HOUSEHOLD FACTORS INFLUENCING FOOD SECURITY STATUS IN BULAWAYN VILLAGE, BARDERA DISTRICT, GEDO REGION OF SOMALIA

BY:

NICHOLAS OMONDI OLOO

THIS RESEARCH PROJECT REPORT HAS BEEN SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF ARTS DEGREE IN PROJECT PLANNING AND MANAGEMENT, OF THE UNIVERSITY OF NAIROBI.

2014

DECLARATION

This research project report is my original work and has not been presented for examination purposes in any other university or institution of higher learning.

Signature:..... Date:.....

NICHOLAS OMONDI OLOO.

REGISTRATION NUMBER: L50/77773/2012

This research project report has been submitted for review with my approval as the University supervisor:

Signature:..... Date:.....

DR. ANGELINE MULWA.

LECTURER,

DEPARTMENT OF EXTRA-MURAL STUDIES,

UNIVERSITY OF NAIROBI

DEDICATION

I dedicate my dissertation work to my family and many friends. A special feeling of gratitude to my loving mother, Margaret Oloo, whose words of encouragement and push for tenacity ring in my ears. My sister Nancy, and brothers Felix, Collins and Wycliffe have never left my side and are very special.

ACKNOWLEDGEMENT

I would like to acknowledge the inspirational instruction and guidance of Dr. Angeline Mulwa, who is my supervisor, and the initial impetus to study Project Planning and Management given to me by Professor Christopher Mwangi Gakuu. Both of these lecturers have given me a deep appreciation and love for the beauty and detail of this subject.

I would also like to acknowledge the support and assistance given to me by CAFOD and my co-workers there. CAFOD has been very generous in their support of my academic pursuits and many of my co-workers have contributed ideas, feedback and advice. Abdullahi Isse, in particular, has assisted this research with his data collection expertise. I am also very thankful to Nelly Shonko, Regional Program Manager at CAFOD, for a thorough review of this report. Her expertise in the field of food and nutrition security and its measurement within Horn and East Africa region greatly contributed to tighten the arguments presented in this report. Finally, I would like to thank my wife, Donnah, for her support and encouragement. I could not have completed this effort without her assistance, tolerance, and enthusiasm. Responsibility for errors or omissions is solely that of the author.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

'Al-Shabaab'	Islamist insurgent group operating in South Central Somalia
AMISOM	African Union Mission in Somalia
CAFOD	Catholic Agency for Overseas Development
DFID	Department for International Development (UK)
EC	European Commission
ECHO	EU Directorate-General for Humanitarian Aid and Civil Protection
FAO	Food and Agriculture Organisation of the United Nations
FEWSNET	Famine Early Warning Systems Network
FGD	Focus Group Discussion
FSNAU	Food Security and Nutrition Analysis Unit (FAO)
Gu	A Somali language meaning main long rainy season (April to June)
HDDS	Household Dietary Diversity Score
HHS	Household Hunger Scale
INGO	International Non-Governmental Organisation
ICRC	International Committee of the Red Cross
IDP	Internally Displaced People
IPCC	Intergovernmental Panel on Climate Change
NGOs	Non-Governmental Organizations
TFG	Transitional Federal Government of Somalia
UN	United Nations
UNICEF	United Nations Children's Fund
VSF Suisse	Vétérinaires Sans Frontières Suisse (name of an NGO)
WFP	World Food Programme of the United Nations

ABSTRACT

The specific research problem addressed in this study is that despite an increased amount of dollars being donated to Somalia for humanitarian assistance, the food security status of the households remains grim and there has been no effort to carry out empirical formative research on actual causes of food insecurity within the households that would inform the design and implementation of these humanitarian interventions. The main objective of this study is to examine the household factors influencing food security status in Bulawayn village using a logistic regression procedure. The household characteristics are defined by the socio-demographic, property ownership and income characteristics while the household food security status will be defined by the household hunger scale. The logit model was fit with eight (8) explanatory variables which were identified to be major determinants of food security in this study. These include gender of household head, age of household head, size of the household, education level of the household head, size of land owned by the household, number of livestock owned by the household, household income levels and number of people engaged in gainful income generating activity in the household. The household sample size for the study has been computed using the Cochran formula and a sample of 246 households coming from rainfed agro-pastoral, riverine agro-pastoral, employed urban residents and business community were identified using a two stage sampling procedure. A structured questionnaire was used for the data collection with the help of enumerators. The findings of the study revealed that 63% of the households are food secure whereas 37% are food insecure. Recurrent drought and insecurity have been the main drivers and causes of food insecurity within the study area, exacerbating the food security status of the resource-poor agro pastoral households. Solutions to food insecurity must include analysing and elimination of poverty at household level. Using a logistic regression model, this study found that the socio-demographic characteristics that have a significant influence on household food security were: size of the household and education attainment of the head of the household. Gender and age of the head of household were found not to be significant pointers of household food security status in Bulawayn village. The study further found that the household income characteristics that have a significant influence on food security are: household income and number of people employed in the household. Land and livestock ownership of the household, as property ownership characteristics were also found to have a significant influence on the households food security. This study found that most food insecure households are the agro pastoralists. It is therefore recommended that promotion of sustainable agriculture and biodiversity among the agro-pastoralists should be a priority. This should be aimed at improving on crops and livestock production levels within the households. This may include promotion of use of drought tolerant seed varieties, use of inputs such as improved seeds, fertilizers, manure, pesticides and intensive irrigation. A further research should be undertaken to understand the agricultural practices undertaken by the agro pastoralists and why are the most food insecure household are within this livelihood zone, irrespective of the fact that they are the food producers.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

For the last twenty years, Somalia has been entangled in a "civil war" amidst the destruction of both its rural and urban economies which has resulted into abject suffering of the population. On July 20, 2011, the UN declared a famine in southern Somalia, affecting some 3.1 million people, and an estimated half million children were malnourished. However, there had been early warning of a crisis in the Horn of Africa, and specific warnings about Somalia, for nearly11months prior to the declaration (Funk, C., Eilerts, G. Verdin, J. Rowland, J. Marshall M., 2011).

The well-publicized drought was a major causal factor, with the lowest recorded levels of rainfall in 50 years in some of the affected areas, but the drought only accounts for part of the causes of the famine (New York Times, 2011; Zarocostas, 2011; Zutt, 2011). Other causes included the rapidly rising price of food, both domestically in Somalia and globally. Even in good rainfall years, Somalia relies heavily on imported food both commercial imports and, for many years, food aid. Any increase in the international price of food exacerbates the existing food access crisis in Somalia. The fighting between the Transitional Federal Government (TFG) and the African Union Mission in Somalia (AMISOM) on one side, and the Islamist insurgent group, *Al-Shabaab* on the other, was also a major cause of the famine. These proximate causes were over lain on long-standing crises of food security, livelihoods, governance and the environment in southern Somalia, an area that has not had an effective central government since the over throw of the Siad Barre regime in1991,and which has been mostly under the control of *Al-Shabaab* since 2007. In many ways, even before the famine, southern Somalia was experiencing a classic case of ''protracted crisis'' (WFP/WFP, 2010).

Several complicating factors made the humanitarian response more difficult. Access to affected populations was very restricted by the governing authority *Al-Shabaab*. The absence of major food aid agencies meant the humanitarian community was left scrambling to come up with alternative means of addressing food needs in the famine-affected areas, and it did not have an adequate contingency plan for this situation, despite early warning (WFP, 2012; Darcy et al.,2012).

Currently speaking, Somalia continues to make progress in its recovery from the 2011 famine, but some 870,000 people, most of them IDPs specifically in Gedo region, are predicted to require food assistance up to December 2014, according to new data from FSNAU for Somalia.

The lack of physical access by international organizations, institutions or individuals due to security reasons for the last twenty years has not allowed any empirical research on the causes of food insecurity at household levels within South Central Somalia. This has therefore created a vacuum of

knowledge which has resulted into the humanitarian agencies responding blindly from experience borrowed from other countries such as Somaliland, Punt land, Djibouti, Eritrea and South Sudan.

1.2 Statement of the Problem

In spite of the various emergency responses by both local and international NGOs, Somalia remains one of the most food insecure regions in the world; more than 70% of people are undernourished, with 20% of children dying before their fifth birthday, and the nutritional status of women, who are the main assets for farming and family care, remaining a grave concern (Devereux, 2009). Therefore the scale and impact of food insecurity in South Central Somalia is devastating. It is against this background that this study assessed the '*household factors influencing food security status in Bulawayn village, Bardera district, Gedo region of South Central Somalia*.'

The overall research problem addressed in this study is that despite an increased amount of dollars being donated into Somalia for humanitarian assistance, the food security status of the households remains grim and there has been no effort to carry out empirical formative research on actual causes of food insecurity within the households that would inform the design and implementation of these humanitarian interventions.

Much of the available literature on food security focuses on developing and testing determinants of food insecurity at country level and never at household level. According to FAO and other United Nations agencies, Somalia's persisting food insecurity is due to a combination of conflict and human insecurity, limited access for humanitarian organizations, limited development programs, and lack of foreign investment. Climate change in its various manifestations also poses an additional threat to food security in all its dimensions and exacerbates the food situation. External factors such as drought, flood, or pest infestation have dramatically reduced food production, creating a disaster for the poorest communities. Farmers, pastoralists and urban migrants are some of the most food-insecure groups in South Central Somalia. According to FAO, 2010, Farmers who live at subsistence level in the higher-rainfall areas experience food insecurity along 0.5 million to 1 million pastoralists inhabiting arid and semi-arid lowlands. In times of floods or droughts, these communities not only go hungry but also lose their productive assets. Urban migrants, most of whom have fled poverty and violence in the countryside, live in extremely precarious conditions.

Despite the prevalence of food insecurity in South Central Somalia regions, there has been relatively little analysis with a specific focus on the households' link. Awareness of food insecurity in these Somali communities has grown among members of the international community, but many of the recommendations about how best to address the issue have been based on anecdotal evidence or outcomes generated by humanitarian organizations as part of internal evaluations. Within the scarce

empirical research that exists, the situation in South Central Somalia has received more attention than other food insecure regions of the world. While efforts to ensure adequate food supplies in Somalia at the national level by both the national government and the international community are laudable, these efforts on their own cannot ensure food availability for households and individuals. However, the primary causes of food insecurity at household level have not been studied adequately. This study therefore investigated the primary factors that contribute food security at household level in Bulawayn village, Bardera district, Gedo region of South Central Somalia.

1.3 Purpose of the Study

The main purpose of this study was to investigate the primary household factors that are influencing food security in Bulawayn village, Bardera district, Gedo region in South Central Somalia.

1.4 Research Objectives

The objectives of this study were:

1. To establish the influence of household socio-demographic characteristics on food security in Bulawayn village, Bardera district, Gedo region of South Central Somalia;
2. To establish the influence of household income characteristics on food security in Bulawayn village, Bardera district, Gedo region of South Central Somalia;
3. To establish the influence of household property ownership characteristics on food security in Bulawayn village, Bardera district, Gedo region of South Central Somalia;

1.5 Research Questions

The study aimed at answering the following research questions:

1. To what extent do the household socio-demographic characteristics influence food security in Bulawayn village, Bardera district, Gedo region of South Central Somalia?
2. To what extent do the household income characteristics influence food security in Bulawayn village, Bardera district, Gedo region of South Central Somalia?
3. To what extent do the household property ownership characteristics influence food security in Bulawayn village, Bardera district, Gedo region of South Central Somalia?

1.6 Significance of the Study

The findings of this study are aimed at increasing the general understanding of food security at household level in order to improve the design of the interventions, targeting of the beneficiary households, monitoring of the intervention results and evaluations for evidences and lessons learnt gathering. This would thus facilitate the development of more effective humanitarian and

development interventions by all agencies working in South Central Somalia by operationalizing approaches that are based on empirical findings.

The Somalia donor community, particularly the European and American donors will also find the findings of this study very useful because their concerns of continuously funding Somalia households' food security interventions without realising major strides would be answered. They will therefore find a basis of selecting the projects to fund in the near future. Finally, the findings of this study provides an initial platform for the academicians and practitioners within the humanitarian sphere to make reference to the findings and also research deeper into how to counter household food insecurity within South Central Somalia.

1.7 Limitations of the Study

The first limitation of this study was inadequate availability of empirical research, specifically focused on household food security in South Central Somalia regions, which could better inform the researcher's search for sustainable solutions. Although there is recognition that food insecurity persists in South Central Somalia, stakeholders are still grappling with understanding the particular dynamics causing this. To minimize this limitation, the researcher used and relevant food security journals and studies that are available. The second limitation was related to security. Due to context and frequent insecurities within Gedo region, respondents felt insecure to respond freely due to suspicions. To counter this, the researcher used the village elders and other influential people within the village to inform the households about the study and its objectives. The third limitation was on lack of enumerators with adequate capacity to assist in data collection. This was because a large percentage of the population is illiterate and those who are literate are all working. The researcher therefore used research assistants from the NGOs that CAFOD works with within Gedo region. The last limitation was language barrier. The researcher does not speak the local dialect (Somali). He therefore worked with Somali speaking research assistants and also hired a translator throughout the data collection, analysis and interpretation phases of the study.

1.8 Delimitations of the Study

Even though household food security is multi-facet concept that needs an integrated approach to tackle, this study only limited its scope to socio-demographic, income and property ownership characteristics of households. Therefore the researcher acknowledges that the issues studied do not encompass the variety of households food insecurity scenarios and were not intended to be exhaustive thus does not unearth all the household food insecurity causes that may arise in the different national, regional and village contexts in Somalia. For instance, the study did not dive into multiple strategies and coping mechanisms that households deploy in order to cope with seasonal and chronic food

insecurity during crisis situations, climate disasters or war-provoked famines. These were not captured in this study due to both the limited human and material resources available to the researcher and the shorter timeframe of research available.

1.9 Basic Assumptions of the Study

This study was conducted based on some key assumptions. The researcher assumed that all the selected food insecure households would provid complete and honest responses within the specified study time.

1.10 Definitions of Significant Terms Used in the Study

Agro pastoralists Refers to households that derive more than 50% of household gross revenue (including income and consumption) from farming and between 10% and 50% from livestock.

Coping mechanism Refers to survival skills or methods used by households to survive when confronted with unanticipated livelihood failure or shocks (Ellis, 2000).

Donor community Refers to all governmental, non-governmental organizations, foundations and charities providing financial support and aid to the local nongovernmental organizations working in South Central Somalia.

Food security Refers to a state where households, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

Food insecurity Refers to a situation of limited or uncertain availability of nutritionally adequate and safe foods within households or limited or uncertain ability of the households to acquire acceptable foods in socially acceptable ways.

Household Refers to a domestic unit consisting of the members of a family who live together along with nonrelatives such as servants and whole depend on the same source of food and income.

Local community Refers to a group of interacting people sharing an environment, village or resources.

Livelihood	Means of securing the basic necessities -food, water, shelter and clothing- of life.
Pastoralists	Refer to those households in which at least 50% of household gross revenue (including income and consumption) comes from livestock or livestock-related activities.
Project	Refers to a set of coordinated activities undertaken to meet a specific goal and purpose in a set time period and budget.
Program	Refers to a set of coordinated projects with common purpose or objective.
Resilience	This is the capacity of a household, community or society potentially exposed to hazards to adapt, by changing or resisting in order to reach and maintain acceptable levels of functioning and structure.
Vulnerability	The diminished capacity of an individual, household or group to anticipate, cope with, resist and recover from the impact of a natural or man-made hazard.

1.11 Organization of the Study

This study is organized into five chapters. Chapter one presents the introduction component of the study with an aim of laying the foundation for the study by providing a brief overview of the problem, providing context information on where the research will be conducted, demonstrate the researcher's view of the research problem. All these are aimed at positioning the study.

Chapter two deals with the literature review that composes a critique of the reference materials on food security that have been identified as relevant by the researcher. This chapter analyzes the reviewed literature under each research objective. The chapter also presents the theoretical and conceptual frameworks of the study which aim at explaining the relationship between the dependent and independent variables. The chapter concludes by analyzing the gaps in the reviewed literature.

Chapter three outlines the research methodology which is the blue print on the design of the study, target population, sampling and data collection procedures. After this there will be a fourth chapter which presents the data analysis, presentation of the findings and interpretations which are as per research objective. The study closes with the fifth chapter which outlines the findings of the study,

emanating discussions, conclusions and recommendations made by the researcher. This chapter winds up with an overview of the contribution this study has made to the body of knowledge.

Chapter four presents the data analysis and interpretation per objective of the study as chapter five concludes the report by providing a summary of the findings, discussions, conclusions and recommendations. The last section also presents suggested areas for further research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter composes a critique of the reference materials on food security that have been identified as relevant by the researcher. The chapter analyzes the reviewed literature under each research objective and also presents the theoretical and conceptual frameworks of the study which aim at explaining the relationship between the dependent and independent variables. The chapter concludes by analyzing the gaps in the reviewed literature.

2.2 Household Socio-demographic Characteristics and Food Security

The concept of adequate food is an important part of the current definition of household food security. Food is recognized as a basic human right, and lack of or inadequate food consumption has serious implications for general body health and well-being, growth, development and cognitive ability among children, and labour productivity. Adequate quantity and quality of food are, therefore, important for ability to grow, learn, and earn a living (Pohl *et al*, 2006). This implies that food insecurity is a threat to overall human well-being, as well as efforts geared toward poverty reduction and economic growth. Hofferth (2003), in his study, argues that the higher the age of the household head, the more stable the economy of the farm household, because older people have also relatively richer experiences of the social and physical environments as well as greater experience of farming activities. Moreover, older household heads are expected to have better access to land than younger heads, because younger men either have to wait for a land distribution, or have to share land with their families. A similar study by Obamiro *et al* (2003) arrived at a similar conclusion regarding the relationship between age of a household head and household food security. Williams (2011), in his study, found that the age of the household head was not significant, although it had a negative sign. The older the household head less food secure the household was likely to be. Older people might not have the ability to work, thus ensuring increasing strain of the food acquisition of a household. In a related study, Bashir et al. (2012) found that an increase of one year in the age of household head decreases the chances of a household to become food secure. A study by Omonoma &Agoi (2007) in Nigeria found an inverse relationship between the age of household head and food security. Arene and Anyaeji (2010) concluded that the age of household head has a positive effect on food security status.

The determinants of food security are categorized into three groups within the framework of the general definition of food security, that is, food availability, food access, and utilization. For example, food availability may be constrained by inappropriate agricultural knowledge, technology, policies, inadequate agricultural inputs, family size, etc (Coates *et al*, 2007). On the other hand, access to food

and its utilization could be constrained by economic growth, lack of job opportunities, lack of credit, inadequate training, inadequate knowledge, etc. (Mwangi *et al*, 2006). Among the components of the food system, e.g. food processing, communication and education, there is substantial overlap and inter linkage. For example, household decision-making behaviour with regard to food is influenced by nutrition knowledge and by cultural practices with regard to food allocation within the household as well as by purchasing power and market prices (Najafi, 2003). Larger household sizes are associated with a negative food security status. Larger household sizes require increase food expenditure and competition for limited resources. The negative parameter could be as a result of an increase in the dependency ratio in larger households. A study by Babatunde et al. (2007) concluded that larger household sizes are more likely to be food insecure than smaller size households. While efforts to ensure adequate food supplies at the national level are laudable, these efforts on their own cannot ensure food availability for households and individuals. As Sei (2005) argues, ensuring access to food, not merely increasing food supplies, should be regarded as the major pillar of food security at household level. This assertion is borne out by empirical evidence that suggests that, even in times when countries experience famine, food supplies have been generally available, even in regions where large numbers of people died of starvation. The problem is that those who needed the food do not have the means to acquire it (Jiggins, 1986). Much of the literature on food security focuses on developing and testing determinants of food insecurity at the household level.

Hofferth (2003) further states that subsistence farming is generally characterized by greater reliance on labour than commercial agriculture. In subsistence farming, households with larger labour supplies are better positioned to increase the productivity of their land. Availability of a relatively larger labour force, regardless of farm size, can be an advantage to those households who strive to achieve food security, provided that the excess labour force is engaged in other income generating activities. Similar study by Jiggins (1986); Thomas and Leatherman (1990); and Chen (1991) report that labour availability is an important determinant of household productivity and food security, especially in subsistence-oriented households given the necessary landholding and rainfall.

2.3 Household Income and Property Ownership Characteristics and Food Security

A variety of factors contribute to food insecurity in the Horn of Africa, including drought, environmental degradation, poverty, conflict, population growth, land fragmentation and stagnating agricultural development. Food supplies in large parts of the developing world are locally derived and much of the agriculture is rain-fed. As a result, rainfall and temperature changes directly influence food supply. Water shortages and heat stress limit crop growth and development, reducing yield (Ellis, 2000). Since the mid-1980s, rainfall during the main growing season has declined by 15 per

cent across eastern and southern Africa. Over the same period, per capita cropped area declined by 33 per cent while the population of eastern and southern Africa doubled (FAO, 2011). While droughts are naturally occurring phenomena in the Horn of Africa, changes such as population growth as well as environmental degradation, land fragmentation and conflict, have increased vulnerability and decreased the adaptive capacity of communities (FAO, 2010). Rainfall declines and erratic weather may thus tip households over the edge into livelihood crises.

A household's wealth status forms the other important source of livelihood for farming households. Livestock contribute to households' economy in different ways, e.g. as a source of pulling power, source of cash income, source of supplementary food, and means of transport. Besides, livestock are considered a means of security and means of coping during crop failure and other calamities (Kang'ara *et al* 2001). In a similar study, Thomas (1990) argue that livestock provides not only food for the producers, but also a range of other products which could be sold or consumed by the livestock owner to provide nutrition, income, traction and fuel. The major products of livestock include draught power, meat, milk, eggs, manure which is used as fertilizer or fuel, feathers, fibre, hides, and horns. In addition to these products livestock serve as an asset and may provide a reserve that can be converted to cash in times of need. A study by Feleke *et al* (2005) found that households who own livestock have good food security status as well as sustainable farming. Particularly in Somalia, where crop failure is frequent due to poor rainfall, the level of a household's resources a critical factor in combating such disasters. In view of this, an inventory of livestock for the sample households was conducted.

FAO (2000) reports that employment in off-farm and non-farm activities are essential for diversification of the sources of farm households' livelihoods; it enables households to modernize their production by giving them an opportunity to apply the necessary inputs, and reduces the risk of food shortage during periods of unexpected crop failures through food purchases. Especially in Africa, diversification of sources of income has long been a survival strategy which allows household heads to reduce the risk of starvation for themselves and their families during periods of chronic or transitory food insecurity (Devereux 2009, Thomas and Leatherman, 1990). In this study, the various livelihood sources including crop and livestock production, business, formal and informal employments are measured.

2.4 Current State of Food Security in Somalia

Food security has a variety of definitions. The 1996 World Food Summit adopted the definition of food security, at the individual, household, national, regional and global levels, is achieved, when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet

their dietary needs and food preferences for an active and healthy life. According to FAO, food insecurity exists when people do not have adequate physical, social or economic access to food. According to the remarks made by the UN Secretary General, Somalia is one of the world's most food-insecure countries. He reiterated that between 1970 and 2010, Somalia has been threatened by famine at least once each decade and in the future, the impacts of climate change, as well as growing populations and declining per capita agricultural capacity, are expected to further threaten food security (Ban Ki- Moon, 2011). By September 2011, 4 million people in Somalia were suffering from acute food crisis or outright famine in. Due to inadequate responses by November 2011, tens of thousands of people died, half of whom were children (OCHA, 2011). As one of the least developed countries in Africa, there is limited capacity within Somalia to respond to drought or food crises.

Therefore to prevent humanitarian emergencies, Somalia needs to strengthen its ability to build long-term resilience and tackle the root causes of the country's vulnerability (Desanker et al, 2001).
There is a growing movement among international development practitioners and academics to better understand causes and explore solutions to mitigate the vulnerabilities of households in Somalia communities (Stamoulis et al, 2003). There is also widespread consensus that climate change will further worsen food security in South Central Somalia. According to FEWS NET climate analysis, much of South Central Somalia has experienced a 10 to 20 per cent decrease in *Gu* rains since the mid-1990s and critical food growing areas have been seriously affected. The *Gu* season, the period during which relatively heavy and steady rains are common, typically occurs in South Central Somalia from April through June and are crucial to the region's main harvest. Since the 1990s, however, drought has become more frequent and more widespread during the months of April through September. Between the 1992 and late 2011 the area receiving adequate rainfall (500 mm) to support agro-pastoralist livelihoods had been reduced by 18 per cent due to the reduced rainfall trend. In the semi-arid and dry sub humid zones, rain-fed agriculture is already tenuous due to the seasonality of rainfall, intermittent dry spells and frequent drought years. In addition to the 20 year trend of declining precipitation, there is evidence that variability in amount and timing of rainfall from year to year is increasing, which would further compound food insecurity in the region (FEWS NET, 2011).

A regional climate projections report done by IPCC indicate that an accompanying trend of higher temperatures within South Central Somalia, estimated to be equivalent to an additional 10 to 20 per cent reduction in rainfall in its impact on crops, has exacerbated the reduced and increasingly variable rainfall. Air temperatures in the area have increased by over 1.0° C since the 1990s. As with rainfall, there is evidence that average annual temperatures have become more variable as well (IPCC, Regional Climate Projections, 2007). In addition to crop failures, the droughts have diminished grazing lands, upon which pastoralists rely for food security (FAO, 2011). Pastoralism is an effective productive system in arid and semi-arid ecosystems. It provides insurance to people living in areas of

uncertain rainfall across much of the South Central Somalia, providing a back-up source of food and income (FAO, 2003). The severity and persistence of droughts over several seasons have left pastoralists with limited grass and water for their herds; a problem further exacerbated by fragmentation of rangeland and restricted access to key resources (Pohl, 2006).

Many cattle have died for lack of water or food, and in desperation, many herders have been forced to sell cattle at very low prices. Poor livestock to cereal terms of trade and high food prices have seriously reduced herders' ability to access food. Drought has been particularly devastating in pastoralist and agro-pastoralist areas of Gedo, Middle Jubba, Galgaduud, Banadiir and Middle Shabelle of South Central Somalia. In most of this area, the period between June 2010 and June 2011 was the driest or second-driest in 60 years (VSF Suisse, 2010). Despite the prevalence of food insecurity in South Central Somalia regions, there has been relatively little analysis with a specific focus on the households' link. Awareness of food insecurity in these Somali communities has grown among members of the international community, but many of the recommendations about how best to address the issue have been based on anecdotal evidence or outcomes generated by humanitarian organizations as part of internal evaluations. Within the scarce empirical research that exists, the situation in South Central Somalia has received more attention than other food insecure regions of the world.

2.5 Causes of Food Insecurity in Somalia at National and Regional Levels

A variety of factors contribute to food insecurity in the Horn of Africa, including drought, environmental degradation, poverty, conflict, population growth, land fragmentation and stagnating agricultural development. Food supplies in large parts of the developing world are locally derived and much of the agriculture is rain-fed. As a result, rainfall and temperature changes directly influence food supply. Water shortages and heat stress limit crop growth and development, reducing yield. Since the mid-1980s, rainfall during the main growing season has declined by 15 per cent across eastern and southern Africa. Over the same period, per capita cropped area declined by 33 per cent while the population of eastern and southern Africa doubled. While droughts are naturally occurring phenomena in the Horn of Africa, changes such as population growth as well as environmental degradation, land fragmentation and conflict, have increased vulnerability and decreased the adaptive capacity of communities. Rainfall declines and erratic weather may thus tip households over the edge into livelihood crises. The current vulnerability of the region to climate-related food insecurity was brought into the international spotlight as drought intensified through the 2011 long-rains season. Food shortages accumulating from consecutive years of drought created food emergencies along a broad swath of the drought-affected area from Darfur in Sudan, eastwards to southern Somalia where a famine was declared in early August by the United Nations.

2.6 Strategies to Combat Food Insecurity in Somalia

While declines in food production and market failures contribute to household vulnerability, failures of response can lead to famine. Fortunately, positive action has been taken to address the current crisis in the Horn of Africa. For example, the number of beneficiaries of food aid in Somalia increased between August, 2009 and September, 2013 and nearly 75 percent of the 2.4 billion US dollars requested for the Horn of Africa Drought Appeal has been raised. However, with disease outbreaks reported across the region and refugee flows continuing, further massive, multi-sectorial response is critical to prevent additional deaths.

To reduce vulnerability and promote adaptation, a suite of strategies is needed to address the multiple stressors that interact with climate change. In the short-term, interventions to improve food access are critical. In the medium-term, interventions to support and rebuild livelihoods are necessary. Long-term solutions must include investment in agricultural development and livelihood diversification. Modest increases in per-capita agricultural productivity may offset the agricultural impact of observed precipitation declines. According to the climatic forecasts by FEWSNET, several areas of Somalia may maintain moist climate conditions, and agricultural development could help offset the impacts of declining rainfall. Encouragingly, Somalia has seen increased yields in maize but has more room for improvement since it has not yet reached yields achieved in southern Africa. More effective storage and improved market and transport infrastructure might also improve food security. Additionally, future investment in integrated land management and ecosystem restoration and protection is invaluable. Healthy ecosystems are critical to reducing vulnerabilities and risk, and contribute to livelihood resilience. Pastoral livelihoods also offer a form of diversification, which can protect against moderate dry periods.

If action is not taken, massive increases in food-aid expenditures will be required to deal with food insecurity and undernourishment. Two hundred million sub-Saharan Africans were undernourished in 2002, and if trends continue, this total may increase to almost 600 million people by 2030. The current interaction between vulnerable communities, climate change, ecosystem degradation, population growth, land fragmentation and limited investment in agriculture is potentially explosive, costly and deadly.

2.7 Theoretical Framework

Theory is the scientific basis to explain an observed phenomenon which the researcher applies to gain better understanding of the phenomenon. On the other hand, observation is what occurs in the real world or measures. Researchers conduct research on the basis of theory about what is observed (Sei,

2005). Therefore this theoretical framework specifies which key variables influence the household food security phenomenon and therefore what variables have been measured and the rationale for relationships between the variables. This informed what statistical relationships on which the study focused. This theory therefore guided every aspect of this research, from formulation of the research question through operationalization, analysis and discussion. This theoretical framework mostly focused on the household factors influencing food security and not regional or national factors, even though the mention of these factors at the macro level are evident given the multi-facet nature of food security and multiplier effects of the factors at both household and national levels.

As already mentioned above, food security is a widely debatable and much-confused issue while improving household food security status is an issue of supreme importance to hundreds of thousands of Somalis who are suffering from persistent hunger and under nutrition. The household food security concept in this study aimed at addressing household risks of not having access to needed food. These risks can arise from socio-demographic, income and property ownership characteristics of the households. Even in a 'normal' situation, with no crises such as war or shocks such as sudden food prices changes, these risks typically are higher and the closer a household is to inadequate dietary intake. Thus, at the household level, food security is the ability of the household to secure enough food to ensure adequate dietary intake for all its members. The foregoing therefore proves that a household has its special characteristics which determine whether they will be food secure or not. This platform thus provided a convenient theoretical framework that was used in analysing the household factors that influences food security status.

Socio-demographic characteristics of a household may influence its food security status in one way or the other. The socio-demographic characteristics of a household in Somalia consist of clan or race, the social norms, male or female headed, age bracket of the household head, the social class of the households, educational attainment, age, sizes of the households and sex distributions within these households. The study assessed if the gender, age bracket, educational attainment of household head and size of the household as socio-demographic characteristics have any degree of influence on household food security status.

The income and property ownership characteristics of a household include income and expenditure levels, housing types, assets owned, employments by sector, unemployment and debt levels within the households. The study particularly looked at if size of land owned, number of livestock owned, income levels and number of people working in a household have an influence on the household food security status.

2.8 Gaps in the Reviewed Literature

As the reviewed literature above has spiralled, many schools of thoughts and conceptual models of food security in Somalia have been presented. The multiple dimensions of food security suggest that there can be no single indicator for measuring it. Global, regional and national food security can be, and has always been measured and monitored on food demand, supply and stock and trade indicators. Access to food, availability of food and risks related to either access or availability are the essential determinants of household food security. While on the other hand, food production, stock holding and trade are the primary determinants of national, regional or local availability of food. Therefore, household food security measuring and monitoring require disaggregated consumption information at household level, based on surveys. This aspect of measuring and monitoring household food security status is largely lacking in Somalia.

The social, economic, demographic and nutritional variables such as real wage rates, employment, prices, anthropometric status, when properly analysed, can complement programs and activities that measure and monitor changes in household food security. This demands not only knowledge of overall household needs and consumption, but also an understanding of intra-household dynamics affecting procurement and distribution of food. The absence of such household level measurement and monitoring of food security and related analytical capacity in Somalia is a major deficiency. Household level food insecurity leads to much human suffering. It also leads to substantial productivity losses and misallocation of scarce resources due to diminished work performance, lowered cognitive ability and school performance, and inefficient or ineffective income-earning decisions. Efforts to become food secure may also exact a heavy toll from households if, for example, most of their income and time are spent on obtaining food. Households may achieve temporary food security, for example, by disposing off assets at the cost of becoming highly vulnerable to future insecurity. The household search for food security may also have important implications for the region's or national environment and natural resources utilization as well as its demographic situation. The household food security status has a multiplier effect to the national and regional levels and cannot be wished away. It is with this level of importance that there is need to unearth and understand important factors which influence household food security status in the fragile and upcoming state of Somalia. Given the previous lack of a validated measure of household-level food security, it is not surprising that few studies have examined the factors contributing to household food security in Somalia. This study therefore aimed at closing this gap in knowledge and help in evidence based decision making and policy formulations in Somalia.

2.9 Conceptual Framework

This conceptual framework is an illustrated representation of the idea or body of knowledge on the factors believed to influence household food security status which is based on the researcher's individual understanding of the relationships between the dependent, independent and moderating variables. For the purposes of this study, eight (8) explanatory variables were identified to be major determinants of food security in this study. These include gender of household head, age of household head, size of the household, education level of the household head, size of land owned by the household, number of livestock owned by the household, household income levels and number of people working in a household. The illustration below therefore shows the variables and the hypothesized relationship between them:

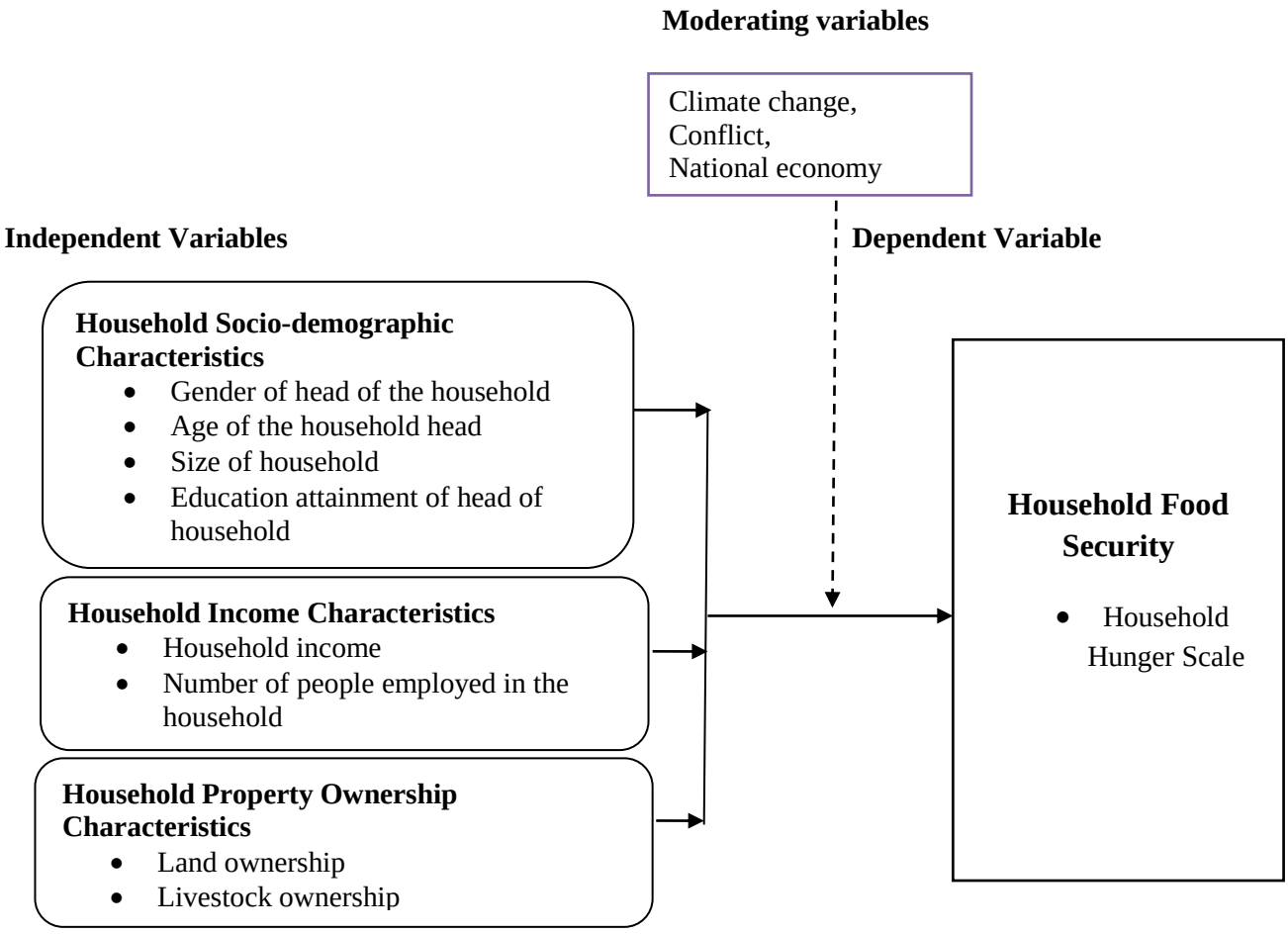

Figure 1: The research study conceptual framework

2.10 Explanation of Relationships of Variables in the Conceptual Framework

The above conceptual framework for this research study illustrates the hypothesised causal chain between the independent and the dependent variables. There are, of course, many other important influences on these relationships especially in Somalia context where the study was undertaken, and they include climate change, conflict and national economy which are all represented as the moderating variables. As already mentioned above, food security is a widely debatable and much-confused issue while improving household food security status is an issue of supreme importance to hundreds of thousands of Somalis who are suffering from persistent hunger and under nutrition. The household food security concept aims at addressing household risks of not having access to needed food. These risks can arise from socio-demographic, income and property ownership characteristics of the households.

Hofferth (2003), in his study, argues that the higher the age of the household head, the more stable the economy of the household, because older people have also relatively richer experiences of the social and physical environments as well as greater experience of farming activities. Moreover, older household heads are expected to have better access to land than younger heads, because younger men either have to wait for a land distribution, or have to share land with their families. A similar study by Obamiro *et al* (2003) arrived at a similar conclusion regarding the relationship between age of a household head and household food security. Age of the household heads will be measured in years.
There is a hypothesised link between household size and food security status. The current average number of individuals in a household in Gedo region is six (OCHA, 2011). The large family size exerts more pressure on consumption as food requirements increase in relation to the number of persons in a household. Hofferth (2003), in his study, states that subsistence farming is generally characterized by greater reliance on labour than commercial agriculture. In subsistence farming, households with larger labour supplies are better positioned to increase the productivity of their land.

Availability of a relatively larger labour force, regardless of farm size, can be an advantage to those households who strive to achieve food security, provided that the excess labour force is engaged in other income generating activities. Similar study by Jiggins (1986); Thomas and Leatherman (1990); and Chen (1991) report that labour availability is an important determinant of household productivity and food security, especially in subsistence-oriented households given the necessary landholding and rainfall. It is thus expected by this study that labour availability will affect food security positively.
Education attainment of the household head is an additional factor which is thought to influence the food security status of households. Educational attainment by the household head could lead to awareness of the possible advantages of modernizing agriculture by means of technological inputs;

enable them to read instructions on fertilizer packs and diversification of household incomes which, in turn, would enhance households' food supply (Najafi, 2003). The educated household heads could as well have nutrition education, including food budgeting, label reading, and efficient shopping practices which could result into households' improved nutrition knowledge, attitudes, and skills leading to changes in household food expenditures, improvements in the nutritional quality of the household food supply, and improvements in the quality of the diets consumed by individuals in the household. Households led by educated heads took a value of 1 while those who are led by uneducated heads took a value of 0.

This study perceived farmland size owned by each household to affect food security status of households positively. According to Najafi (2003), food production can be increased extensively through expansion of areas under cultivation. Therefore, under subsistence agriculture, holding size was also expected to play a significant role in influencing farm households' food security. In Somalia, a household's wealth status forms the other important source of livelihood for households. Livestock contribute to households' economy in different ways, e.g. as a source of pulling power, source of cash income, source of supplementary food, and means of transport. Besides, livestock are considered a means of security and means of coping during crop failure and other calamities (Kang'ara *et al* 2001). Livestock provides not only food for the producers, but also a range of other products which could be sold or consumed by the livestock owner to provide nutrition, income, traction and fuel. The major products of livestock include draught power, meat, milk, eggs, manure which is used as fertilizer or fuel, feathers, fibre, hides, and horns (FAO, 2010). In addition to these products livestock serve as an asset and may provide a reserve that can be converted to cash in times of need. A study by Kassa *et al* (2002) found that households who own livestock have good food security status as well as sustainable farming. Particularly in Somalia, where crop failure is frequent due to poor rainfall, the level of a household's resources a critical factor in combating such disasters. In view of this, an inventory of livestock for the sample households was conducted. Households' livestock ownership was measured by the number of livestock within the household. Household income levels were also expected to influence the household food security status. Greater food purchasing power of a household leads to increased expenditures on food, greater food security, and improved household well-being (e.g., resources freed for meeting other needs). Increased expenditures on food leads to improvements in the nutritional quality of the household food supply.

2.11 Summary of Literature Review

The chapter began by laying a platform of the main purpose of the chapter in this study which is to compose a critique of the reference materials on food security that have been identified as relevant by the researcher. The chapter analyses the reviewed literature under three main inter-related sub-topics: household socio-demographic characteristics and food security; household income and property characteristics and food security; and current state of food security with strong reference to causes of food insecurity in Somalia at National and regional levels and the existing strategies to combat the abnormal condition of food insecurity in Somalia. Under these sub-topics, the chapter presents the viewpoints of various authors and organizations who have worked in Somalia and globally generally on food security related matters. The chapter further presents the theoretical and conceptual frameworks upon which this study is underpinned. This is also coupled by a detailed explanation on the relationship between the dependent, independent and moderating variables of the study. The chapter concludes by analysing the gaps in the reviewed literature.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology that was used in undertaking the study. The chapter outlines in details how the research was conducted and the justification of the methodology adopted. In order to present the entire methodology in a logical flow, the chapter focuses on the research design, target populations, samples and sampling procedures, research instruments used, validity and reliability of the research instruments, data collection procedures and data analysis techniques, in that order. The chapter concludes by ventilating on the ethical considerations for this study and the operational definitions of the research variables.

3.2 Research Design

Kerlinger (1973), in his book Foundations of Behavioural Research, defines a research design as a plan and strategy on investigating a phenomenon as it seeks to obtain answers to various questions. The study adopted a descriptive survey design in order to effectively investigate the factors influencing household food security status in Bulawayn village, Bardera district of Gedo region in South Central Somalia. According to Kothari (2003), descriptive survey is designed to obtain data that describes the characteristics of the topic of interest in the research. Kerlinger (1973), stated that descriptive statistics discover and measure cause and effect relationships among variables. The choice of the descriptive design was thus informed by the fact that the study involved drawing a sample of households from the population in Bulawayn village and four characteristics of the sample households were measured once. The study employed both quantitative and qualitative data. It involved collection of quantitative information that are tabulated along a continuum in numerical form and qualitative information that describe the various categories of information and situations.

3.3 Target Population

This study was conducted in Bulawayn village in Bardera district. Bardera district is the second most important district, in terms of food production and economy, in the larger Jubba Region of Somalia. The agricultural produce from the district include sorghum, maize, onions, beans, sesame, tobacco, bananas, watermelons, oranges, papayas and mangoes. Bulawayn village is the largest village within Bardera district located at the southern bays of Bardera town along Jubba River. Majority of the population in this village are Somali Bantus speaking the '*Rahwenic'* dialect and divided into three livelihood clusters including agro pastoralists (both rain-fed and riverine), urban residents and IDPs. The main reason why this village was zeroed down for this study was because it is ranked as one of the most food insecure (FAO, 2011). The village has also faced recurrent drought and conflict despite

the fact that they are a food basket for Somalia. The issue of security and accessibility to most parts of the village by the research team was also considered. According to the 2005 rural population estimates by UNDP Somalia, Bulawayn village has an estimated population of 7520. The targeting of the respondents for this study was from four livelihood sub-clusters: rainfed agro pastoralists, riverine agro-pastoralists, employed urban residents and business dependent households who produce their own food or access their food from the markets. The study did not target the IDPs due to their special conditions that they live in within the IDP camps where they are taken care of by various humanitarian agencies and thus do not majorly produce their own food but rely on assistance. Therefore such a set up may not give a clear, realistic picture on the household food security status.

3.4 Sample Size and Sampling Procedures

Sampling is the process by which inference is made to the whole by examining a part to provide various types of statistical information of a qualitative or quantitative nature about the whole by examining a few selected units (Kerlinger, 1973). The sampling procedure is the scientific procedure of selecting those sampling units which would provide the required estimates with associated margins of uncertainty, arising from examining only a part and not the whole (Kothari, 2003).

3.4.1 Sample Size

The Cochran formula was used to calculate the representative sample for proportions in the large population.

$$n = \frac{t^2 \times p(1-p)}{m^2}$$

Where:

n= required sample size

t= confidence level at 95% (standard value of 1.96)

p= estimated proportion of an attribute (food secure) that is present in the population in Bardera district

m= margin of error at 5% (standard value of 0.05)

Source: Cochran, W. G. (1977). Sampling techniques (3rd edition), New York: John Wiley & Sons.

Using the estimated 20% food security prevalence rate (FAO, 2011) and the standard values listed above, the sample size calculation followed as below:

$$n = \frac{1.96^2 \times 0.2(1-0.2)}{0.05^2}$$

$$n = \frac{3.8416 \times 0.16}{0.0025}$$

n= 245.8624 ˜ **246 households**

3.4.2 Sampling Procedure

A two-stage sampling procedure was employed to select the 246 households in Bulawayn village. The study area was classified into four strata: rain fed agro pastoralists, riverine agro pastoralists, employed urban residents and business dependent households, based on the village's four livelihood sub-clusters. Probability proportionate to sample size was then employed for the selection of the households from each stratum. Table 3.1 below summarises the population estimates as per sub-livelihood clusters according to UNDP 2005 population estimates for Somalia:

Table 3.1: Bulawayn village population estimates per livelihood sub-clusters

DISTIRCT	VILLAGE	LIVELIHOOD SUB-CLUSTERS	ESTIMATED POPULATIONS
Bardera	Bulawayn	Rain fed agro pastoral	3020
		Riverine agro pastoral	2250
		Employed urban	1500
		Business dependent	750
TOTALS			**7520**

Source: Rural Population Estimates by Region/District, UNDP Somalia, August 1, 2005.

From table 3.1 above, the rain fed pastoralists represent 40% of the population, riverine agro pastoral represent 30%, employed urban represent 20% while the business dependent households represent 10% of the entire population. These same estimates were used to zero down on number of households per strata. Therefore the study interviewed the following number of household in each stratum as summarised in table 3.2 below:

Table 3.2: Survey sample sizes per survey stratum

SURVEY STRATUM	% REPRESENTATION OF THE POPULATION (%)	SAMPLE SIZE
Rain fed agro pastoralists	40	98.4 ˜ 98
Riverine agro pastoralists	30	73.8 ˜ 74
Employed urban residents	20	49.2 ˜ 49
Business dependent households	10	24.6 ˜ 25
TOTALS	100	246

In each of the survey strata, the households were then selected randomly.

3.5 Data Collection Instruments

The researcher used structured questionnaires that were completed by each of the 246 selected households. Shao (1999) defines a questionnaire as a formal set of questions or statements designed to gather information from respondents. The use of the questionnaire ensures faster collection of data and also, if properly done, leads to a high return rate. The researcher developed a focused questionnaire which contained at least five questions per research objective area utilizing both closed ended and open ended types of questions, but mostly closed ended questions. The questionnaire were administered by the enumerators through interviews.

3.5.1 Pilot Testing of the Instruments

The researcher undertook a one day pilot test of the developed questionnaires in Bulawayn village to make sure that every respondent not only understood the questions, but understood them in the same way. The pilot test also enabled the researcher to find out if any questions within the questionnaire made the respondents feel uncomfortable, of which no question was found to bring any discomfort to the respondents. In addition to these, the researcher used the pilot test to train the enumerators on the tool, get their feedback on how they found the questionnaire and also found out how long it took to complete the survey in real time. Each survey took an average of six (6) minutes to complete.

The pilot testing of the tool was administered on twenty (20) people, five (5) in each strata, within Bulawayn village that represent the already identified four survey strata. This was so because the pilot test was planned to be administered in the same way and under similar conditions as planned for in the actual data collection. The test respondents were however not part of the sample population during the actual data collection.

3.6 Validity and Reliability of Instrument

Instrument is the generic term that researchers use for a measurement device. Measurement is a systematic, replicable process by which objects or events are quantified and/or classified with respect to a particular dimension. This is usually achieved by the assignment of numerical values (Willmott and Nuttall, 1975). Usability of an instrument refers to the ease with which an instrument can be administered, interpreted by the participant, and scored or interpreted by the researcher (Kerlinger, 1973). Validity and reliability concerns of the instrument thus helped alleviate usability issues.

3.6.1 Validity of the Instruments

Validity is the extent to which an instrument measures what it is supposed to measure and performs as it is designed to perform. It is rare, if nearly impossible, that an instrument be 100% valid, so validity is generally measured in degrees (Kerlinger, 1973). As a process within this study, a content related validity of the data collection instrument was ascertained by the pilot test on twenty (20) respondents. This was designed to help identify any form of ambiguities or difficulties in responding or asking the questions and establishing whether the questionnaire had been properly developed as to capture the required data for the four objectives of the study. No question was found not to have any input to the study objectives thus none was dropped. All the questions in the instrument were also found to be clear and simple and thus did not need any rephrasing.

3.6.2 Reliability of the Instrument

Shao (1999) observed that reliability can be thought of as consistency, that is, does the instrument consistently measure what it is intended to measure. He also stated that 'the most useful instrument is both valid and reliable'. The researcher used the Test-retest method to determine the reliability of the empirical measurements. This was done by administering the same pilot questionnaires to the same respondents after a week. The researcher then estimated the reliability of the instrument by examining the consistency of the responses between the two responses. The researcher obtained the same results on the two administrations of the instruments, which made the reliability coefficient to be 1.00 and thus a good indication of the reliability of the instrument.

3.7 Data Collection Procedures

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes. The data collection component of research is common to all fields of study including physical and social sciences, humanities, business, etc (Whitney, 1998). The data was collected from each of the study stratum by ten enumerators plus the researcher. The enumerators used for this study all had a diploma; prior experience in data collections; had the ability of speaking Somali Bantu '*Rahwenic'* dialect; and had worked in Bulawayn village previously and thus knew the village well. On February 13th 2015, the researcher subjected the enumerators to an intensive training and induction to the study. The training sessions covered: the research background, objectives and questions; target area and populations; communication skills; interviewing techniques and role plays.

Two pilot surveys were then undertaken before the actual data collection. The first pilot survey was basically used to test the research instrument and also give the enumerators actual feel of the tool in the real set up. The second pilot was used to test on the reliability of the instrument. The actual data

collection then followed and was undertaken for ten (10) days running consecutively, running from February 23rd 2015 to March 4th 2015. After each day of data collection, the research team met to recap the day, share challenges, debrief and plan for the next day. For consistency purposes, the same enumerators were then engaged on the data entry exercise which took four consecutive days, running from March 5th 2015 to March 8th 2015. On March 9th 2015, the researcher undertook a systematic data consistency checking using the SPSS software. Consistency checking is a procedure designed to ferret out both-data entry errors and apparent enumeration mistakes or inconsistencies. By systematically applying this computerized checking routine to each case entered, the researcher limited the number of errors in the final analysis to a minimum.

3.8 Data Analysis Techniques

Following Megan Deitchler, Terri Ballard, Anne Swindale, and Jennifer Coates (2010), household food security in this study was measured using the Household Hunger Scale (HHS). The HHS is most appropriate food security measure to use in areas of substantial food insecurity (FAO, 2011). The approach used by the HHS is based on the idea that the experience of household food deprivation causes predictable reactions that can be captured through a survey and summarized in a scale.

The HHS was measured and calculated in three simple steps. Firstly, the responses from each household were recorded to each frequency-of-occurrence question from three frequency categories ("rarely," "sometimes," "often") into two frequency categories ("rarely or sometimes" and "often"). Secondly, adding a code of "0" for households that replied "No" to each corresponding occurrence question. Once this step was completed, all households had a value of 0, 1, or 2 for each of the three new variables created. Thirdly, was to sum up the totals for the three questions for each household to calculate the HHS score. Each household had a HHS score between 0 and 6. These values were then used to generate the HHS indicators following the HHS Categorical Indicator table 3.3 below:

Table 3.3: HHS Categorical Indicator Table

Household Hunger Score	Household Hunger Categories
0–1	Little to no hunger in the household
2–3	Moderate hunger in the household
4–6	Severe hunger in the household

Source: M. Deitchler, T. Ballard, A. Swindale, and J. Coates, Validation of a measure of household hunger for cross-cultural use (2010).

Therefore households that scored between 0 and 1 were regarded as food secure and were labelled as one (1) while households that scored anything higher than 1 were regarded as food insecure and labelled as zero (0). The study then employed a logit model (Equation 1) with the dependent variable (food security) being a binary variable having a value of one if a household was found to be food secure, and a value of zero otherwise:

$$P_i = \left(Y = \frac{1}{X_i}\right) = \frac{1}{1+e^{-Zi}} = \frac{e^{Zi}}{1+e^{Zi}} \text{ .....} \textit{Equation 1}$$

Where

e is an exponential term,

P_i is the probability of household i being food secure. It is 1 if a household is food secure, otherwise 0.

Y is the observed food security status of a household.

X_i is the household set of explanatory variables.

Z_i is a function of n-explanatory variables (X_i) which can be expressed in linear form as:

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots \beta_n X_n$$

Seven (7) explanatory variables were identified to be major determinants of food security in this study. These included gender of household head, age of household head, size of the household, education level of the household head, size of land owned by the household, number of livestock owned by the household and household income levels. The logistic regression command in the SPSS software version 16 was used to run the model of analyses.

3.9 Ethical Considerations

The researcher had full obligation of ensuring that the research actions, findings and recommendations were responsible, transparent and accountable and thus ethical considerations were inherent in the research process. The questionnaire had been designed to collect information directly related to the research questions only, and no private or personal questions were asked from the respondents. The researcher also ensured that the survey questions did not contain any degrading, discriminating or any other unacceptable language that could have been offensive to any respondent. In respect to human rights to democratic participation, the researcher sought informed consents of the participants before involving them in the study. This ensured that the respondents participated in the survey voluntarily and had been fully informed about the aims and objectives of the study. The researcher also addressed ethical aspects of the study by ensuring that texts belonging to other authors

that have been used in any part of this study have been fully referenced using Harvard Referencing System in an appropriate format.

3.10 Operational Definition of the Variables

RESEARCH QUESTION	VARIABLES	INDICATORS	MEASUREMENT SCALE	DATA COLLECTION METHOD	DATA ANALYSIS TECHNIQUE
How do household socio-demographic characteristics influence food security?	Food Security-*Dependent variable*	Household hunger scale	Interval	Administering household questionnaires	Frequencies and percentages
	Gender-*Independent variable*	Gender of household head	Nominal/dichotomous	Administering household questionnaires	Frequencies and percentages
	Age-*Independent variable*	Age of household head	Nominal	Administering household questionnaires	Frequencies and percentages
	Household size-*Independent variable*	Number of people within each household	Nominal	Administering household questionnaires	Frequencies and percentages
	Education attainment-*Independent variable*	Education level of the household head	Nominal	Administering household questionnaires	Frequencies and percentages
How do household property ownership characteristics influence food security?	Land ownership-*Independent variable*	Number of hectares owned by each household	Ratio	Administering household questionnaires	Frequencies and percentages
	Livestock ownership-*Independent variable*	Number of livestock owned by each household	Nominal	Administering household questionnaires	Frequencies and percentages
How do household income characteristics influence food security?	Household income-*Independent variable*	Household income levels	Ratio	Administering household questionnaires	Frequencies and percentages
	Employment status-*Independent variable*	Number of people employed in the household	Ratio	Administering household questionnaires	Frequencies and percentages

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION OF THE FINDINGS

4.1 Introduction

This chapter presents the analysis of the findings and interpretations on how household socio-demographic, asset ownership and income characteristics influence food security status. The survey gathered qualitative and quantitative data pertaining to social, demographic, economic and food security aspects of households. The present analysis is based on data from a sample of 246 households randomly selected from 7520 households residing in the study area.

4.2 Questionnaire Return Rate

The study recorded a very high average questionnaire return rate of 97.7%. This can be attributed to two factors. The first is that the community had been well informed of the data collection exercise and were therefore prepared to receive the research team. Another factor was that the questionnaires were administered by the enumerators who were well trained by the researcher on various aspects of data collection including going through the tool through role plays and pilot tests. Table 4.1 summarises the questionnaire return rates for each category of respondents:

Table 4.1: Questionnaires return rate per respondents' categories

Respondents Category	**Questionnaires Issued**	**Numbers Returned**	**Questionnaire Return Rate (%)**
Rain fed agro pastoralists	100	98	98
Riverine agro pastoralists	75	74	98.7
Employed urban residents	50	49	98
Business dependent households	26	25	96
TOTALS	**251**	**246**	**97.7 (Average)**

4.3 Characteristics of the Respondents

This sub-section presents the socio-demographic, income, property ownership and food security characteristics of the sampled households. The findings are discussed under three sub-topics.

4.3.1 Socio-Demographic Characteristics of the Sampled Households

A summary of statistics on the socio-demographic characteristics of the sampled households is presented in Table 4.2 below and shows that of the total 246 sampled households in the study, 119 households were headed by a male with the remaining 127 households headed by a female. 37% of the sampled households head were over 45 years of age, closely followed by those in the age bracket of 31 to 39 years old at 23.6%. The sampled households were also relatively large with an average of 7 members per household and an average of 2 children being under 5 years. On matters education, 65.4% of the household heads had no formal education, 14% had lower primary level education, 10.5% upper primary, 8.1% secondary level and only 2% having college diploma level education. No household heads were found to have a university degree and above.

Table 4.2: Socio-demographic characteristics of the respondents

Household demographic characteristics		**n**	**(n=246) Percentage**
Female head of household		127	51.6
Male head of household		119	48.4
Age bracket of head of household (years)	Under 18 years	0	0
	Between 19 and 24 years	17	7
	Between 25 and 30 years	42	17
	Between 31 and 39 years	58	23.6
	Between 40 and 45 years	38	15.4
	Over 45 years	91	37
Average size of household		7	-
Average number of children below 5 years in the household		2	-
Education	No formal	161	65.4

attainment of household head	education		
	Lower primary	34	14
	Upper primary	26	10.5
	Secondary level	20	8.1
	College diploma	5	2
	University first degree	0	0
	University post graduate	0	0

4.3.2 Income and Property Ownership Characteristics of the Sampled Households

The households' economic characteristics were also analysed as presented in Table 4.3. According to the findings, the average farmland size was 0.5 hectares. Relatively low livestock ownership numbers were also registered with the most owned livestock being goats at an average of 6 per household, followed by chicken at an average of 4 per household. Monthly incomes were also reported at an average of 277,740 Somali Shillings and average debts owed at 41,272 Somali Shillings per household.

Table 4.3: Economic characteristics of the respondents:

Household economic characteristics		**n**	**(n=246) Percentage**
Sources of livelihoods for households	Crop and livestock production	172	69.9
	Business	25	10.2
	Formal and informal employment	49	19.9
Average farm size (ha)		0.5	-
Average	Cattle	2	-

number of livestock owned by the households	Camel	0	-
	Donkey	1	-
	Sheep	2	-
	Goats	6	-
	Chicken	4	-
Average monthly income for the households in a normal month (Somali Shillings)		277,740	-
Average debts owed by the households (Somali Shillings)		41,272	-

4.3.3 Food Security Status of the Sampled Households

Following Megan Deitchler, Terri Ballard, Anne Swindale, and Jennifer Coates (2010), household food security in this study was measured using the Household Hunger Scale (HHS). The HHS is most appropriate food security measure to use in areas of substantial food insecurity (FAO, 2011). Therefore, households that scored between 0 and 1 in the hunger scale were labelled as food secure while those that scored anything higher than 1 were labelled as food insecure. Table 4.4 shows that out of the 246 sampled households, 155 were food secure (63%) and 91 were food insecure (37%).

Table 4.4: Food security status of the sampled households

Food Security Status	Number of Households	Food Security Status (%)
Food secure	155	63
Food insecure	91	37
Total	246	100

Table 4.5 below provides a further break down on the number of households that were found to be food secure in each of the livelihood sub-clusters interviewed. The table suggests that the largest number of food insecure households (over 68%) are within the rain fed and riverine agro pastoral livelihood clusters. The employed and business dependent households were found to have fewer food insecure households.

Table 4.5: Food security status of the sampled households per livelihood sub-clusters

Livelihood Sub Clusters	Number of Food secure Households	Number of Food insecure Households
Rain fed agro pastoral	62	36
Riverine agro pastoral	48	26
Employed urban	32	17
Business dependent	13	12
Totals	155	91

4.4 Influence of Household Socio-demographic Characteristics on Food Security

The first objective of this study was to establish the influence of household socio-demographic characteristics on food security in Bulawayn village, Bardera distict, Gedo region of South Central Somalia. The objective covered four variables which include gender of head of household, age of head of household, size of the household and education attainment of the head of the household. The results of the regression model on the household socio-demographic factors that influence food security are shown in Table 4.6 below:

Table 4.6: Household socio-demographic estimates of the logit model

Variable	Coefficient	Standard Error	Z Statistic	Probability
Constant	-3.059	1.042	-2.935	0.004
Gender of head of household	0.085	0.155	0.031	0.584
Age of head of household	-0.007	0.006	-0.068	-1.265
Size of the household	-0.395	0.153	-2.585	0.011
Education attainment of head of household	1.304	0.590	2.210	0.029

Demographic characteristics such as the gender, age, and education of the household head were expected to influence food security positively (Shiferaw et al., 2003). On the other hand, family size was expected to have a negative influence on food security (Muluken, 2005). The results of the survey show that education attainment of the head of the household significantly affect positively the food security status of households in Bulawayn village. This indicates that, with other things constant, households with relatively better educated household heads are more likely to be food secure than

those headed by uneducated household heads. Findings from the gender and age of the head of the household recorded statistical non-significance indicating that these variables are not important predictors of the food security status of a household. The results further indicate that size of a household has a negative and significant relationship with household food security status. This further means that with all factors held constant, larger households are associated with a negative probability of being food secure, which can be explained by the fact that large households mean competition for a limited food basket. Since most of the farm households are small holder subsistence producers, an increase in the number of people in the household tends to exert more pressure on consumption than the labour it contributes (Shiferaw et al., 2003; Paddy, 2004).

4.5 Influence of Household Income Characteristics on Food Security

The second objective of this study was to establish the influence of household income characteristics on food security in Bulawayn village, Bardera district, Gedo region of South Central Somalia. The objective covered two variables which include household income and number of people employed in the household. The results of the regression model on the household income factors that influence food security are shown in Table 4.7 below:

Table 4.7: Household income estimates of the logit model

Variable	Coefficient	Standard Error	Z Statistic	Probability
Constant	-3.059	1.042	-2.935	0.004
Household income	1.777	0.813	2.184	0.031
Number of people employed in the household	0.371	0.127	2.915	0.161

The results of the survey show that household income and number of people employed in the household significantly affect the food security status of households in Bulawayn village. The results suggest that these variables positively affect food security status of the household. This can be explained by the fact that both of these variables increase household income levels which plays a key role in a household's accessibility to food. Household income enables households to modernize their production by giving them an opportunity to buy the necessary inputs, and reduce the risk of food shortage during periods of unexpected crop failures through purchases (Muluken, 2005).

4.6 Influence of Household Property Ownership Characteristics on Food Security

The third objective of this study was to establish the influence of household property ownership characteristics on food security in Bulawayn village, Bardera distict, Gedo region of South Central Somalia. The objective covered two variables which include land and livestock ownership of the households. The results of the regression model on the household property ownership factors that influence food security are shown in Table 4.8 below:

Table 4.8: Household property ownership estimates of the logit model

Variable	Coefficient	Standard Error	Z Statistic	Probability
Constant	-3.059	1.042	-2.935	0.004
Land ownership of the household	0.458	0.186	2.462	0.016
Livestock ownership of the household	0.338	0.222	1.527	0.130

The results of the survey show that both land and livestock ownership variables significantly affect the food security status of households in Bulawayn village. The results suggest that, keeping the other variables constant, land and livestock ownership are positively and significantly related to the probability of a household being food secure. Ownership of assets such as cultivated land and livestock were expected to affect the food security of the households in this study positively. According to Nejafi (2003) and Muluken (2005), food production is increased extensively through expansion of the area under cultivation, while livestock provides not only food for the producers but also other products which could be sold to provide food or income (Muluken, 2005).

CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses the summary of the findings drawn from results presented in the previous chapter by highlighting important findings and indicating these results in broad terms based on the research objectives. The chapter concludes by presenting recommendations of the study, suggesting areas for further research and pointing out the contribution to body of knowledge that this study has achieved.

5.2 Summary of the Findings

The first objective of this study was to establish the influence of household socio-demographic characteristics on food security in Bulawayn village, Bardera distict, Gedo region of South Central Somalia. The objective covered four variables which include gender of head of household, age of head of household, size of the household and education attainment of the head of the household. Results of the regression model on these variables show that education attainment of the head of the household significantly affect positively the food security status of households which indicate that households with relatively better educated household heads are more likely to be food secure than those headed by uneducated household heads. Findings from the gender and age of the head of the household recorded statistical non-significance indicating that these variables are not important predictors of the food security status of a household. The results further indicate that size of a household has a negative and significant relationship with household food security status. This further means that with all factors held constant, larger households are associated with a negative probability of being food secure.

The second objective of this study was to establish the influence of household income characteristics on food security in Bulawayn village, Bardera distict, Gedo region of South Central Somalia. The objective covered two variables which include household income and number of people employed in the household. The results of the survey show that household income and number of people employed in the household significantly affect the food security status of households in Bulawayn village. The results suggest that these variables positively affect food security status of the household. This can be explained by the fact that both of these variables increase household income levels which plays a key role in a household's accessibility to food.

The third objective of this study was to establish the influence of household property ownership characteristics on food security in Bulawayn village, Bardera distict, Gedo region of South Central Somalia. The objective covered two variables which include land and livestock ownership of the households. The results of the survey show that both land and livestock ownership variables significantly affect the food security status of households in Bulawayn village. The results suggest that, keeping the other variables constant, land and livestock ownership are positively and significantly related to the probability of a household being food secure.

5.3 Discussions of the Findings

This section looks at the findings of the study and compares these findings with what has been found out by other researchers as discovered during literature review. In doing this, the section highlights the key findings that brings out new knowledge and compares it with other findings from other similar studies, thus presenting an argument for the findings from this study.

5.3.1 Influence of Household Socio-demographic Characteristics on Food Security

The socio-demographic characteristics of a household may influence its food security status. Household heads in the sampled households are mostly female (51.6%) with only 48.4% of the households being male headed. Most of the household heads (37%) are over 45 years old with average size of household being 7 people, including an average of 2 children under 5 years per household. In this study, 65.4% of the household heads do not have any form of formal education. According to a study by Shiferaw et al. (2003), socio-demographic characteristics such as the gender, age, and education attainment of the household head influence food security positively. In another study by Muluken (2005), household size has a negative influence on food security. Results of the regression model on these variables show that education attainment of the head of the household significantly affect positively the food security status of households which indicate that households with relatively better educated household heads are more likely to be food secure than those headed by uneducated household heads.

Of interest were the findings from the gender and age of the head of the household which recorded statistical non-significance, indicating that these variables are not important predictors of the food security status of a household in Bulawayn village. In a related study, Bashir et al. (2012) found that an increase of one year in the age of household head decreases the chances of a household to become food secure. A study by Omonoma &Agoi (2007) in Nigeria found an inverse relationship between the age of household head and food security. Arene and Anyaeji (2010) concluded that the age of household head has a positive effect on food security status. Hofferth (2003), in his study, argues that the higher the age of the household head, the more stable the economy of the farm household, because

older people have also relatively richer experiences of the social and physical environments as well as greater experience of farming activities. Moreover, older household heads are expected to have better access to land than younger heads, because younger men either have to wait for a land distribution, or have to share land with their families. A similar study by Obamiro *et al* (2003) arrived at a similar conclusion regarding the relationship between age of a household head and household food security. Williams (2011), in his study, found that the age of the household head was not significant, although it had a negative sign. The older the household head less food secure the household was likely to be. Older people might not have the ability to work, thus ensuring increasing strain of the food acquisition of a household.

The results further indicate that size of a household has a negative and significant relationship with household food security status. This further means that with all factors held constant, larger households are associated with a negative probability of being food secure because they have increased food expenditures and competition for limited resources. Larger household sizes require increase food expenditure and competition for limited resources. The negative parameter could be as a result of an increase in the dependency ratio in larger households. A study by Babatunde et al. (2007) concluded that larger household sizes are more likely to be food insecure than smaller size households. Hofferth (2003) in his study states that subsistence farming is generally characterized by greater reliance on labour than commercial agriculture. In subsistence farming, households with larger labour supplies are better positioned to increase the productivity of their land. Availability of a relatively larger labour force, regardless of farm size, can be an advantage to those households who strive to achieve food security, provided that the excess labour force is engaged in other income generating activities. Similar study by Jiggins (1986); Thomas and Leatherman (1990); and Chen (1991) report that labour availability is an important determinant of household productivity and food security, especially in subsistence-oriented households given the necessary landholding and rainfall. A study by Babatunde et al. (2007) concluded that larger household sizes are more likely to be food insecure than smaller size households.

5.3.2 Influence of Household Income Characteristics on Food Security

Household income plays a key role in accessibility to food. The results of this study show that household income and number of people employed in a household significantly affect positively the food security status of households in Bulawayn village. The results suggest that these variables positively affect food security status of the household. This can be explained by the fact that both of these variables increase household income levels which plays a key role in a household's accessibility to food. According to a similar study by Muluken, (2005), household total annual income and food security are positively related because it enables households to modernize their production by giving

them an opportunity to buy the necessary inputs, and reduce the risk of food shortage during periods of unexpected crop failures through purchases.

FAO (2000) reports that employment in off-farm and non-farm activities are essential for diversification of the sources of farm households' livelihoods; it enables households to modernize their production by giving them an opportunity to apply the necessary inputs, and reduces the risk of food shortage during periods of unexpected crop failures through food purchases. Especially in Africa, diversification of sources of income has long been a survival strategy which allows household heads to reduce the risk of starvation for themselves and their families during periods of chronic or transitory food insecurity (Devereux 2009, Thomas and Leatherman, 1990). In this study, the various livelihood sources including crop and livestock production, business, formal and informal employments are measured and were found to be positively related to household food security.

5.3.3 Influence of Household Property Ownership Characteristics on Food Security

A household's wealth status forms the other important source of livelihood for farming households. Ownership of assets such as cultivated land and livestock were expected to affect the food security of the households in this study positively. The results of the regression analysis on the household property ownership factors show that both land and livestock ownership variables significantly affect the food security status of households in Bulawayn village. The results suggest that, keeping the other variables constant, land and livestock ownership are positively and significantly related to the probability of a household being food secure. According to Nejafi (2003) and Muluken (2005), food production is increased extensively through expansion of the area under cultivation, while livestock provides not only food for the producers but also other products which could be sold to provide food or income (Muluken, 2005).

Livestock contribute to households' economy in different ways, for example, as a source of pulling power, source of cash income, source of supplementary food, and means of transport. Besides, livestock are considered a means of security and means of coping during crop failure and other calamities (Kang'ara *et al* 2001). In a similar study, Thomas (1990) argue that livestock provides not only food for the producers, but also a range of other products which could be sold or consumed by the livestock owner to provide nutrition, income, traction and fuel. The major products of livestock include draught power, meat, milk, eggs, manure which is used as fertilizer or fuel, feathers, fibre, hides, and horns. In addition to these products livestock serve as an asset and may provide a reserve that can be converted to cash in times of need. A study by Feleke *et al* (2005) found that households who own livestock have good food security status as well as sustainable farming. Particularly in

Somalia, where crop failure is frequent due to poor rainfall, the level of a household's resources a critical factor in combating such disasters. In view of this, an inventory of livestock for the sample households was conducted.

5.4 Conclusions of the Study

The main purpose of this study was to investigate the primary factors that influence household food security in Bulawayn village, Bardera district, Gedo region in South Central Somalia. The findings of the study revealed that 63% of the households are food secure whereas 37% are food insecure. Recurrent drought and insecurity have been the main drivers and causes of food insecurity within the study area, exacerbating the food security status of the resource-poor agro pastoral households. Solutions to food insecurity must include analysing and elimination of poverty at household level. Using a logistic regression model, this study found that the socio-demographic characteristics that have a significant influence on household food security were: size of the household and education attainment of the head of the household. Gender and age of the head of household were found not to be significant pointers of household food security status in Bulawayn village. The study further found that the household income characteristics that have a significant influence on food security are: household income and number of people employed in the household. Land and livestock ownership of the household, as property ownership characteristics were also found to have a significant influence on the households food security.

5.5 Recommendations of the Study

The researcher recommends that the Federal Government of Somalia, all the humanitarian and development actors working on food security related programming should change the blanket food distribution approach to food security programming in Somalia and consider the household dynamics and factors which are promoting or exacerbating food insecurity at household level. This consideration should be at program design level, to ensure that food security programs are designed to strengthen household income, socio-demographic and property ownership characteristics which are major determinants of how stable a household is in terms of its food security status. The program considerations should also be at program beneficiaries targeting level where households that demonstrate weak socio-demographic, income and property ownership characteristics should be enrolled into these programs with an aim of strengthening, developing and diversifying these household characteristics.

This study found that the most food insecure households are the agro pastoralists. It is therefore recommended that promotion of sustainable agriculture and biodiversity among the agro-pastoralists should be a priority. This should be aimed at improving on crops and livestock production levels within the households. This may include promotion of use of drought tolerant seed varieties, use of

inputs such as improved seeds, fertilizers, manure, pesticides and intensive irrigation. Improving agricultural biodiversity through reduced mono-cropping may also be considered. Mono-cropping increases crop susceptibility to both pests and diseases.

5.6 Suggested Areas for Further Research

Given that this study did not attempt to consider the nutritional contents of the food consumed by households (the study only focused on hunger scale), the nutritional aspects of food security at household level should be further researched on.

A further research should be undertaken to understand the agricultural practices undertaken by the agro pastoralists and why are the most food insecure household are within this livelihood zone, irrespective of the fact that they are the food producers.

REFERENCES

Arene, C.,& Anyaeji, C. (2010). Determinants of Food Security among Households in Nsukka Metropolis of Enugu State, Nigeria. Pakistan Journal of Social Sciences, 30(1), 9-16.

Atieno Oluoko-Odingo, A. (2011). Vulnerability and Adaptation to Food Insecurity and Poverty in Kenya. Annals of the Association of American Geographers, 101 (1): 1-20.

Babatunde, R., Omotesho, O., & Sholotan, O. (2007). Socio-economic characteristics and food security of farming households in Kwara State, North-Central Nigeria. Pakistan Journal of Nutrition, 6(1), 41- 58.

Ban Ki- Moon (2011). Remarks at Mini-Summit on Horn of Africa, September 24, 2011. Accessed April 11, 2014 at: http://www.un.org/apps/news/infocus/sgspeeches/print_full.asp?statID=1327

Bashir, M., Schilizzi, S., & Pandit, R. (2012). The Determinants of Rural Food Security: the case of Landless Households of the Punjab, Pakistan. Crawley: a School of Agricultural and Resource Economics, The University of Western Australia.

Coates., Jennifer., Anne S., Paula B., (2007): Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v.3). Washington, D.C.

Cochran, W. G. (1977). Sampling techniques (3rd edition), New York: John Wiley & Sons.

Chen MA (1991).Coping with Seasonality and Draught. Sage Publications, NY.

Desanker, P. et al. (2001). Africa, Chap 10. In: McCarthy, J., Canziani, O., Lary, N., Dokken, D., White, K. (eds). IPCC Third Assessment Report, Working Group II: Impacts, Adaptation and Vulnerability. Accessed April 20, 2014 at: http://www.grida.no/publications/other/ipcc_tar/

Devereux, S. (2006) Distinguishing between chronic and transitory food insecurity in emergency needs assessments. SENAC, WFP, Rome.

Devereux, S. (2009). Why does famine persist in Africa? Food Security, 1:25 – 35.

Elagib, N., and Elhag, M. (2011) Major climate indicators of ongoing drought in Sudan, Journal of Hydrology. doi: 10.1016/j.jhydrol.2011.08.047

Elagib, N. (2009) Assessment of drought across central Sudan using UNEP dryness ratio. Hydrological Research,40(5):481-494.

Ellis, F**,** 2000. Rural livelihoods and diversity in developing countries, Oxford, OUP.

FAO (2011) Executive Brief: Horn of Africa, Drought 2011, September 30, 2011. Accessed February 21, 2014 at: http://www.fao.org/crisis/horn-africa/home/en/

Feleke, S.T., Kilmer, R.L., Gladwin, C. H., 2005. Determinants of food security in Southern Ethiopia at the household level. Agricultural Economics 33 (2005):351-363.

Food and Agriculture Organization (2003) Trade Reforms and Food Security: Conceptualizing the Linkages. Rome: FAO.

FAO (2006) Integrated Food Security and Humanitarian Phase Classification (IPC) Framework, ESA Policy Brief, 06-01. ftp://ftp.fao.org/es/ESA/policybriefs/pb_01.pdf

FAO (2000) The Elimination of Food Insecurity in the Horn of Africa – Summary Report. Rome: Food and Agriculture Organization. Accessed on February 21, 2014 at: http://www.fao.org/docrep/003/x8530e/x8530e00.htm

FAO. 2010. "The State of Food Insecurity in the World: Addressing food insecurity in protracted crises."Accessed February 24, 2014. http://www.fao.org/docrep/013/i1683e/i1683e.pdf

FEWS NET (2011) East Africa Food Security Update, August 7, 2011. Accessed February 22, 2014 at: http://www.fews.net/docs/Publications/East_Regional_FSOU_2011_08_07_final.pdf

FEWS NET (2011) EAST AFRICA: Past year one of the driest on record in the eastern Horn, June 14, 2011. Accessed February 22, 2014 at: http://www.fews.net/docs/Publications/FEWS per cent20NET per cent20EA_Historical per cent20drought per cent20context_061411.pdf

FEWS NET (2011) Ethiopia Food Security Outlook Update, August 25, 2011. Available at: http://www.fews.net/docs/Publications/Ethiopia_Dekadal_08_20_final_ext.pdf

FEWS NET (2011). KENYA Food Security Alert, September 19, 2011. Accessed March 11, 2014 at: http://www.fews.net/Pages/default.aspx

FEWS NET (2011). SOMALIA Dekadal Food Security and Nutrition Monitoring, April 13, 2014. Accessed April 11, 2014 at: http://www.fews.net/Pages/default.aspx

FEWS NET (2011) SOMALIA: Food Security Update, September 5, 2011. Accessed April 11, 2014 at: http://www.fews.net/Pages/default.aspx

FEWS NET (n.d.) FEWS NET Livelihood Maps.http://www.fews.net/pages/region.aspx?gb=r2&l=en

Funk CC, Brown ME (2009) Declining global per capita agricultural production and warming oceans threaten food security. Food Security, 1:271–289

Funk CC, Dettinger MD, Michaelsen JC, Verdin JP, Brown ME, Barlow M, Hoell A (2008) Warming of the Indian Ocean threatens eastern and southern African food security but could be mitigated by agricultural development. Proc Nat Acad Sci USA, 105:11081–11086

Funk, C. (2011) we thought trouble was coming. Nature, 476: 7. Accessed April 11, 2014 at: http://www.nature.com/news/2011/110803/full/476007a.html

Funk, C., Eilerts, G. Verdin, J., Rowland, J. Marshall, M. (2011) A Climate Trend Analysis of Sudan. U.S. Geological Survey Fact Sheet 2011-3072. Accessed May 22, 2014 at: http://www.usgs.gov/science/cite-view.php?cite=2770

Funk, C., Eilerts, G., Davenport, F., and Michaelsen, J. (2010) A climate trend analysis of Kenya–August 2010: U.S. Geological Survey Fact Sheet 2010–3074. Accessed May 22, 2014 at: http://pubs.usgs.gov/fs/2010/3074/pdf/fs2010-3074.pdf

Funk, C., Senay, G., Asfaw, A., Verdin, J., Rowland, J., Michaelsen, J., Korecha, D., Choularton, R. (2005). Recent drought tendencies in Ethiopia and equatorial-subtropical eastern Africa: U.S. Agency for International Development. Washington, D.C.

Hofferth SL (2003).Persistence and Change in the Food Security of Families with Children,

1997-1999. Department of Family Studies, University of Maryland. Available online:http://www.findarticles.com/p/articles/mi_m1309/is_3_40/ai_111027115

Jiggins J (1986). Women and Seasonality: Coping with Crisis and Calamity. IDS Bulletin. 17(1): 9-18

Kang'ara JN, Ngoroi Eh, Muturi Jm, Amboga Sa, Ngugi Fk & Mwangi I(2001).The Role of Livestock in Soil No Fertility, Biodiversity, Land use, Cultural and Welfare change in Nduuri Embu, Kenya.

Kerlinger, F.N. (1973). Foundations of Behavioral Research. New York: Holt, Reinehart And Winston.

Kothari, C. (2003), Research methodology: Methods and Techniques, Kisha Prakasham, New Delhi.

Megan Deitchler, T. Ballard, A. Swindale, and J. Coates, Validation of a measure of household hunger for cross-cultural use (2010).

Muluken, Y. (2005). Measuring household food security status and its determinants in the Benshangul Gumuz Region of Ethiopia. Alemaya University, Ethiopia.

Mwangi, A. and Mbera, G. 2006. Report of the Adaptation and Pre-Testing of Household Food SecurityMonitoring Tools: The Kenya Experience. Rome: FAO. http://www.foodsec.org/fileadmin/user_upload/eufao-fsi4dm/docs/kenya_adapt_hfias.pdf.

Najafi B (2003). An Overview of Current Land Utilization Systems and Their Contribution to Agricultural Productivity. Report of the APO Seminar on Impact of Land Utilization Systems on Agricultural Productivity. Productivity Organization, Islamic Republic of Iran Asian.

Obamiro EO, Doppler, Kormawa PM (2003). Pillars of Food Security in Rural Areas of Nigeria. Food Africa, Internet Forum 31 March – 11 April, Internet Paper accepted for the Food Security Theme. Available online http://foodafrica.nri.org/security/internetpapers/ObamiroEunice.pdf

OCHA (2011) Horn of Africa Crisis, Situation Report No. 14. 15 September 2011, New York: OCHA.

OCHA (2011) Horn of Africa Crisis, Situation Report No. 18. 14 October 2011, New York: OCHA.

Omonoma , B., & Agoi , G. (2007). An analysis of food security situation among Nigerian urban households: evidence from Lagos State, Nigeria. Journal of Central Europena Agriculture, 8(3), 307-406.

Paddy, F. (2004). Gender differentials inland ownership and their impact on household food security: A case study of Masaka district. Retrieved from: http://www.troz.unihohenheim.de/Research/Thesis/MScAES/Paddy.pdf

Pohl, B. and Camberlin, P. (2006) Influence of the Madden-Julian Oscillation on East African rainfall: II. March-May season extremes and interannual variability. Quarterly Journal of the Royal Meteorological Society ,132:2541-2558.

Prasad PVV, Staggenborg SA (2008) Impacts of drought and/or heat stress on physiological, developmental, growth, and yield processes of crop plants. In: Ajuha LR, Reddy VR, Saseendran SA, Yu Q (eds) Response of crops to limited water: understanding and modelling

water stress effects on plant growth processes. American Society of Agronomy/ Crop Science Society of America / Soil Science Society of America, Madison, WI, p 301–356

IPCC. (2007). Regional climate projections, Chap. 11 . In: Climate Change 2007 - The Physical Science Basis: Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Accessed online on January 5, 2014 at http://www.ipcc.ch/ipccreports/ar4-wg1.htm

SEDAC (2010) Gridded Population of the World: Future Estimates. Socioeconomic Data and Applications Center (SEDAC); collaboration with CIESIN, UN-FAO, CIAT. Accessed January 10, 2014 at: http://sedac.ciesin.columbia.edu/gpw

SEI (2005) Sustainable pathways to attain the Millennium Development Goals – assessing the role of water, energy and sanitation. Document prepared for the UN World Summit, 14 September 2005, New York, USA. Stockholm Environment Institute, Stockholm, Sweden. Accessed January 12, 2014 at: http://www.ecosanres.org/pdf_files/MDGRep/SustMDG31Auglowres.pdf

Shao, T. (1999) Marketing Research: An Aid to decision making, Ohio: South-Western College Publishing

Shiferaw, F., Kilmer, R. L., & Gladwin, C. (2003). Determinants of food security in Southern Ethiopia. Paper Presented at the 2003, American Agricultural Economics Association Meetings in Montreal, Canada.

Stamoulis K., Zezza A. (2003). A Conceptual Framework for National Agricultural, Rural Development, and Food Security Strategies and Policies, Working Paper 03-17, ESA Division, FAO.

Thomas Rb & Leatherman TL .(1990). Household Coping strategies and Contradictions in Response to Seasonal Food Shortage. European Journal of Clinical Nutrition 44(1):103-111.

UNEP (n.d.) Africa Population Distribution Database. Accessed February 22, 2014 at: http://na.unep.net/siouxfalls/datasets/datalist.php

VSF Suisse- Impact Assessment Final Report – July 2010, Interactive Booklets of Patoralists Drought Preparedness for Improved Community Response to Drought Phase II

WFP (2005) Emergency Food Security Assessment Handbook. www.wfp.org/operations/emergency_needs/EFSA_section1.pdf

Whitney, C.W., Lind, B.K., Wahl, P.W. (1998). Quality assurance and quality control in longitudinal studies. Epidemiologic Reviews, 20(1): 71-80.

Williams, A., Funk, C., Michaelsen, J., Rauscher, S., Robertson, I., Wils, T., Koprowski, M., Eshetu, Z., Loader, N. (2011) Recent summer precipitation trends in the Greater Horn of Africa and the emerging role of Indian Ocean sea surface temperature. Climate Dynamics. Doi: 10.1007/s00382-011-1222-y.

Williams, A.P, and Funk, C. (2011) A westward extension of the warm pool leads to a westward extension of the Walker circulation, drying eastern Africa. Climate Dynamics (in press). Accessed February 22, 2014 at: http://www.geog.ucsb.edu/~williams/publications/WilliamsAndFunk_2011_ClimateDynamics.pdf

World Health Organization (2011). Food security. Accessed January 21, 2014 at: http://www.who.int/trade/glossary/story028/en/

APPENDICES

APPENDIX ONE: Research Introduction Letter

Nicholas Oloo,
University of Nairobi,
P.O. BOX 30197 – 00100,
Nairobi, Kenya.

The Study Respondent,
Bulawayn Village,
Bardera District,
Gedo Region of Somalia

Dear Sir/Madam,

REF: LETTER OF TRANSMITTAL OF DATA COLLECTION INSTRUMENTS.

I am a postgraduate student at the University of Nairobi in Kenya currently undertaking a research on factors that influence household food security status in Bulawayn village.
It is because of this that you have been selected as a respondent.

This is purely an academic research and the findings from this study will strictly be used for academic purposes only. The provided information will also be handled and treated with the highest level of confidentiality.

Thanks you for your time and for your cooperation.

Yours sincerely,

Nicholas Oloo.

APPENDIX TWO: Household Survey Questionnaire

HOUSEHOLD SURVEY QUESTIONNAIRE

This household survey questionnaire aims at assessing how the household social, economic and demographic characteristics influence food security

SECTION A: GENERAL INFORMATION		
A1	Questionnaire Number	
A2	Date of Interview	
A3	Name of the Enumerator	
A4	District	
A5	Village	
SECTION B: HOUSEHOLD SOCIO-DEMOGRAPHIC CHARACTERISTICS		
B1	Are you the head of the household?	**0=NO** ☐ **1=YES** ☐
B2	Gender of the respondent	**1=MALE** ☐ **2=FEMALE** ☐
B3	Gender of the head of the household (if different from the respondent)	**1=MALE** ☐ **2=FEMALE** ☐
B4	Age bracket of the respondent	**1=UNDER 18 YEARS** ☐ **2=19-24 YEARS** ☐ **3=25-30 YEARS** ☐ **4=31-39 YEARS** ☐ **5=40-45 YEARS** ☐ **6=45+ YEARS** ☐
B5	Age bracket of the head of the household (if different from the respondent)	**1=UNDER 18 YEARS** ☐ **2=19-24 YEARS** ☐ **3=25-30 YEARS** ☐ **4=31-39 YEARS** ☐ **5=40-45 YEARS** ☐ **6=45+ YEARS** ☐

B6	Total number of people in the household	.....
B7	Number of Children below 5 years in the household	.....
B8	What is the highest level of education attained by the head of this household?	**1=NO FORMAL EDUCATION** ☐ **2=LOWER PRIMARY** ☐ **3=UPPER PRIMARY** ☐ **4=SECONDARY LEVEL** ☐ **5=COLLEGE DIPLOMA** ☐ **6=UNIVERSITY FIRST DEGREE** ☐ **7=UNIVERSITY POST GRADUATE** ☐
SECTION C: HOUSEHOLD INCOME AND PROPERTY OWNERSHIP CHARACTERISTICS		
C1	What is the main source of livelihood of your household	**1= CROPS PRODUCTION ONLY** ☐ **2= LIVESTOCK PRODUCTION ONLY** ☐ **3= CROPS AND LIVESTOCK PRODUCTION** ☐ **4= BUSINESS** ☐ **5= FORMAL OR INFORMAL EMPLOYMENT** ☐ **6=HUMANITARIAN AGENCIES ASSISTANCE (***for IDPs only***)** ☐ **7= OTHERS (***Please specify***)** ☐
C2	How many hectares of land does your household own?	.....
C3	How many of the following livestock assets do you or your household members own. Fill the table below	

Livestock	**Cattle**	**Camel**	**Donkey**	**Sheep**	**Goats**	**Chicken**
# Owned						

C4	On average, how much total income does your household earn in a normal month in Somali shillings?	.....So shillings
C5	On average, how much does your household spend on the following items in a normal month in Somali shillings? Fill the table below	

ITEM	**Food**	**House rent**	**School fees**	**Medication**	**Clothing**	**Gifts to friends and family**	**Savings**
AMOUNT SPENT							

(Somali shillings)							

C6	How much debt does your household owe currently in Somali shillings?	.....So shillings
C7	How many people are working/engaged in gainful income generating activity in your household?	……
SECTION D: HOUSEHOLD FOOD SECURITY STATUS		
D1	In the past [4 weeks/30 days], was there ever no food to eat of any kind in your house because of lack of resources to get food?	**0 = NO (SKIP TO D3)** ☐ **1 = YES** ☐
D2	If Yes in D1 above, 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)** ☐
D3	In the past [4 weeks/30 days], did you or any household member go to sleep at night hungry because there was not enough food?	**0 = NO (SKIP TO D5)** ☐ **1 = YES** ☐
D4	If Yes in D3 above, 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)**	**1 = RARELY (1–2 TIMES)** ☐ **2 = SOMETIMES (3–10 TIMES)** ☐ **3 = OFTEN (MORE THAN 10 TIMES)** ☐
D5	In the past [4 weeks/30 days], did you or any household member go a whole day and night without eating anything at all because there was not enough food?	**0 = NO (SKIP D6)** ☐ **1 = YES** ☐
D6	If Yes in D5 above, 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)** ☐

END OF THE QUESTIONNAIRE