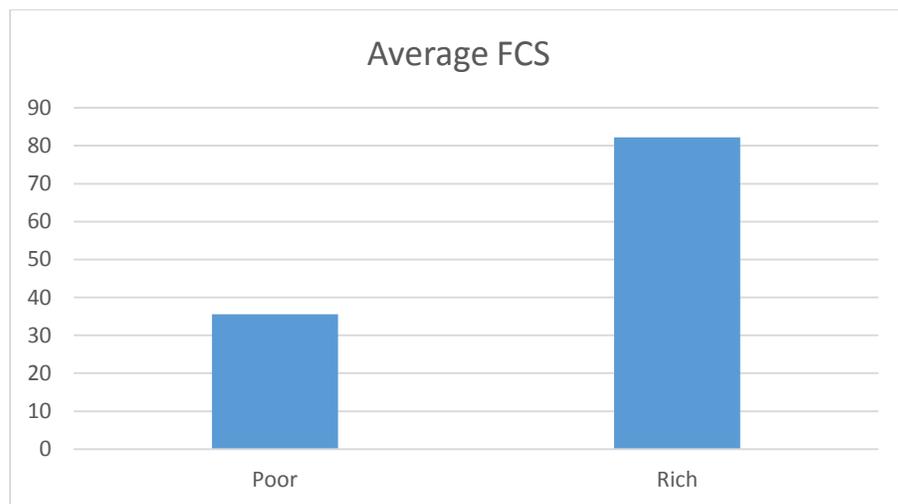
Results from FCS questionnaires administered to rich and poor household indicate that; 42.8% have poor Food Consumption Scores, 28.6% have borderline and 28.6% have acceptable Food Consumption Scores. 100% of rich households have Food Consumption Scores above the borderline and therefore acceptable; they are not food insecure. 71.4% of poor households are stressed and food insecure. This implies that rich households are 71.4% more food secure than poor households. The mean FCS for the rich and poor households when compared indicates a significant range as indicated figure 9. Poor households have a borderline mean FCS of 35.6 and the rich households have acceptable mean FCS of 82.2; see table 10.

**Table 11: Mean FCS for Poor and Rich Households**

HH category	Mean FCS
Poor	35.6
Rich	82.2

Source: Field data, July 2018

**Figure 8: Mean FCS for Poor and Rich Households**



Source: Field data, July 2018

Correlating household categories and Food Consumption Scores using a 2-tailed test indicates a strong correlation between household category and FCS; this signifies that household category has a strong influence and determines the outcome of household FCS. Correlation of FCS with household category has weak and negative correlation values (-.338); this signifies that FCS has no influence over household category and does not determine any household category as indicated in table 12.

**Table 12: Correlation between Household Category and FCS**

		Household category	Food Consumption Score
Household category	Pearson Correlation	1	-.338
	Sig. (2-tailed)		.079
	N	28	28
Food Consumption Score	Pearson Correlation	-.338	1
	Sig. (2-tailed)	.079	
	N	28	28

Source: Field data, July 2018

### Summary Findings

The field data collected indicates that 71% of female headed households have poor and borderline FCSs compared to 42.8% male headed households with poor and borderline FCSs. Therefore female headed households are more food insecure and vulnerable than male headed households.

100% of rich households have Food Consumption Scores above the borderline and therefore acceptable; they are not food insecure. 71.4% of poor households are stressed and food insecure.

### 4.3 Vulnerabilities of Different Household Categories

The research sub-question answered in this section is; *“What differences do exist in household vulnerability in terms of sensitivity, exposure and adaptive capacities in the face of climate change?”* To answer the above research sub-question, a household questionnaire with both structured and semi-structured questions was administered to different household categories and assessment of Hunger and Climate Vulnerability (HCVI) was done as indicated in section 4.3.1.

In the face of climate change, household Vulnerabilities may vary in terms of Exposure, Sensitivity and Adaptive Capacity among the rich, poor, female headed and male headed households. Oxfam (2012: p4) defines Vulnerability as characteristics and circumstances of a community, system, or asset that makes it susceptible to the damaging effects of a hazard or the impacts of climate variability. It is a function of risks and the ability of the household to manage the risks that predispose them to food insecurity.

#### 4.3.1 Assessment of Vulnerability Levels

##### Vulnerability to Food Insecurity

During household interviews, respondents were asked to what level they *“agreed/ disagreed”* with the statement that; *“Your household is vulnerable to food insecurity”*. The responses are summarised in table 12.

Twenty out of 28 respondents (71.4%) *“Strongly agreed”* with the statement that; *“Your household is vulnerable to food insecurity”*. Out of the respondents who *“Strongly agreed”* with the above statement, 10% were rich households, 25% poor households, 35% male headed and the rest were female headed households. *“Of course my household is very vulnerable to food insecurity”*, a female head of household said with a weak smile mixed with sadness, *“I have a lot of anxiety of what the future holds for my family and am not sure what to do about it”*, she added. See case summaries of responses in appendix 3.

Seven out of 28 respondents (25%) *“Agreed”* with the statement that; *“Your household is vulnerable to food insecurity”*. Out of the respondents who *“Agreed”* with the statement above, 57% were rich households, 28.6% poor households and the rest were female headed households.

One out of 28 respondents (3.6%) *“Disagreed”* with the statement that; *“Your household is vulnerable to food insecurity”*. Because this household in the category *“Rich”* has livestock plus other assets and can easily access credit to keep his household food secure as he mentioned; *“I don’t think my household is vulnerable to food insecurity; I am able to provide for my family and I try as much as possible to see that my family is food secure and I can even borrow a loan from the local savings and loan associations to provide food for my household then pay back later”*.

**Table 13: Response to the Statement; "Your Household Is Vulnerable to Food Insecurity"**

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	1	3.6	3.6	3.6
Agree	7	25.0	25.0	28.6
Valid Strongly agree	20	71.4	71.4	100.0
Total	28	100.0	100.0	

Source: Field data, July 2018

### Livelihood Vulnerability due to Climate Change

During household interviews, respondents were also asked to what level they “agreed/ disagreed” with the statement that; “Climate change has added another layer of vulnerability to pastoralists’ livelihoods”. The responses are summarised in table 13.

Twenty two out of 28 respondents (78.6%) said that they “Strongly agreed” with the statement; “Climate change has added another layer of vulnerability to pastoralists’ livelihoods”. Out of the respondents that “Strongly agreed” with the above statement, 22.7% were from the rich category, 27.3% poor, 27.3% male headed and 22.7% were from female headed households. The respondents said that they “Strongly agreed” with the above statement because they have continuously lost their assets due to untimely climate hazards like flash floods which sometimes carry away their livestock, water logging caused loss of sorghum in addition to prevalence of livestock diseases and drought. See appendix 4 for case summaries.

Three out of 28 respondents (10.7%) “Agreed” with the statement that; “Climate change has added another layer of vulnerability to pastoralists’ livelihoods”. Out of the respondents that “Agreed” with the above statement, 33.3% were rich, 33.3% poor and the rest were male headed households. The respondents “Agreed” with the above statement because weather conditions are increasingly unpredictable and with that they can’t plan effectively. In addition, there is increased rate of occurrence of hazards for example flash floods, prolonged dry spells and livestock diseases.

Two out of 28 respondents (7.1%) remained neutral; they neither “Agreed” nor “Disagreed” (all female headed households) with the statement that; “Climate change has added another layer of vulnerability to pastoralists’ livelihoods”: they said they were not sure of what to say regarding climate change and their livelihoods. “Am not sure of what climate change has caused to my livelihood because sometimes these weather changes work to our advantage because if there is too much rain, we have enough grass and water for our livestock although it affects our sorghum, sometimes it’s devastating when there is water logging and/or prolonged dry spells”, the female respondent said.

One out of 28 respondents (rich category) representing 3.6% said that he “Disagreed” with the statement that “Climate change has added another layer of vulnerability to pastoralists’ livelihoods”. Because due to changing weather patterns, there is much rain for example this

year, 2018 and as a result, there is enough water and pasture for their livestock; so they do not have to move to distant places looking for pasture and water for their livestock. *“I don’t see any problem with the changes in weather patterns; in fact it has even favored us because we have enough water and pasture for our cattle. Most times during this time of the year, we experience long dry spells and we are forced to move to distant place in search of pasture and water for our cattle”*, he said.

**Table 14: Response to The Statement; "Climate Change has added another Layer of Vulnerability to Pastoralists' Livelihoods"**

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	1	3.6	3.6	3.6
Neutral	2	7.1	7.1	10.7
Agree	3	10.7	10.7	21.4
Strongly agree	22	78.6	78.6	100.0
Total	28	100.0	100.0	

Source: Field data, July 2018

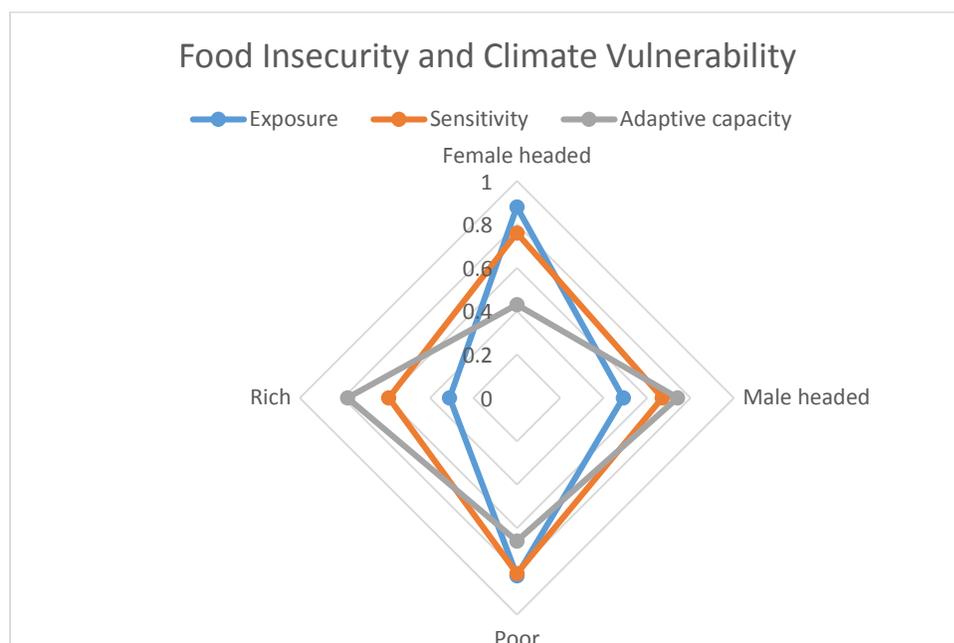
#### 4.3.2 Hunger and Climate Vulnerability

Using the Hunger and Climate Vulnerability Index (HCVI), context specific Indicators for three components of vulnerability (Exposure, Sensitivity and Adaptive Capacity) were identified by the researcher. Indicators were recorded with respect to maximum and minimum values for each of the Exposure (degree of disease prevalence, drought, flash floods and water logging), Sensitivity (% depending on natural vegetation cover to derive livelihoods, % of rain-fed cropping, % of people changing to eat other undesired foods because of lack of enough food, % reducing the amount of food consumed per day due to lack of food and % of people who lost assets due to hazards) and Adaptive Capacity components (% with diversified livestock species, % practicing sustainable rangeland use, % using indigenous knowledge for livestock parasites and disease control and % doing timely planting).

Exposure, Sensitivity and Adaptive Capacity components were then calculated by averaging the recorded indicators. Hunger and Climate Vulnerability Index (HCVI) was then calculated by summing the averaged components and re-scaling between 0 (least vulnerable) and 1 (most vulnerable). Figure 6 below shows summary of results for the different components in the four household categories and appendix 2 for vulnerability contributory factors.

Female headed households are the most Vulnerable household category i.e. have the highest Exposure Index (0.88) to hazards and climate risks with the least Adaptive Capacity Index (0.43) – see figure 9. Rich households are the least Vulnerable household category to Food Insecurity and Climate risks because they have the highest Adaptive Capacity Index (0.78) and the least Exposure and Sensitivity Indices of 0.49 and 0.54 respectively.

**Figure 9: Household Hunger and Climate Vulnerability**



Source: Field data, July 2018

Male headed households are 39% less likely to be exposed to Climate risks and Food Insecurity Outcomes than female headed households who are 2% more Sensitivity to climate risks than male headed households. Female headed households therefore have worse Food Security outcomes than male headed households.

Rich households have 30% less Exposure to climatic hazards compared to poor households. This is because most poor households are engaged in and depend on opportunistic rain-fed crop farming for a living and have few or no livestock. Poor households have 22% more Sensitivity to climate risks and likelihood of occurrence of undesired (poor) Food Security Outcomes and have 12% less Adaptive Capacity compared to the rich households because the majority have a narrow asset base and mostly depend on rain-fed agriculture and have unsustainable coping strategies like charcoal and firewood selling.

### Summary Findings

Majority of respondents (71.4%) “Strongly agreed” with the statement that; “Your household is vulnerable to food insecurity”. 25% of respondents “Agreed” with the statement above. Out of the respondents who “Agreed” with the statement above, 57% were rich households, 28.6% poor households and the rest were female headed households, while 3.6% “Disagreed” with the above statement because they have livestock plus other assets and can easily access credit to keep his household food secure

The majority, twenty two out of 28 respondents (78.6%) said that they “Strongly agreed” with the statement; “Climate change has added another layer of vulnerability to pastoralists’ livelihoods”. 10.7% of respondents “Agreed” with the above statement because weather conditions are increasingly unpredictable. Overall the changing climatic conditions affected all

household categories and therefore “*Agreed*” that their livelihoods have been made vulnerable by climate change save for one respondent who “*disagreed*” the above statement arguing that due to climate change, there is much rain for example this year, 2018 and as a result, there is enough water and pasture for their livestock; so they do not have to move to distant places in search of pasture and water for their livestock.

Female headed households are the most Vulnerable household category i.e. have the highest Exposure Index (0.88) to hazards and climate risks with the least Adaptive Capacity Index (0.43). Rich households are the least Vulnerable household category to Food Insecurity and Climate risks because they have the highest Adaptive Capacity Index (0.78) and the least Exposure and Sensitivity Indices of 0.49 and 0.54 respectively. Rich households have 30% less Exposure to climatic hazards compared to poor households. Poor households have 22% more Sensitivity to climate risks and likelihood of occurrence of undesired (poor) Food Security Outcomes and have 12% less Adaptive Capacity compared to the rich households

## CHAPTER FIVE: DISCUSSION

This chapter discusses the main results of the study presented in the previous chapter (Chapter four). The discussions will compare the study findings with the literature reviewed in the previous chapters of this study.

The first section 5.1 discusses the food security outcomes of pastoralism, section 5.2 discusses food security outcomes for different households (Female headed vis-à-vis Male headed and Rich vis-à-vis poor households). The last section (5.3) discusses Vulnerabilities that exist among different household categories.

### 5.1 Food Security Outcomes of Pastoralism in the Face of Climate Change

In this section, results from the review of secondary data are presented and discussed in section 5.1.1, findings of Focus Group Discussions (FGDs) are discussed in section 5.1.2 and results from Household Hunger Scale are discussed in section 5.1.3.

#### 5.1.1 Food Security Outcomes from Secondary Data

An inter-agency food security and nutrition assessment for Karamoja during the lean season in 2016 found that half (50 percent) of households were moderately or severely food insecure (USAID, 2017). Results from this study also show that 46% (approximately half) of households interviewed were moderately or severely food insecure in a similar season; 25% have borderline FCS and 21.4% have poor FCS.

The Integrated food security Phase Classification (IPC) reported that in the period January 2017 to November 2017 Karamoja experienced a widening food consumption gap with deteriorating dietary diversity and high malnutrition rates (IPC, 2017: p1-3). The affected population included poor households with low meal frequency of up to 1 meal per day because of prolonged dry spells and low purchasing power due to food price increases (IPC, 2017).

In line with the above, this study found deteriorated food security status with 100% of respondents interviewed reporting that they, or any of their household members, had ever had to go to sleep at night hungry because there was not enough food in the house. Households' inability to secure access to food was also found to be caused by increasing food prices and low purchasing power of especially poor households and female headed households

#### 5.1.2 Food Security Outcomes from FGDs

This section discusses relevance of pastoralism, pastoralism in the face of climate change and the future of pastoralism and livelihood options.

##### Relevance of Pastoralism

During Focus Group Discussions, the majority of participants (79%, see table 5), when asked how strong they agreed/disagreed with the statement "*Without pastoralism no food security*", expressed that they "*strongly agreed*" with this statement. They mentioned that pastoralism plays a key role in ensuring pastoralists' household food security and that livestock is the main source of income on which the majority of households depend in times of distress to save their household from hunger.

Because crop farming is highly sensitive to unpredictable weather conditions as currently experienced in the region, agricultural production cannot guarantee household food security.

Also, in case of prolonged dry spells, pastoralists can move livestock to other areas in search of pasture and water, which one cannot do with crops.

This is consistent with arguments put forth by some authors for example Levine (2010: p2) stressed that, *“Although crop harvests are unreliable in most of Karamoja, households that are able to rely on semi-nomadic herding as a main livelihood strategy are able to cope with such crop failures and settled households that depend on rain fed crop agriculture are not able to cope”*.

Two out of the 34 respondents (6%) ‘Agreed’ with the statement; *“Without pastoralism, no food security”* with some reservation. The reason they gave for this is that animals are not just easily sold to buy food, only in extreme situations of hunger they would do so. The majority of pastoralists, especially those proximate to trading centers, depend on selling firewood and charcoal and casual labor to earn some income to purchase food in times of hardship, lest they would rather starve or depend on the little products they get from their livestock, for example milk, ghee etc. This is consistent with Jordaan (2014) who found that, *“Karamojong pastoralists resorted to charcoal and firewood selling as an alternative livelihood activity to cope with the effects of drought”*.

This study found that 12 % of the respondents *“Disagreed”* with the statement *“Without pastoralism, no food security”* claiming that pastoralism these days is losing relevance because animals are dying due to prevalence of diseases and lack of enough veterinary services, animal numbers have reduced and people are finding alternative sources of livelihood. This argument was put forth especially by the poor because they own a few or not any livestock at all. This argument disputes the claim that farming and pastoralism will continue to play a dominant role in Karamoja’s livelihood portfolio for the foreseeable future (IRIS, 2017).

### Pastoralism In the Face of Climate Change

Findings from this study show that pastoralism is a more feasible livelihood option as the contribution of crop farming to pastoralist’s household food security is diminishing due to its sensitivity to unpredictable weather patterns. Pastoralism was the main contributor to food security of over 80% of households interviewed.

Karamojong pastoralists use a range of adaptation measures to cope with the effects of climate change of the most important of these being: livestock diversification by keeping different livestock species for example goats, sheep, cattle, donkeys and poultry for different purposes and addressing household needs of varying magnitudes, moving to distant places in search of pasture and water for their livestock, use of local indigenous knowledge for livestock parasites and disease control, mixed and inter-cropping to mitigate crop losses for example cucumber and sorghum are always mixed cropped.

The high stocking rates in the past rendered pastoralists extremely vulnerable to dry periods (Jordaan, 2014: p41). However, even amidst risks associated with bad weather, household incomes of the different economic groups in Karamoja were broadly comparable with households in the equivalent economic groups in other parts of rural Uganda, particularly once the accumulation of wealth (i.e. increase in herd sizes) is included as income (Levine, 2010).

Karamojong pastoralists especially those with large herds of livestock since they move their animals to areas with pasture and water are more resilient to drought (Jordaan, 2014: p79). This is in line with the findings of this study because moving in search of pasture and water for

livestock implies ownership of a certain number of livestock and this is directly associated with male headed and rich households who have at least better FCS when compared with female headed and poor households respectively.

### **The Future of Pastoralism and Livelihood Options**

According to IRIS (2017), *“Pastoralism and farming will continue to play a predominant role in the portfolio of Karamoja livelihoods in the near foreseeable future and agriculture is not a livelihood sector that will change dramatically”*.

Equally, 59% of participants during Focus Group Discussions were confident that pastoralism will continue to contribute greatly to their livelihoods; specifically to household food security in the coming 10 years because their livestock numbers will have multiplied; therefore they will be rich and able to provide enough food for their households. This finding is in line with Jordaan (2014: p42) who concluded that *“Pastoralism is the most resilient system in Karamoja because it encourages use of low potential land unsuitable for crop farming, allows mobility to areas with better pasture and water, low production costs, adapted to arid climate regimes and allows self-sufficiency and independence”*.

This study however also found that 41% of FGD respondents looked at pastoralism’s contribution to household food security in the next 10 years with pessimism claiming that there was high prevalence of livestock diseases and veterinary service delivery is still weak.

#### **5.1.3 Household Hunger Scale (HHS)**

Results from the HHS indicate that 1 out of 10 (1/10) households interviewed had no instance where there was no food of any kind in their house due to lack of resources to get food. This was particularly a rich household. 9/10 of households in the past four (4) weeks/ one month from the time of the interview reported to have had no food of any kind in their households due to lack of resources to acquire food. This occurred only sometimes (3-10 times) to 80% of the households and often (more than 10 times) to 10% of the households. These findings are serious in that 90% of the sampled households reported a lack of resources to secure access to food.

The Integrated food security Phase Classification (IPC) indicated that between January 2017 and November 2017, Karamoja had a food security stressed population of 0.11 million and that 10% of Karamoja’s population had widening food consumption gaps with deteriorating dietary diversity (40-55%) and high malnutrition rates (IPC, 2017). Perhaps the lack of resources to secure access to food by the majority of the population as stated in the research findings above is the main cause of widening food consumption gaps and high malnutrition rates in Karamoja’s population.

The case study findings are thus in line with the prediction of the Integrated food security Phase Classification (IPC).

### **5.2 Food Security Outcomes for Different Household Categories**

This study found that, 46.4% of households are vulnerable to food insecurity and 53.4% are food secure.

More than 70% of female headed households fell in the poor or borderline food consumption category (all of whom are illiterate). Only 28% have acceptable Food Consumption Scores in

the consumption classification; the majority of those had attended primary education and/or Alternative Basic Education for Karamoja (ABEK). This implies that, level of education has some level of influence on pastoralists' household food security. Illiteracy curtails access to information because one cannot read or write and this influences choice of coping strategies which in turn affect household food security.

Conversely, 72% of poor households do not have acceptable FCSs, the majority (43%) of whom have poor FCSs because they have low purchasing power and food prices are unstable (increasing) as there is increased dependency on the markets for food because crop production is increasingly unreliable. This argument is consistent with FEWSNET findings that during the lean season in June 2018, very poor Karamojong households are heavily reliant on market purchases to access food and relative to a typical lean season, very poor households have greater food access, though access is still insufficient to meet all basic needs and most are consuming wild vegetables, some milk earned in-kind, and cereals purchased from markets (Messages, Calendar and Typical, 2019).

The majority of male headed households (58%) have 'acceptable' (>42) Food Consumption Scores but 28% have 'borderline' (28.5-42) FCS and 14% have 'poor' (0-28) FCS, most of whom are dependent on selling firewood and charcoal. Income from the sale of firewood/charcoal and agricultural labor is likely below average and it is expected that most households have sufficient income to meet their basic food needs, but are Stressed (IPC Phase 2) and relying on less expensive and less preferred foods and limiting expenses on essential non-food items (Messages, Calendar and Typical, 2019).

All rich households have acceptable food consumption scores because they have a wide asset base and high purchasing power thus not much affected by increasing food prices.

### **5.2.1 Female Headed vis-à-vis Male Headed Households**

71% of female headed households interviewed had poor and borderline Food Consumption Scores compared to only 42.8% male headed households; meaning, female headed households were more vulnerable to food insecurity. A majority of female headed households did not own livestock and depended on selling firewood and charcoal, casual labor like doing household chores in nearby towns and farm labor to purchase food.

Male headed households are therefore more food secure than female headed households because the majority of them own at least one species of livestock. They depend on livestock and livestock products such as milk, ghee to improve their dietary diversity and occasionally sell to earn little income for the household to address other food and household needs. This is consistent with Jordaan's argument that; "*Livestock herding in Karamoja is predominantly a male domain and therefore most male headed households own livestock*" (Jordaan, 2014: p42).

### **4.2.2 Rich Households vis-a-vis Poor Households**

Poor households have a 'borderline' mean FCS of 35.6 and therefore they are food insecure compared to the rich households with 'acceptable' mean FCS of 82.2; which implies that they are not food insecure. Over 90% of poor and rich households interviewed have market purchase as their main source of food. This is because these households did not have any stocks of food due to poor yields (mainly sorghum) in the previous two years.

Karamojong people are the poorest in Uganda compared to other regions; they have 60.8% poverty levels compared to Kampala with least poverty rates of 5.6% (UNHS, 2017: p119). The Poor Karamojong households are heavily reliant on market purchases to access food (Messages, Calendar and Typical, 2019) and because they have low purchasing power, they can't keep up with the ever increasing food prices.

There is a strong relationship between household category and food consumption scores. This is because of the varying levels of power to access and control resources. Because women are traditionally (culturally) least privileged, they have limited access to and control over productive assets and therefore rendered most vulnerable to food insecurity as compared to male headed and rich households.

In short, most findings of this research are in line with the literature. This is with exception of arguments from Jordaan (2014) who concluded that; *"Pastoralism is the most resilient system in Karamoja because it encourages use of low potential land unsuitable for crop farming"*. Though findings of this study show that the majority (59%) of FGD respondents were confident that pastoralism will continue to be a key contributor to household food security, almost half (41%) of FGD respondents looked at pastoralism's contribution to household food security in the next 10 years with pessimism claiming that there was high prevalence of livestock diseases and veterinary service delivery was still weak.

This is highly relevant because it signifies ineffectiveness of existing institutions and skewedness of policies and government's development agenda as the unprivileged become increasingly vulnerable to effects of climate change and food insecurity.

### 5.3 Vulnerabilities among Different Household Categories

This section discusses findings of Food Insecurity and Climate Vulnerabilities of the identified household categories. Section 5.3.1 discusses results from assessment of Food Insecurity and Climate Vulnerability of the four household categories (Rich, poor, female and male headed households).

#### 5.3.1 Assessment of Vulnerability Levels

##### Vulnerability to Food Insecurity

When respondents during household interviews were asked to what level they *"agreed/disagreed"* with the statement that; *"Your household is vulnerable to food insecurity"*;

Twenty out of 28 respondents (71.4%) *"Strongly agreed"* with the statement that; *"Your household is vulnerable to food insecurity"*. Out of the respondents who *"Strongly agreed"* with the above statement, 10% were rich households, 25% poor households, 35% male headed and the rest were female headed households. See case summaries of responses in appendix 3. Female headed households *"strongly agreed"* that their households were food insecure because most of them do not have access to and control over productive assets like land and livestock (cattle), there are no more government programmes like cash/food for work which used to support majority of women then, loss of a spouse who used to be household heads and sole bread winner, prevalence of livestock diseases especially tick borne and anxiety because they are not sure of the future in terms of their ability to keep their households food secure and sometimes sleep hungry because of lack of enough food in the household. This is with IRIS argument that the position of Karamoja as the poorest region in Uganda carries with it a host of

socio-economic issues which have made Karamojong households unable to break the cycle of poverty and food insecurity (IRIS, 2017; p6).

Seven out of 28 respondents (25%) “*Agreed*” with the statement that; “*Your household is vulnerable to food insecurity*”. Out of the respondents who “*Agreed*” with the statement above, 57% were rich households, 28.6% poor households and the rest were female headed households. There has been a dramatic reduction of vegetation in Karamoja in the past few years as the loss of cattle to cattle rustling and diseases has forced people to harvest trees for brick making and charcoal as alternative sources of income (IRIS, 2017). Findings of this study also indicate that; though Karamojong households have some assets (livestock) to survive on, they are also involved in other livelihood activities like casual labor, mining and charcoal burning which is environmentally destructive and unsustainable to complement their main livelihood (pastoralism).

One out of 28 respondents (3.6%) “*Disagreed*” with the statement that; “*Your household is vulnerable to food insecurity*”. Because this household in the category “*Rich*” has livestock plus other assets and can easily access credit from local Village Saving and Loan Associations (VSLAs) to keep his household food secure in times of hardship.

Because the majority of female household heads; over 85% are illiterate, they cannot engage in any formal wage or salary labor. These findings are not any far from Karamoja region’s 81% illiteracy rates among female heads of household as compared to 68% of male heads of household and therefore female headed households are deemed to be highly vulnerable to food insecurity (Security and Assessment, 2017: p6).

Other household categories strongly agree that their households are vulnerable to food insecurity because they have limited livelihood options for example livestock which have a risk of disease outbreaks and charcoal burning/ firewood selling.

### **Livelihood Vulnerability due to Climate Change**

When respondents during household interviews were asked to what level they “*agreed/ disagreed*” with the statement that; “*Climate change has added another layer of vulnerability to pastoralists’ livelihoods*”;

Twenty two out of 28 respondents (78.6%) said that they “*Strongly agreed*” with the statement; “*Climate change has added another layer of vulnerability to pastoralists’ livelihoods*”. Out of the respondents that “*Strongly agreed*” with the above statement, 22.7% were from the rich category, 27.3% poor, 27.3% male headed and 22.7% were from female headed households. The respondents said that they “*Strongly agreed*” with the above statement because they have continuously lost their assets due to untimely climate hazards like flash floods which sometimes carry away their livestock, water logging caused loss of sorghum in addition to prevalence of livestock diseases and drought. See appendix 4 for case summaries. This confirms USAID argument that climate change and variability undermine the already limited resources and development in Karamoja through recurring droughts, flash floods and prolonged dry spells (USAID, 2017: p1).

Three out of 28 respondents (10.7%) “*Agreed*” with the statement that; “*Climate change has added another layer of vulnerability to pastoralists’ livelihoods*”. Out of the respondents that “*Agreed*” with the above statement, 33.3% were rich, 33.3% poor and the rest were male headed households. The respondents “*Agreed*” with the above statement because weather conditions are increasingly unpredictable and with that they can’t plan effectively. In addition,

there is increased rate of occurrence of hazards for example flash floods, prolonged dry spells and livestock disease outbreaks. The respondents said there was unexpectedly too much rain within a few months in some years especially this year 2018, resulting to flash floods and water logging which destroyed sorghum gardens hence hunger. This has prompted these pastoral communities to look for any easily available livelihood options which are in most cases unsustainable for example charcoal burning. However, while there have been increasing floods in the region, it is not clear how much of this is as a result of climate variability and how much can be associated with land degradation (IRIS, 2017: p5).

Two out of 28 respondents (7.1%) remained neutral; they neither “*Agreed*” nor “*Disagreed*” (all of which were female headed households) with the statement that; “*Climate change has added another layer of vulnerability to pastoralists’ livelihoods*”: they said they were not sure of what to say regarding climate change and their livelihoods. While the correlation between household vulnerability to food insecurity and education level of respondents was not tested, the researcher asserts that education level of respondents is likely to have influenced their level of perception and response to the questions related to food insecurity and climate vulnerability asked above.

One out of 28 respondents (rich category) representing 3.6% said that he “*Disagreed*” with the statement that “*Climate change has added another layer of vulnerability to pastoralists’ livelihoods*”. Because due to changing weather patterns, there is much rain for example this year, 2018 and as a result, there is enough water and pasture for their livestock; so they do not have to move to distant places looking for pasture and water for their livestock.

### 5.3.2 Hunger and Climate Vulnerability

The vulnerability scores for all the major components (Exposure, Sensitivity and Adaptive Capacity) are discussed in this section. Scores of female headed, male headed, rich and poor households are compared to explore their levels of vulnerability with respect to components stated above.

Findings indicate that; female headed households are most vulnerable with 0.88 Exposure to climate hazards like drought, diseases (both livestock and human), flash floods and water logging in some areas and have the least Adaptive Capacity (0.43). This is because female headed households have the narrowest range of adaptation and coping strategies which are most times unsustainable for example charcoal burning and selling firewood, reducing food consumption, resorting to alternative diets like residue from the local/ traditional brew called “*Kwete*” and “*Ebutia*”.

Male headed households are moderately vulnerable to hunger and climate risks with 0.49 Exposure score, 0.67 Sensitivity and 0.71 Adaptive Capacity. This implies that male headed households are less vulnerable to climate risks and food insecurity as compared to female headed households. This is consistent with food security assessment findings which suggest that female headed households are highly vulnerable as they are worse off on several measures compared to their male counterparts with; lower access to land, fewer households with at least one income earner, and poorer food consumption scores, among others and therefore any interventions to address food insecurity in the region need to deliberately prioritize female headed households (Security and Assessment, 2017: p8).

Rich households are least vulnerable; they have 0.31 Exposure and 0.59 Sensitivity scores as compared to poor households with 0.81 Exposure and 0.8 Sensitivity score (the highest among

household categories). This means that; poor households are the most likely affected by the effects of Exposure to climate risks because they have a narrow asset base and limited livelihood options/ activities in addition to having a low purchasing power.

Heavy rainfall in Karamoja in the month of March to May 2018 led to localized floods, mudslides and water logging, which in turn caused an unconfirmed number of deaths, displaced households, and damaged infrastructure and crops (Messages, Calendar and Typical, 2019: p1-3)

While there may be variations in Exposure, Sensitivity and Adaptive Capacity, all the household categories have indices above zero (0), implying that all households interviewed are exposed to natural disasters and climate variability; therefore vulnerable to climate risks and food insecurity though magnitude of the effect of hazards and food insecurity vulnerability may vary across household categories. Findings could not be compared as other studies have not been published presenting Exposure, Sensitivity and Adaptive Capacity figures.

## CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

This chapter includes conclusions presented in section 6.1 and recommendations of the study presented in section 6.2.

### 6.1 Conclusion

This study was aimed at assessing how vulnerability of pastoral communities in the face of climate change influences household food security among pastoral communities in Moroto district, Uganda. This study concludes that: pastoralism remains the most feasible livelihood option as crop farming cannot guarantee food security due to unpredictable weather patterns; Female headed households are more food insecure than male headed households because they have limited access to and control over productive assets and; Exposure, Sensitivity and Adaptive capacity Indices show that female headed households are the most vulnerable category followed by poor and male headed households. Rich households are the least vulnerable to food insecurity and climate risks because they have a wide range of assets and alternative sources of income to depend on.

#### Pastoralism as most feasible livelihood option in the face of unpredictable weather patterns

Pastoralism remains the most feasible livelihood option as crop farming cannot guarantee food availability due to unpredictable weather patterns and pastoralism contributes greatly to household food security of over 80% of pastoralists. However, there is high prevalence of food insecurity among Karamojong pastoral communities with over 40% of respondents reporting to have had instances when they or any of their household members had to go the whole day and night hungry without eating anything at all because there was not enough food and this occurred sometimes (3-10 times) in the past four weeks preceding the time of the interview. 46% of households have FCSs falling in the poor and borderline categories and therefore vulnerable to food insecurity. The majority of these are female headed and poor households, with illiteracy level of over 80%. Over 85% of households interviewed are involved in unsustainable coping strategies like firewood and charcoal as alternatives for income.

#### Food Security Outcomes across Household Categories

Female headed households are more food insecure than male headed households with 71.4% poor and borderline Food Consumption Scores compared to 42.8% male headed households. Therefore female headed households are over 28.5% more Food Insecure and Vulnerable to Food Insecurity than male headed households. 100% of rich households have Food Consumption Scores above the borderline and therefore are not food insecure. 71.4% of poor households are stressed and food insecure; rich households are 71.4% more food secure than poor households.

#### Hunger and Climate Vulnerability

Female headed households are the most Vulnerable household category to climate risks and subsequently Food Insecurity i.e. have the highest Exposure Index (0.88) to hazards and climate risks with the least Adaptive Capacity Index (0.43). Rich households are the least Vulnerable household category to Food Insecurity and Climate risks because they have the highest Adaptive Capacity Index (0.78) and the least Exposure and Sensitivity Indices of 0.49 and 0.54 respectively.

....

All household categories under study had Exposure, Sensitivity and Adaptive capacity Indices above zero (o), though there may be some variations; implying that all of them are exposed to natural disasters and climate variability and therefore vulnerable to climate risks and food insecurity though vulnerability may vary across household categories. Vulnerability to climate risks and hunger depends on the adaptive capacity of the household.

## **6.2 Recommendations**

Based on the insights drawn from the study, the following recommendations are made as priority for development intervention to reduce Hunger and Climate Vulnerability and build resilience of pastoral communities;

### **Recommendations to both Local and International NGOs**

Because female headed households are the most vulnerable to food insecurity, food security interventions should prioritise targeting and inclusion of female headed households.

There is high use of unsustainable livelihood coping strategies which are destructive and continually affect pastoralists' ability to cope with subsequent shocks and there is therefore need to identify and promote sustainable livelihood alternatives.

The most commonly mentioned hazard to livestock is diseases and parasites. Given the important contribution of livestock to pastoralists' household food security, there needs to be a study instituted to understand epidemiology of the recurrent diseases and parasites in the Karamojong pastoral communities to be able to provide effective and feasible course of action.

### **Recommendations to Government (both Local and National)**

There is need to improve extension and social service delivery to Karamojong pastoralists; especially veterinary service delivery.

The illiterate female headed households had the worst FCSs compared to those who had attended some level of education. Girl child education should therefore be emphasized.

There is need for a long term disaster risk reduction support but not repeated short term interventions and households that cannot cope need long term inclusive social protection programmes.

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# Appendices

## Appendix 1: Food Consumption Scores for Household Categories

	HH Category	FCS	Number of days food group is consumed by household								Classification based on data description
			Cereals&tubers	Pulses	Meat, fish & eggs	Vegetables	Fruit	Oil	Sugar	Milk	
1	male headed	16	2	1	0	3	3	6	0	0	Poor
2	poor	18	6	0	0	7	1	0	0	1	
3	female headed	23	6	1	0	7	0	2	0	0	
4	female headed	23	4	1	1	7	1	0	0	0	
5	poor	27	7	0	0	7	1	2	0	1	
6	poor	27.5	7	1	1	1	1	1	0	1	
7	male headed	30	7	0	0	7	1	0	0	2	Borderline
8	female headed	36	4	1	1	3	4	3	1	3	
9	poor	36	7	1	0	7	0	0	0	3	
10	poor	38	4	2	2	7	1	0	0	2	
11	female headed	38	6	0	0	7	5	2	2	3	
12	female headed	38.5	7	3	1	3	2	5	0	1	
13	male headed	39	7	1	3	3	1	3	0	1	
14	female headed	43.5	7	3	0	7	0	3	0	3	
15	female headed	45.5	5	2	1	7	0	2	3	4	
16	poor	46.5	4	3	2	7	5	3	0	2	
17	rich	49.5	7	1	0	7	7	7	4	3	
18	male headed	52	5	1	3	7	4	2	0	3	
19	poor	56	7	3	2	2	7	5	3	3	
20	male headed	70.5	7	1	2	7	7	5	2	7	
21	male headed	76.5	7	2	4	3	7	4	1	7	
22	rich	82.5	7	7	2	5	7	3	0	7	
23	rich	83.5	7	3	6	4	7	7	0	7	
24	rich	86	7	5	7	2	3	4	0	4	
25	rich	86.5	5	7	3	7	5	7	0	7	
26	male headed	89	7	5	5	7	7	4	0	6	
27	rich	90.5	7	2	7	7	3	7	2	7	
28	rich	97	7	7	4	7	7	7	1	7	Acceptable

Source: Field data, July 2018

## Appendix 2: Household hunger and climate vulnerability contributory factors

Major components	Sub-components	Value	Min.	Max.	Index	Value	Min.	Max.	Index
<b>Male headed Households</b>						<b>Female headed HH</b>			
Exposure contributory factor of Vulnerability	Percentage rate of disease prevalence	60	0	100	0.60	89	0	100	0.89
	Prevalence of drought / unpredictable weather	66	0	100	0.66	100	0	100	1
	Presence of floods and water logging	22	0	100	0.22	75	0	100	0.75
<b>Profile Vulnerability index = 0.49</b>						<b>= 0.88</b>			
Sensitivity contributory factor to Vulnerability	Percentage depending on natural vegetation (forest) as livelihood alternative	71	0	100	0.71	71	0	100	0.71
	Percentage falling to feeding on poor diets	43	0	100	0.43	72	0	100	0.72
	Percentage reducing food consumption and number of meals/day	85	0	100	0.85	85	0	100	0.85
	Percentage practicing rain-fed crop farming	100	0	100	1	100	0	100	1
	Average assets lost to hazards	85	0	100	0.85	57	0	100	0.57
<b>Profile Vulnerability Index = 0.76</b>						<b>= 0.76</b>			
Adaptive capacity contributory factor to vulnerability	Percentage doing livestock diversification	85	0	100	0.85	28	0	100	0.28
	Percentage practicing sustainable rangeland use	57	0	100	0.57	28	0	100	0.28
	Percentage using indigenous knowledge to control livestock diseases and parasites	86	0	100	0.86	57	0	100	0.57
	Percentage doing timely planting of crops especially cereals	71	0	100	0.71	57	0	100	0.57
	Percentage moving with livestock to other places in search of water and pasture	71	0	100	0.71	00	0	100	0.0
<b>Profile Vulnerability Index = 0.74</b>						<b>= 0.43</b>			
<b>Poor Households</b>						<b>Rich Households</b>			
Exposure contributory factor of Vulnerability	Percentage rate of disease prevalence	77	0	100	0.77	52	0	100	0.52
	Effect of drought / unpredictable weather	86	0	100	0.86	37	0	100	0.37
	Presence of floods and water logging	00	0	100	0.00	06	0	100	0.6
<b>Profile Vulnerability Index = 0.82</b>						<b>= 0.49</b>			

Sensitivity contributory factor of Vulnerability	Percentage depending on natural vegetation (forest) as livelihood alternative	85	0	100	0.84	43	0	100	0.43
	Percentage falling to feeding on poor diets	71	0	100	0.71	00	0	100	0.00
	Percentage reducing food consumption and number of meals/day	85	0	100	0.85	71	0	100	0.71
	Percentage practicing rain-fed crop farming	100	0	100	1	100	0	100	1
	Average assets lost to hazards	43	0	100	0.43	57	0	100	0.57
	<b>Profile Vulnerability Index = 0.81</b>					<b>= 0.54</b>			
Adaptive capacity contributory factor of Vulnerability	Percentage doing livestock diversification	57	0	100	0.57	100	0	100	1
	Percentage practicing sustainable rangeland use	57	0	100	0.57	57	0	100	0.57
	Percentage using indigenous knowledge to control livestock diseases and parasites	71	0	100	0.71	71	0	100	0.71
	Percentage doing timely planting of crops especially cereals	71	0	100	0.72	85	0	100	0.85
	Percentage moving with livestock to other places in search of water and pasture	65	0	100	0.65	78.5	0	100	0.78
	<b>Profile Vulnerability Index = 0.64</b>					<b>= 0.78</b>			

Source: Calculated from field data, July 2018

### Appendix 3: Case summaries for household vulnerability to food insecurity

		<i>“Your household is vulnerable to food insecurity”</i>		
Household category	Rich	1	Disagree	
		2	Strongly agree	
		3	Strongly agree	
		4	Agree	
		5	Agree	
		6	Agree	
		7	Agree	
		N		7
	Poor	1	Strongly agree	
		2	Strongly agree	
		3	Strongly agree	
		4	Agree	
		5	Strongly agree	
		6	Agree	
		7	Strongly agree	
		N		7
	Male headed	1	Strongly agree	
		2	Strongly agree	
		3	Strongly agree	
		4	Strongly agree	
		5	Strongly agree	
		6	Strongly agree	
		7	Strongly agree	
		N		7
	Female headed	1	Strongly agree	
		2	Strongly agree	
		3	Strongly agree	
		4	Strongly agree	
5		Strongly agree		
6		Strongly agree		
7		Agree		
	N		7	

## Appendix 4: Case Summaries for pastoralists vulnerability to climate change

		<i>“Climate change has added another layer of vulnerability to pastoralists’ livelihoods”</i>			
Household category	Rich	1	Strongly agree	N	7
		2	Agree		
		3	Strongly agree		
		4	Strongly agree		
		5	Strongly agree		
		6	Strongly agree		
		7	Disagree		
	Poor	1	Strongly agree	N	7
		2	Agree		
		3	Strongly agree		
		4	Strongly agree		
		5	Strongly agree		
		6	Strongly agree		
		7	Strongly agree		
	Male headed	1	Strongly agree	N	7
		2	Agree		
		3	Strongly agree		
		4	Strongly agree		
		5	Strongly agree		
		6	Strongly agree		
		7	Strongly agree		
	Female headed	1	Strongly agree	N	7
		2	Strongly agree		
		3	Neutral		
		4	Neutral		
		5	Strongly agree		
		6	Strongly agree		
		7	Strongly agree		
				N	7

Source: Field data, July 2018

## Appendix 5: Household Questionnaire

VANHALL LARENSTEIN UNIVERSITY OF APPLIED SCIENCES- NETHERLANDS  
HOUSEHOLD QUESTIONNAIRE

**Instructions:** For each question, circle one answer that applies. In the case where options are not provided, write the response in the spaces provided.

**Questionnaire number**..... **Date of the interview**:.....**Location**:

.....

### Section A: Demographic Characteristics

1. (i) Age\_\_\_\_\_ 2. Gender of respondent: (1) Male (2) Female 3. Gender of household head: (1) Male (2) Female 4. Main occupation of household :( 1) Livestock rearing (2) Petty trade (3) formal employment (4) others (specify).....
5. Level of education (1) No formal education (2) primary (3) secondary (4) Tertiary education

### Section B: Food security outcomes for different categories

#### 6. Food consumption score

I would like to ask you about all the different foods that your household members have eaten in the last 7 days. Could you please tell me how many days in the past week your household has eaten the following foods?

#	Food item	# days eaten in the past week (0-7 days)	Source of food (see codes below)	
			Primary	Secondary
1	Maize			
2	Rice			
3	Bread/ wheat			
4	Tubers			
5	Groundnuts and pulses			
6	Fish (eaten as main food)			
7	Fish powder (used for flavor only)			
8	Red meat (sheep/goat/beef)			
9	White meat (poultry)			
10	Vegetable oil, fats			
11	Eggs			
12	Milk and dairy products (main food)			
13	Milk in tea in small amounts			
14	Vegetables (including leaves)			
15	Fruits			
16	Sweets, sugar, honey			

#### Food source codes

Purchase =1 Own production =2 Traded goods/ services, barter =3 Borrowed =4  
Received as gift =5 Food aid =6 Others (specify) =7

**Section C: Sensitivity and exposure**

7. Climate change has added another layer of vulnerability to pastoralists' livelihoods. Do you agree?

2= strongly agree, 1=agree, 0=neutral, -1 disagree, -2=strongly disagree

8. Give an explanation to the answer above.

9. How have your livelihood activities been affected by climate change (e.g. unpredictable weather conditions)?

10. What hazards did you experience in the past 5 years and how many times did they occur?

Hazard	Number of times

11. How did these hazards affect your household?

12. Do you agree that your household is vulnerable to food insecurity?

2= strongly agree, 1=agree, 0=neutral, -1 disagree, -2=strongly disagree

13. Why do you say your household is vulnerable to food insecurity or otherwise?

14. What do you think is perpetuating this kind of vulnerability?

**Section D: Identification of Coping, Adaption Strategies**

15. What are some of the ways you have used to cope or adapt with the prevailing hazards and climate variability to ensure household food security in the past 5 years?

Coping Strategy	Tick	Adaptation	Tick
Income from off-the Kraal jobs (livelihood diversification). E.g. charcoal burning, casual labour etc.		Diversification of livestock species kept	
Sell assets/ livestock to cope with the effects of hazards.		Moving to distant places in search of pasture and water for livestock	
Reducing food consumption		The use of local indigenous knowledge for pests and disease control	
Change to poor diet		Sustainable rangeland use	
Rain-fed crop farming		Timely planting	

**END**

## Appendix 6: Focus Group Discussion Guide

### FOCUS GROUP DISCUSSIONS GUIDE

#### Questions

1. “*Without pastoralism, no food security for my household*”. Do you agree with this statement?  
2= strongly agree, 1=agree, 0=neutral, -1 disagree, -2=strongly disagree.
2. Give reasons for the answer selected.
3. What has kept you in livestock rearing as a livelihood option even amidst varying and unpredictable climatic conditions?
4. What other livelihood options would you consider feasible in this current state of climate change and why?
5. What species/ categories of livestock do you keep? Why are you keeping these categories?
6. What measures have you taken to improve productivity at household level to ensure food security?
7. Do you think that pastoralism in ten years from now is as important to your household food security as it is today? Why, why not?

## Appendix 7: Household Hunger Scale

No	Question	Response option	code
Q1	In the past 4 weeks/30 days, was there no food of any kind in your house because of lack of resources to get food?	0=No (skip to Q2) 1=Yes	__
Q1a	How often did this happen in the past 4 weeks/30 days?	1= rarely (1-2 times) 2= sometimes (3-10 times) 3= often (more than 10 times)	__
Q2	In the past 4 weeks/30 days, did you or any household member have go to sleep at night hungry because there was not enough food?	0=No (skip to Q3) 1=Yes	__
Q2a	How often did this happen in the past 4 weeks/30 days?	1= rarely (1-2 times) 2= sometimes (3-10 times) 3= often (more than 10 times)	__
Q3	In the past 4 weeks/ 30 days, did you or any household member go the whole day and night without eating anything at all because there was not enough food?	0=No (skip the next question) 1=Yes	__
Q3a	How often did this happen in the past 4 weeks/30 days?	1= rarely (1-2 times) 2= sometimes (3-10 times) 3= often (more than 10 times)	__

## Appendix 8: Field Notes

### INTERVIEW NOTES

001. Male respondent- Rich. *"I remember there used to be good harvests when I was a child, we could have granaries filled with sorghum but since then things kept changing, even diseases both human (tuberculosis, typhoid, brucellosis, hepatitis) and livestock (FMD and tick borne diseases) have become so prevalent". "There is an 'unpreferred' grass species (weed) by cattle which has emerged in our grazing lands and this is tremendously affecting the quality of our pasture".*

*"The hazards caused death of livestock. I don't think am vulnerable to food insecurity; am able to provide for my family and I try as much as possible to see that my family is food secure. If hunger becomes so severe, I can even borrow a loan from the local savings and loan associations then pay back later".*

*"To sustainably build resilience in my household, there is need for improved veterinary service delivery so that our animals are kept healthy because they are our "granaries" for food and I just wish the government could be able to inform people on the weather and other expected hazards so that we are prepared. Also the government needs to support us in times of hazards and emergencies". "Am trying to educate my children and hopefully they can be able to support their families in future".*

002. Female respondent-Female headed. *"Am not sure of what climate change has caused to my livelihood. Sometimes these weather changes work to our advantage because if there is too much rain, we have enough grass and water for our livestock although it affects our sorghum, sometimes it's devastating when there is water logging and/or prolonged dry spells".*

*"We experience hunger every year especially 3-5 months after harvests up to the time of harvest again depending on how good the harvest is that year". "I lost sorghum in the garden because it could not germinate because of water logging. I also had to painfully sell a few goats I had to buy food for the family. It is uncommon for us to sell livestock especially cattle to buy food; we would rather starve because we are not certain of the future". "It's not good to lose your livelihood security at a go". "These hazards also affected my decision making; I cannot make any smart decisions anymore because rainfall patterns can change anytime, sorghum harvests are worsening every year and I have become more vulnerable to food insecurity".*

*"I think what is perpetuating my vulnerability to food insecurity is the diminishing support from government because there is no longer food aid, climate change causing a lot of uncertainties and besides I have a very limited source of livelihood (livestock)". "I think I can reduce vulnerability of my household by diversifying livelihood options; am not certain of the alternatives at the moment but I think finding other options is feasible in addition to educating children".*

003. Female respondent-Female headed. *"I strongly agree that climate change is adding another layer of vulnerability to pastoralists' livelihood because crop gardens are no longer productive and therefore poor harvests, there are prolonged droughts and rainfall has increasingly become unpredictable there affecting pastoralists' decision making". "I have now resorted to charcoal burning and selling firewood for a living". "Yes my household is very vulnerable to food insecurity because I don't have productive assets (e.g. cattle) which one may think of selling to buy food and also act as livelihood security in case of hardships". "Also am the only productive in my home with one child and taking care of my elderly husband, therefore I do not have any one else to support me to produce enough food for the family".*

*"I don't know what's perpetuating this vulnerability, may be the gods are not happy with this land". "There was a lot of insecurity in this land, a lot of people we killed as a result of armed cattle rustling; that could have annoyed the gods". "May be I have to work hard in all ways possible to ensure that I also buy some livestock to reduce vulnerability". "Also the government or NGOs need to provide productive assets to the most vulnerable e.g. oxen and ox-ploughs". "Sometimes I feel it is better to just migrate to other places with better weather conditions and start crop farming".*

004. Female respondent-Female headed. *"Yes climate change has added another layer of vulnerability to pastoralists because the rains have become unpredictable and there is persistent hunger even in the neighboring sub counties due to poor livestock and crop productivity". "We used to rely on food for work but now it is no more". "Now we are forced to go for casual labor in Moroto town and relying on charcoal burning and sale of firewood to town dwellers to at least find something to eat". "I lost assets and my household income sharply dwindled because of persistent hazards in my household".*

*"Yes my household is now strongly vulnerable to food insecurity because I mainly depend on charcoal burning and casual labor as the only sources of money to be able to buy food because there is no one to assist/support me". "Bad weather is perpetuating this kind of vulnerability and in order to reduce vulnerability to food insecurity, there needs to be a focus on livestock accumulation because I see those with livestock are better-off than those without because they feel secure and sure of a living even in very tough times". "Life without livestock is full of anxiety, worries, uncertainty and insecurity because you are not sure what tomorrow has for you". "Increasing crop production by strengthening extension service delivery by government".*

005. Female respondent- Female headed. *"I actually recognize significant changes in weather patterns and strongly agree that it's really affecting pastoralists' livelihoods". "There are a lot of diseases compared to the past when I was in my teen age and people are always going hungry in addition to persistent crop failure". "Now am forced to solely depend on natural resources i.e. existing trees to sell firewood and burn charcoal and am poor because I don't have livestock; my income is very low. Am so stressed and keep worrying of the future". "I strongly agree that my household is vulnerable to food insecurity because I have no support from any man since my husband died in 2015 and I don't have any alternative source of income". "I think the gods are not happy with us and also the unpredictable weather patterns associated with climate change the governments are talking about". "There is need for more support from government and NGOs; there used to be cash for work and food for work in public works those days, it really used to help us a lot but it's no more. Now we only depend on selling firewood and charcoal".*

006. Male respondent- Male headed. *"Yes, I agree that climate change has added another layer of vulnerability to pastoralists livelihood because for example this year (2018), there has been too much rainfall which caused water logging and spoilt our sorghum: it couldn't germinate and most times after harvests, we only have food for a few months and most of the times of the year we are stressed with hunger". "This has affected my activities because am force to diversify activities to earn a living". "I have been experiencing a number of hazards which include drought, water logging, livestock disease outbreaks and hunger in the past 5 years; I lost a lot of livestock and crops failed consecutively and obviously being hungry and food insecure". "Yeah, I strongly agree that my household is food insecure because my household is hungry and am at a risk of losing all my livestock if I continue selling them every time the household needs food and if disease outbreaks persist". "I think it's because I have limited livelihood options and unfavorable weather conditions which perpetuate my vulnerability to food insecurity". "Diversifying livelihood activities will help build resilience in addition to government and NGOs support inform of food or cash for work while providing investment grants to enable asset*

*accumulation and working towards improving financial inclusion for women; there are existing VSLAs but not everyone belongs to them and also we need to educate our children”.*

007. Female respondent-Male headed HH. *“Yes I strongly agree, this climate change has added a lot of vulnerability to pastoralists livelihoods because every year we rely on charcoal burning and casual labor to provide food for the household; we can’t produce enough for the household and we experience hunger every year”. “These days we are perpetually dependent on existing trees for charcoal and firewood for sale to be able to buy food. Because of the hazards, am weaker: I lost assets (livestock) and now am unable to provide enough food for my household”. ‘Of course my house is very vulnerable to food insecurity’, with a weak smile mixed with sadness, “I have a lot of anxiety of what the future holds for my family and am not sure what to do about it”. Am not sure what is perpetuating this vulnerability but what am sure of is that am what I am because am not educated, so I can’t be employed by anyone, “I wish my parents had taken me also to school” with an emotional expression. I don’t know what can be done, “hunger has become part of our lives, and we have no other ways of living apart from just getting used to living with it, maybe the government can do something about it!”*

008. Male respondent-Rich. *“Yes I agree, the productivity of our livestock has gone down. Animals are sick continuously and pasture is poor. There is a weed which is seriously affecting the quality of our pasture and animals don’t even eat it. We are now resorting to selling firewood to diversify our sources of income for the household. I have experienced a number of hazards which include; livestock diseases, drought and hunger most years in my household. I strongly recognize that my household is vulnerable to food insecurity because even if am able to provide for my family because I can sell an animal to rescue my family from hunger, these animals can easily get finished by the constant outbreaks of diseases: there I will have lost all the productive assets and the respect I have in this community. May be because we can’t plan properly for our assets (livestock) that’s why we are persistently vulnerable to food insecurity and also our history is long: it is just of recent that we stopped raiding each other as a result of forced disarmament by the government. I think insecurity also contributed a lot to our vulnerability to food insecurity but with security in place, I think things will change in the near future. The government needs to maintain security and continue enforcing law and order to eliminate even a few cattle thefts which are still occurring”.*

009. Male respondent-Rich. *“I strongly agree that climate change has added another layer of vulnerability to pastoralists’ livelihood because the sorghum we used to grow no longer grows well due to bad weather. The rains have become unpredictable, like this year water was too much that it affected germination of crops planted; so I don’t expect any harvests to supplement food got from livestock. My wife sometimes takes firewood to Moroto town to sell and comes back with maize flour and we have resorted to depending on market to purchase food. I experience flash floods every year and “lowokot” (babesiosis) has become a very common livestock disease in my herd, I don’t know what to do about it. With these hazards my livestock died and flash floods in Matheniko river carried away one of my relatives. I agree that my household is vulnerable to food insecurity because we sleep hungry sometimes because of lack of food in the house. Years have continuously become bad and I think it’s the unpredictability of rainfall which has caused this. There is need to improve financial access for the most vulnerable groups like mothers, the elderly and the disabled. I think education can also help us reduce vulnerability because for example am a student of ABEK”.*

010. Male respondent-Rich. *“Yeah, climate change is strongly adding problems to pastoralists’ livelihoods because livestock and human pests and diseases have become so prevalent. There is hunger even in households with large herds of cattle. This prompted migration of one of my*

family members to nearby gold mining site to do casual labour. It is pests and diseases in addition to hunger which I faced in the past five years. My household labor reduced as one of the household members migrated to the gold mines. Vulnerability to food insecurity is real and I agree with it because we don't have enough food for household consumption. I even don't know what is perpetuating this kind of vulnerability. We need to improved livestock production so that we are able get enough milk and other livestock products. Also good animals if sold will earn you good money because I really see our cattle are not of good quality which can fetch a good price in the market".

011. Female respondent- male headed. "Yeah, I think people have become more vulnerable these days because of climate change. It's probably the reason both human and. livestock diseases are so prevalent these days. Now we have resorted to cutting down trees for charcoal burning and firewood. We had to sell some of the livestock to purchase food. I strongly agree, my household is vulnerable to food insecurity because sometimes we sleep hungry, we don't produce enough food for example last year we had very poor sorghum harvest and this year there is no hope for any harvest. We just depend on the market to access food. I think over dependency on natural resources e.g. Current weather conditions, forests etc. is perpetuating our vulnerability to food insecurity. Finding alternative sources of income e.g. mining, trade etc. can reduce vulnerability of my household".

012. Female respondent-Poor household. "I strongly agree that climate change has caused as more problems coz hunger is so persistent. People can't have enough to eat coz they can't produce it or can't afford enough from the market. This has prompted us to go for casual labor and charcoal burning to be able to buy food. Our cattle is a bank: it's so painful to sell a cow for food unless hunger hits harder that's when we can sacrifice to sell at least one cow to survive the hunger. Some diseases associated to poor feeding emerged in my household. One of my children fell so ill and she is now on supplementary feeding programme WFP. With this I strongly agree that my household is vulnerable to food insecurity because unless we sell charcoal or firewood or go for casual labor, we hardly anything to eat. I think persistent crop failure has caused our vulnerability to persist and I don't think there is anything we can do to remove hunger, it has become part of this land unless we are to migrate to other places".

013. Female respondent-Male headed. "Think it is climate change which has led to emergence of some strange weed species in this land. It is not palatable to livestock and it is affecting the quality of our pasture and because of this, I strongly agree that climate change has added another layer of vulnerability to pastoralists' livelihoods. I can't cultivate sorghum anymore because it is the same as not cultivating. My crop gardens has failed consecutively in the past 3 years due to hazards like drought and pests and now I don't have food. "Look at those two granaries, they are completely empty. In good years, they are full with sorghum", he said. Constant variation in food availability is perpetuating food insecurity vulnerability in my household. I have no idea of what we can do to become resilient and get out of this problem for once and for all".

014. Female respondent-Male headed. "There are a lot of animals dying these days, even crops have poor yields and of poor quality and because of this I strongly agree that climate change is affecting pastoralists' livelihood. Untimely prolonged droughts affect us every year and this has led to persistent food insecurity in my household. I also strongly agree that my household is vulnerable to food insecurity because we sleep hungry sometimes because we don't have resources to purchase food. We are not sure of what to do maybe because we are illiterate and I guess this is what is keeping us in this state. To get out of this I think we as a household can

also Identify alternative income generating activities like petty trade (brewing local beer) and going for gold mining to be able to provide for our household”.

015. Female respondent-female headed. *“I no longer have any livestock, we had a disease outbreak here which wiped out all my herd of goats in 2015. From then I depend on selling firewood and casual labor to provide for my family. This climate change has really caused devastating effects on our livelihoods. As I earlier mentioned it is disease outbreak and I lost my main source of livelihood. I strongly agree that my household is vulnerable to food insecurity: we don’t have enough food to eat and besides I do not have any livestock to sell in order to purchase food for my household. I do not have any person to help me in the household since my husband died six years ago perhaps that’s why my household is perpetually vulnerable because I remember we never used to be like this when my husband was alive because he could provide for the family or it might be the gods who are not happy because I see most people in our village here do not have enough to eat. The government should find ways of providing food to the most vulnerable just as it has been supporting the elderly (social protection)”.*

016. Male and Male headed. *“Yes I strongly agree because conditions have really changed, people are really suffering compared to the past. There is hunger almost throughout the year. This has affected us a lot, we are even most time not certain of which activities to involve ourselves in because weather conditions are unpredictable causing a number of hazards which have been affecting us e.g. drought, diseases. A number of illnesses have affected us due to poor quality of water we use. I agree that my household is vulnerable to food insecurity because sometimes we just eat residue from local brew and sleep, when firewood or charcoal fails to be sold we have to just sleep hungry. I think this is perpetuated by a lack of resources (assets) in the family. The few animals we have can’t provide enough for the family at all times. I think we need to diversify our activities e.g. going for quarrying, mining etc. and the government should maintain sustainable peace and security so that we have space to find ways of survival. Also we need to adopt mixed cropping/ inter-cropping so that incase one crop fails, we can survive on the others”.*

017. Male respondent-Rich household. *“Our soils are poor at water retention and with these unpredictable weather, we can’t produce anything and a strange weed has emerged which has affected our grazing areas and with these I strongly agree that climate change has added another layer of vulnerability to pastoralists’ livelihoods. Sometimes some of my household members go mining and sometimes sell firewood. Yeah I experienced some hazards which include drought, water logging, diseases in both livestock and human and hunger. I was unable to support friends and relatives as I always used to. This made me to lose some of my social capital. Yeah I agree that I may also be vulnerable to food insecurity because I may be secure for now but we never know what happens in the future as there is too much uncertainty due to climate change. I think some people are just lazy that’s why they are perpetually vulnerable and also uncertainty causing fear/anxiety so people have lost confidence in themselves. To build resilience, we need to persist and work hard towards improving household food security, build a lot of social capital so that people can come to your rescue when you are in need, cereal banking and petty trade”.*

018. Female respondent- Poor household. *“I see a lot of changes/ patterns in which our lives are affected e.g. increasing prevalence of diseases, crop failure, changing rainfall patterns causing water logging and flash floods but I don’t know if it is really climate change causing that (am neutral). Due to above changes, we are now forced to opt for gathering wild fruits and vegetables in addition to firewood selling. Due to the hazards, my cattle died, I also lost my only*

son who used to support me. I strongly agree that my household is vulnerable to food insecurity because we starve sometimes because there is no food to eat, depend on gathering and selling firewood to buy food. I think God is not happy with us, our crops have failed consecutively: we have nothing to harvest. This is what is perpetuating our vulnerability to food insecurity. In order to get out of this vulnerability, I think we need to have a variety of activities we do so that when one activity is affected one can survive from the other”.

019. Female respondent-Female headed. “I strongly agree that climate change has added another layer of vulnerability to pastoralists’ livelihoods because there are hardly any good harvests for sorghum and diseases are so prevalent (in both human and livestock). We are now forced to do things we never used to do like cutting down trees to sell as firewood and charcoal. There have also been a lot of hazards e.g. prolonged droughts, too much rain sometimes, diseases etc. and this has made us strongly vulnerable because we lost all our productive assets, do not have enough to eat, continuously depend on relatives and any well-wisher who comes around and gives me something to eat. Coping is really hard for me because am already old and cant to a lot of heavy work, am a beneficiary of the government’s social protection programme for senior citizens but the amount I get hardly takes me through a month because its little but I appreciate because it is better than nothing. The government needs to add a helping hand to the most vulnerable”.

020. Female respondent-Female headed. “Because there is persistent hunger and deteriorating productivity for both livestock and crops, I strongly agree that climate change has added another layer of vulnerability to pastoralists’ livelihoods. These days I do mining, charcoal burning and selling firewood as the only alternatives for survival. The hazards are really common here and have just become part of our lives and include; hunger, outbreak of diseases. Now am really stressed, livestock have died and am living in anxiety coz am not sure of tomorrow. Yeah I agree that my household is vulnerable to food insecurity because I no longer have livestock which could act as my security for the future, we sleep hungry some days, have fewer meals per day and there is nothing in those granaries you are seeing standing there. There are a lot of diseases these days killing the livestock I try to acquire and I also think being a widow is one of the things perpetuating my vulnerability; there is no one to support me physically and in decision making. The government should focus on controlling disease outbreaks and improving veterinary service delivery to save our livestock from dying because livestock is key for our livelihood; the rest are secondary”.

021. Male respondent- Male headed. “I strongly agree that climate change has added another layer of vulnerability to pastoralists’ livelihoods because we have lost a number of animals to diseases, we are hungry because there isn’t food in our households. We are just left wondering what to do coz everything we try to do seems not to be working out; we need you as experts to come and help us find feasible ways of survival. There is hunger, livestock and human diseases, sometimes too much rain, untimely prolonged dryness. These hazard especially my sickness affected my productivity as a household head and I also lost some cattle to livestock diseases and this is really affecting my household’s resilience. Yeah I strongly agree that my household is vulnerable to food insecurity because am losing my assets (livestock) to disease, am weak because of this TB. Which has persisted now for 3 years and I no longer can involve myself in hard labor to provide enough for my family. Am failing to understand what perpetuates this vulnerability but I think God is just not happy with us and also these changing weather patterns might be the cause of these prevailing disease”. We need to diversify livelihood options e.g. mining, petty trade, quarrying etc. so that when we fail from one, we are able to gain from the other”.

022. Male respondent-Male headed. *“Yes climate change has added another layer of vulnerability to pastoralists’ livelihoods; I strongly agree because the quality of our pasture is deteriorating because there some weed species emerging affecting the quality of pasture for our livestock, also hardly can we harvest any sorghum from our gardens anymore because of unpredictable weather changes. I think I may not have to change from livestock rearing to other things because I think it’s the only solution to this unpredictable weather though sometimes my wife sells firewood and charcoal to purchase food. The key hazards experienced in this household and the community at large include; disease outbreaks (both livestock and human), hunger which is becoming the order of the day, prolonged dry spells and water logging especially this year and this prompted migration of some household members to gold mines and Moroto town to look for casual work. Yeah I strongly agree that my household is vulnerable to food insecurity because there is no food in store; we live day by day, it’s a hustle to put food on the table. I think it is an accumulated effect of a lot of things including climate change and loss of assets leading to poverty which is perpetuating our vulnerability to food insecurity”.*

023. Poor male respondent-Male headed. *“I strongly agree that climate change has added another layer of vulnerability to pastoralists’ livelihoods because our cattle are sickly, some are dying and this has made us to shift to charcoal burning and gold mining as alternative for a living. Diseases and hunger are really affecting us and this has cause loss of productive assets coz we are forced to sell at least an animal to purchase drugs for the treatment of the others and also buy food for the family. Yeah I strongly agree that my household is vulnerable to food insecurity because sometimes we sleep hungry and we are only left with a few animals to survive on as our livelihood security. I think continuous presence of hazards and climate change is perpetuating my household’s vulnerability to food insecurity. Diversifying livelihood options e.g. seeking casual labor in nearby peri-urban areas, gold mining and crop farming in good years will help build resilience of my household for food security”.*

024. Poor male respondent-Male headed. *“Sorghum is our main food in this land but now there is no more because of poor harvests, I therefore strongly agree that climate change has added another layer of vulnerability to pastoralists’ livelihoods. Some of us have now changed to brick making, selling firewood and charcoal and mining to earn some income to be able to purchase food for the household. There is prolonged droughts, too much rain within a short time, flash floods, hunger and diseases affecting us here e.g. anaplasmosis, foot and mouth disease, babesiosis, etc. in cattle and tuberculosis, malaria, diarrhea, dysentery, trachoma etc.. Now we are stressed and live in anxiety. Yeah I strongly agree that my household is vulnerable to food insecurity because besides livestock, I have no other assets to sell to buy food. I don’t know what is perpetuating this vulnerability. I think the most important things that can be done is keeping large numbers of livestock of different species so that one is able to depend on them for a longer time to address household needs and diversifying livelihood activities e.g. quarrying and seeking casual labor in towns”.*

025. Poor female respondent-Female headed. *“I strongly agree that climate change has added another layer of vulnerability to pastoralists’ livelihoods because the few crops we used to grow to supplement livestock products no longer grow well because of associated effects of climate change like unreliable rainfall patterns causing poor harvests. Now I just sell tobacco to earn little income to provide my needs. The hazards I have experienced include; drought, hunger and diseases. I don’t know these hazards affected my household. Yes I strongly agree that my household is vulnerable to food insecurity because there is not enough food in my household, am not able to harvest anything due to crop failure and sometimes depending on friends and relatives for handouts. I don’t know what is perpetuating this kind of vulnerability; perhaps you people can determine this, I can’t know because am not learned; ok! Perhaps it’s because I*

*don't have any productive assets from which I can be able to earn income to purchase food for my household. I don't know what can be done to build my household's resilience coz everything I have tried never seems to work (e.g. livestock keeping, crop farming etc.)".*

026. Rich female respondent-female headed. *"There is high prevalence of diseases especially in livestock, crop failures, there is not enough food to eat, prices of food are high and with that I strongly agree that climate change has added another layer of vulnerability to pastoralists' livelihoods. Am forced to diversify activities e.g. petty trade (making local brew) to earn extra income. Yeah I agree because sometimes with this level of livestock disease prevalence, I feel insecure with my livestock because any time I can lose some of them to disease. I think it's a lack of adequate service delivery especially veterinary services to the people and lack of a proper alternative sources of income perpetuates household vulnerability to food insecurity. Having viable alternative income generating activities, educating children, embracing hygiene and sanitation and government's improvement of service delivery to its citizens can help build resilience of the household for improved food security".*

027. Rich male respondent-male headed. *"I disagree with the statement that climate change has added another layer of vulnerability to pastoralists' livelihoods because there is rain enough to support growth of pasture and provide for the livestock; however much there are livestock diseases, they are manageable. I don't see any problem with the changes in weather patterns; in fact it has even favored us because we have enough water and pasture for our cattle. Most times during this time of the year, we experience long dry spells and we are forced to move to distant place in search of pasture and water for our cattle. Some of my livestock died due to diseases and most time I incur high expenditures on treatment of my livestock in case there is any disease outbreak. Yeah I agree that my household is also vulnerable to food insecurity because I only depend on the market for food and I don't have any sorghum in the granary due to poor harvest last year. Because am unemployed and the unpredictability of the weather patterns, I feel my household is perpetually vulnerable to food insecurity. In order to build resilience, there is need to have a large asset base by keeping large number of animals, keeping different livestock species (cattle, goats, sheep, donkeys, poultry etc.), investment/trade and government's improvement of service delivery, especially veterinary services".*

028. Male respondent-Poor: male headed. *"Yes I strongly agree that climate change has added another layer of vulnerability to pastoralists' livelihoods because animals are dying due to diseases and lack of water and pasture in case of prolonged droughts e.g. I lost 5 cattle during the 2016/17 prolonged drought. Sometimes I go for casual labor in town because I can no longer depend only on livestock. The main hazards experienced include livestock diseases, prolonged drought, theft of animals and hunger; with these I lost a number of livestock (cattle and goats). Yeah I strongly agree that my household is vulnerable to food insecurity because most times there is not enough to eat and end up sleeping hungry and I don't have any food in store. I think it is unpredictable weather and increasing hazards perpetuating vulnerability of my household to food insecurity. The only solution I think of is to diversify livelihood activities in order to have different income sources hence building household resilience".*

## **FOCUS GROUP DISCUSSIONS (FGDs)**

### **FGD 1**

**Friday 13<sup>th</sup> July 2018**

**Atedewoi village- Mogoth parish, Rupa sub county-Moroto**

**10 participants (Female=5, Male=5)**

### ***“Without pastoralism, no food security for my household”***

8 strongly agree that without pastoralism, they can't be food secure, reasons being; it is livestock that you can sell in worst situations to rescue you from hunger in addition to their products which is a source of protein which important for children's' growth, livestock are also used for rain making during traditional rituals as sacrifice and can also be sold to purchase other household assets like ox-ploughs and bicycles. *“I believe pastoralism is the only solution given the conditions in which we live, its livestock that you can drive to other areas in search of pasture and water, you can't take crops from the garden looking for places with enough rain”*, the LC 1 chairperson emphasized with passion. Lady added *“the crops we grow, it's just by chance that they will grow to maturity and be harvested due to these unpredictable weather conditions: we are surer of livestock securing our household food security than crops”*. Two of the participants agreed with reservation. *“Yes I agree but things are changing these days, most times we are so stingy with livestock coz we need these animals to multiply, we would rather starve or depend on the little livestock products we get from our livestock like milk, ghee etc. than sell an animal to purchase food, Instead we resort to selling firewood and charcoal or even go for casual labor in case the season is bad and the sorghum harvest is poor”*, said male participant .

### **Reasons for pastoralism even in the face**

*“Pastoralism is our way of life, you cannot separate yourself from what you were born in and grew up with: it's our culture to keep animals and we can't stop doing it”*, one lady stated. Another participant added, *“It is a solution to our environmental problems: our weather conditions are not favourable, I don't think there will be a more feasible alternative for a living for the Karamojong people to replace livestock keeping”*. Other reasons include; pastoralism means keeping livestock and therefore it's a livelihood security given the nature of climate (unpredictable weather conditions), there are so much risks involved in crop production compared to livestock, source of pride as more value is attached to livestock ownership than crops.

### **Other livelihood options**

Crop farming because there are good harvests in some years for food and little income.  
Aloe Vera extraction and selling coz there is ready market and also used as medicine in both livestock and humans  
Brick making  
Charcoal burning and firewood is a quick source of money because it is easy to sell.  
Participants were aware of the effects of deforestation and therefore some cut selectively by pruning branches of big trees but the majority of the participants (60%) said they cut non-selectively for so long as the tree is good enough for charcoal burning, they will cut it down.

### **Livestock species kept**

Cattle, goats, sheep, donkeys, poultry  
Because of the relative peace and security we are enjoying, we are able and prefer to keep all these livestock species besides its inherited from our fore fathers, said one participant.  
*“We have various needs in a pastoralist household with varying solutions: you can't sell a bull to just buy books for a child instead a wife can sell chicken to address such a small problem, also small animals multiply faster although larger animals are more valuable while others are used for transport therefore we get encouraged to keep all”*, another male participant said.  
*“We keep all the above animals for livelihood security in case of an outbreak of disease and extreme weather conditions, some species may not be affected and therefore the family will survive on that, also culturally women in a household are not allowed to own cattle so they can*

*also keep shoats and poultry while the men keep cattle, that's why we end up keeping most of these species in a household", a female participant added.*

### **Measures to improve productivity**

Selective breeding for all categories of livestock  
Moving in distant places in search of pasture for livestock  
Use of indigenous knowledge for livestock pests and disease control

### **The future of pastoralism**

6/10 of the participants hope that in the coming 10 years their livestock numbers will have multiplied because there is no longer cattle rustling, therefore will be rich and able to have enough food for their households. *"On condition there is peace and security and reduced livestock disease outbreak, am optimistic that my livestock will multiply and I will be more able to provide food for my household and hunger will be reduced",* the male participant said with a smile. 4/10 of the participants see the future of pastoralism for food security with pessimism. One male participant said, *"For as long as the livestock diseases persist without proper veterinary support from government, our animals will keep dying and our livelihood will be wiped out, the government should think of improving veterinary service delivery and sustaining the existing peace".*

## **FOCUS GROUP DISCUSSION (FGD) 2**

**14<sup>th</sup> July 2018**

**Kadilakeny village, Lobuneit parish-Rupa sub county, Moroto**

**12 participants (female=8, Male=4)**

***"Without pastoralism, no food security for my household"***

7/12 participants strongly agree with the above statement because it is mainly livestock that people sell in times of crisis to purchase food, livestock provide milk and other livestock products which is a source of protein for children. 4/12 participants disagree with the statement above claiming that pastoralism these days is losing relevance because animals are dying, animal numbers have reduced and people are finding alternative sources of livelihood. *"I do not depend on livestock for food because I no longer have animals since I was raided 7 years ago, now depend on casual labor, charcoal burning, selling firewood and growing some crops which I can harvest in case the weather conditions favor me that year",* the male participant said. 1/12 participants argues that both pastoralism and crop farming are equally good since both contribute to household food security.

### **Reasons for pastoralism even in the face of climate change**

It's the only feasible livelihood option as crop farming can no longer work due to unpredictable weather patterns. Livestock act as a wealth reserve and livelihood security. *"It is to the kraal that one can run, pick one animal (e.g. Cow) and sell to fix pressing problems and besides, it is in our tradition that a real man has to pay a large number of cattle as bride price and therefore we are bound by such norms to rear large numbers of livestock",* said male participant. some participants believe it is the only activity karamojong men can do; crop growing, poultry and small ruminants are for women.

### **Other livelihood options**

Charcoal burning and firewood selling is the most common alternative for income because it is the most easy to do even when well aware of the environment risks of deforestation. *"We are aware of the dangers of tree cutting but we are forced to do so because there is no other easy option for survival",* one female participant said. Other options include; gold mining, quarrying and crop farming.

### **Livestock species kept**

We keep goats, sheep, cattle, poultry and donkeys. These different livestock species are kept for varying reasons. Traditionally women are not allowed to own large ruminants because cattle are believed to belong to men. Women can own shoats and poultry. *“There are varying levels of needs in the household, you can’t sell a cow to buy for a child a pen or a book or to buy salt but rather the woman in the household can sell her chicken for that purpose”*, one of the male respondents said. Keeping various species of livestock also acts as security and build resilience so that in case of a disease outbreak in one species, the rest of the livestock species can still remain a source of livelihood for that particular household. Some species are kept because they are easy to sell while others multiply faster than the others e.g. the shoats multiply faster than the cattle.

### **Measures to improve productivity for food security**

Finding other alternative sources of income to reduce selling of livestock so that they can multiply, pests and disease control and seeking veterinary services from government extension workers.

### **Future of pastoralism**

The majority agree that pastoralism will still be as important as it is today for their household food security because they are optimistic that with the current peace and security if sustained, their animals will be able to multiply and grow to big numbers and therefore grow rich. Those without livestock feel pastoralism may not be sustainable in the near future because of the growing population pressure on land and there won’t be space to keep large numbers of cattle.

## **FOCUS GROUP DISCUSSION (FGD) 3**

16<sup>th</sup> July 2018

Kwamong village, Pupu parish-Rupa sub county, Moroto

12 participants (Female=6, Male=6)

*“Without pastoralism, no food security for my household”*

All participants strongly agree with the above statement, reasons being; livestock is the only closest asset a pastoralist can think of selling to purchase food, livestock provide food from livestock products e.g. milk, blood etc. and the oxen can be used for ploughing.

### **Reasons for pastoralism even amidst CC**

It’s a tradition inherited from our fore fathers and therefore we can’t easily let go our tradition. It is the safest livelihood option at the moment given the currently unreliable rainfall patterns.

### **Other livelihood options**

Crop farming (sorghum), brick making, casual labor, quarrying, mining and charcoal burning.

### **Livestock species kept**

Cattle, sheep, goats, donkeys and poultry

These many species are kept because; some can multiply very fast compared to the others, it is savings in different forms and therefore spreading risks in case of hazards or disaster. Some keep many species to guard against price fluctuations so that e.g. incase prices for shoats falls one can decide to sell chicken instead to buy what s/he wants.

### **Measures to improve productivity**

Pest and disease control (especially tick borne diseases affecting livestock).

### **Future of pastoralism**

*“Because of existing peace, we are optimistic that in the next ten years, pastoralism will be equally important in ensuring household food security because our animals will have multiplied coz cattle produce yearly and we shall be able to tackle food insecurity in our households”.*