ANALYSIS OF SOCIO-ECONOMIC DETERMINANTS OF HOUSEHOLD FOOD INSECURITY IN JUBA RIVER BASIN, SOMALIA

AHMED ALI

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY DEGREE IN DEVELOPMENT STUDIES OF MOUNT KENYA UNIVERSITY

MAY 2024

DECLARATION

This research thesis is my original work and has not been presented for examination in any other institution of higher learning leading to any award.

Signature:  **Date:** ……..May 20, 2024……..

Ahmed Ali

PhD/2013/54375

Supervisors

This report has been submitted with our approval as the University Supervisors.

Signature:  **Date:** 20th May 2024 2023

Prof. Kennedy Mutundu

Department of Social & Development Studies

Mount Kenya University

Prof. Grace Wamue Ngare

Department of Gender and Development

Kenyatta University

Signature:  **Date:** 20th, May 2024

DEDICATION

Dedicated to the people of Somalia who have endured in the face of many difficulties.

ACKNOWLEDGEMENTS

First and foremost, I would like to express my sincere gratitude to my internal and external advisors Prof. Kennedy Mutundu and Prof. Grace Wamue Ngare, respectively, for their unwavering support, guidance, patience, motivation, and immense subject matter knowledge every step all the way during my PhD work. Their guidance helped me in all the time of research and writing of this thesis. I could not have imagined having better advisors and mentors for study. I would like to thank the staff at Mount Kenya University for their academic and administrative support through which this thesis was developed and finalized. Finally, my appreciation goes to my family for their patience and support the entire research work.

ABSTRACT

Despite much evidence supporting Somalia as food sufficient in the 1960s and 1970s, with every indication that it has the potential to be food secure, 70% of its vulnerable households remain hungry. The cornerstone of discourse on the determinants of this reality has focused on environmental factors and the political conflicts in the country over the past three decades. Virtually no studies have been conducted on alternative factors such as household economy and social structures, which may play a greater role in situations where ecological and political factors are favorable. Thus, the purpose of this study was to examine socio-economic determinants of household food insecurity in Juba Valley Basin of Southern Somalia focusing on barriers to access through the family structure and income variables. Specifically, the study was guided by four objectives: i. to establish the state of household food insecurity in Juba River Basin ii. to investigate the influence of household structure on food insecurity in Juba River Basin iii. to examine the effect of income on household food insecurity in Juba River Basin, and iv. to identify strategies that can enhance household food security Juba River Basin. The target population entailed the household residents of Juba Valley Basin lying along the belt of 2km radius from the river boundaries with a representative sample of 368 households. A pragmatic approach involving collecting both qualitative and quantitative data, with a mixed method research design was employed. Data collection involved household survey, key informant interviews, focus group discussions (FGDs) and observation. The severity of hunger, the state of food security and vulnerability of the households were measured using the standard Household Food Security Access Scales (HFIAS). Socio-economic determinants of household food security in the area were analyzed using mixed regression methods. The results indicate that the majority of households are severely food insecure. Likewise, a measure of household food security access-related domains revealed that most of the households fall in domain 1of worry and anxiety about food due to lack of resources. A large number of the respondents fall in domain 2 of insufficient quality food and as a result, eat less preferred foods. Further, most of the households' experience hunger (domain 3) where they reduce their meals per day. The majority of the respondents face severe hunger according to the household hunger scale. The gender of household head, age, and marital status were found to be the critical determinant household structure variables. Moreover, credit acquisition for food, the primary source of food, and seed shortage were significant variables. The study concludes that the main socio-economic factors influencing household food security are the gender of the household head, age, marital status, and households' weak income base. The result of this study is significant because it addresses not only existing knowledge gaps in the field of international development but also contributes theoretically and conceptually grounded knowledge of the causes of household food security. Further, the primary knowledge contribution of this thesis is empirical and likely to improve our understanding that underpins food insecurity discourse as one of the global challenges. Further, the results provide strategies that can be applied by Somali Government and its International development partners to develop strategies and interventions for enhancing food security for the targeted household beneficiaries who have demonstrated not only similar income base and livelihoods but also face similar constraints to access food.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AU: African Union

FAO: Food and Agriculture Organization

FSAU: Food Security Analysis Unit

FSNAU: Food Security and Nutrition Analysis Unit

HFIAS: Household Food Security Access Scale

IPCC: Intergovernmental Panel on Climate Change

JVB Juba Valley Basin

SSA: Sub-Saharan Africa

UN: United Nations

UNDP: United Nations Development Programme

UNSC: United Nations Security Council

USAID: United States Agency for International Development

WFS: World Food Summit

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Somalia, a country with a rich history of self-sufficiency in food during the 1960s and 1970s, now faces a severe challenge of food insecurity, with approximately 70% of its households experiencing hunger in the 21st century (Devereux, 2018). The Juba River Basin, once considered the breadbasket of Somalia, is particularly affected. Despite the presence of irrigation water sources, rain-fed farming lands, and a significant number of live animals available for export, the region's households remain among the largest food-insecure populations in the country (Carruth & Mendenhall, 2019). The socio-economic determinants of household food insecurity in this region are complex and multifaceted. Previous studies have highlighted the impact of severe climate shocks and political instability on food security. However, the underlying causes at the household level remain under-researched. This thesis aimed to bridge this knowledge gap by analyzing the socio-economic factors that contribute to food insecurity in the Juba River Basin.

The region's socio-economic landscape is characterized by a weak income base, gender disparities, and varying family structures, which all play a role in determining food security status. Factors such as credit acquisition for food, the main source of food, seed shortages, and the gender of the household head have been identified as significant determinants (Asenso-Okyere, Mekonnen & Zerfu, 2013). Moreover, age, marital status, and the number of dependents also contribute to the household's vulnerability to food insecurity.

Available socio-economic statistics in Somalia confirm this observation where about 82% Somalis were poor across multiple dimensions and where 73% survive less than live $2 per day and 43% with less than 1 per day (The World Bank, 2015). Similarly, household food security assessments and reports point out that 70% of households in Somalia remain hungry where about 4.7 million people need life-saving and unable to meet their minimum food needs as a result of acute food security (UNSC, 2023). That is half of Somalia population. This tragedy is the result of household food insecurity- the lack of capacity of a household to produce a stable basket of adequate food for its members. More particularly, poverty and food security statistics in Somalia are mostly consistent with quantitative and qualitative findings of this study.

With the above context combined with literature spanning a decade about the local communities in villages across Somalia raise troubling study questions: What explains the reasons for 70% of households in Somalia remain hungry? Why can they not access food? What are the underlying socio-economic causes of household food insecurity in the study area? How can family structure and income base influence household level food insecurity? Providing an answer to these research questions starts with finding out what is already known about the socio-economic determinants of household food insecurity as well as non-socio-economic factors. This exercise was done by reviewing the scholar of work of others and practitioners. Taking as a whole, the reviewed literature show that food security is a complex global and regional issue influenced by not only socio-economic factors, but also non-socio-economic factors including political, environmental, and social issues. Unfortunately, it is also a local issue, a tragic reality faced by 70% of households in Somalia who remain hungry. A close examination of the

literature reviewed also show that food security is essential to alleviate hunger, poverty, disease, and economic development.

To determine the underlying causes of household food security, many researchers (Abebaw & Betru, 2019; Zhou, Shah, Ali, Ahmad, Din & Ilyas, 2019) have explored different perspectives and took different approaches in detail and arrived at different conclusions of why people are hungry. While some studies attributed socio-economic factors including farm size, family size, dependency ratio, the education level, disability of the head of the household, age of household head, and access to credit service to household food security, other studies found that political instability, security, climatic variability, agro-ecological variability, aid, trade relations, and market accessibility as the critical none-socio-economic factors including contributing to food insecurity among households globally. (Adeoti and Egwudike, 2003; Hussein and Janekarnkij, 2013; Ayandiji et al., 2012). It should be noted that these are non-socio-economic factors and are consistent with the global and regional findings.

Applied to Somalia in this particular context, studies on the subject have attributed food insecurity in Somalia to many years of extreme climate shocks (Said & Bashir, 2023), environmental variability (Omer, 2024) and lack of stability in politics (Jaspars, Adan & Majid, 2019) -- macro level none-socio-economic factors. Nevertheless, the basic socio-economic causes of household food insecurity in Somalia are poorly researched. There has been no (at time of this study) research conducted examining the critical variables in family structure and income base and the linkages between these variables in influencing household food shortage in the target families in Somalia. The current research also

argues that the irregularity of climate-induced shocks alone cannot account for the chronic food security either can the long term civil strives be solely blamed for Somalia's food security hardships. In as much as climatic and environmental, political factors impact on food security, and are not less important; however, they are treated as a critical intervening variable in this study.

Therefore, this study examined socio-economic determinants of household food insecurity in Juba Valley Basin of southern Somalia, focusing on access problems of household food insecurity diminution through the family structure and income variables. The study argued that family structure and income base are the most immediate socio-economic variables affecting individual household food insecurity in the study area. The study aimed not only to find out and understand why 70% of households in Somalia were food insecure (Hussein, Law and Fraser, 2021) but also to address socio-economic factors influencing the same.

In doing so, the study begins with the proposition that family structure and income are most likely socio-economic determinants of household food insecurity and argues that until we understand and address the socio-economic factors influencing food insecurity, 70% households in Somalia will remain hungry and malnourished. In other words, food access among households is influenced by family and income variables. Therefore, to achieve its objectives, this study attempted to take a historical perspective in understanding and analyzing problems of access dimension of household food insecurity through the family structure and income variables because understanding and analyzing problems of access to food security approach was a critical variable in determining the

household status to be food secure or insecure. The assumption underlying this argument is grounded in the belief that food availability at the national level does not provide access to the household or individual level (Menkhaus, 2012). The study further assumed identifying, understanding and dealing with the socio-economic factors influencing in household food insecurity meant reducing household poverty and ensuring household food security in the study area.

This assumption is consistent with the reviewed literature which shows a weak linkage between national food availability and household food security as Cohen articulated (Cohen, 2007). This weak linkage indicates that even if food is available at the national level or in markets, it may not be accessible to the socio-economic disadvantaged group of households or individuals- a situation that makes them food insecure. Besides, analyzing and understanding the problem of the access dimension of household food insecurity was also crucial because reviewed literature indicates a close linkage between the lack of access and poverty. According to Cohen, lack capabilities to access food either through their production and purchase can make households or individuals food insecure (Cohen 2007).

The background illustrates the weak linkage between food availability and household food security. The argument is how lack of access linked to poverty. It further illustrates how one's socio-economic status puts citizens in a disadvantaged position. In a nutshell, lack of physical, economic or social access to food, people will experience food insecurity (Clay, 2002). The examination of access was also critical for this study because socio-economic problems combined with nonsocial-economic factors including environmental

shocks and decades of political instability have created the lack of resources for households in Somalia to purchase food or produce it-thus food insecurity. What is more, analyzing the socio-economic status of households in the study area focusing on family structure and income variables were especially important because it was hypothesized that people who are socioeconomically disadvantaged or have low disposable incomes are more like to experience food insecurity. This argument was moreover supported by the existing body of knowledge which has shown clear evidence that socio-economic status of a person, household or community (Masuku, Selepe & Ngcobo, 2017) can place them at a disadvantageous position. For example, several studies found that households with more children, households headed by a single parent or headed by a female is strongly related to food insecurity, compared to households headed by a married couple, or those with no without children (Lee, Shin & Kim, 2020). Similar, Hispanic and Blacks households in America as well as, Aboriginal ethnic groups in Canada and unemployed are food insecure compared to their white counterparts (ANZJPH, 2010). Both groups are at high risk of food insecurity because of their socio-economic status. Other research evidence also shows that a person's level of income, access to credit, literacy, and land ownership, availability of labor, gender, and overall social status influence one's food insecurity.

The research background that informed this study was drawn from both scholarly and practitioner literature as well as field data collection. To provide the theoretical and conceptual basis, for explaining poverty and food security, this study was guided by Theory of Access (Ribot & Peluso, 2003) and Food and Nutrition Security Theory (Simelane & Worth, 2020). Theory of access complements the food security and nutrition

theory to denote how socio-economic factors determine household food insecurity in Juba basin region. In this study, family structure and income variables were grouped into two main categories. Variables in family structure category include gender of the respondent, age, marital status, occupation, disability, condition, household size and number of dependents. Household income category variable investigated were income, labor, land size, and food source, debt for food, river access, Crop production constraints faced by household farmers were found to be recurrent droughts, pests and diseases, deficiency of fertilizers, seeds, and suitable farm inputs. Besides the above variables estimated using regression models, intervening variables that have been discovered to lead significantly to food insecurity were lack of stability in politics felt in the study area, the occurrence drought and degree of climate shocks that have led to breakdown of crops, death of farm animals, inflation, increased buying weaknesses, limited access to the market because of ruined physical infrastructure such as roads and bridges, damage of irrigation foundations, limited socio-economic service delivery, and lack of upgraded seeds. The crucial point to make here is that constrains on erratic climate conditions, limited farmland availability, scarcity of natural resources, lack of infrastructure, poor economic policies, famine, and wars affected food security of many nations big and small.

Finally, this thesis touches on an important topic in development parameters in the developing world, general understanding of food insecurity, the food security situation in Somalia, and factors determining food access among others. Result of this thesis significant because not only it addresses existing knowledge gaps in the field of international development but also contributes to theoretically and conceptually grounded new knowledge on why 70% of households in Somalia remain hungry. Further, the thesis

knowledge contribution is not only relevance to academia but also to Somali Government and its International development partners to develop strategies and interventions for enhancing food security for the targeted household beneficiaries who have demonstrated not only similar income base and livelihoods but also face similar constraints to accessing food.

1.1.1 State of Global Food Security

Described as whether or not people have access to sufficient quality and quantity of food, food insecurity is a complex global issue influenced by political, environmental, and social factors. Discussions on food insecurity have evolved over the last half century from physical availability of food at the global level to the provisions of food to individuals. As a social problem, it became prominent and generated heated international debate in the 1970s. A series of literature have discussed food security dynamics, dimensions, factors, definitions, and the measurements (Ericksen, 2008; Alinovi et al., 2009; Leichenko and O'Brien, 2002; Osbahr et al., 2008; Thompson and Scoones, 2009; Vogel and Moser, 2007; Ziervogel et al., 2006).

A substantial body of food security data indicate that approximately 870 million individuals in the globe were estimated to have been hungry and insufficiently nourished between 2010 and 2012 where 98% of this live in the Third World Countries nations (Shaw, 2007; FAO, 2012a). Moreover, a recent data from various researchers and practitioners illustrates that food security has a connection with hunger, poverty and disease. Moreover, over 200 million infants have low weight where one child dies under five years of age in each acquainted second as a result of food shortage and similar causes

as a resulting from abject poverty according to the work of Shaw (2007). The same author asserts further that most deaths are caused by lack of food and poor nourishment than a combination of AIDS, malaria and T.B and less people die in war compared hunger (Shaw, 2007). Moreover, bottom billion of the globe's population subsists on less than a dollar a day where 2.8 billion survive on not more than two dollars daily (Shaw and John, 2007). Moreover, in Africa, Asia and Latin America, there were 918 million underinsured people between 1969-71: 905 million between 1979-80, and 840 million between 1990-92 (Allan and Thomas, 2000). What is more, history of hunger show that this phenomenon has impacted people of big and small nations same. For example, people of China suffered a great famine where an estimated 45 million people died between 1958 and 1961 (Hays, 2008). Poor economic policies and unfavorable weather during the Great Leap Forward period was considered to be the key factors behind the famine. Other countries that have been affected by food insecurity include the 1943 famine in Bengal, India; the 1933 USSR famine; and the food disaster in Cambodia in the 1970s; Hunger in Ethiopia in 1984 to just name few.

Although food insecurity and its anti-thesis (food security) has been a social problem and experienced throughout history, its analysis and what to do about it has been the product of WWII. The arguments on food insecurity have developed over the past 50 years, proceeding from a focus about the physical accessibility and availability of food at the universe view to the supply of food to individuals. However, it was not until the global food crisis during 1972-74 and subsequent World Food Conference in 1974 serious discussion regarding food insecurity and its anti-thesis (food security) begun (FAO, 1997). The very first Food Conference for food in the world in 1974 was held at a time

when both developed and underdeveloped nations were experiencing food supplies shortages (World Food Conference, 1974). To confront the perceived food insecurity crisis, a number of international bodies including FAO Committee on World Food were introduced. These newly established international bodies were mandated to focus on increasing domestic agricultural production as well as to establish international grain reserves (FAO, 2011). For instance, the first Conference for food (1974) based on the difficulties concerning production globally, stocks and trade where subsequent safety for food efforts paid attention primarily on food production plus storage mechanisms to ascertain the capability to obtain food from other countries by nations whenever need arises (FAO. 1997). This was because food security was measured in terms of national and global level food supply, thus food availability.

By 1980s, it became obvious that 1974 conference assumptions on increased food production and supply to respond to the world's ever growing food insecurity crisis was proven to be insufficient primarily because this approach alone was not the simple answer to the perceived world food insecurity, but also how food is distributed (German Agro Action, 2004). In addition, clarity that food availability globally or nationally was not necessarily meant food security at household or individual levels, was established (FAO. 1997). This was primarily because there were situations where food was not accessible but was available due of inability of households to access food either own production or purchase. From the early 1980s, food security discourse recognized the importance of both availabilities of and stable means of acquiring food as a key factor of food security (FAO, 1997). Since the 1990s, food utilization has become a prominent subject in food security discourse.

A recent data from various researchers and practitioners illustrates that food insecurity is linked to not only hunger, poverty and disease, but also food insecurity is linked human insecurity. More recently, it was recognized that lack of food unsafety can also become a beginning of human insecurity, and food security is just one factor in the human security equation- along with economic security, health security, environmental security, personal security, community security, and political security (Cohen, 2007). Recognizing linkage between food security and human security, the United Nations General Assembly adopted Resolution 66/290 in 2012. The resolution called for the member states to take an approach that can identify and address "widespread and cross-cutting challenges to the survival, livelihood and dignity of people" (FOA, 2016). Moreover, the linkage in between people security and food security relates to the full realization of the human right to adequate food, as a fundamental human right. Thus, sustainable, and meaningful food security cannot be achieved without addressing other pillars of human security.

Despite the global commitment and despite the fact that the 1996 World Food Summit (WFS) reaffirmed the right of all people to safe and sufficient foods, access to and sufficiency of food remains unevenly distributed. Sub-Saharan Africa has the largest concentration of food insecure people. Many scholars and authors have argued that societies today have become prone to food insecurity including 'hidden hunger' caused by micronutrient or protein deficiencies (Graham et al., 2007; Keatinge et al. 2011; FAO, 2011; Khush et al., 2012). It is also reported that global acute malnutrition rates are high, reaching 15–20% in some areas of the world with significant regional differences (FAO,

2011). Other studies have suggested that the last and the present centuries Africa Nations have witnessed an escalating trend of food security challenges.

Nonetheless, there has been noticeable expansion in production of agricultural products with production of food in the world increasing by 17% per head and aggregate production of food going up by 145% worldly in the beginning of 1960s (Allen, 2007). The literature reviewed reveals that today's methods of agriculture have led to impressive productivity growth in terms of per hectare output-cereal, milk, meat, eats and animal output per every employed person. Notwithstanding this impressive farming productivity, the development gap that exists between the developed and developing countries has become substantial and highly asymmetrical. This observation mirrors Korten's assertion that the world is every now and then separated in that there are those who benefit luxuriant affluence and those who live in extreme poverty, slavery and insecurities involving the economy (Korten, 1995). Korten calls this the global threefold of an instability of humanity of "deepening poverty, social disintegration and environmental destruction" (1995).

While causes are many-sided, multi-sectorial and manifested at different levels, it has been argued by researchers that alterations in climate and an increased high weather frequency shocks have worsened food insecurity situation in the world (Adger, 1999; Adger, 2006; Alan, 2007; Downing and Patwardhan, 2005; Adger and Kelly, 2000; McMichael et al, 2007; Munang et al 2011; Schipper, 2007; Thompson and Scoones, 2009; Vogel and Moser, 2007; Wesche and Chan, 2010). FAO has further suggested that increased linkages between energy and agricultural markets due to growing demand for

biofuels have distended food security challenges at the global level (FAO, 2011). Erratic climate states, rare farmland, difficulties in finding natural resources and unavailability of basic facilities and money, poor economic policies, famine, wars constrain affected food security of many nations big and small.

Finally, series of literature have discussed food security dynamics, dimensions, factors, definitions, and the measurements (Adger, 1999; Ericksen, 2008; Alinovi et al., 2009; Leichenko and O'Brien, 2002; Osbahr et al., 2008; Thompson and Scoones, 2009; Vogel and Moser, 2007; Ziervogel et al., 2006). Similar to other academic concepts, literature reviewed indicates over 200 definitions and 450 indicators of food security that resulted to consensus unavailability on the explanation of on the definition of food insecurity and its anti-thesis (food security) among academics, nations as well as international organizations (Devereux and Maxwell, 2001). Since food security is a multi-dimensional concept, variously defined, analyzed, and measured. For Devereux and Maxwell, safety of food can be evaluated by examining the achievement of local livelihoods to assure ease in acquiring enough food at the household level. (Devereux and Maxwell, 2001). For the World Food Summit (WFS) of 1996, it can be evaluated by examining whether "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" (FAO, 1996a). Reutlinger also suggested that other than access at all times for a healthy life, "food security essential elements are the availability of food and the ability to acquire it" (Reutlinger, 1985). At a macro level, this shows that enough food supplies can be accessed via production in the country or acquiring from other countries to meet the food wants for everyone country wide. At the micro levels, be it family or a person,

the safety of food is based on some elements that are associated with a few ways of entitlements to income and assets that produce food and also connections between within the country and outside country markets. Finally, this study adopts food security definition of FAO which refers "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" (FAO, 1997), since it captures all important extends of food safety: availability, stability, accessibility, as well as usage. The four dimensions are also linked since a system of food is exposed when these dimension(s) are uncertain and insecure.

To sum up, despite evidence of sufficient resources and "know-how" to end global unsafety of food and agricultural capability to give out enough food to give everyone (infoplease, 2005); Despite Millennium Submit of the United Nations in 2000 which commitment to: “eradicate extreme poverty and hunger” by 2015; and UN Sustainable Development Submit in 2015, which aimed at “No poverty, zero hunger” by 2015, 870 million persons in the continent were estimated to be hungry and undernourished between 2010 and 2012. The middle of this tragedy is food unsafety- inaccessibility of secure and healthy food needed for the purpose of a healthful life. A substantial body of empirical research suggest that global challenges of food unsafety is well researched, debated then reported. Findings and conclusion drawn from food security studies from various scholars, and practitioners seem to agree the extent to which food insecurity is a problem at global level and offer variety of reasons and explanations as to why people are hungry. However, the disagreements between food security scholars and practitioners lies indicators (450 indicators) and explanations of food security (over 200 explanations) that

resulted to consensus deficiency on the food security description and its anti-thesis. Various literature suggest that food security discourse recognized the importance and linkage between not only food availability at national level, but also all four key food safety extends (availability, stability, accessibility, as well as utilization) but also important determinant at national food safety, individual levels and also the family levels. Literature further indicate that the world has demonstrated agricultural capability to produce enough food to feed everyone**;** present of food supply abundance and continued gains in agricultural productivity to end global hunger. It further shows evidence of sufficient resources and "know-how" to end global food security (infoplease, 2005). While some countries have achieved MDGs targets, most of Sub-Sahara Africa including Somalia were unable to achieve this objective. Virtually no progress has been made towards for Somalia, and the development gap that exists between the developed and developing countries remains substantial and highly asymmetrical. For example, while the poorest 50% of world's population receives only about 1.4% of the global income, the richest 50% continues to receive 85% of the total world income. Various literature shows that how poor economic policies, unevenly distributed of food, growing demand for bio-fuels, climate change and an increased frequency of weather shocks have made worse situation of food safety in the world. Having discussed extent to which food security is a global problem, let's examine Africa and Somalia respectably on the same.

1.1.2 State of Africa Food Security

As per the World Food Security Summit (WFS) in 2012, approximately 870 million persons in the continent were estimated to be under fed between 2010 and 2012 (FAO,

2012a). Ninety-eight percent (98%) or 852 million of the 870 million worlds hungry people live in developing countries (FAO, 2012a). The same report indicates that African countries produce less food per person today than it did 30 years ago where production of food per capita is 10% less lately compared to the way it was in the 1960s (FAO, 2002). Moreover, 38% of Sub-Sahara Africa were undernourished between 1969-71; 41% between 1979-81 and 43% between 1990-92 (Allan and Thomas, 2000). The WFS report further asserted that the "situation in sub-Sahara Africa would continue to deteriorate while progress in South Asia will be painfully slow" (WFS, 2012).

According to AU Report, 355 million people in Africa were moderately or severely food insecure in 2015 (AU, 2005). Also, the AU report in 2005 noted that the annual growth rate for food production in Africa is dwarfed by population growth, which leads to food deficit. It is suggested that food production in Africa should increase by 4% to 6% annually in order to cater adequately for its population (AU, 2005). The growth in the push to decrease hunger has taken long time in the past decade, particularly in Africa. What is more, as Hine and Pretty report, Hungry people in Sub-Sahara Africa has grown in number by 20% since 1990 (Hine and Pretty 2007).

Underweight children have also increased in the nations of middle, Westward, and Eastwards of Africa, as per Hine and Pretty's study. More precisely, the Horn of Africa was declared to be in a state of emergency due to a prolonged drought in 2011. The affected countries included Ethiopia, Djibouti, Somalia, Eritrea, as well as parts of Kenya (Oxfam, 2012). Oxfam reported that this situation led to the death of livestock, crop failure, destruction of other livelihoods, as well as loss of human life (Oxfam, 2012). New

indices have indicated that Somalia and the Democratic Republic of Congo are the least in terms of food insecurity ranking (Maple Croft, 2013). Likewise, the study on "Vulnerability Despite Abundance" by Marc J. Cohen, indicates that 820 million of food-insecure people live in developing nations where the nations of south of the Saharan desert and Southwards of Asia account purposely for the vast majority (60%) of hungry people (Cohen 2007). Further, Cohen argues that 80% of people that are insecure in terms of food in the world are residents in rural areas.

Who are the food insecurity households? The study of "Vulnerability Despite Abundance)" indicates that 50% of food insecure population are rural smallholder farmers; 20% are landless rural laborers; pastoralists and fishing communities constitute 10% where low-income urban residents account for 20% (Cohen 2007). Unlike rural smallholder farms, pastoralists or fishing communities and low-income urban residents most often rely on money to access food, "as they have fewer opportunities than rural people to produce food" (Cohen, 2007). Similarly, the AU Report in 2005 reported that the most of the seriously hungry are rural cultivators who often are very pitiable to buy inputs and are relegated from markets, a report said (AU, 2005). It has been argued that rural residents are food insecure due to problems that affect them, for instance "lack of credit, poor roads, poor access to government services (health, education, agricultural research, and extension), difficult environmental conditions, and natural resource degradation, they often do not produce enough to meet their own families' needs and may have to spend much of their meager incomes on food", (Cohen, 2007).

Despite the continent of Africa was food exporter between 1966 and 1970, (Rania Khalek, 2011). According the work of Rania Khalek, (emergency of food: How the IMF and the World Bank Have Made African Famine impossible to avoid), and despite its reach in wealth in natural and human resources, together with reserves of oils, natural gas, gold, and diamonds (GHAZVINIAN, 2007), majority of African States rely on foo import and food aid to feed their citizens, with an average of 1.3 million tons of food exported each year (Rania Khalek, 2011).

Within a close examination of dozen oil-producing of African states including Nigeria, Angola, Gabon, Sudan, Equatorial Guinea, and Chad by GHAZVINIAN, reveals how wealth from oil has failed to bring much needed economic development to Africa. The examination of all discussed countries has revealed fascinating conclusions: that all discussed states have an immense of natural wealth including much-needed oil; that over of 50% their populations survive less than dollar a day; that life expectancy of their population over 50% is under fifty; that over 50% of their adults are illiterate; that 45% of school-age children have access to education; that degree of risk of infectious disease is very high; that there are a strong presence of food or waterborne diseases, HIV/AIDS; that high energy costs have long handicapped their economic developments, a history of instability, heavy reliance on foreign aids and conditional loans; that corruption, economic mismanagement, and poor planning have long married all (GHAZVINIAN, 2007). The issue of hunger and food insecurity in Africa has been felt across the continent and statistics on the state of household unsafety of food in the continent is awful. Despite the continent of Africa was food exporter between 1966 and 1970; despite being resource-rich, Africa stands the poorest, the least developed and most food-insecure place on the

face of the earth as the literature reviewed revealed (GHAZVNIAN, 2007); (Rania Khalek, 2011).

What explains resource-rich continent vs. poverty paradox? Easterly (2007), Moyo (2009), Sachs (2005) and Collier (2007) (leading scholars in development and foreign aid) offer a variety of arguments and explanations as to why for underdevelopment. For William Easterly, development aid failed partially because of the attitude and approaches of donor nations and their continental monetary institutions like the World Bank and the IMF towards aid recipients. Example, donor states impose the free market principles on the developing states. He argues that free markets should emerge geographically from within rather than importing (Easterly, 2007). In her "Dead Aid", Damisa Moyo argues cut economic aid to Africa because it failed the Africans. She insists, help has neither resulted to better strategies in building countries, nor has it promoted growth of the economy. Instead, there is a lot of evidence that help mostly has served to back regimes based on politics with small concern in expansion and development (Moyo, 2009). According to Collier, the bottom billion are a group of fifty failing states (mostly Africans). These fifty states are trapped in the cycle of civil wars and bad governance. Failing states, he argues, are failing because they defy traditional approaches to alleviating poverty and promoting growth (Collier, 2007).

To sum up, the state of global and regional food security-security indicate that 870 million people are hungry and undernourished; over 200 million children below the age of five are underweight; lack of food and unhealthy eating kill a lot of persons than HIV AIDS, malaria, and T.B put together; many persons pass away from lack of food than in fights;

the bottom billion people subsist on less than a $1 daily and 2.8 billion survive on not more than $2 daily. The literature also indicates that micro socio-economic factors, as well as non-socioeconomic macro factors, influence global and regional food insecurity-security thesis: At the micro-level, rural smallholder farmers depend on land to produce food; landless rural laborers and pastoralists and fishing communities, and low-income urban residents account most often depend on money for access to food. Both groups face multiple constraints: they face shortage of credit, undeveloped roads, inaccessibility of services from the government such as education research pertaining agriculture and other expansions, extreme states of the environment, and degradation of natural resources, too inferior to buy inputs and are relegated from markets. At macro level, weak states are underdeveloped because they face structural challenges, and are trapped in the cycle of civil wars. They have a history of stability and lousy governance- correction, economic mismanagement, and poor planning. Their economic developments are handicapped by high energy costs and heavy reliance on foreign aids –food and conditional loans.

1.1.3 State of Food Security in Somalia

Mainly, purpose of this study was to identify and quantify the magnitude of the effect of socio-economic factors contributing to household food insecurity in the target population within Somalia. However, the socio-economic underlying factors of household food security in Somalia cannot be understood without understanding global and regional factors influencing the same since global and regional issue of food insecurity also affects individual countries. This is confirmed by work of scholars, and practitioners that show the extent in which food insecurity has been a global problem and how hunger has been experienced from international to local. Thus, above discussions looked at the number of

people experiencing food insecurity, causes, and how food security can be achieved globally and regionally. This section discusses the state of food insecurity in Somalia.

With a total area of about 637,540 km^2, Somalia is the most eastern nation in Africa. It has the longest coastline in mainland Africa stretching more than 3333 km along the Indian Ocean, the Red Sea, and the Gulf of Eden. It also borders Kenya to the south, Ethiopia to the west, and Djibouti to the north. Somalia's Gross Domestic Production (GDP) in 2013 was assessed and found to be around $5.4 billion. In today's dollar restrictions, the economies of central Africa republic and other few countries such as Djibouti, Eritrea, Burundi as well as Malawi are smaller compared to the economy of Somalia. Of all 46 countries in the south of Sahara Desert in Africa, the economy of Somalia is classified 24h from the top in terms of size. Total Gross Domestic Production estimates show a GDP of $435 per head, thus, Malawi, Burundi, the Central African Republic, and Niger becoming poorest before Somalia which is the fifth in that line (World Bank, 2015). Moreover, 70% of the Somalia's population derive their livelihood from agriculture and related activities. Approximately 60% of Somalia's job opportunities are created by livestock sector which actually governs the economy and gives approximately 40% of Somalia's Gross Domestic Profit as well as 80% of foreign currency earning (pre-war numbers) (FAO, 2010b; Rongfa and Zhang, et al., 2021). Both sectors play a crucial role in ensuring food security, job creation, income generation and foreign exchange earnings.

Most crop productions are undertaken by farmer who do small scale faming with an arithmetic mean of 1/5 to 3 hectares of land and only 1.6% of the land of Somalia mass

still being used for agriculture with 90% of the production under rain-fed agriculture and 10% under irrigation (FAO, 2010b). Famers with small firms subsector contribute to 80% of the overall agriculture outputs and 70% of agricultural produce that are marketed (FAO, 2010b; Rongfa and Zhang, et al., 2021) . Most of the small-scale farmers are resource poor and are usually stuck within the cycle of poverty, in short of the ability and resources to raise production and make farming practices modern. Only 1.6% land mass in Somalia is being utilized for agriculture currently. By 1987, the country had 51 million ha of rangelands with large numbers of live animals (4 million cattle, 6 million camels, 18 million goats and 12 million sheep) (Treakle, 1989). Beyond agriculture and livestock, the most abundant natural resources in Somalia are untapped blue economy and oil. By tapping marine resources that can produce about 180,000 tons annually, Somali can be a food secure country (Treakle, 1989). Further, one area of natural resources which shows considerable promise is oil. Even though not substantiated yet, an evidence-based data suggests that there could be as many as 110 billion barrels of oil within the country's territory.

However, today, Somalia's food insecurity challenges are in an appalling state due to its chronic nature and the multiple factors contributing to the same where FAO has placed it second to last in terms of the proportion of undernourished members of insufficiently nourished members (71%) of the total population (FAO, 2003). Moreover, food insufficiency have been a problem in Somalia and great rise of interest to the international humanitarian community in the absence of state for the last two and half decades (FAO, 2003; *Rania Khalek*, 2011; Allen and Thomas, 2000; Center, 1989). By 2009, 3.2 million people (42%) of the Somalia residents needed immediate livelihood and life-saving

assistance (Holleman and Moloney, 2009). By 2016, about 4.7 million persons in Somalia really require life-saving or livelihood support where one million of these people face acute food in security concerns and have no ability to get their lowest food needs (UNSC 2023). Moreover, 73% of the 12.3 million survive less then live $2 per day where 95% of these live-in rural areas (UNDP, 2012).

Likewise, socio-economic available data in Somalia is awful as the country faces multifaceted human and economic development challenges. With total population 12.3 million and GDP of $435 in 2013, the World Bank ranks Somalia the fifth poorest country in the world and about 82% of Somalis were poor across multiple dimensions. In the same study, the World Bank Development Indicators in 2013, indicate weak social indicators. With 67% unemployment rate among youth and women just about 42% school-age children enrolled in primary school. Infant mortality rates of about 92 per 1,000 live births and under five mortality rates of 150 per 1,000 live births, and Maternal mortality was 850 deaths per 100,000 live births far in 2012 excess of the Sub-Saharan average (the World Bank, 2013). While Somalia is a food deficit country, it never used to be food insufficient in the 1960s and 1970s, and the potential exists for the country to be food secure and to substantially reduce its dependence on food imports. (FAO, 2003; *Khalek*, 2011; Allen and Thomas, 2000; Treakle, 1989; Rongfa and Zhang, et al., 2021). Nevertheless, during the thirty years, rapid rising food deficit have been experienced. While per capita food consumption has been reflected to increase rapidly, the country has on the other hand experienced a decline in regard to per capita food production.

Contrary to commonly held assumption that Somalia is poorly endowed with natural resource, evidence based historical and more recent data confirms the presence of Agriculture, livestock, "blue economy", mineral and oil in Somalia which makes it a natural resources abundant country (FAO, 2003; *Khalek*, 2011; Allen and Thomas, 2000; Treakle, 1989; Rongfa and Zhang, et al., 2021). From 1960s and 1970s, Somalia' economy has transformed drastically from a net exporter of food and commercial products to an economy in crisis and balance of payment deficit. Since these all resources are available, what explains the suffering of farmers from poverty and food insecurity? Even though evidence-based data socio-economic underplaying factors influencing food insecurity in Somalia was lacking by the time of this study undertaken, the available literature reviewed attributed to three main non-socio-economic factors for the reasons why 70% of households in Somalia remain hungry: political factors as well as climatic and environmental factors:

Political Factors: (instability civil strife, absent of government and poor policies**:** 2.5 decades clashes, consolidated mostly in southwards of Somalia, tempered a lot of governance structure of the country, institutions and infrastructure of the economy. In their book, *Poverty and Development into the 21st Century,* Allen and Thomas state that the genesis of the Somali Government's inability to feed its starving people can all be blamed on a combination of factors: prolonged droughts in 1974; oil price increases in 1973; inflation; war with Ethiopia in 1977-78; the Barre Government's attempt to regulate the market; the 1980s IMF's Structural Adjustment Program; the failure of Barre Government to make available enough price incentives to those who produce food crops, besides, and its subsidization principles of food security in 1970s and 1980s marred with

corruption and poor management, as well as political instability in 1990s (Allen and Thomas, 2007). However, the work of Watts and Bohle attributed food in security situation to the civil strife in the country that took long time which seems to have made the unsafety of food situation worse (Watts and Bohle, 1993).

Following the collapse of the Said Barre government, in January 1991, Somalia experienced deep cycles of internal conflict that fragmented the Somalia that have eroded livelihoods and threatened people's access to food. Agriculture, which has been the main economic activity in Somalia not just for meeting the food needs of the people but also for income generation for rural livelihoods, is in a state of neglect and underdevelopment (FSNAU, 2013). Most of the small-scale farmers are resource poor and without the capacity and resources to increase production and modernize their farming practices leading dependency of food imports and food aid. This equation has forced the country to over-rely on imported food as well as food aid. However, one cannot fully understand the role of cheap imports and food aid of structural adjustment programmes (SAPs), without understanding how they displaced small farmers and destroyed local economy (*Khalek, 2011)*.

Food Aid, Food Imports and SAPs: *Rania Khalek*, discusses how the cheap imports and food aid of the Bretton Woods Institutions, through its structural adjustment programmes (SAPs), displaced small farmers and destroyed local economy. He writes "other than droughts that occur frequently, "the economy of Somalia, starting with pastoralists or "nomadic herdsmen" and farmers who do small scale farming was independent in food in the 1970s". livestock produced 80 percent of export earnings in

Somalia in 1983 therefore, the pastoralists proved good performance. However, Under SAPs, livestock veterinarian services were made private, thus making it hard as well as of high prices for farmers who are not in urban grazing areas to get healthcare for animals, especially devastating pastoralists who created up to a half of the population. Rice from other countries and wheat substituted small farmers, and resources were distracted to increase export commodities. Badly, "Water points and boreholes dried up due to lack of maintenance, or were privatized by local merchants and rich farmers," because water resources were made private" (*Khalek, 2011*).

Food Imports and Food Aid: the share of food from other countries in Somalia has been continually and significantly rising, getting to an average of about 29% for the 1980-84 time compared with 19% in the 1970s period (Allen and Thomas, 2000). From late 1970s, Somalia' economy has transformed drastically from a net exporter of food and commercial products to an economy in crisis and balance of payment deficit. The resurgence of Western influence and donor aid from late 1970s has led to political economic reforms. These have included the decline of state-run enterprises, promotion of the private sector and smallholder on the state farms, trade liberation, exchange rate reforms, and the dismantling of agricultural pricing and market controls. Moreover, baseline assessment on 'Somalia's Growing Urban Food Security Crises' conducted by Cindy Holleman and Graine Moloney (FSNAU, 2009) revealed that 3.2 million persons (42% of the Somali population) needed fast livelihood and life-saving assistance (Holleman and Moloney, 2009). Holleman and Moloney stated that 'Somalia's growing urban Food Security crises' attracted an estimated 299,000 metric tonnes of food aid in 2008 and this played an important role in filling the gap in locally produced cereal

supplies. Finally, a combination of political factors (instability, civil strife and poor policies) forced the Somalia to over-rely on imported food and food aid (Holleman and Moloney, 2009).

The Crisis of Food Insecurity, linked to Natural Shocks: the economy of Somalia which is controlled by crop production and pastoral livestock, has chronically witnessed extreme weather shocks, which often led to devastating food conditions of the most vulnerable households. The two are crucial for cash income and also subsistence and both have ability to increase productivity where natural resource-dependent activities for their livelihood are relied upon by about 80 percent of Somali families: grazing and crops land, irrigation water and livestock (FAO, 2010b; Rongfa and Zhang, et al., 2021) Unfortunately, both sectors are linked to natural disasters droughts and floods.

With an estimated annual average rainfall ranging from 215 mm in the North-eastern regions to approximately 700 mm in the South-Central regions, the climate of Somalia is generally classified as arid to semi-arid, where water shortage defines not only the ecological conditions but also the livelihoods of the inhabitants (2004a FSAU). There is an implication that some of the close causes include "seasonal fluctuations vis-à-vis access to key foods, limited dietary diversity, poor early child feeding practices and low level of contact with health services for young children and women of reproductive age" (2004a FSAU). Moreover, climate shocks may have had an increased burden on families, besides the civil war challenges, in providing for livelihoods among the households in Somalia.

The frequent droughts, experienced every 3-4 years, have also been blamed for the rampant hunger, causing households to fall into inadvertently unfortunate state of living (Adeloye, 2010; World Food Programme, 2007, World Food Programme, 2009; Funk and Brown, 2009; Little et al. 2001; Maystadt et al 2013; Munang and Nkem, 2011). Prolonged drought, for example, leads to loss of pasture for grazing livestock. Seasonal water points also dry out and therefore exposing the livestock to suffer severe heat exhaustion, loss of bodily water, weight loss and eventual deaths of herds of livestock, as well as human lives. Extreme droughts also lead to drying of crops of the farming communities. This leads to loss of expected crop harvests, especially of households without irrigation technology solutions. Besides, excessive rains also destruct livelihoods of the most vulnerable communities, especially of agricultural households, which lead to crop loss. In the Somalia dry climate, production of crops and livestock keeping greatly exposed to changes in the amount of rain. Resultant effect is hunger and category of 5 of food clarification scale among the affected communities (Adeloye, 2010; World Food Programme, 2007, World Food Programme, 2009; Funk and Brown, 2009; Little et al. 2001; Maystadt et al 2013; Munang and Nkem, 2011). Despite these challenges, potential to be food secure exist. Volumes of existing literature show in the 1960s and 1970s Somalia has never experienced food insufficiency and much evidence supporting and implications that Somalia is very able to be safe in terms of food (FAO, 2003; *Khalek*, 2011; Allen and Thomas, 2000; Treakle, 1989; Rongfa and Zhang, et al., 2021). This is grounded on the notion that the country has abundant resources in agriculture, large livestock and untapped marine resources.

The Agricultural Economy of Somalia Survey in 1989 by Treakle suggests that "Somalia is nearly self-sufficient in good crop years". Just by increasing dryland crops to 2400 pound per ha can exceed the cereal demands (Treakle, 1989). The study argues that with the presence of 7 million arable land, fountainhead of water for irrigation, provided water in the farming lands, 51 million ha of rangelands with large numbers of live animals (4 million cattle, 6 million camels, 18 million goats and 12 million sheep) as well as untapped marine resources that can produce about 180,000 tons annually, Somali can be a food secure country. What is more, The recent work *by Rania* Khalek, explains that, the economy of Somalia , beginning with famers that have a small scale together with pastoralists or "did not depend on other countries for sufficient food during the 1970s ((*Khalek*, 2011). Furthermore, Allen and Thomas argue that Somalia was dependent on livestock keeping and crops production for selling to other countries as well consumption within the country in the 1960s and 1970s. Somalia was "self-sufficient" in grain and livestock in 1960s and 1970s (FAO, 2003; *Rania Khalek*, 2011; Allen and Thomas, 2000; Center, 1989).

Moreover, the productive sector of Somalia has great potentials to contribute food security, economic growth, job opportunity as well as building livelihood resilient for Somalia. Somalia has three vital sectors that can strengthen and promote economic growth (Agriculture, Livestock and Fisheries): Juba and Shabeelle rivers and fertile soils, there is a great potential for agricultural production in Somalia. Also, the annual rainfall in the agriculture production area which is between 500-600mm is another advantage to preservation of the natural resources. According to STAG current cereal yield is as low as 1 to 1.5 tons per ha is unable to meet the country's current cereal demands of 300,000.

It can meet the current domestic consumption demand, by increase the land area which is currently only 1.6% and yield increase per unit area from 1 to 1.5 tons per ha to potential 15 tons/ha, one could aim for export markets (Rongfa and Zhang, et al., 2021).). Livestock sector contributed over 40% of Gross Demotic Product (GPD). For example, in 2014 alone there has been 5 million livestock exported from Somalia. Livestock has always been strong hold in Somalia economy with about $360 million annual contribution. The annual yield of fisheries in Somalia has potential to reach 200,000 tons per year with annual revenue of $200,000 Million. STAG study suggest that food production has potential to exceed among require to feed the country. The same study also suggests tow-third of food produced in Somalia can easily exported to other countries.

1.1.3.1 Summary

To determine the underlying causes of household food security, many researchers have explored different perspectives and took different approaches in detail and arrived at different conclusions. While some studies attributed farm size, family size, dependency ratio, the level of education, disability household master, age of family head, as well as access to credit service as socio-economic elements that bring about home food unsafety, other studies highlighted inadequate access to land, high off-farm and non-farm incomes, costs of labor and inadequate asset and income (Adeoti and Egwudike, 2003; Hussein and Janekarnkij, 2013; Adeyeye, 1997; Ayandiji et al., 2012). Yet, other studies found that political instability, security, climatic variability, agro-ecological variability, aid, trade relations and market accessibility as the key none-socio-economic factors contributing to

food security among households. Further, the literature further indicates that food security is a complex global and regional issue influenced by not only socio-economic factors, but also non-socio-economic factors including political, environmental, and social issues. Unfortunately, it is also local issue, a tragedy reality faced by 70% households in Somalia who remain hungry as we enter 21 centuries. The crucial point to make here is that constrains on none-socio-economic factors influencing household food insecurity including erratic climate conditions, scarcity of natural resources, lack of infrastructure, poor economic policies, famine, and wars affected food security of many nations big and small and are consistent with the global and regional findings.

From 1960s and 1970s, Somalia' economy has transformed drastically from a net exporter of food and commercial products to an economy in crisis and balance of payment deficit. Several factors contribute to this. A combination of political factors (instability, civil strife and poor policies) compelled Somalia to depend so much on food from other countries and donations. However, the irregularity of climate induced shocks alone cannot account for the chronic food security neither can the long term civil strives be solely blamed for Somalia's food security hardships.

Despite the above factors attributable to determining food unsafety for families, a quantification of magnitude of such effects of these factors, among others, on food insecurity in Somalia needs more empirical evidence. An analysis of how economic activity affects social processes and understanding how societies progress, stagnate, or regress is important when studying household food insecurity. The dynamics of how households acquire assets and the ability to convert these assets into meeting household

food needs is of essence. Determinants such as household income and family structure, among other factors, are important to understand in socioeconomic studies of food security.

1.2 Statement of the Problem

Despite much evidence supporting the fact that Somalia used to be food secure in the 1960s and 1970s, and there all implications that it has the ability to be food secure; despite Somalia is a country privileged with rich agricultural land, abundant livestock, and marine resources while harboring the Africa's second longest coastline- an indication of food sufficient, Somalia is a place where most of food insecure households (70%) live. Consequently, the presence of hunger and malnutrition in Somalia's households has been a challenge and remained a cause for interest to the Global humanitarian community in the absence of a capable condition for the last 25 years. Ironically, the biggest food insecurity households in Somalia live in Juba Valley Basin (JVB), a place known to be the breadbasket Somalia region. As per FSAU, households in the Valley Basin of Juba (in the study area) are conditioned with lack of enough food.

Contrary to commonly held assumption that Somalia is poorly endowed with natural resource, volumes of existing literature, and much evidence supporting that in the 1960s and 1970s there used to be enough food in Somalia and potentially can food sufficient country. The recent work by Rania Khalek, explains that the economy of Somalia in the 1960s had enough food from within the country ((Khalek, 2011). Furthermore, Allen, Khaled and FOA asserted that Somalia was able to produce its own grains as well as livestock production for selling to other countries as well as for use within the country in

the 1960s and 1970s. Likewise, the Agricultural Economy of Somalia Survey in 1989 by Treakle suggests that Somalia is nearly self-sufficient in good crop years

While Somalia is a food deficit country, evidence based historical and more recent data confirms the presence of 7 million arable land, irrigation water sources, rain-fed farming lands which is very crucial to Somalia's food security This potential can be realized in areas where irrigation is possible along the rivers of Shabelle and Juba. However, current cereal yield is as low as 1 to 1.5 tons per ha which is unable to meet the country's current cereal demands, and current agricultural production fell by 50% of pre-war production mainly due to a reduction in cultivated area and abandonment of irrigation schemes and infrastructures. Also application of the required technology as well as inputs such as, fertilizer, pesticides and hybrid seeds, not to mention practices of agriculture that are good, have been very limited – all these contributing to declining agriculture productivity

If Somalia was a food secure country and implications that the country is able to be food secure, what explains the reasons for 70% of households in Somalia remain hungry? Why can they not access food? What are the underlying socio-economic causes of household food insecurity in the area of research? The available literature reviewed attributed to three main non-socio-economic factors for the reasons why 70% of households in Somalia remain hungry: climatic, environmental, political instability factors. However, until the time of this study, reviewed studies did not look to find the social and economic factors that cause household food insecurity in the study area making it an under-researched topic. Further, the reviewed literature shows a notable lack of empirical evidence of the underlying causes of household food insecurity in Somalia. Much of the

available literature on the subject is media and aid organizations report, which mainly lack empirical evidence. Such reports hardly benefit from local households' perspectives who have their views on the causes of food insecurity as well as how to address them. A number of research on the subject had drawn an overall problem tree. Such a problem tree had no specific coverage of the Juba Valley Basin-study site. For this general tree, the problem does not tell why 70% of Somalia households remain hungry? Moreover, most of these reports focused on the issues and not solutions. What the reviewed literature has not shown is the evidence-based socio-economic knowledge on the determinants of household food insecurity in Somalia. Equally significant is that most of the research has focused on theoretical arguments of environmental factors and political conflicts as the root cause of food insecurity in the country. While this may be the case in some parts of the region, cases where food insecurity has persisted amidst favourable climatic conditions and political stability points to the inadequateness of this perspective in explaining food insecurity in the country. This study intended to fill such gaps. Therefore, this study has examined socio-economic determinants of household food insecurity in Juba Valley Basin of southern Somalia, focusing on access problems of household food insecurity diminution through the family structure and income variables. These two significant factors (household structure, household income) are ideally the most immediate socio-economic determinants of a household's food insecurity status as these are likely to vary from one household to another, whereas the intervening variables can be looked at as general conditions facing all households in the area of the study.

The study also sought to answer the question "Why?" and looks for causes and what factors contribute to it. It urges that until one understands why 70% of households in

Somalia are hungry and address it, they will remain hungry as they enter the 21st century. The study argues that why 70% of households are hungry can be understood by understanding the underlying social and households' institutional economics. By understanding the underlying causes and severity of the consequences, the government of Somalia and other stockholders will be able to formulate an appropriate program and policy on household food security that generate a proper action plan. The results from this study are likely to improve our understanding that underpins food security discourse as one of the global challenges. Finally, this study acknowledges that household food insecurity occurs because their livelihoods are made vulnerable by other factors such as political instability, and climate changes. It further acknowledges environmental, political factors impact on food security, and are not less important. However, this study also argues that irregularity of climate-induced shocks alone cannot account for the chronic food insecurity nor can the long term civil strives be solely blamed for Somalia's food security hardships. These factors could be areas of further research and beyond the scope of this study, and are therefore treated as a critical intervening variable.

1.3 Purpose of the Study

The purpose of the study was to analyze the socio-economic determinants of household food insecurity in Juba River Basin, Somalia. In this, the study sought to identify and quantify the magnitude of the effect of socio-economic factors contributing to household food insecurity in the target population. The study aimed not only to find out and understand why 70% of households in Somalia were food insecure but also to address socio-economic factors influencing the same.

1.4 Objectives of the Study

The study sought to:

i. Establish the state of household food insecurity in Juba River Basin
ii. Investigate the influence of household structure on food insecurity in Juba River Basin
iii. Examine the effect of income on household food insecurity in Juba River Basin
iv. Identify strategies that can enhance household food security of Juba River Basin.

1.5 Research Questions

This study sought to answer or address the following key research questions:

i. What is the status of food insecurity among households in the Juba Valley Basin?
ii. How does household structure influence food insecurity in Juba Valley Basin?
iii. How does household income influence food insecurity in the study area?
iv. How can food security be improved among households in the Juba Valley Basin?

1.6 Justification of the Study

Despite the existence of data and information that positions Somalia as potential for food security, recent socio-economic data and figures show that about 82% Somalis were poor across multiple dimensions where 70% of vulnerable households in Somalia remained hungry. The available body of literature further indicates that food insecurity is a complex global and regional issue influenced by both socio-economic and non-socio-economic. However, research concerning the subject have ascribed this to non-socioeconomic factors, including lack of stability in politics as well as extreme shocks of climate in many years. However, by the time of this study, reviewed studies did not look at the social and economic causes leading to household food insecurity in this study area. They further lacked empirical evidence. Several factors can be attributed to this lack of empirical

evidence on both social and economic factors affecting households' food insecurity in Somalia. First, Somalia was a challenging environment to conduct studies in both pre- and post-state collapse. Before Somalia fell into governance challenges in 1991, it generated very little interest in academia. During Somalia's military rule, foreign journalists, researchers, and investors were not welcomed by the military government that ruled the nation for over 20 years-1969-1991.Secondly, a meaningful study could not have taken place amidst the civil war from 1991 to date. This could be due to prolonged insecurity in Somalia, or researchers may have shied away from the country; hence, empirical data may be lacking to support various assertions on the root causes of food shortages. This makes underlying socio-economic factors causing food unsafety in Somalia severely under researched topic, which limits one's understanding of the subject. This helps explain the lack of scholarly interest in its socio-economic development.

Therefore, the justification of the study stems from several interesting arguments: First, much of the available literature on the subject is media and aid organizations report, which mainly lack empirical evidence. Secondly, these reports are collected and analyzed at macro-level and not micro level. Thirdly, most of the information collected by NGOs show biased towards short term humanitarian interventions. Fourth, such reports hardly benefit from local household's perspectives who have their views on the causes of food insecurity as well as how to address them.

The study was done in the Juba Valley Basin. The region was chosen for the reason that it has been the breadbasket of Somalia in both irrigated and rain-fed agriculture as well as the hub of Somali's cattle and camel production which were the backbone of the Somali

economy. Despite being the breadbasket of Somalia, the status and the determinants of household food insecurity in the region is an under-researched topic in this crucial region. This geographical location was also chosen since some of the most food-insecure people in Somalia are the residents of JVB which incidentally should be the breadbasket of the country. Until the time of this study, reviewed studies did not look at the socio-economic causes of household food insecurity in the study area, making it severely under-researched. This study intended to fill such a gap. Undertaking study on the causes of household food insecurity in Juba Valley Basin (JVB) was critical since the outcome will produce results-based evidence to food security development programs in Somalia.

Since evidence-based information on factors determining household's food insecurity in Somalia was lacking or limited, knowledge-based evidence was needed. This study reports empirical evidence on the social and economic factors of family's food safety in Somalia's southern areas by capturing the local perspectives of the subject matter. Finally, climatic and environmental, political factors impact on food insecurity and are no less significant. These factors are an area of more study and beyond the study's scope, and they are treated as critical intervening variables.

1.7 Significance of the Study

In the absence of a working state for the last over 25 years, hunger and malnutrition have been severe challenges in Somalia and great causes for concern to the international humanitarian community. Therefore, this study contribution to research and contribution to practice is very significant in many ways: Contribution to practice: this thesis provides a detailed analysis and establishes a clear picture of the social and economic elements affecting household safety for food in the target area once looked at as breadbasket of the

country. Moreover, findings of the study are of immense value to the new Somalia government, which is attempting to revive the country's socio-economic development given that the study provides the basis for policy recommendation towards increased food security and improved of overall quality of life of the families in the area of study. Further, the study is equally of significance to the numerous development partners who often rely on media report or rapid appraisals to inform and design their intervention programs. Further local community organizations might find it useful in deepening their understanding of some of the internal as well as external factors that shape local food insecurity dimensions. Development Partners, and Local Organizations address production and financial constraints that directly impacted on the lives and livelihood of the study beneficiaries. Contribution to research is equally important. Further, the study addresses existing knowledge gaps in the field of international development and generates theoretically and conceptually grounded knowledge on household food insecurity. Thesis contribution to research and contribution to practice was recognized by both Journal of Education the international one and study, as well as the Journal of Humanities internally & Social learning, which published two articles of this study and rated the study "above average."

1.8 Assumptions of the Study

The following assumptions guide the study:

1. The socio-economic characteristics of households in Somalia are significantly similar to the targeted households in the study area. Therefore, any observed effects could be generalized to the Jubaland Regions.

2. Socioeconomically disadvantaged households with low disposable incomes are more like to experience food insecurity.
3. The Gender of the head of a household and income are considered as an influence of household food security in a significant way.
4. Food availability at the national level does not provide access to the household or individual level.
5. Households with a reliable income base are hypothesized to have stable food security disposition throughout the year unlike households with a weak income base.
6. Proper management, technology, and policies in place, Somalia can once again become food secure nation and booming center of commence dominating the regional trade market.

1.9 Scope of the Study

The research took place in the Juba Valley Basin (JVB) in Southern Somalia, focusing on access to food dimension of household food insecurity and covered between 1975 and 2016. The scope of this study was narrowed down to examine between 1975 and 2017 because volumes of existing literature suggest that Somalia's economy has transformed drastically from a net exporter of food and commercial production to an economy in crisis and balance of payment deficit.

Before, above thirty years (1975 onwards), food shortage has been increasing drastically that reflects not only rapidly increasing per capita food consumption, but also a decreasing production of food per capita causing too much reliance on food imports and food aid

from other countries. The scope of this study was also narrowed down to investigating access dimension of household food insecurity focusing on the households whose primary source of livelihood was farming. Data on food utilization and other nutrition-related aspects could not easily be identified, especially on the chosen study population. This study also concentrates in coming up with social and economic elements influencing household food insecurity among those households in Juba Valley Basin in Southern Somalia. Less emphasis was on anticipated intervening variables, but rather on factors classified at the household level.

Further, the approaches to the study of food insecurity are diverse. Conceptually, the analysis of the determinants of food insecurity would usually distinguish between food and nutrition status - with its three components of food access, food availability and food utilization - and the stability of the food and nutrition status. Despite the advantage of such a multi-dimensional approach to the scientific inquiry, collection of such comprehensive data could not be possible at the time of data collection given the difficult challenges facing the country in general.

1.10 Limitations

Limitations in research refer to weaknesses and shortcomings or conditions that are researchers out of reach, which may influence the result of the study. Obtaining reliable and accurate data in a politically unstable country, characterized as a failed state, is a daunting task. Somalia's state of socio-economic determinants of food insecurity statistics are either not available or if they are really there, suffer from (a) lack of reliability (b) recorded information may be incomplete.

This study had several limitations. First, the security situation on the ground was unpredictable and fragile. Therefore, the researcher was faced with fears of being viewed with suspicion during the fieldwork. Secondly, finding the household head was unpredictable as people were on the move nearly all the time searching for basic needs; thus, migrations might have biased the sampled households as people check-in and check-out to the camps in the year depending on the circumstances. However, one measure to overcome field data collection relating to migration was to identify household heads before data collection took place and confirming with them if they have been in the area for such a period to allow food production in the past one year. Another measure aimed at mitigating the issues of suspicion was to involve the local authorities and community leaders into understanding the importance of the study and solicit their support.

1.11 Delimitations of the Study

There were also delimitations related to the scope and the boundaries of the research. As data on nutrition and utilization was hardly attainable, the research scope, questions, variables, and theoretical perspectives were refocused only to empirical data that could be feasibly obtainable and with accuracy. Unlike limitations, delineations were within the control of the researcher which gave the researchers the ability to refocus the scope so that the empirical data would suit scientific authentication on food insecurity, but less on utilization and nutrition insecurity.

1.12 Operational Definition of Key Terms

Adaptation: Strategies employed in mitigating potential future threats such as those of climate change and other factors whose future occurrences is highly likely

Climate change: Extreme deviations in mean annual atmospheric temperatures, and rainfall precipitation that often have negative impact on food production and eventual food security

Coping Mechanism: Strategies people use as a means of getting through difficult times or whenever shocks strike

Food access: The ability of the household to acquire/obtain the food they need in order to meet daily dietary requirements

Food availability: The physical presence of food that is available to the people to meet their dietary needs, especially that of the household.

Food insecurity: A situation in which people are in an unstable state of food security

Food insufficiency: A state in which people may have access but the food is not enough to meet the dietary needs.

Food Security: The state in which 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

Food Utilization:	The proper maintenance of the quality of the food either in storage or preparation and proper use of the food in order to provide for bodily nutrient requirements
Hunger:	The uneasy or painful sensation caused by a lack of food
Household Food Security:	The lack of capacity of a household to procure a stable basket of adeguate food f for its members
Household Structure	This was conceptualized as the component and details of a give household as defined by its membership and kinship categories
Livelihood:	A way of making a living (Assets, income, activities and capacity of people require in order to make living
Resilience:	A state in which people's food security status remains stable despite
Socioeconomic Determinants:	A situational analysis of how economic activity affects social processes; and understanding how societies progress, stagnate, or regress because of either their local, regional, or the global economy
Vulnerability:	A household's ability to cope with risks and shocks

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews and presents related literature on socio-economic factors effecting household food security in Somalia. Broadly speaking, the goal of literature review is to a) demonstrate familiarity with a body of knowledge and establish credibility b) show the path of prior researcher and how the current research is linked to it c) integrate and summarize about the topic area and d) learn from others and stimulate new ideas. The literature review on the topic points out areas where prior studies agree, disagree and where future studies should head (Babbie & Benaquisto, 2002). Therefore, reviewing existing knowledge on socio-economic factors effecting household food security in Somalia was an essential part of research process. The purpose of the literature review in study was to identify what is known and not know about this study topic, to identify what knowledge and ideas exist, to identify methods that are relevant to this study, to identify weakness and strength of the existing studies, and to evaluate and present the results. Emphases was placed on the available literature in juba valley Basin on the security of food state and identifying the socio-economic elements of food security. Particularly, literature review was guided by the following study objectives: (1) the influence of household structure; (2) causes of income on security of food for household and; (3) strategies that can be adopted for improving security of food for households in the area of study.

To add to reviewing existing knowledge on social and economic elements effecting household eats security in Somalia, the empirical studies and relevant theories were

evaluated and presented here. Further, research theory gaps were identified and discussed. The latter part of this chapter illustrates the theoretical framework as well as conceptual framework on food security adopted by the study for identifying the social and economic food security determinants in Somalia. other influencing factors or factors that may have an important function in determining security of food for household, such as factors based on politics, the way the environment varies as well as variability of the climate were taken as intruding variables thus shallow discussion was done.

2.2 State of Household Food Security in Somalia

Security of food is used to measure food deprivation. From these literatures, Initially the words "food security" meant that a country could easily get adequate food to attain requirements of dietary energy some used national eats safety to mean personal adequacy, that is, production of food needed by people in the country is produced within the country. Whereas this definition claims self-sufficiency on the part of nations, it is not clear whether a self-sufficient nation can guarantee access by all individuals. Therefore, later definitions proposed that food sovereignty nationally is used to "measure the extent to which a country has the means to make available to its people the food needed or demanded, irrespective of whether the food is domestically produced or imported" (Pinstrup-Andersen, 2009). This indicates that if a country that produces the food it needs or does not need to buy, but have the hard currency to import what is missing, it would be food sovereign (Pinstrup-Andersen, 2009). The USDA describes security of food as "continuous access to enough food is not well available by in availability of money as well as other resources sometimes of the year.

Somalia is a place where most of food insecure households (70%) live (FAO, 2003); (FAO, 2003; Rania Khalek, 2011; Allen and Thomas, 2000; Center, 1989). With total population 12.3 million and GDP of $435 in 2013, the World Bank ranks Somalia the fifth poorest country in the world and about 82% of Somalis were poor across multiple dimensions. in the same study, the World Bank Development Indicators in 2013, indicate an estimate 73% of the population lives with less than USD 2 per day, and 43% with less than 1 per day, and only 34% have completed 28% upper primary education (World Bank, 2015).

Alternatively, just by increasing dryland crops to 2400 pound per ha can exceed the cereal demands (Treakle, 1989). Another empirical study by STAG found that by increasing yield per unit area from 1 ton per ha of current production level to potential 15 tons/ha, one could aim for export markets (Rongfa and Zhang, et al., 2021). With modern technology, farmers can potentially produce 10-15 tons per hectare rather than the current 0.2 to 3 tons per hectare (Rongfa and Zhang, et al., 2021). Therefore, proper management and policies in place, Somalia can once again become booming center of commence dominating the regional trade market. In addition to agriculture sector, the Survey on Agriculture Economy of Somalia in 1989 Survey indicates the presence of numbers of live animals (4 million cattle, 6 million camels, 18 million goats, and 12 million sheep) as well as untapped marine resources that can produce about 180,000 tons annually, Somali can be a secure food country. Finally, agriculture, livestock, “blue economy”, mineral and oil makes Somalia a natural resources abundant country (FAO, 2003; *Khalek*, 2011; Allen and Thomas, 2000; Treakle, 1989; Rongfa and Zhang, et al., 2021). With known vast natural resources, the potential exists for the country to substantially reduce its dependence on food import.

Providing an answer to these research questions starts with finding out what is already known about the socio-economic determinants of household food security as well as non-socio-economic factors. This exercise was done by reviewing the scholar of work of others and practitioners. Taking as a whole, the reviewed literature show that food security is a complex global and regional issue influenced by not only socio-economic factors, but also non-socio-economic factors including political, environmental, and social issues. Unfortunately, it is also a local issue, a tragic reality faced by 70% of households in Somalia who remain hungry.

Out of these descriptions, security of food can be attributed to a number of elements. These elements were grouped by FAO into three important parts: food *Availability*, *Accessibility* and *Utilization* (FAO, 2010a). When enough amounts of food are accessible all the time to everyone in the country, food availability is arrived to. Where families and everyone in the family does not have enough resources to obtain the right food for nutrient needs, food accessibility is not assured (FAO, 2010a). For accessibility to be, income available to families should be considered how income is distributed within the family as well as the food prices should be put into consideration since access depends on such factors. The proper biological use of food is Food utilization, demanding a diet giving enough energy as well as nutrients that are important, water that can be carried from one place to another and sanitation that is adequate (FAO, 2010a). Effective utilization of food relies greatly on the knowledge that is in the families on food storage as well as techniques of processing the food, nutrition basic guidelines and child care that is proper, as well as management of sicknesses (Riely et al., 1999). World Food and Agriculture

Organization (FAO) identified a fourth dimension of food security: *stability.* Individuals who are at high danger of losing their access to the resources needed temporarily or permanently to use enough food either as a result of these individuals being unable to ensure *ex ante* against income shocks or they don't have enough ''reserves'' to consumption smoothness *ex post* or both (FAO, 2002).

Availability of climate is a crucial cause of unstable access such as agricultural laborers who have no land, those that actually rely on wages from agriculture say almost all through in region that has no reliable rainfall and do not have many savings, could be at a great danger of running of access to food. Otherwise, individuals with no stable ease of acquiring eats even in communities that do agriculture where climate does not vary, for example, laborers of agriculture with no land that get ill thus not get their wages on daily basis would have no stable access to eats (FAO, 2002).

Objective one of this research was to test the condition of family's food unsafety within Somalia. The literature gleaned indicated that the presence of hunger and malnutrition in Somalia's households has been a challenge and remained to raise alarm for the international humanitarian community without a capable nation for the last 25 years. Despite the fact that "global agricultural production kept pace with population growth over the past 50 years, mainly due to intensification associated with the Green Revolution", and extend into areas that were not cultivated before, Somalia has remained behind over time (Royal Society, 2009, Green et al., 2005; Ramankutty et al., 2008). According to FSAU (2011), condition of household insecurities concerning food in the basin of Juba Valley (the study area) is chronic as well as decreasing with the most levels of malnutrition in Somalia, which are actually more than the main level (24.5%) of Global

Acute Malnutrition (GAM). Almost 43% of the people in the area are in poverty or below 1 US dollar. This percentage is 53% in rural families (Cite). According to Food Security Phase Classification report by Food Security and Nutrition Analysis Unit (FSNAU) in 2011, the current food security situation of Somalia has been classified as phase 2 (Borderline food secure), phase 3 (Acute food and livelihood crisis), phase 4 (Humanitarian emergency), or phase 5.

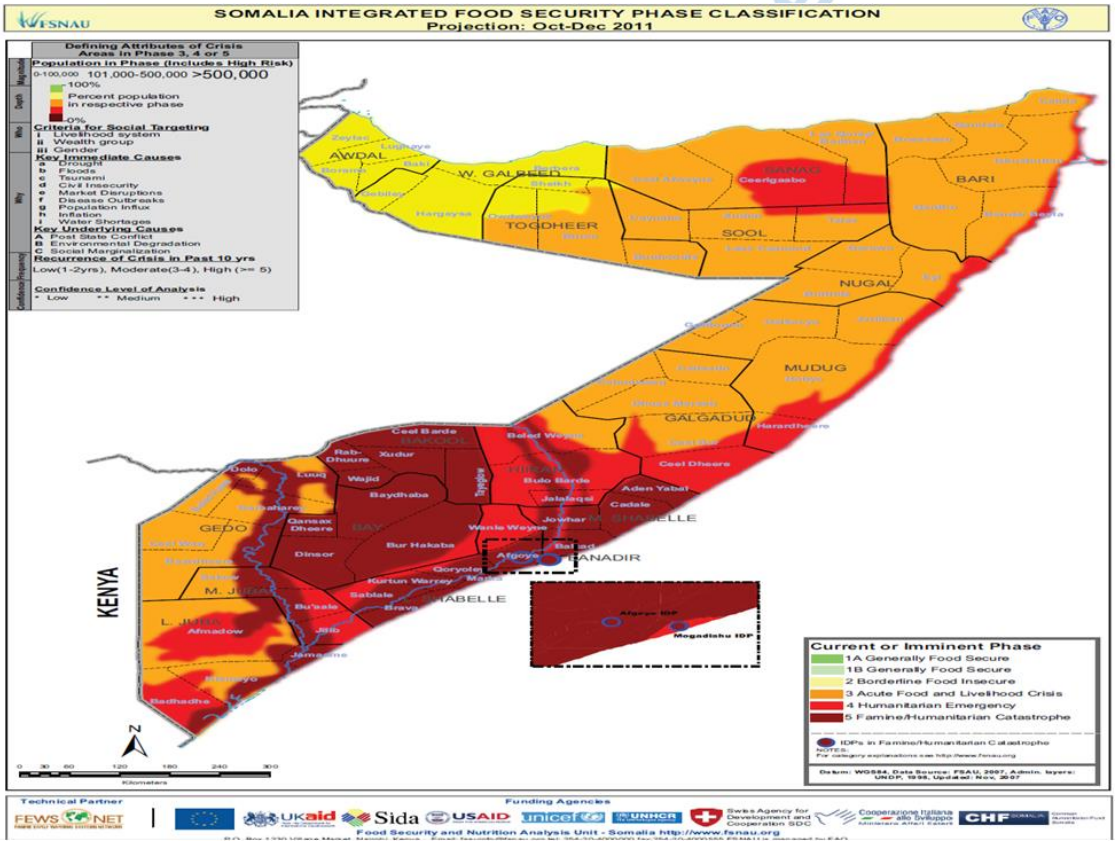


Figure 1: Food Security Classification Map - Somalia 2011
Source: FSAU, 2011

Observation on the Food Classification Map indicates that over 95% of Somali Regions are either phase 3, 4 or 5 in Figure 1 above. Only 1 region out of the 18 administrative regions of Somalia is classified as phase 2 (Borderline food secure). None of the regions is in phase 1 classification – regarded as foods secure (FSAU, 2011). Moreover, baseline assessment on 'Somalia's Growing Urban Food Security Crises' conducted by Cindy Holleman and Grainne Moloney (FSNAU, 2009) revealed that 3.2 million people (42%) of the Somali population needed emergency livelihood and life-saving assistance (Holleman and Moloney, 2009). Holleman and Moloney stated that 'Somalia's growing Urban Food Security crises' attracted an estimated 299,000 metric tonnes of food aid in 2008 and this played an important role in filling the gap in locally produced cereal supplies.

The UN report in 2002 indicated that the sub groups in the population that are very much exposed to insecurities of food in Somalia are the Riverine Bantu agricultural communities in the Middle and Lower Juba regions (this study site), which is ranked as the most poorest in Somalia (UN, 2002). Paradoxically, this region used to be the most food secure regions of the country due to its agricultural and freshwater abundance in pre-war years. It is also reported that in the northern regions, nomadic pastoralists moved property that belonged to them and were able to adopt the climate stress and conflicts in the south than sedentary farmers (UNDP, 2001).

Recent Famine Early Warning Systems Network observed the bulk of families that are poor in the agro-pastoral places of Lower Juba and Gedo (the study site) were afflicted. Recent years have shown declined patterns in harvest. In 2013, the actual production of maize Jamame District in Lower Juba which overwhelmingly depended on maize

production registered poor yields during the January/February *Deyr* harvest in 2013. While in February and March the locally poor Deyr harvest of that year led to more dependence on markets for many poor families whose power of purchasing are dampened by livestock holdings that are small, many of the agro-pastoral areas were reportedly governed by al-Shabaab and way to interventions of trade and humanitarian were very few (FEWS NET, 2013). In 2014, due to lack of successive rains drought came in, Somalia's main cause of humanitarian crisis in Somalia. According to the Somalia Water and Land Information Management, the April to June Gu rains bore only 50 per cent of the normal rainfall and interestingly started later and ended earlier (SWALIM, 2014).

In 2004, it was identified that economic shocks that are big, spared pastoralists and livestock traders who were not hit hard by the ban on livestock imports from Somalia because of the Rift Valley fever in countries along the Arabian Peninsula. The menace brought an essential end in employments and income related to trade and livelihoods of pastoral families are affected. In years that passed consecutive drought also resulted to many livestock deaths in northwards Somalia of up to 80% of the livestock, according to species and place (FSAU, 2004b). As per Bradbury (1998), in times when there are serious instability , crises of humanitarian happen to be redefined as progress chances . Otherwise stated, whatever would have been once seen as not correct level of malnutrition resulting to an emergency seen after a while as normal and is petitioned via development intervention.

Finally, the wellbeing of families in Somalia were from mainly five areas: agriculture, livestock, fishing, wage labour and activities generating income/ business operating at a small scale. Literature reviewed suggest that each of this area of wellbeing, which figure

out the family's food safety, are poorly researched due to this there is no much coverage in the literature apart from a few reports from NGOs. However, NGO reports show that hhousehold food security situation in Somalia is all time worst today. The reports blamed drought, poor or failure of successive rains, the ban on livestock exports and trade disruption due to armed conflicts for the household food security. A normal family that is unsafe in terms of food means the family members have no idea of where to find their next meal.

2.2.1 Socio-economic Determinants of Household Food Security

Mainly, the objective of this research is to find out how much effect of socio-economic factors contributing to household food security in Juba River Basin in Southern Somalia. Social and economic factors that affect food security can be described as the economic activities that affect social processes and how societies progress, stagnate, or regress because of their local, regional, or the global economy. In Somalia, accessibility of food is as per factors like disposable salary, employment status and education level of the families in nutrition status (Adeyeye, 1997; Ayandiji et al., 2012). Where families live and their wellbeing also affect the way of feeding of families. Pastoral communities mostly depend on milk, most legumes and vegetables are relied upon by pastoral communities whereas most vegetables and imported cereals are better accessed by urban households. Among families, there was a report on prioritization of children specially concerning food stress. In allocation of food between female and male there was no difference found. There was low consumption by women that are pregnant in Somalia (Montani & Omwega, 2002). UNDP approximated that in every five harvests in Somalia one is a partial failure and in every ten one is a full write-off (UNDP, 2001).

An earlier report indicated that the prolonged food security and vulnerability of Somali households were results of few opportunities of employment, increase in the prices of goods and services over time, markets that are volatile for cereals and exports of livestock prohibition, put together with continuous years of crops failing, very high rainfall, changes of conflicts and demography's that has led to protracted emergency. Further, a UN report showed that a variation that can be considered in terms of vulnerability degree, lack of safety and viability of the economy among different regions of the country (UN, 2002). Additionally, households in Somalia are mainly vulnerable to famine and drought, particularly since their livelihood is heavily dependent on livestock as well as agriculture related products, this two highly susceptible towards drought. It is argued that security of food as well as livelihoods that are threatened are pervasive, especially in the Central regions on the south where the destruction of both physical and economic infrastructure occurs, goods that are not there for public are delivered and so much internal and external movement from one place to another has occurred with more of displaced people from the inside (FAO, 2010b).

Globally, future food security has been viewed with a lot of concern too. Some scholars have argued that the ongoing population and growth of consumption, means 40years of rise in demand for food globally (Godfray *et al.*, 2010). In light of this plight, agriculture has moved to the forefront of the international development agenda (IFPRI, 2012). This is because of the realization that agriculture plays a crucial role in the production of adequate food as well as improved nutrition and health. Therefore, sustainable use of land and other natural resources, as well as addressing global threats like climate change need to be noted in today's food production. Multi-sector investment in agriculture and

strategic policy formation and implementation by governments will secure adequate food production in developing nations and for industrialized countries.

Finally, Socio-economic factors that influence food security are complex and multidimensional. From the literature gleaned, it is evident that there is no single factor that determines the household food security in isolation but rather a set of factors regardless of whether these factors are interrelated, or no correlations exist between them. The following sections investigated, the influence of household structure and the effect of income on household on food security.

2.3 Household Structure and Food Security

Investigation of the influence of household structure on food security was second objective of the study. The theoretical literature on economic models of household behavior shows that household members are assumed jointly to maximize some household level welfare function. In actual sense, the household remains intact and may be treated as if it acts as a single individual (Barnum and Squire, 1979; Lancaster, 1975) since all resources are pooled and then reallocated according to some common rule (Becker, 1981). The question of how household structure change relate to food security is important. Food security is considered to be a household-level economic outcome and is distinguished from hunger, which is identified as an individual physiological response (Coleman-Jensen et al., 2012). The fundamental demographic feature of a household is the number of members it contains. In sub-Saharan Africa, reports on the various dimensions of poverty (and therefore food security) are consistently bleak (Gage, Sommerfelt and Piani, 1997).

In Somalia, UNICEF reported that men played a critical role in tendering food to their households. It is also reported that prior to the civil war, boys would go out to vend for food and eat separately from women and young children (Montani & Omwega, 2002). This underscores that gender matters everywhere, and gender relations strongly differ from place to place and are highly variable over time even as increasing concentration of poverty among women and associates increase with the rise in the proportion of households headed or principally maintained by women (World Bank, 2001).

Friedmann (1980) dubbed, a "dual specification" of households, as internally diverse organizations, embedded within and shaped by wider structures. It is apparent that there are many conceptual problems with contemporary interpretations of food security. A look at a household as a unit of analysis requires making a series of assumptions about household structure and organization in order to identify the activities, relationships and processes essential to improving food security and to maintaining adequate nutrition status to operationalize the concept of household food security (Maxwell & Smith, 1992).

Moreover, household structure is interesting in terms of its relationship to a number of important outcomes; Poverty, for instance, is closely related to household structure (European Union, 2010). Le and Majid noted that in Somalia, vulnerability remains high since political violence, and disease outbreaks and related challenges are replaced by depleted household asset bases with exposure to inadequate social services and poor terms of trade (for certain groups) as the determining factors in understanding household wellbeing (Le and Majid, 2002). However, one of the most basic ways in which households differ is in their composition, that is, as households become less food secure,

there is a decrease in the frequency and quantity of adults' and children's food intake (Bronte-Tinkew et al., 2007).

From previous studies, primarily, household structure might be related to household food security via impacts on household finances. It is therefore important to mention that women's workload have a significant influence on family food choices and food-sharing behavior within the family. A study in Nigeria revealed that factors that contribute to food security are farm size, family size, dependency ratio, and age of household head (Adeoti and Egwudike, 2003). Inadequate access to land, high costs of labor and inadequate capital, however, were given as the common problems for household food security. Improved access to credit will also ameliorate the problem of labor cost and encourage greater involvement in urban farming, according to the study.

Bashir et al (2012) found that household heads' age and family size are negatively associated with household food security. They also investigated the factors affecting rural household food security in three different regions of the Punjab Province of Pakistan and argued that the education level of the household head was known to impact on food security (Bashir et al, 2012). Additionally, household heads' increasing age deteriorated food security and the total number of earners in the households were also found to be determinants. The study recommended that rural household food security can be improved by focusing on education, creation of income generating opportunities and family planning programs (Bashir et al., 2012).

2.4 Household Income and Food Security

Objective three of the study investigated the effect of income on household food security in Somalia. Generally, Somalia households depend on five livelihood zones: agriculture, livestock, fishing, wage labor and small-scale business/income generating activities. Pre-civil war (before 1991) data indicates that the agriculture and livestock sectors had always been the backbone of the Somali economy and still have a crucial role in ensuring job creation, income generation and foreign exchange earnings, thus food security today. Pre-war figures point out that these sectors provided 67% of the country's GDP (FAO et al. 2013). Indeed, about 70% of the country's population lives in rural areas and derives their livelihoods from agriculture and livestock and related income-generating activities. To this end, the agriculture and livestock sectors are, therefore key in addressing poverty and food security at both micro and macro levels.

According to FAO, most crop production is undertaken by small-scale subsistence farmers with an average of 0.2 to 3 hectares of land and only 1.6% of Somalia's land mass is being used for agriculture with 90% of the production under rain-fed agriculture and 10% under irrigation (FAO, 2010b). Most of the small-scale farmers are resource poor and are usually trapped in a poverty cycle, without the capacity and resources to increase production and modernize their farming practices. The smallholder farming subsector accounts for 80% of the total agriculture outputs and 70% of marketed agricultural produce. Currently, use of appropriate technology and inputs such as hybrid seeds, fertilizer, and pesticides, not to mention good agriculture practices, have been very limited – all these contributing to declining agriculture productivity (FAO, 2010b). With modern technology, farmers can potentially produce 10-15 tons per hectare rather than the current 0.2 to 3 tons per hectare (Rongfa and Zhang, et al., 2021).

It is clear that the capacity of households to cope with a situation of food security is related to a household's resources, skills and networks that allow them to overcome a difficult situation (FAO, 1997). Various organizations have conducted medium-term agriculture interventions in recent years in Somalia. FAO noted that current activities in the crop subsector are targeted towards emergency interventions (FAO, 2010b). These include the provision of seed, inputs, training, rehabilitation of irrigation canals, and post-harvest technologies. Seed distribution is a common short-term intervention, but limited effort has been made to assess the agro-ecological conditions, varietal suitability, and technology adaptation within the local context. Since 2009, FAO has been testing maize, sesame, and banana varieties in the Lower and Middle Shabelle regions of southern Somalia and increasing seed of the most promising varieties and identified superior varieties of maize, sesame, and banana and reached thousands of farmers engaged in irrigated and dry-land agriculture activities.

The livestock sector has a major impact on the country's food deficit and overall food security, thus the need for growth in this sector is more pressing than ever. However, the Somali livestock breeds are characterized by poor growth rate, low milk yield, and low meat production. Apart from the pastoralist livelihood, pockets of livestock enclosures (ranches) and dairy farms are beginning to emerge in some parts of Somalia. According to the Food Security and Nutrition Analysis Unit (FSNAU) of the Food and Agricultural Organization (FAO), overall livestock exports have significantly increased in Somalia since December 2009, but exports are still lower compared to the peak of the export season during Ramadan (July/August) and Hajj (November). In May 2010, exports from Bosasso port were 59,662 heads of livestock, a figure that was 30 percent higher than in

December 2009. Total livestock from the port of Berbera was 60,620. An increase in the number of live animals is attributed to improved pasture and water throughout the country, resulting in the increased number of export quality livestock as well as improved access to export markets (AMISOM, 2010).

On the fisheries subsector, a UN survey indicated that only around 30,000 Somalis, or 2.6% of the country's estimated 8 million people, depend on fishing as their principal livelihood. An additional 5.2% use fishing as a supplementary livelihood, according to the UN study. The small fraction of people involved in Somalia's fishing industry leaves a huge biomass resource untapped. Somalia's fishing waters produce around 300,000 metric tons of fish annually. Health experts believe the high malnutrition rates in Somalia as a result of years of internal strife could have drastically reduced if the population consumed more seafood (AMISOM, 2010). However, World Bank reports noted that the fishery sector in Somalia is underutilized, yet there is significant potential for increasing the catch and for extensive further processing. Underutilization was primarily a result of a lack of fishing vessels, poor infrastructure (including landing facilities, lack of transport and an absence of ice and freezing facilities), a lack of ancillary services such as boat repair and inefficient processing.

Capacity building in Juba Valley region has been ongoing with humanitarian agencies majorly involved. Oxfam (2013) reported a number of projects identified by the people in the region as priorities indicating them being knowledgeable of the current situation of food security. But despite these efforts, the region still remains food insecure, and the question is why should this be? Oxfam (2013) indicated that community action plans have been initiated in the region. Oxfam (2013) also observed that the high trade in wild game

meat in Qoqani town has significantly reduced, due to the increased supply of beef, and easy access to the market meaning the locals are knowledgeable enough to make wise decisions and engage in practices that empower them.

2.5 Intervening Factors Influencing Household Food Security

Food security is variably influenced by several factors, not just the once discussed above. Intervening factors such as climate induced changes have grossly reduced the potential of households to produce food and sustain their families. Social services provision in supporting food production, trade and acquisition equally contribute to the household's ability to be food secure.

In a study in Bangladesh by Chatterjee and Kundu, lack of agricultural land, employment opportunities, social services, access and knowledge of nutritional diet and healthcare, sanitation and safe drinking water coupled with sustained poverty were identified as factors that lead to hunger and malnourishment (Chatterjee and Kundu, 2011). In southern Ethiopia, based on results of a test of full/reduced model and the magnitude of changes in conditional probabilities of food security, a study concluded that the supply-side variables were more powerful determinants of food security than the demand-side variables (Feleke et al., 2005).

Approaches that include these three issues will transform smallholder farming in Africa into productive and sustainable enterprises and will contribute greatly to food security and environmental conservation, in a win-win situation, according to (Sanchez and Leakey, 1997). To further complement the above factors, challenges arising from climatic factors impacting negatively on food production cannot be neglected. Climate Change is

increasingly becoming a big agenda in international development programs as it has raised concerns over world food security (IPCC, 1996). Kurukulasuriya and Rosenthal argued that as research on the spatial variation in climate change and its subsequent impacts mounts, it is becoming increasingly apparent that both across and within regions vulnerability to climate impacts will be diverse (Kurukulasuriya and Rosenthal, 2003). In reference to Somalia specifically, it has been evident that climate shocks – especially droughts – have made many households fall into severe hunger, displacement, death and misery as witnessed in 2011 (Oxfam, 2012). Despite the socio-economic factors influencing household food security discussed above, Juba Valley Basin (JVB) of Somalia – the study area – has specifically suffered most from drought, clan conflict and political instability. A study on "agriculture, food and nutrition" done by FAO in 1997, showed that the vast majority of farming communities in Juba Valley Basin fled from their farmlands and sought refuge in Kenya's north-eastern refugee camps while others were displaced to main cities in Somalia including Mogadishu and Kismayu because of the civil war (1991-present). Some returnees who attempted to resettle on their former farms faced discouragement as the farming lands could not be cultivated primarily because it was populated with trees and bushes/shrubs. To clear the land was not only difficult and labour intense but also expensive for returnee families who had lost their assets to the conflict.

In addition, the fear of being attacked and robbed by the armed clan militias during harvesting times eroded their confidence in producing like they used to do before the war. To further exacerbate the food production condition, many of the flood-control systems and canals in the area that existed were being destroyed; infrastructure looted or became

unusable (FAO, 1997). Because the river flood control systems were destroyed, crops and crop fields in many villages within 2 km radius of the river were destroyed and became either flood prone areas or lacked water, thus rendering the areas unsuitable for farming. In addition, agriculture extension trainings, technical advice, and farm inputs previously provided by the Ministry of Agriculture became unavailable (FAO, 1997). The opportunities for off-farm employment and income generation activities were no more. Loss of transport facilities, poor road network and security in the Juba Valley Basin reduced farmers' access to markets in major towns (FAO, 1997). As a consequence, production levels in this area dropped to 40 – 50% lower in 1995 than pre-war levels. It is suggested that this changing context poses difficulties for small-scale farmers, who are directly dependent on ecosystem services and have less capacity to adapt to changing contexts, compared with larger, more resource-endowed farmers (IFAD, 2013).

In conclusion, the reviewed literature seems to clearly indicate that socio-economic factors influencing food security are multifaceted, multi-sectorial and multi-dimensional, compounded by other intervening factors including but not limited to environmental and/ or climatic variability and political factors. More specifically, these factors can be regrouped as follows: Firstly, the uncertain extreme weather variability has had impact on food security arising from flooding and prolonged droughts. Secondly, the biophysical characteristics such as availability of water resources, soil quality, pests and diseases, water, energy and under-utilization of fisheries resources are also crucial factors. Thirdly, the rising food, fuel and fertilizer prices driven by changing markets affects farmers' ability to produce maximally. Fourthly, agricultural policies including subsidies, incentives, tariffs, credit facilities, insurance, management practices/extension services,

terms of trade, land-use regulations and increasing competition for farming lands are yet other impeding challenges to farmers. Either individually or in combination, these factors have evidently contributed to food security among the vulnerable groups in Sub Saharan Africa including Somalia. It is also important to understand that the political history and the clan conflicts in Somalia have contributed to food security. Achieving food sufficiency in this area requires confronting these enormous challenges ranging from the ecological context to the geo-political mayhem. Creation of stable environment where all activities relating to food systems, that is, the production, distribution and consumption of food is highly desirable as a precondition to restore the country's glory.

2.6 Food Security Measurement Techniques

Food security measurement is a complex area of study, and no single method has proved adequate in isolation. In as much as climatic and environmental, political factors impact on food security, and as they are critical intervening variables, socio-economic factors play a very critical role. A person's level of income, access to credit, literacy, land ownership, availability of labor and gender influence one's food security. As a result, many approaches have been proposed by various scholars in the measurement of food security especially at the household level. For USAID, households are food secure when they have year-round access to the amount and variety of safe foods their members need to lead active and healthy lives (USAID, 1992). For FAO, a household is food secure when it has the ability to produce, its own production or through purchases, adequate food for meeting the dietary needs of all members of the household (FAO, 2010a). Besides, many scholars have also used various measurement techniques in determining whether a household food secure or not. For instance, to determinants of household food security

among rural households in the Ada Berga District in central Ethiopia, household calorie acquisition was analyzed to measure the status of household food security (Beyene and Muche, 2010).

Likewise, Feleke et al. (2005) developed a recursive household food security model within the framework of consumer demand and production theories following (Singh et al., 1986) and highlighted the relative importance of supply-side versus demand-side variables in determining household food security in southern Ethiopia (Feleke et al., 2005). Econometric considerations can also be used to measure food security. In a study in Mozambique, the independent effect of income on calories or nutritional status were estimated using ordinary-least-squares and instrumental-variables (Garrett and Ruel, 1999). Groote et al. analyzed data from southern Mali using enlarged household model. Their model also includes two other elements that have recently received major attention, that is, Credit and Seasonality (Groote et al., 1997). In same study, logit model was used to determine statistically significant variables that influence food security of the households (Hussein and Janekarnkij, 2013).

In a more recent study, a conceptual model was proposed on the basis of the three widely known components of food security: food availability, accessibility and utilization. The model was used to select a total of 40 peer-reviewed studies carried out over the last decade (20 each from Africa and Asia). A meta-analysis technique was then used to identify which determinants of food security have been highlighted and how well the causality is demonstrated (Bashir and Schilizzi, 2013).

2.6.1 Household Food Security Access Scale Score (HFIAS)

This the continuous measure of the degree of food security (access) in the household in the past four weeks (30 days), was also used. A HFIAS score variable is calculated for each household by summing the codes for each frequency-of-occurrence question. This is done after recoding the response of occurrence as "0" if the response to part (a) of each question was a "No". The maximum score for a household is 27 (the household response to all nine frequency-of-occurrence questions was "often", coded with response code of 3); the minimum score is 0 (the household responded "no" to all occurrence questions). The higher the score, the more food security (access) the household experienced. The lower the score, the less food security (access) a household experienced. Finally, the average Household Food Security Access Scale Score was calculated from the household scores above.

2.6.2 Household Food Security Access Prevalence (HFIAP)

Another most important indicator is the categorical household food security access prevalence indicator of Food Security Status was used. The HFIAP indicator categorizes households into four levels of household food security (access): food secure, and mild, moderately and severely food insecure. Households are categorized as increasingly food insecure as they respond affirmatively to more severe conditions and/or experience those conditions more frequently (FANTA, 2007). Whereas the severely food insecure categorization seems adequate in the categorization of households, it seems not to adequately capture the severity of hunger if mere response to just one question of the last 3 conditions places a household in the severely food insecure group.

2.6.3 Household Hunger Scale (HHS)

Additionally, a categorical measure of HHS was done to assess the severity of household hunger in the past 1 month and examine the distribution of households beyond the preceding indicators of household food security. USAID (2011) invented this methodology for assigning households to specific groups based on whether the household experiences severe hunger, moderate hunger or little to no hunger. The HHS data is obtained from the household responses to last 3 frequency-of-occurrence questions of the FANTA questionnaire. Recoding of the HHS data collected proceeds in three simple steps (USAID, 2011). This is how:

Step 1: Recode the responses to each frequency-of-occurrence question from three frequency categories ("rarely" "sometimes" "often") into two frequency categories ("rarely or sometimes" and "often"). For each of the new variables created a frequency response of "rarely" (originally coded as "1") is coded as "1"; a frequency response of "sometimes" (originally coded as "2") is coded as "1"; and a frequency response of "often" (originally coded as "3") is coded as "2".

Step 2: Next, add a code of "0" for households that replied "No" to each corresponding occurrence question. All households should now have a value of 0, 1, or 2 for each of the three new variables created.

Step 3: The values are then summed for each household to calculate the HHS score. Each household will have an HHS score between 0 and 6. These values are then used to generate the HHS indicators. Finally, HHS categorical indicators are assigned by introducing two different cutoff values (> 1 and > 3) which are applied to the HHS scores

that were generated in Step 2 above. The three household hunger categories are shown in Table 1.

Table 1: HHS Categorical Indicator

HH Hunger Score	HH Hunger Categories
0-1	Little or No hunger
2-3	Moderate hunger
4-6	Severe hunger

2.7 Theoretical Framework

In order to make predictions, find solutions to current or future problems, determine which facts more critical, or better understand the social phenomena under investigation, researchers develop a theory- a way of describing, explaining and predicting things. However, the utility of a theory is different, and researchers use theories for different reasons. Some use theory for prediction because they are interested in predicting what type of economic model would lead to stable economic growth, for example. Others are interested in understating the issues rather than predicting what will happen next.

Applied to the question of food security, contemporary discourses of international development present several significant paradigms, theories, schools, and approaches in explaining poverty and hunger- consequences of underdevelopment. Some have been around over half-century others have sprouted within the last decade. They include climate-related theories that concentrate on variations in weather patterns that cause crop failure and aridity locally and over long periods; Theoretical explanations that focus on

population dynamics (such as the Neo-Malthusian Theory by Scanlon, 2003); theories that focus on food access rather than just availability (such as the theory of entitlement by Sen 1981 and Borton and Shoham, 1991), Modernization and Dependency theories underdevelopment; post-development and Alternative development theories (critics of the mainstream development paradigm); as well as Theories of Access and Food and Nutrition Security. Moreover, Social anthropologists have more recently realized that people consistently suffer food insecurity concerning various economic conditions, which supports the significance of behavioral reactions and coping strategies in food crises (Frankenberger, 1992). Nevertheless, some theories have advanced, some were criticized where others were discredited all together and replaced by other theories.

To provide the theoretical and conceptual basis, for explaining poverty and food security, this study was guided by Theory of Access and Food and Nutrition Security Theory. Theory of access complements the food security and nutrition theory to denote how socio-economic factors determine household food insecurity in Juba basin region. The household structures including income base entail the stability. At the same time, this is conceptualized as property whose benefits must be felt in the context of food security. This culminates into the food security status of the household through utilization and influencing the nutritional status.

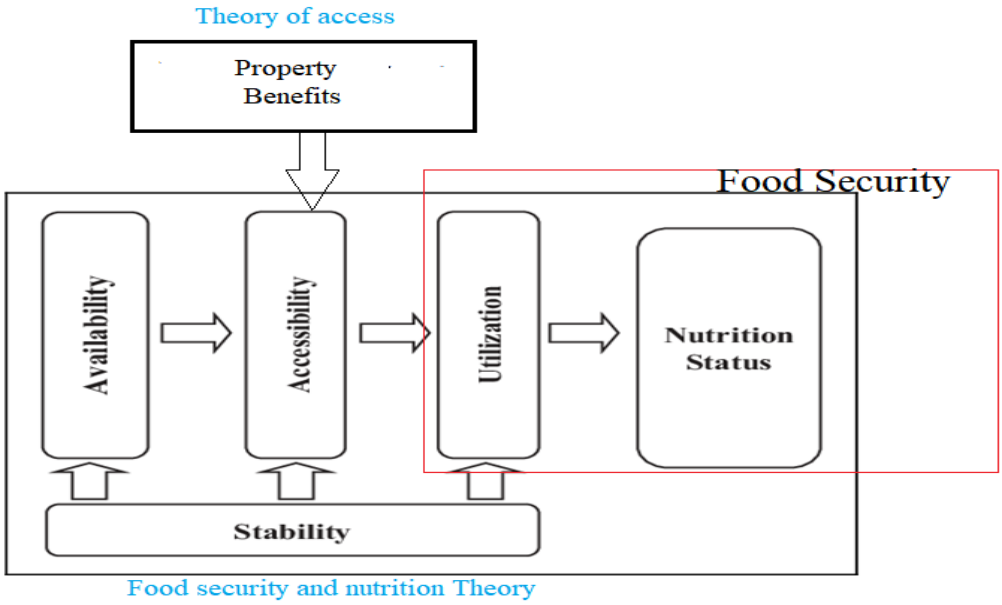


Figure 2 illustration of Theories of Access and Food and Nutrition

2.7.1 Theory of Access

Theory of access was developed by Ribot and Peluso (2003). Myers and Hansen (2020) describe the approach to access as the motive for power rather than just property. With power in the context, the meaning covers towards having rights to resources which is key to the concept of food security. Accessing food will imply the power to make decisions over it (resources) and hence covering the household status, the household structure, income base as well as the strategies for being food sufficient.

The concept of Theory of access entails how a phenomenon is analyzed in terms of availability to create a relationship between processes that define the benefits of the phenomenon. This alludes to the food that is need in Juba region for the starving

populations. The food forms the resources that links up the process of human interactions while its variations in availability and access form the dynamic cycle.

In exploring more about the Theory of access, Myers and Hanse (2020) reviewed available articles on the theory. The review scope was on how it has helped in sustaining livelihoods, entitlements framework, materiality, power, gender, and property. The Theory of Access has been used to relate phenomenon superficially. However, it has also been modified in some literature to bring out the social theoretical framework. Thus, the Theory of Access delved into both the independent and dependent variables studied in the current research. The aspects of household structure, the income and strategies for food security are bound within the framework of access.

The theory is also in the postulation borne in the works of Marxian political economy. In the wake of the industrial revolution and as a reaction to realism school of thought, the theory of access applies in the international economy that emerged in 17th and 18th century. Its theoretical roots and basic economic principles are based on Adam Smith's "laissez-faire" or hands-off or leave us alone principles. Also, the US president Woodrow Wilson of 1918 advocated for the liberal principles of free trade, self-termination, and the use of international organizations to settle disputes between states. Further, the Breton Woods international economic institutions such as the World Bank, the IMF, WTO and later the Washington Consensus, globalization, and neoliberal mode of economic development-better known as Structural Adjustment Programmes (SAPs are all shaped and guided by liberal principle. Another theory that supports theory of access is neo-liberal of the 70s which argues that in order for countries to develop, they need to engage in free trade, deregulation, and privatization by removing protectionist barriers (Allen

Thomas). Theory of access also support the works covering the modernization theory which responded to economic and ideological differences between capitalism and communism school of thoughts in the 1950s and 60s.

In its very basic sense, modernization theory divides countries into two main camps: Modern and tradition. It argues that underdevelopment is the result of backward internal structures-rather than external factors- that cause underdevelopment and keeps developing countries in pre-conditions stage of development. For access to products and services, it argues that to undergo industrialization and develop not only deep social structures changes are necessary, but also the traditional type of nations need to engage in free trade and liberalization. They do this with less government intervention by removing trade barriers. Rostow- the fort runner of modernization explanation for access to resources, presents the theory of linear growth which sees the process of economic development as a series of consecutive stages. It argues that a "mixture of saving, investment, and foreign aid was necessary for economic development." The basic premise of the capitalist theory of modernization is that economic development is achieved through a 5 phased process. Here, modernization means process from traditional society to mass consumption society (Nhema, 2016). It argues that the developing countries should be expected to follow the economic model taken by the developed states (Jackson and Sorenson, 2007). By citing the success stories of the post-war Marshal Plan in Germany and Japan, many African Nations adopted modernization theory as an engine of economic development in the 1960s. However, it became clear that the economic development model of modernization theory was not working for Africans a decade later.

However, the modernization theory failed following the economic failures of Africa attributed to "too big and inefficient governments and too much state control over the marketplace" by Breton Woods international economic institutions such as the World Bank and the IMF. In response to the failures of Africa economies, Breton Woods Institutions introduced liberal economic policies- known as Structural Adjustment Programmes (SAPs) intended to "promote long-term and sustained economic growth" in the 1980s where the free-market philosophy become the dominant ideology -Trade. IMF argues that Africa needs better economic management and more trade liberalization. The solution had to be reduced state size and allow markets to operate freely. If one wants money from the IMF and the World Bank, one has to open up their economy and allow for foreign investment and free trade.

Many African states, which either could not sustain their socialist economic models or run out of money, had to lead political, economic reforms and deal with strict conditionality for borrowing, privatization, and massive deregulation according to SAPs. This strict conditionality for borrowing included the decline of state-run enterprises, promotion of the private sector and smallholder on the state farms, trade liberation, exchange rate reforms, and the dismantling of agricultural pricing and market controls.

One of the African States that had to reform its state-run economy was Nigeria. Nigeria received a "debt-restructuring deal from the Paris Club and a $1 billion credit from the IMF, both contingents on economic reforms". As part of the deal, the government-initiated deregulating "fuel prices, announced the privatization of the country's four oil refineries, and instituted the National Economic Empowerment Development Strategy, a domestically designed and run program modeled on the IMF's Poverty Reduction and

Growth Facility for fiscal and monetary management." in 2003. As a result, "once a large net exporter of food [Nigeria], now must import food" because the agricultural sector has miserably failed to keep up with rapid population growth.

Another decade later (the 1980s), a substantial body of empirical research consistently confirmed that development in Africa had failed once again for different arguments. IMF has been blamed for almost all circumstances surrounding the underdevelopment for the third world states its structural adjustment program particularly. In addition to liberal economic policies, others blame foreign aid and donor attitude towards developing countries, civil wars, and bad governance, internal structural challenges and big and inefficient governments for the lack of development in Africa.

For starters, the World Bank and the IMF hold the view that the economics of Africa has failed because of "too big and inefficient governments and too much state control over the marketplace". The solution had to be reduced state size and allow markets to operate freely, they proposed. Contrary, ". (In her book The Shock Doctrine: The Rise of Disaster Capitalism, Naomi Klein highlights on the impact of the implementation of SAPs), Klein argues that structural adjustment programs have caused political, social, and economic mayhem in most of the African counties, including Somalia since the 1980s. Privatization and massive deregulation destroyed local market, fostered perpetual debt and created food aid dependency syndrome in the following way: Cutting government subsidies to "small farmers, eliminating tariffs and price controls, selling off food and grain reserves, increasing cash crop exports of raw materials to the west, and allowing imports from the US and Europe to flood their markets" means death sentence for Africans at state, local and individuals levels, she writes.

Finally, the theory of modernization and neoliberal policies have been criticized for its thinking of westernization ethnocentric and global hegemony. One of the most exciting conclusions concerns the demands of the free-market philosophy is the "regardless of the nature of their economy, regardless of their level of development, regardless of their size; modernization requires that all countries must pursue a common set of economic policies- an irreversible process. The most significant criticism of moderation theory is the assumption that development is necessarily linear line forgetting that Asian Nations like China, Taiwan, and South Korea have developed like the West without following the Rostow's ethnocentricity model of development. Furthermore, Rostow's view that the process of economic development as a natural order of things and are an only acceptable model of development for progress has been proven as a facile argument. Further SAPs are criticized for being are for being short-term financial crisis management techniques that failed to look ahead.

In sum, a Theory of Access envisages a broader range of structural and relational mechanisms, including but not limited to property, that determine how access is gained, maintained or controlled. Moreover, by focusing on abilities and the ability to benefit, which may be interpreted in various situations and contexts to encompass both endowments, entitlements and capabilities, we consider A Theory of Access to constitute a more flexible analytical construct than the environmental entitlements framework. Similarly, combining the two theories guiding the study showed the relationship to the study problem (food in security) as well as informing the conceptual framework. Theory of access complements the food security and nutrition theory to denote how socio-economic factors determine food security in Juba basin region. The household structures

including income base entail the stability. At the same time, this is conceptualized as property whose benefits must be felt in the context of food security. This culminates into the food security status of the household through utilization and influencing the nutritional status. The Theory of access was chosen because its argument on the access to food while emphasized in the food and nutrition security theory.

Further, Modernization Theory as it relates to Theory Access, was discussed not only because the free-market theories became a central aspect of economic management in Africa in 1960s, but also to understand how liberal modernization economic policies have failed Africa because IMF has been blamed for all most all circumstances surrounding the underdevelopment for the third world states its structural adjustment program particularly. Further, published studies indicated that the economic development model of theory of access has failed in Africa despite massive international economic aid. Rostow's idea of economic "take-off" from traditional methods of development to modern forms of development has been proven to be an easy argument mainly because of African economic development refused to "take-off

2.7.2 Food and Nutrition Security Theory

The food and nutrition theory were developed by Simelane in 2020 with a preposition that there exist various dimensions of food which determines food sufficiency. This is based on the argument that food can be harvested in one area and fails to reach another area which will continue experiencing food insecurity. Thus, the aspect of food availability does not automatically fulfil the needs of food security. Similarly, the availability does not obviously imply sufficiency in nutrients that the body needs. The

theory opines that food exist as elements of availability, accessibility and utilization in order to create a platform of sustainability. This eventually creates a buffer for nutrition.

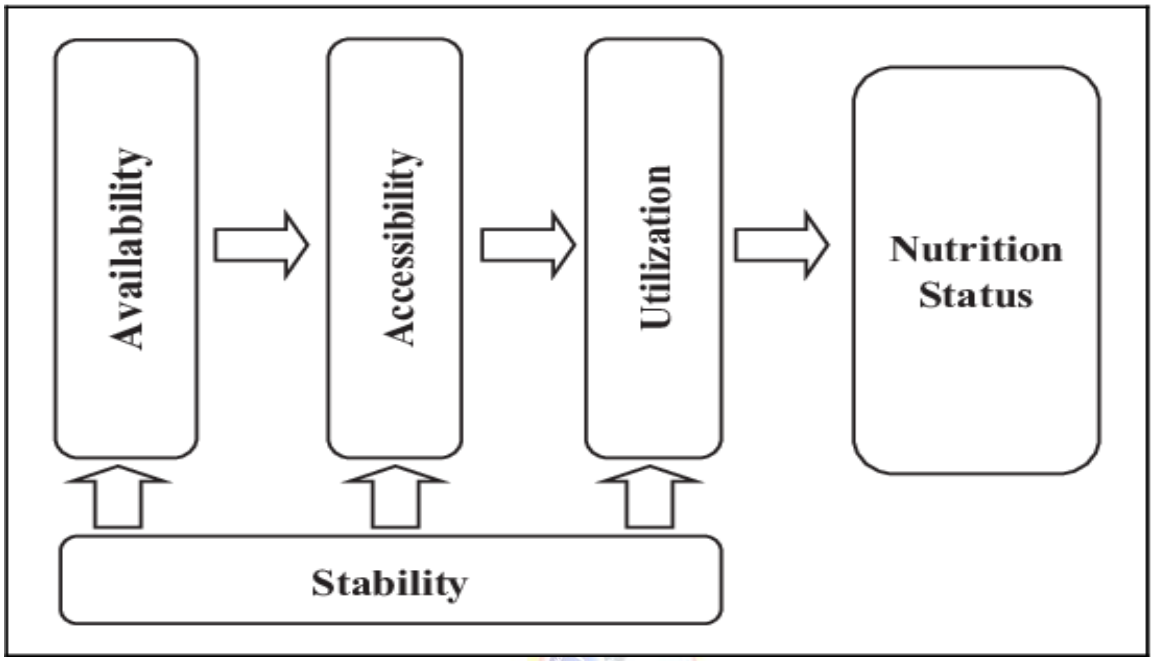


Figure 3 Illustration of Food and Nutrition Security Theory

The food and nitration concept stretch into dependency theory- the need of the poorer countries and the more affluent countries concerning the world economy and suggest the need for "delinking from external dominance." It argues that the richer ones exploit the poorer countries through unequal terms of trade because they are weaker participants in the world economy (Jackson and Sorenson, 2007). This theory further relates to how globalization and capitalism control weaker states through material production (availability) and human expertise (access through distributions). It points out how developed countries design strategic planning through structural adjustment policies for developing countries. Consequently, these policies make the production of raw materials such as agriculture, crude oil, and the experts of fields dependent on the host country. The food and Nutrition Security theory thus goes further to suggest that underdevelopment is

caused by external factors: that the interest of the West dominates economic development of the Third World Countries; that underdevelopment is not a result of traditional methods of development, but rather it is the result of a single process of global capitalist development; that external forces crippled the structure of the Third World societies; that "to overcome underdevelopment, a delinking from external dominance is required" (Jackson and Sorenson, 2007). In a nutshell, dependency school of thought argues that failure in the Less Developed Countries is a result of political and economic dependence on core countries.

Similarly, Helen Lauer challenges the belief that African societies require foreign direction in their socio-economic development. She argues that profit-seeking schemes guide foreign fiscal priorities of the world economic powers. Their claim for globalization, trade liberalization, spreading democracy, and fighting HIV/AIDS are no more than colonial imperialism (2007).

Tando writes Africa "produces more, imports more and exports less to get less and less." Unequal trade places many small business owners and farmers out of business and many other people out of work." According to Tandon Africa is weak and impoverished because its abundant natural resources are taken away from it at a fraction of their value, and these resources are consumed in industrialized nations. This argument is based on the fact that sources of revenues for millions of Africans have been agricultural production; therefore, free trade destroys this livelihood.

From the 1960s and 1970s, Somalia' economy has transformed drastically from a net exporter of food and commercial products to an economy in crisis and balance of payment

deficit. Several factors contribute to this. However, one cannot fully understand the role of cheap imports and food aid of structural adjustment programs (SAPs), displace small farmers and destroy local economy without the food and nutrition security theory (Rania Khalek). The Theory is quite relevant when discussing food security in developing countries such as Somalia. It was also selected to explain and understand how the neoliberal policies dismantled Somalia's state-lead development in the 1980s. However, the theory has been criticized for its state-centered approach of development and for not offering variable policy and an economic prescription for how emerging countries can initiate and sustain development through availability, accessibility and utilization.

Theory of access complements the food security and nutrition theory to denote how socio-economic factors determine food security in Juba basin region. The household structures including income base entail the stability. At the same time, this is conceptualized as property whose benefits must be felt in the context of food security. This culminates into the food security status of the household through utilization and influencing the nutritional status. The following theoretical framework indicate the connecting between the research topic, research problem, research objectives, research variable and the reach goal.

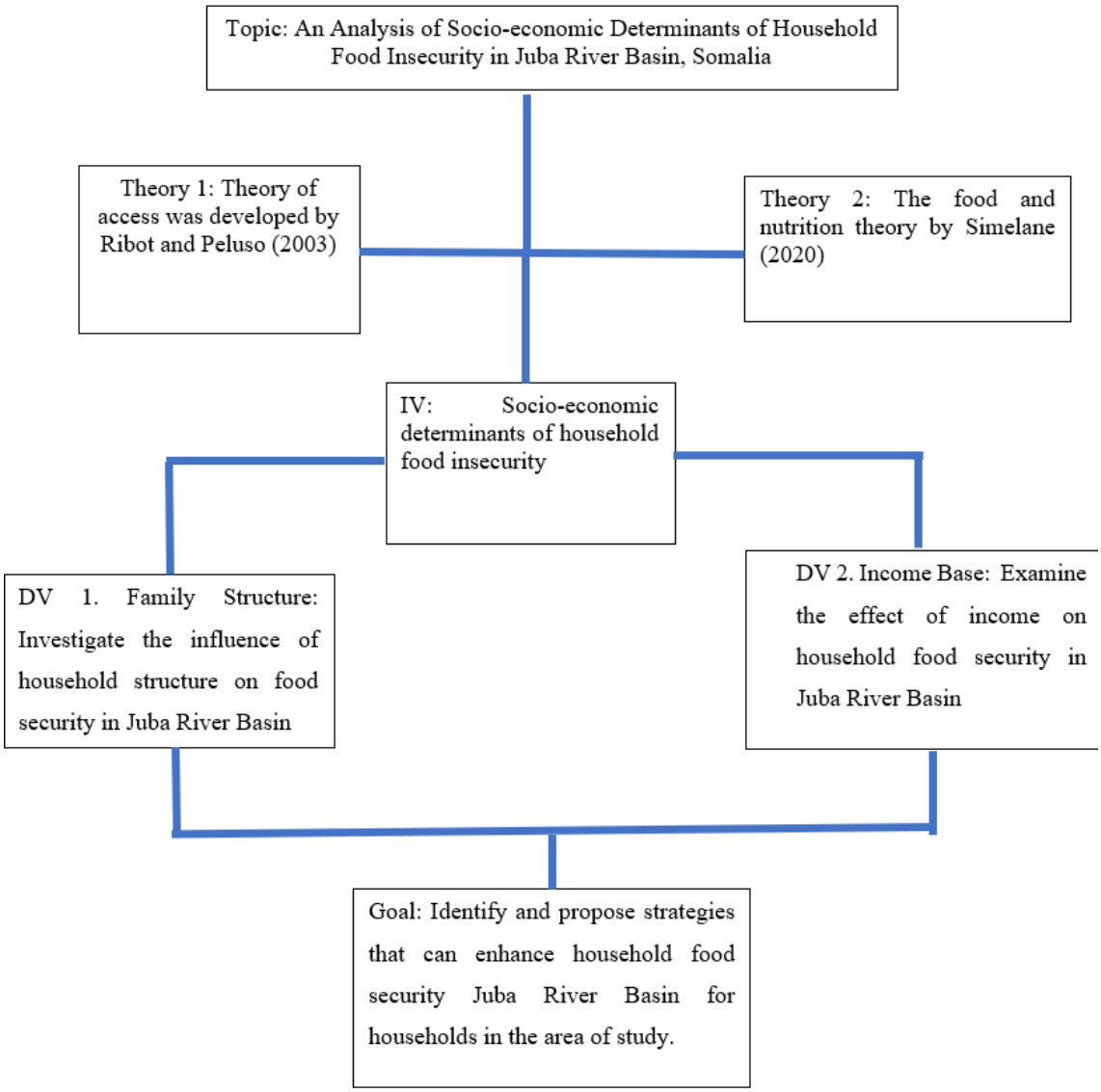


Figure 4. Theoretical framework (Source: Author's)

To sum up, the theoretical Framework is critical in any research because the Framework describes the theory that explains why the research problem under study exists. In its basic sense, it is the structure that holds a theory of a research study. Theoretical Framework is described together with the rationale behind choosing the theories employed where conceptual Framework explains how it relates to the leading problem formulation contributes to answering it.

A reviewed substantial body of empirical research suggests that many scholars and theorists offer a variety of reasons and explanations as to why nations, households, or individuals are hungry. Some theories present scarcity-based argument and other inequality-based evidence as to why people are hungry. Scarcity arguments of hunger hold the view that hunger in underdeveloped nations is caused by too many people with too little resources. This view argues that food-producing resources such as land, water, fertilizers, and technologies cannot produce enough food to feed everyone. To the contrary, inequality explanation blames unequal distributions of resources. It says that poor people are hungry because they lack access to resources needed to produce or purchase food (land and income). Other researchers, as well as practitioners, suggest political instability, conflict, natural disasters, corruption, lack of technology, unfair trade agreements, investment, and rapidly changing prices for their goods are causes of poverty in the Third World Countries.

The Theory of access was chosen because its argument on the access to food while emphasized in the food and nutrition security theory. Modernization and Dependency theories of development were discussed to complement theories of Access and Food and Nutrition. These theories were also dominated the development trajectory in Africa from 1950s to 90s and blame internal factors for the economic underdevelopment of Africa. The theories were chosen because they revolutionized African thinking on development and blames external factors for the same. While theory of Access and Modernization explanation of underdevelopment argues that poor countries are poor because backward internal structures that cause underdevelopment and keeps developing countries in pre-conditions stage of development, Theories of food and nutrition security and Dependence

theory explanation holds view that developing countries are not merely in a backward stage in food availability, accessibility and utilization just like the developed countries once were, but rather, the relationship between the two spheres is exploitative. Both views were chosen to present a balanced argument.

Finally, the theoretical framework adopted in this study explained why household food security exists in Somalia. It explicitly shows how the Dependent Variable of this study, the Independent Variable, and Intervening Variables are interlinked. Independent variable refers to a variable whose variation does not depend on that of another. The dependent variable is a variable whose value depends on that of another. Adopted by this study, the theoretical framework (Fig. 4) illustrate the connection between the research topic, research problem, research objectives, research variable and the reach goal. Together with figure 2, 3 and 5, it illustrates how the Dependent Variables (food access, availability, utilization, and stability), the Independent Variables (household structure and income base), and Intervening Variables (climatic variability, environmental variability, and political factors) are related to each other. Similarly, combining the two theories guiding the study showed the relationship to the study problem (food insecurity) as well as informing the conceptual framework. This is illustrated in Figure 5.

Variables

Variables are central ideas in quantitative research. A variable is a concept that varies. It is the language of variables and relationships among variables that is address in quantitative research. Variables vary in three ways: in quantity, in intensity and in amount, and they can take on two or more values or attributes. For example, what is your

gender? Gender is variable, and it has two responses categories-male and female- these are attributes of gender variable.

Types of variables:

1. Independent Variable (IV), also known as "exogenous," is the cause or predictor variable or one that identifies forces that act on something else (X causes Y).

2. Dependent Variable (DV) also known as "endogenous" variable is the effect, result or outcome variable-depending on the cause. DV's are the phenomena to be explained or measured.

3. A spurious variable is one form of Intervening variable. Intervening Variable (Z) is a variable that comes between the IVs and DVs and indicates a linkage between the two. It occurs in more complex causal relationships.

Independent Variable (IV 1): Household Income

Households with arable land are theorized to produce enough food to sustain the household members over the months of the calendar year. It is assumed that when the household does not have food from the farm, they are expected to purchase food using cash savings or exchange with other assets that are at the disposal of the household. The ability of a household to cope with daily food demands is therefore theorized to heavily dependent on income. However, household income in itself is a derivative of multiple factors namely: employment status of the household members who earn some income to acquire food; land size owned by the household for productive income ventures; livestock owned can be sold in case of lack of physical cash for food; access to credit facilities

during lack of ready income to purchase food; remittances from abroad and from within the country to support household members back at home; access to humanitarian and government food voucher in the absence of food; other productive assets that the household possesses to support food needs whenever it lacks. Household labor ratio is also one of those factors to consider because a household with more dependent members is likely to face more food security constraints as compared to households with less dependent members (elderly, sickly, children).

Income is, therefore, an important variable to analyze in this study. Based on the understanding of the study area and the challenges facing the households, the socio-economic status and particularly income will be of interest to investigate. Households with a reliable income base are hypothesized to have stable food security disposition throughout the year, unlike households with weak income base.

Household Structure

The household structure encompasses multiple variables, all with the potential to influence household food security. It is theorized that the larger the household size, the more challenging it becomes for the household to meet the required daily food needs, unlike smaller households. Gender, on the other hand, is believed to influence food security to a significant extent. Female-headed households are known to face devastating food conditions than male-headed households, given the unique limitations and challenges they face in the African farming society. It is also hypothesized that households headed by elderly or young youthful persons experience more hunger than able mature adults. On another hand, the health status of the household head is also a

strong determinant of food security i.e., the healthier the household head, the more capable is the household head in acquiring food for the household members. The number of dependents in the household is also a factor for consideration in the analysis of food security. The more the number of dependents, the more likely it is the household to fall into food security given the imbalances in the ratio of active members contributing to food. The education level of the household head is another important determinant for food security. It is theorized that the more learned a household head, the more capable the household head in acquiring food for the family. It is believed that educated members have more opportunities available as well as the ability to convert assets into cash. They are also viewed to be food planners for food supply and managing the situations based on the knowledge of the household head.

Income and capital resources (assets) of the household are intertwined with household structure, whose collective interaction yields the status of household food security. At the micro-household level, these variables are highly varied across study entities, and any variations in food security among the households could boldly be attributed to these factors. Whereas the general cross-cutting intervening variables (climate, environmental, and political) could affect the households in general, the ability to cope and adapt with the challenges is also highly dependent on income and household structure.

DV: Food Security (dimensions of food security)

Food Availability – sufficient food for all people at all times

Food Accessibility – physical and economic access to food

Food Utilization – proper use of food, storage, processing, adequate sanitation

Food Stability – in terms of the production system

Intervening Variables (discussed below)**:** Climatic variability, Environmental variability and Political Factors

Climatic Variability Variable: The republic of Somalia has chronically witnessed extreme weather shocks, which often leads to devastating food conditions of the most vulnerable households. Prolonged drought, for example, leads to loss of pasture for grazing livestock. Seasonal water points also dry out and therefore exposing the livestock to suffer severe heat exhaustion, loss of bodily water, weight loss and eventual deaths of herds of livestock, as well as human lives. This loss of wealth among the predominantly pastoral communities of Somalia leads to hunger and eventual displacement of the people to IDP camps in Mogadishu and other urban centers where they can find food relief from the humanitarian organizations. The high influx of refugees to urban centers has partly been contributed by drought. Extreme droughts also lead to drying of crops of the farming communities. This leads to loss of expected crop harvests, especially of households without irrigation technology solutions. Besides, excessive rains also destruct livelihoods of the most vulnerable communities, especially of agricultural households, which lead to crop loss. The resultant effect is hunger and category of 5 of food clarification scale among the affected communities.

Environmental Variability Variable: Environmental factors such as pests and diseases are reportedly becoming a global challenge, especially in the tropics, Somalia inclusive. The increasing global temperature - attributed to climate change – accelerates the prevalence of pests and diseases that affect both crops and livestock (the two food security

and livelihood sectors in Somalia). On the one hand, the Somali nomadic pastoralists lose part of their herds to livestock morbidity caused by diseases. On the other hand, the agro-pastoral communities in South Central Somalia also suffer similar consequences of crop pests and diseases. The household food dynamics highly gets affected in the face of such environmental calamities, hence robbing them of their breadwinners with the resultant consequences of hunger and desperation.

Political Instability Variable: The security situation for two-plus decades has greatly affected food stability among many households in Somalia. The chronic protracted wars among factions in South Central Somalia have robbed households of livelihoods and productivity. The inter-clan clashes too are very evident in Somalia. These compounded together have paralyzed some communities' abilities to cope with food requirements. Likewise, Al-Shabab presence especially has proved challenging to resolve for over the years. Communities are forced to vacate from their original settlements where their livelihoods are. This displacement leads to crowding in the IDP camps and exposing the people to hunger and malnutrition. Additionally, fear of security also leads to loss of confidence and eroding of concentration to invest in and the utilization of livelihood assets to meet food needs. The lack of a stable government in Somalia has also significantly contributed to food security in the area.

All these factors together accrue to perpetual hunger and miserable Somali community that would require government support for social services such as extension education, agricultural technologies, road access, health services, education and other social amenities needed for a productive and patriotic society for social and economic development. The scope of this study is mainly aimed at understanding the relationship

between these above-discussed factors and the current food security among households in the study areas.

Food security theoretical and conceptual models argue that food security stem from not only constrained financial resources and household structure but the combination of all other factors. The four dimensions of household food security have to be borne in mind by a researcher when analyzing the food security situation of households. Here is how all the four dimensions are interlinked: Suppose households have money they can access food (accessibility dimension). However, if there is no food to buy in the market, then the households remain trapped in hunger (availability dimension). These situations will lead households to the risk of food security. If food is available and accessible, then the question becomes whether households are eating quality and nutritious foods (utilization dimension). Another argument is that the presence of food access, availability, and utilization does not necessarily mean households are food secure. For instance, if these three dimensions are affected negatively by climatic variability, environmental variability or political factors, households will experience fluctuations in these three mentioned dimensions as far as food is concerned (stability dimension), and therefore food security among the households.

2.8 Conceptual Framework

While theoretical framework introduces the theory that explains why the research problem exists, the conceptual framework is the researcher's proposal on how the research problem will have to be investigated. The conceptual framework identified the variables that were explored in the study. Since a wide variety of factors influences the relationship between Socioeconomic- Independent Variables (IV) and Dependent

Variable (IV) of food security, the well-constructed conceptual framework provides a common frame for clarifying and communicating variables influencing food security and clearly show the relationship between them.

This study tries to construct a conceptual framework based on literature review and author's theoretical construction about the food security issues of the study area; an approach that is hypothesized to be holistic and that can fit a scholarly perspective of the complex food environment of Somalia (**Figure 4**). Based on this framework, analysis procedures for the study objectives have been derived.

This conceptual model illustrates the interlinkage of household structure; Income; as well as the intervening factors such as climatic influences, social insecurity and political upheavals, all of which react to determine a household's food status. These are the key hypothesized factors contributing to food insecurity in Southern Somalia

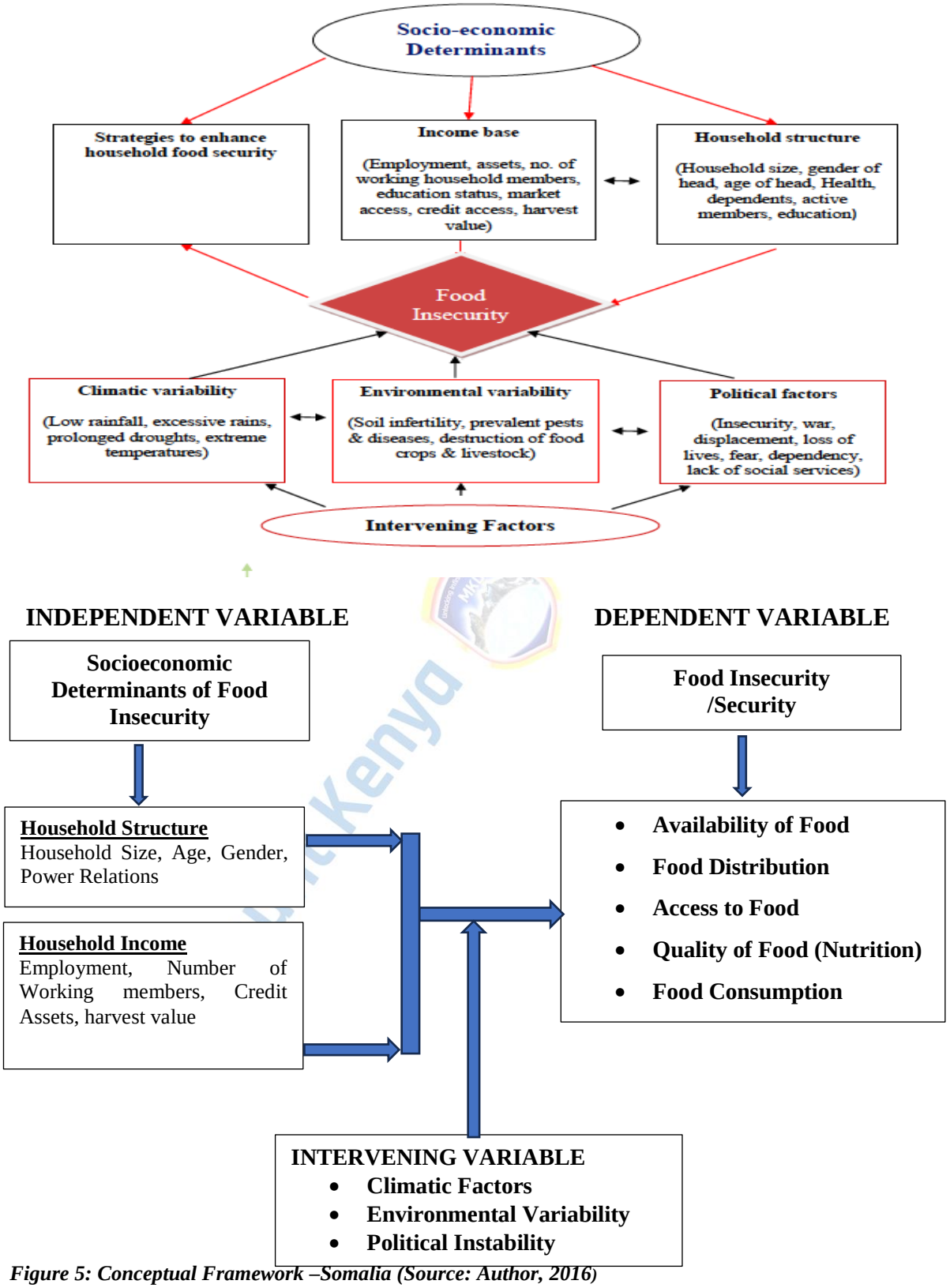


Figure 5: Conceptual Framework –Somalia (Source: Author, 2016)

This conceptual model (Figure 5) illustrates the inter-linkage of household structure, income base as well as the intervening factors such as climatic influences, social security and political upheavals, all of which react to determine a household's food status. These are the key hypothesized factors contributing to food security in Southern Somalia households. How is a household's food security situation determined? Four main categories four categories have been proposed:

Category 1: **Food Secure.** Households show no evidence of food security. Presence of all 4 dimensions of security

Category 2: **Food Insecure without hunger.** Household members' concern about adequacy of the household food supply, including reduced quality of food and increased coping patterns.

Category 3: **Food insecure with hunger** (moderate). Food intake for adults in the household has been reduced to an extent that implies that adults have repeatedly experienced the physical sensation of hunger.

Category 4: **Food insecure with hunger** (severe). Households have reduced the children's food intake to an extent indicating that the children have experienced hunger.

Broadly, there are two category of food security: Chronic and Transitory. While the former is long-term and persistent, the latter is short-term and temporary.

2.9 Summary of Literature Review

This chapter has reviewed relevant literature on socio-economic factors effecting household food security at global, regional and local levels. It focused on and in explored family structure and income dynamics influencing the household's food security in Somalia. Further, the current situation of household food security in the Somalia was examined. In addition, definitions of food security, measurement and imperial studies were reviewed.

The literature reviewed show that there about 925 million people of the world's population remained hungry 2010. The underlying causes of household food security are diverse and complex. Discussion and Interest of the food security and its anti-thesis- food security- was focused on the problem of global and national food production, stock and supply in 1970s. A decade Later, it become clear that increased global or national food availability was not the simple answer to the perceived food security at the individual and household levels. (German Agro Action, 2004). It was not until 1980s that household food security generated discussion and interests among nations and academia. The household food security discussion, interest and approach emphasized on food availability and access. It concerned understanding food systems, production systems and stability and households' access to the food. (German Agro Action, 2004).

Taken as a whole, the literature suggests that food security has two main dimensions: the physical availability of food and the capacity of people to produce or purchase the food they need. It is a complex phenomenon, attributable to a range of factors that vary in importance across time, space and culture. The ineffective solutions to the problem of food security in the 1970s and 1980s has been evident that food security is more than

issue of social concerns but rather an environmental, economic and political issues. According to Vogel and Smith, the approach to address food security, therefore, need an integrated approach which challenges many regions' ability to address food security adequately (Vogel and Smith, 2002; Clover, 2003).

In light of the empirical studies reviewed, there are over 200 definitions and 450 indicators of food security which led to a lack of consensus on the definition of food security and its anti-thesis (food security) among academics, nations as well as international organizations (Devereux and Maxwell, 2001). For Devereux and Maxwell, adequacy of food in society can be assessed through the availability and abilities to access food (Devereux and Maxwell, 2001). For the World Food Summit (WFS) of 1996, it can be assessed by examining if "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" (FAO, 1996a). For USAID, households are food secure when they have year-round access to the amount and variety of safe foods their members need to lead active and healthy lives (USAID, 1992). For FAO, a household is food secure when it has the ability to produce, its own production or through purchases, adequate food for meeting the dietary needs of all members of the household (FAO, 2010a).

Likewise, measurement in research is a complex matter and yet very important field of study. That is why approach of the measurement of food security highly varied among researchers. Some propose demand-supply approach; others propose ordinary least square regression approach, some opt for other regression methods; while others, multidimensional index study to arrive at the required answers. Besides, many scholars have also used various measurement techniques in determining whether a household food

secure or not. Different scales of analysis employed by the literature imply different insists that the food systems in an economy is very critical. For example, making an analysis using the household, may show a greater economic concern on the availability rather than assessing the situation at either national or regional level. In other words, measuring the adequacy of food need to consider environmental aspects "co-evolve" (Norgaard, 1984) and need to comprise al other perspectives. This is so unique to food systems which are the indications of economic and ecological systems (SES). The effects of this measure determine both the amount of food available (the subject under scrutiny) and the measuring techniques employed (how it is analyzed), because they make the food system to be seen as a complex adaptive system that call for a systematic approach.

Many researchers have studied that factors contribute to household food security especially at the household level. While some studies attributed farm size, family size, dependency ratio, the education level, disability of the head of the household and age of household head as factors that contribute to house food in security, other studies highlighted inadequate access to land, high off-farm and non-farm incomes, costs of labor and inadequate asset and income (Adeoti and Egwudike, 2003). For example, in a study carried out by Hussein and Janekarnkij to identify determinants of rural household food security in the Jig-jiga district of Ethiopia, found that access to fertilizer, extension, veterinary and credit would increase household food security by 84%, 46%, 36% and 141% respectively (Hussein and Janekarnkij, 2013).

Devereux et al. (2004) argued that analytically, carrying out a food adequacy analysis using household criteria calls for a disintegrated method, as well as an analysis of diversity in both agriculture and non-agriculture areas. This approach clearly spells out

the relationship between food security and a number of multi-dimensional and people-centered analysis of poverty. This implies that analysts need to look beyond the perceived shortage or plenty. This also explains why many researchers feel that measuring livelihoods based on analytical framework is a promising food security measure. However, it appears several studies agreed that there are three main concepts of food security: availability, access and utilization (Barrett, 2010). They also agreed that are sufficient food produced globally to provide everyone (FAO, 2011).

The examination of the literature reviewed indicated that the prolonged food security and vulnerability of Somali households were results of limited employment opportunities, inflation, volatile markets for cereals and a ban on livestock exports, combined with successive years of crop failure, flooding, conflict and demographic changes that have reacted a protracted emergency. Others argued ,in Somalia, access to food is dependent on factors such as disposable income, employment status and level of education of the household in nutrition status (Adeyeye, 1997; Ayandiji et al., 2012).

Finally, the reviewed literature shows notable lack of empirical evidence pertaining the underlying causes of household food security in Somalia making it an under-researched topic and consequently little of it has been covered in the academia. Further, much of the available literature on the subject is media and aid organizations report, which mainly lack empirical evidence. Such reports hardly benefit from local household's perspectives who clearly have own views on causes of food security as well as how to address them. The few studies that have researched the subject drew a general problem tree. Such a problem tree had no specific coverage of the Juba Valley Basin-study site. For this

general tree problem does not tell why 70 of Somalia households remain hungry in the land of plenty. This study intended to fill such gaps.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Food security measurement is a complex area of study, and no single method has proved adequate in isolation. Moreover, for this reason, many researchers adopt different methodological and research designs. The choice of research method depends on question or questions research must answer. In research, one must answer these questions: what researchers are researching, what they want to know, why they want to know, what are going to do with it, and how. Besides, it is the subjective nature of social science research, which helps explain why different researchers see through different lenses. As Mark Blyth explains, the highest quality of work in social science is conducted by combining the work of scholars who operate from different ontological and epistemological positions (Blyth, 2002). To holistically understand the socio-economic factors influencing household food security in the study area and analyze them, this study employed a mixed-method, mixed research design and was written from mixed ontological and epistemological positions.

3.2 Research Methodology

First, the research data that informed this study was drawn from both scholarly and practitioner literature as well as field data collection. Mixed Methods Approach also knows pragmatic parading was employed (Creswell et al., 2003). A mixed-method approach involving collecting, both qualitative and quantitative data. The core assumption for the utilization of the mixed approach was the combination of qualitative and quantitative investigation which have provided a holistic picture of understanding the

socio-economic factors influencing household food security in the study area than either approach alone. Analyzing the socio-economic status of the households in the study was inductively chosen, where households were the primary unit of analysis in this study. Qualitative researchers use inductive logic, where the researcher first designs a study and then develops a hypothesis or theory to explain the results of the analysis. The goal is to develop a hypothesis, not to test one. Qualitative studies have an advantage in that they provide broad, general theories that can be examined in future research. Whereas Quantitative researchers test theories by examining the relationship among variables. Variables can be measured so that numbered data can be analyzed using statistical procedures here data is analyzed deductively building from general to particular themes as March and Furlong suggest that the study of social science should seek to integrate fundamental concepts and theoretical insights from different intellectuals and approaches in an overarching, multi-dimensional approach.

Secondly, researchers would be lost without ontological and epistemological approaches. Ontology and epistemology are closely related concepts in terms of meaning and function. Former is the theory of existence, whereas later refers to the theory of knowledge (the notion that how we know what we think we know). Furthermore, the importance of ontological and epistemological issues when undertaking research and interpreting the academic work of others arises from the notion that the study of social science has become more "diverse" in nature. As Mark Blyth insists, the highest quality work in social science is done by comparing the work of scholars who operate with different ontological and epistemology positions. Understating methods involve, and the scientific claim made by behaviorism and interpretive theory will illustrate this point

further. On the one hand, positivist ontology, who is foundationalist, hold the view that "there is a real-world out there independent of our knowledge of it" and the role of social science scholars is to discover that reality by utilizing the modern scientific methods.

The positivist paradigm insists that social science scholars can establish the real world through empirical observation. On the other hand, the hermeneutic schools of thought, who are anti-foundationalists, reject the notion of objectivity, a real world, and a single truth entirely. They argue that "there is not a "real" world, which exists independently of the meaning which actors attach to their action, to discover." There is only a double interpretation. For them, the world is socially constructed where objectivity is impossible. The interpretive methodology focuses on understandings, meanings, norms, and discourses of human activities as well as their interactions. Finally, the study of social science concerns not only the empirical observation and analysis of "what is" but also deals with normative questions of what "should be." As March and Stoker indicate, by giving space to all-inclusive approaches, each benefit from the interaction with other approaches. This is so because each approach has something to offer.[i]

3.3 Research Design

Research design is the first dimension of social science research. It provides the overall road map for the collecting, observing and analyzing the field data- a process for deciding what to observe, of whom, for what purpose, why and how. REF Earl Babbie and Lucia Benaquisto. There are essential tasks in any research design. First, the researcher must be clear about what is that he/she wants to find out, secondly, articulate to conduct it, and thirdly, determine the best way to do it. Thus, the purpose of this research design was to find out and understand the causes and reasons of why 70% of Somali households are

hungry. The results aimed to provide strategies that can be applied by Somali Government and its International Development Partners to develop strategies and interventions for enhancing food security for the targeted household beneficiaries who have demonstrated not only similar income base and livelihoods but also face similar constraints to accessing food.

Therefore, this study employed a mixed-method research design for different purposes and application: descriptive, exploratory, and explanatory. For instance, the descriptive investigation was applied in the examinations of the state of household food security as well as other socio-economic characteristics of the households. The purpose of this design was to observe the food security situation of the beneficiates to describe that situation and offer potential solutions to the problem. Descriptive examination method presented a specific details picture of not only how household food security situation, but also who was affected more. In addition to the descriptive study, exploratory research was conducted to deeply understand and determine the factors contributing to household food security. The study was also exploratory for there was limited scholarly literature on Somalia's food security data.

Moreover, the explanatory research design was adopted to determine relationships between variables. The explanatory research design was structured in a way that would enable the researcher to examine associations of variables that determine socio-economic factors influencing household food security. The explanatory research design allowed to go one step further to answer the 'why" things were the way they were. Explanatory study built on exploratory and descriptive designs because it looks for causes and reasons of why 70% of household in the study area are hungry.

3.4 Location of the Study

The study was conducted in the Juba Valley Basin (JVB) in Southern Somalia. Jubaland is Administrative Regions of Jubaland State of Somalia and lies on nation's southern tip. Jubaland Region consists of three provinces (Lower Juba, Middle Juba, and Gedo) with population estimate 1.3 million according to UNFPA, (Population Estimation Survey, 2014) Gedo Region has a total population of 508,405 and Middle Region has 362,91 while Lower Juba region is home to 489,307 people. All regions have significant numbers of rural and nomad populations. The results reveal that Middle Juba region with a rural and nomad population of 77% of the total population followed by Gedo with rural and nomad population standing at 63% of the region's total population and lastly Lower Juba region, at 58%. All regions are also home to IDP populations. Comparatively, Gedo region has the highest number of IDPs, 15% of its total population; followed by Middle Juba whose percentage is 7% and lastly Lower Juba region whose IDP population comprises 6% of its total population. Its name "Juba" is derived from the Juba River, which runs through all the three administrative provinces.

3.5 Target Population

The population in the region is classified under five main categories: pastoralists, agro-pastoralists, agriculturalists, fishing, and urban sedentary. This was estimated at 3500 households in the region. Agriculture is an important livelihood activity in Somalia not only in terms of meeting the food needs production) but also in terms of generating income through crop sales and agricultural labor opportunities. Agriculture is a significant component, particularly for two of the leading rural livelihood systems: Agro-pastoralists and Agriculturalists. Agro-pastoralists who derive their food and income source from a

mixture of agriculture and livestock production are found throughout Gedo, Lower and Middle Juba Regions. Agriculturalists live in along the Juba river valley and Dawa River where they engage in agriculture-based activities as an economic livelihood.

The Jubaland Region has plenty of natural resources. It contains the most favorable land for practicing agriculture, enormous numbers of livestock, large grazing fields, vast virgin ocean resources, some unexplored minerals, and two main rivers - the Juba and Dawa which are crucial for the communities along their course that rely on irrigation-fed agriculture and livestock watering. It is also suspected that the area is rich in oil and gas that has not been explored. Moreover, Jubaland Region was where all major and essential production factories and major water reservoirs for power generation, dams for irrigation and other activities In the pre-civil war era, the government of Somalia had invested in the following industries in the Jubalan Region: Mareray sugar factory in Jilib; two main water dams for power generation, irrigation and water conservation capable of supplying the whole Somalia that: Bardhere Dam Project and Fanole Dam Project in Bardhere and Jilib respectively. Maganbow Rice Project in Kismayo; Kismayu Cattle Meat Processing factory in Kismayo; Kismayo Fishing Refrigeration and Processing Facility in Kismayo; Jamame Banana Packaging Factory in Jamame District.

Despite these attributes, the Juba Valley Basin lacks food and the people in the area are starving. These facts largely influenced the researcher's purposive selection of this area for study. It was also chosen for the reason that it has been the breadbasket of Somalia in both rain-fed and irrigated agricultural lands as well as the hub of Somali's cattle production. Further, JVB was chosen since some of the most food-insecure households in Somalia are the residents of this location.

This study was purposively limited to the residents of Juba Valley Basin which is approximated at 15 million (Elmi, 2013). The study targeted the households lying along the belt of 2km radius from the river boundaries. This group constituted the target population, whose main economic activity is farming and are possibly deriving some livelihoods from the Juba river resources. A representative sample of 368 households was selected from the study population for the primary data collection on the households. The data collection exercise took place during the first lean season of the year 2015 when food is historically scarce in the area, generally, i.e., February - April. Data entry, cleaning, analysis, and reporting took place on April 2015.

3.6 Sample Techniques and Sample Size

3.6.1 Sampling Procedure

Complex multistage sampling procedure was used for selecting study units in the study area. An illustration of this procedure and its justification is shown in Table 2 below. The total number of households in this study was 368. Besides household surveys, triangulation with qualitative approaches was applied in order to complement the quantitative data collected from the households. The qualitative approaches included: Key Informant Interviews (KII), Focus Group Discussions (FGD), Direct Field Observation and Desk reviews.

Table 2: Sampling Procedure and Sample Size

	Admin Unit	Region	Province	District	Village	Household
Sampling Techniques	Purposive sampling	Simple Random Sampling	Purposive Sampling	Purposive Sampling		Systematic Random
Justification	Juba region because of its agricultural potential (bread basket)	Equal chance to all provinces because of similar livelihood characteristics	Only Districts that lie along the Juba River belt were selected due to irrigation potential, and access to water	Villages that are within a radius of 2km from the river bank are expected to be food secure, but why they are not is subject to investigation		Households falling within these selected villages were selected using systematic random selection to minimize serial correlation between too close households
Target population	15M Juba Residents	Gedo, Middle & Lower Juba Provinces	Jilib, Sakoow and Bu`ale	20 villages fitting the demography		3500 households
Sample	Juba	Middle Juba	Sakoow	Gurmeysto		360 households

3.5.2 Sample Size

The sample size was determined using a sampling formula by Pagoso et al, 1992. The formula puts sample size, n as;

n=

$$\frac{N}{1+Ne^2}$$

…… (1)

(Source: Pagoso et al, 1992)

Where: n = required sample size

N = household population size (3500 households)

e = margin of error (5%)

n = 3500/(1+3500*0.052)

n=359

3.7 Data Collection Methods and Procedure

This study combines both quantitative and qualitative approach, as well as secondary and primary data collection methods. Chapter 3 presents a detailed discussion on the study area, research design, sample frame and sample size, data collection methods and the construction of research instruments.

Data collection procedure is a systematic approach to gathering information. According to Dawson (2009), an approach may be qualitative and quantitative or combination of both. On the one hand, qualitative research explores attitudes, believes, behaviors, and experience of the subjects through focus group discussion, key informants' interview, and direct observation. Quantitative research is primarily inductive process used to formulate a theory. It is more subjective and describes a problem or condition from those experiencing it (Dawson, 2009). Quantitative research, on the other hand, generate statistics through surveys. Its primarily deductive process used to test concepts, constructs, and hypotheses that make up a theory. It is more objective and provides observed effects (interpreted by researchers) of a problem or condition (Dawson, 2009).

At its core, this study does not restrict itself to a single methodological approach, arguing that there is no single approach that is adequate in understanding the underlying causes of household food security in Somalia. To holistically grasp socio-economic factors influencing household food security, the study employed qualitative and quantitative approaches through the following five methods to gather data: i) Secondary Data Review; ii) Household Interviews; iii) Key Informant Interview; iv) Focus Group Discussion; v) and Field Direct Observation. More precisely, this study combines the primary and secondary data investigations in identifying the determinants of household food security. In its definite terms, primary data refers to the data that has never been gathered before, and it is collected directly through the first-hand experience whereas secondary data involves the collection of information from studies that other researchers have made of a subject (Dawson, 2009)

3.7.1 Review of Secondary Data

The first stage of this report was to review the secondary data which were critical in shaping the study in a number of important ways: first, it provided the background information and formed a clearer and up-to-date background data on household food security situation in the target regions, and secondly, this led to determining of the data gap. This study reviewed the existing literature on the determinants of household food security in Somalia and elsewhere to see what has been written on the topic. While some of the literature review writing of this report, others were sourced from the university library, including links to electronic books and journals. The study reviewed literature from the government of Somalia and development organizations. A checklist was used in this exercise. Secondary data refers to data that was collected, collated, and analyzed by

another source i.e., other researchers, agencies, institution, or bodies (Dawson, 2009). In other words, secondary data involves the collection of information from studies that other researchers have made of a subject.

3.7.2 Household Surveys

A survey as a method of data collection technique is used for collecting information or data as reported by individuals or households (Dawson, 2009). It can be a quantitative or qualitative approach. In this study, data on households' food availability and accessibility were obtained through household interviews using semi-structured questionnaires. Households' main staple food and other food varieties consumed were explored. Further, household assets such as income from on-farm and off-farm employment, land, livestock assets, remittances, and other livelihood sources were investigated. Moreover, common shocks that affect agricultural production of the households were assessed and how these have influenced food production in the household analyzed. Characterization of these shocks was done in terms of whether they are climate-induced, socially, or politically engineered. Households coping, adaptation, and mitigation strategies were somewhat explored, though not very exhaustive in this study. To understand what the households perceive to be viable solutions to food security, respondents were asked to provide a list of such options. A close-ended survey questionnaire was used in the exercise.

3.7.3 Focus Group Discussions

As defined by Kumar, focus group discussions (FGDs) are rapid assessment, semi-structured data gathering methods in which a purposively selected set of participants gather to discuss issues and concerns based on a list of crucial themes drawn up by

researchers (Kumar, 1987). FGDs differ from individual interviews and surveys for they provide detailed opinion on the topic. In this study, 2 FGDs (One from female respondents and one from male respondents) each comprising of 8 people in a session were conducted. FGDs, as a qualitative data collection technique were useful in generating cross-cutting perspectives on the food security issue. FGDs respondents were carefully selected to ensure that all categories of the respondents are captured in terms of gender and age groups. An FGD question guide was used in the exercise.

3.7.4 Key Informant Interviews (KII)

A key informant (KI) refers to a person with unique skills or professional background on the issue being researched, assessed, or evaluated (Dawson, 2009). Then key informants who are familiar with the conditions and experiences of household food security (access) in the areas were contacted and interviewed. Persons selected were with a comprehensive understanding of the food security pattern, food situation, livelihood assets and options, and challenges in the selected study area. KI included National Government Agriculture Contact Persons, local authority, community leaders, agricultural and food security experts - civil society actors/NGOs. The KIs respondents brought out a wide range of information and varying perspectives in relation to underlying issues of food security. A KI question guide was used in the exercise.

3.7.5 Field Direct Observations

Observation is arguably the oldest scientific method of research. It is a useful method as it complements all other methods. It was therefore used for “triangulation” and cross-checking the information gathered by other methods employed in this study. An observation checklist was used in the exercise.

3.8 Research Instrument and Pre-Testing Instruments

Research instruments are critical tools to research studies. In this study, the household survey questionnaire was the main research instrument for data collection, which was designed in line with the objectives of the study. This was complemented with other interview guides for qualitative data. Data from the household interview questionnaires were entered using Census and Survey Processing (CS-Pro) software application. Two data entry clerks were recruited for the double data entry procedure for quality control purposes. The same but parallel entered data files were reconciled where there were mismatches, and any erroneous entries were erased. The cleaned dataset was exported and analyzed in STATA 13 statistical software. The qualitative data from KIIs, FGDs, and other secondary sources were typed in MS Word document and then analyzed. Before the primary data was collected, a pre-test was conducted to ensure that both instruments and survey questions for data collection were appropriate for the study.

3.9 Instruments Validity and Reliability

3.9.1 Validity

Reliability and validity are fundamental concepts in research design in that they provide, consistent results, and actually measure what you think you are measuring. According to Norland (1990), validity represents the extent to which the questionnaire is measuring what it intends to measure. It is considered to be the most critical attribute of a measuring instrument since an instrument should measure what it is supposed to measure. For example, a kilogram is an invalid measurement for height (Cooper and Schindler, 2006; Zikmund, 2000). Malhotra (1999) also defines validity as the extent to which differences in observed scale scores reflect an actual difference among the subjects on the

characteristics being measured, rather than systematic or random errors. Further, Pennington (2003) indicates that validity is the extent to which a measure what it claims to measure and that a test needs to be valid in order for the results to be accurately applied and interpreted.

Additionally, validity is not determined by a single statistic but by a body of research that demonstrates the relationship between the test and the behavior it is intended to measure. According to Diamantopoulos and Schlegelmilch (2000), there are many methods in which validity can be assessed. The main methods are content validity, criterion validity, nomological validity, construct validity, convergent validity, discriminant validity, and concurrent validity. Of all the different types of validity, construct validity is considered the most sophisticated and rigorous type of validity to establish and most recommended for social research (Pennington, 2003).

In quantitative research, validity is the basis for positivism. It sought to assess evidence, objectivity, fact, and actuality, among other things. Validity determines whether the research in question measures accurately that which it was intended to measure; whether the research instrument allows the research to collect the correct data. In qualitative research, validity may not find a full application. However, scholars such as Stenbacka (2001) argue that validity should be redefined in qualitative research to capture the subjective nature of interpretative studies. According to Ratcliff (1995), validity in qualitative research can be enhanced by divergence from initial expectations, extensive quotations, and convergence with other sources of data.

In this study, sufficient proof of content and criterion-related validity was established using various approaches. These included checking the comprehensiveness of the measuring tool in line with the literature review, its ability to address the study goals and objectives, and its appropriateness to the respondents. To ensure face and content validity, physical verification of the format and design of the questionnaire was undertaken.

3.9.2 Reliability

Reliability refers to the degree to which measures are free from error, and in this case, provide consistent results (Zikmund (2000). Similarly, Malhotra (1999) states that reliability is the ability of a measuring instrument to determine the proportion of systematic variation in the scores yielded by the instrument. Further, a reliable questionnaire is one that would give the same results if used repeatedly with the same group (Collis and Hussey, 2003). Hence, reliability measures to what extent responses provided on a test, re-test basis are identical. It indicates the accuracy or precision of the measuring instrument (Norland, 1990). Only a test of reliability will indicate whether results conducted using the questionnaire can be trusted. Moreover, reliability is measured by determining the association between variables from different tests of the instrument. If the association is high, the instrument yields consistent results and is therefore reliable. According to Cant Gerber-Nel, et al. (2003), test re-test, split-half, equivalent-form, and the alpha coefficient are commonly used methods to assess reliability. Likewise, Mugenda and Mugenda (1999) argued that the reliability of the instrument might be improved through conducting pre-tests on a small sample of persons similar in characteristics to the target group. In a nutshell, reliability in quantitative research sought to establish the extent to which results are consistent over time and

whether they are representative of the total population under study. In a qualitative study, reliability is a test of quality. This can be enhanced by multiple transcriptions of the audiotape or multiple listening of audiotape by the same researcher or many researchers.

In this study, the Cronbach (1951) coefficient alpha was used to calculate the internal consistency (reliability) of the measuring instrument. To measure the reliability of this study's instrument, the first step in data analysis using STATA assessed the internal reliability of the measuring instrument employing Cronbach alpha coefficients. The pre-test data analysis gave a score of 0.87, indicating that the underlying scores being measured showed a strong association of the variables from the three pre-test sample datasets. The results of this analysis, therefore, led to the conclusion that the instrument was reliable.

3.10 Data Processing and Analysis

Data analysis refers to a process of inspecting, cleansing, transforming, and modeling data to highlight useful information, suggesting conclusions, and recommendations for action. Moreover, the analysis of food security at the household level involves many variables and the identification of food security status, and it is socio-economic requires a stepwise approach and logical analysis of the variables. In this study, multiple analysis procedures were used to arrive at the answers to the study objectives.

3.10.1 Quantitative Data Analysis

Soon after the quantitative data gathered from the field, all questionnaires were checked to ensure uniformity and consistency and completeness. The data collected through structured questionnaires were coded and then analyzed using the statistical package in

Social Sciences (SPSS V20). The data was presented in frequency tables and figures according to the theme under the objectives of the study.

3.10..2 Qualitative Data Analysis

Open-ended qualitative data from FGDs and KIIs were analyzed using content analysis with NVIVO. Data were analyzed qualitatively, and descriptive analysis technique was employed to enable the researcher to highlight consistencies and inconsistencies that will emerge from the focus group discussions and key informants' interviews. This analysis is consistent with qualitative research. With the volumes of data from focus group discussions and key informants' interviews, data needs to be organized in a way easy to retrieve for use.

3.10.3 Descriptive Analysis

Descriptive analysis was conducted on the household demographic characteristics and other socio-economic variables for scrutinizing the patterns in the data. The purpose of the descriptive analysis was to know the most basic behavior. For example, categorical variables such as gender of household head were analyzed for the proportion of headed male households versus female-headed households using frequency tables with percentages and confidence limits. Line graphs were also used to represent the data on categorical variables visually. Descriptive summaries of mean, standard deviation, minimum and maximum observation in the data were used to present continuous variables such as the age of respondent, land size owned by the households, income earned from crop sales or livestock among others. The descriptive findings also facilitated the choice and selection of the variables to include in the regression model in the later stages of the analysis process.

3.10.4 Logistic Regression Analysis

In this study, the three outcome variables of the HFIA were operationalized to be dichotomous where two categories of the food security were measured as either secure or not secure. Thus, following this approach, the study employed logistic regression and made use of a computer statistical tool known as STATA. This was suitable for operationalization the variables so that the study reached at level of exploring the socio-economic determinants as perceive in the study. The fact of interest of the study to associate each individual variable in the study with the dependent variable also enhanced the operationalization of the HFIA-related Domains i.e., Insufficient food intake, Insufficient Quality, Anxiety and Uncertainty, and its physical consequences. This model was assessed and seen as the most appropriate for evaluating the socio-economic status and the issue of food security in the area. Logistic regression is a model that employs logarithms to give an outrightly seen outcome in the model. This kind of the mathematical approach gives room for associating non-linear variables in a linear way as an easier interpretation of the problem under study. It can also be described as the best way of manipulating logarithm to give linear relationship between variables. A number of studies have employed logistic regression to explore on the binary dependent variable and a set of explanatory variables (Greenlund et al., 2004; Kim and Beckles, 2004).

Mathematics experts recommend the use of logistic regression to model response variables that have a binomial distribution. p = y/n

…… (1) where y is number of successes out of *n* independent 'trials. In this study, the probability of food security that occurs as a function of socio-economic variables. Thus, the aim was to analyse the relationship:

Data = pattern + residual …… (2) but, instead of analysing *p*, as for a continuous variable, we analysed logit (*p*) =$\log_e(p/1\text{-}p)$ ……... (3) logit (*p*) is the link function.

The logit link function was useful in the modeling as it predicted the probability that lay between 0 and 1. The logits of the unknown binomial probabilities were modelled as a linear function of the predictor variables.

$$\text{logit}(p)=\ln\left(\frac{p}{1-p}\right)=\beta_0+\beta_1x_1+\beta_2x_2+...+\beta_kx_k$$

……(4)

Logit (*p*) = $\log_e(p/1\text{-}p) = \beta o + \beta_1X_1 + \ldots\ldots\ldots + \beta_nX_n$ .... (5)

Where

p = probability that the event occurs i.e. success

1-*p* = probability that event does not occur i.e. failure

p/1-*p* = odds of success e.g chance of household being food insecure (success) to household not being food insecure (failure).

The odds of success can be estimated from the data as:

y/(n-y)

…….. (6)

The logit 'transformation' of *p* is the natural log of this odds:

$\log_e(p/1-p)$

……..… (7)

the difference between the probability modeling and the logit modeling is that while the former always ranges from 0 to 1, the odds in the logit function always ranges from 0 to infinity.

Comparing two sets of binary operationalize data makes the relative measure of the odds of the perceived success becomes relative to its odds ratio (ψ)

If p_1 and p_2 are success probabilities in two sets of data, then the ratio of the odds of a success in one set relative to the other is:

$$\psi = \frac{p_1/1-p_1}{p_2/1-p_2}$$ …….

(8)

When the odds of success in the two sets are identical, ψ is equal to one.

Values of $\psi < 1$ suggest the odds of a success are less in the first set of data than in the second,

Values of $\psi > 1$ suggest the odds of success are greater in the first set of data.

The odds ratio is a measure of the difference between two success probabilities which can take any positive value unlike the difference between two success probabilities ($p1$ - $p2$), which is restricted to the range (-1, 1).

The estimated probability for the logistic model is:

$$p = \frac{\exp(\beta_0 + \beta_1 x_1 + \ldots)}{1 + \exp(\beta_0 + \beta_1 x_1 + \ldots)}$$

…… (9)

To fit the model to the data the unknown parameters β_o, β_1, β_n have to be estimated by the use of the Maximum likelihood method.

The likelihood function is given by:

$$L(\beta) = \prod_{i=1}^{n} \binom{n_i}{y_i} p_i^{y_i} (1 - p_i)^{n_i - y_i}$$

…… (10)

3.10.5 Model Specification

This study employed the logistic regression model and relied on the computer statistical tool called STATA. All continuous predictor variables were operationalized into categorical variables in the analysis for purposes of interpretation of the estimation of the conditional probabilities i.e. odds ratios. The model used is, therefore, specified as below:

$$\log\left(\frac{\hat{\pi}}{(1-\hat{\pi})}\right) = \beta_0 + \beta_1 x_1 + \ldots + \beta_p x_p$$
$$Y \sim \text{Binomial}(\hat{\pi})$$

…… (11)

Where:

$\hat{\pi}$

= Predicted probability that Y = 1, given the values of X_1 …. X_p.

Y_1 = Anxiety and Uncertainty (0 = No 1= Yes)

Y_2 = Insufficient Quality (0=No, 1=Yes)

Y_3 = Insufficient Food Intake (0=No, 1=Yes)

X_1= Sex of HH head (0 = Male, 1 = Female)

X_2= Age group of HH head (0 = below 60 years, 1= over 60 years)

X_3= Marital Status of HH head (0 = Married, 1= Single)

X_4= Occupation of HH head (0 =Agro pastoralist/pastoralist, 1= Farmer)

X_5= Disability condition of HH head (0 = Healthy, 1= Disable person)

X_6= HH size (0 = less or equal to 6 members, 1= more than 6 members)

X_7= Dependents (0 = less or equal to 3 members, 1 = greater than 3 members)

X_8 = Actual and potential income (0 = above $3000 , 1 = below or equal to $3000)

X_9 = Active labor proportion (0 = greater or equal to 50%, 1 = below 50%)

X_{10} = Land owned (0 = greater or equal to 5 acres, 1= less than 5 acres)

X_{11}= Main food source (0 = from farm, 1= from market)

X_{12}= Incurred debt for food (0= no debt, 1= indebted)

X_{13}= River distance from household location (0= less or equal to 1km, 1= more than 1km)

X_{14}= Farm irrigation (0= irrigated, 1= unirrigated)

X_{15}= Seed type (0= used improved seed lastest season, 1= used local seed last season)

X_{16}= Seed shortage last planting season

3.11 Ethical Considerations

3.11.1 Ethical Considerations Concerning Participants

Before the data collection, permission, and a letter to conduct the study was granted by MKU. Also, before interviews, the respondents were explained about the study and for what purpose it is being carried out. Respondents were informed that they should only participate in the study voluntarily and with their consent. The researcher assured the

respondents that whatever was discussed would be treated with the utmost confidentiality. They were informed that they could refuse to answer any questions they do not want to answer and remain in the study. Participants were assured that there are no anticipated potential risks, including physical, psychological, emotional, financial, and social matters involved in this study.

3.11.2 Ethical Considerations Concerning Research Process and Researcher

In all stages of the research process, the researcher was guided by the following ethical principles in research:

1. Voluntary participation: respondents must agree to participate in the research of their own free will.

2. Consent: respondents would be asked for their written or verbal consent before they are being interviewed.

3. Confidentiality: Personal information that revealed to the researcher would be kept confidential. No information would be publicly reported that would identify them as a participant in the study. Their name would not appear in any report.

4. Respect for Respondents Rights, Dignity, and Diversity: The Researcher would respect the rights, dignity, and worth of all respondents.

5. Professional Competence and Honest: the researcher would not misrepresent or misuse his expertise as a researcher. He would not act in any capacity other than as a researcher while conducting research.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This section presents the empirical findings from the study, and discusses the issues identified in light of other relevant secondary information to validate the empirical results. The first section illustrates the general household demographic characteristics of the study area in view of the food security situations in the Juba river basin. The second section presents the HH food security situation in the study area, highlighting the degree of HH food security among the study population while at the same time discusses the different food security access domains. It also illustrates the distribution of the study HH according to Household Hunger Scale (HHS). Other pertinent discussions on what the communities see constraining food production in the area are also highlighted. The third section presents result from regression models in identifying the factors causing HH food security and discusses the most influencing variables while delineating those that are less important from the sets of the factors in the conceptual model (i.e., family structure, income). The fourth section meanwhile documents the possible remedies that can lead to the reversal of HH food security in the study area.

4.2 Household Demographic Characteristics

The study investigated the basic household characteristics of the study area. The findings show that about 55% of the households were headed by males while about 45% were headed by females. Majority (75%) of the household heads said they were married, 11% remained single whereas 7% widowed and 7% divorced. In terms of the physical state of

the household heads, it was found that 91% were physically sound while 9% reported with disabilities.

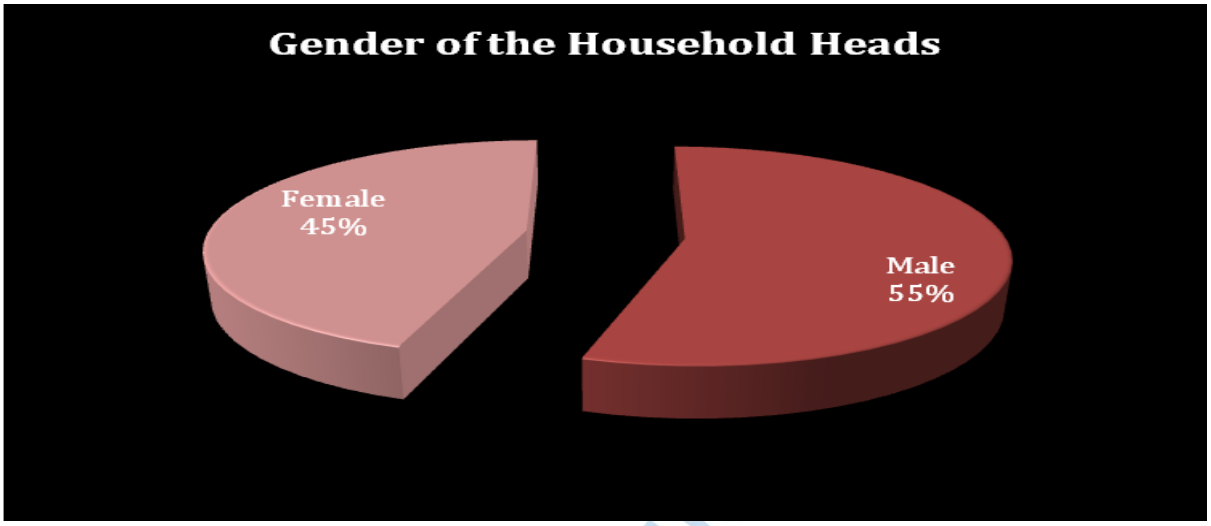


Figure 3: Gender of Household Heads

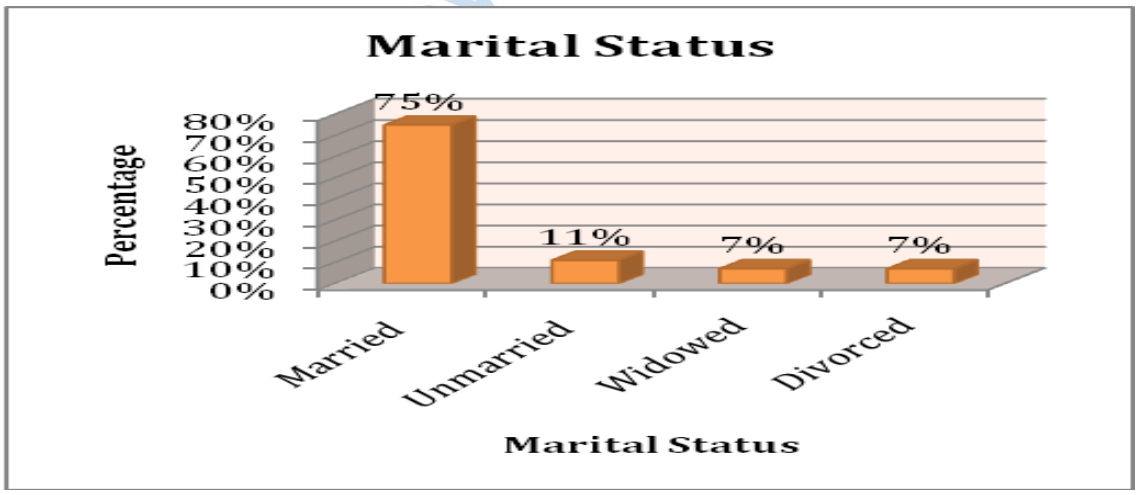


Figure 4: Marital Status of Households

Further, the study found that 99% of the HH heads had no formal education. This is in line with earlier studies which pointed out to that education became a major casualty in Somalia as a result of two decades of civil strife and political instability. The cost of war

left social programs including schools unattended where schools were destroyed, and the education system remained largely in ruins. This left Somali children with little or no opportunities to access education resulting in the high illiteracy rates among adults and very low school enrolment rates (Concern Worldwide, 2013). Likewise, the study respondents indicated that 100% of their children do not go to school as captured in Table 3.

The study found that 61% of the households in the study area were mainly crop farmers. 37% said they were agro-pastoralists and only 1% household heads were found to be purely pastoralists, with another 1% declaring to be unemployed. Finally, the study population can be categorized as farming and agro-pastoral community. The proportional point estimates with respective 95% confidence limits are presented in Table 3.

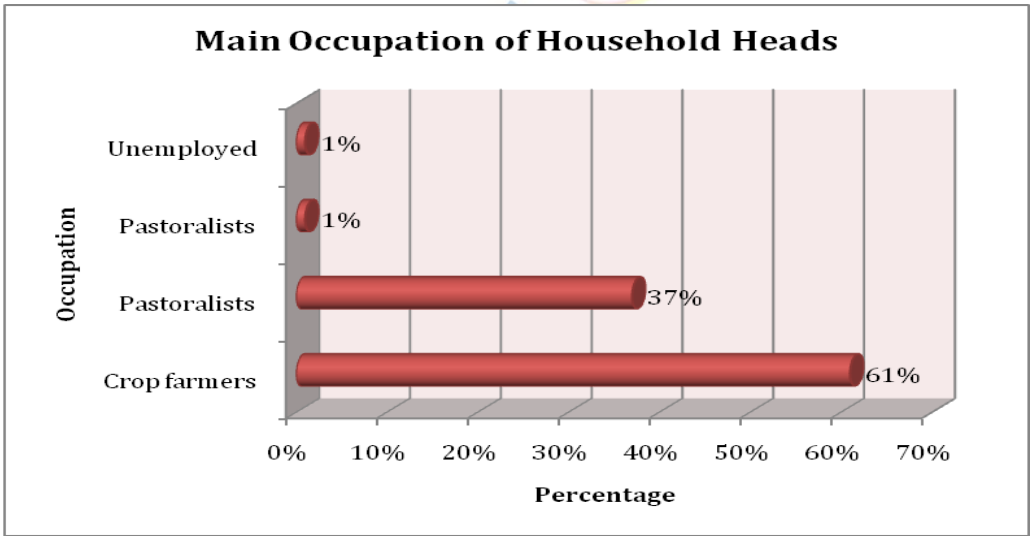


Figure 5: Occupation of Households

Table 3: Basic household characteristics in the study area

Variable	Freq.	Percent	95% Conf. Interval	
Gender of HH head				
Male	204	55.43	50.19	60.59
Female	164	44.57	39.41	49.81
Marital Status of HH head				
Unmarried	40	10.96	7.95	14.62
Married	275	75.34	70.59	79.68
Widowed	24	6.58	4.26	9.36
Divorced	24	6.58	4.26	9.36
Abandoned	2	0.55	0.07	1.97
Disability state of HH head				
Normal	334	90.71	87.26	93.48
Disable	34	9.29	6.52	12.74
Formal education of HH head				
None	334	98.82	97.01	99.68
Primary	4	1.18	0.32	2.99
School children in the HH				
Absent	368	100	*NA*	*NA*
Present	0	0	*NA*	*NA*
Main occupation of HH head				
Agro-pastoralist	139	37.77	32.8	42.94
Pastoralist	4	1.09	0.3	2.76
Farmer	224	60.87	55.68	65.89
Unemployed	1	0.27	0	1.5

Additionally, the study examined the continuous-variable, the socio-economic characteristics of the households. It was found that the average age of HH heads in the study area was 43 years; the eldest being 78 years old and the youngest 22 years. The average HH size was approximated to 5 persons (slightly lower than the Somali national average household size estimate of 6 persons). It was also observed that the average number of HH members who are 18 years and above was 3, while that below18 year per HH was 2. In terms of HH labor force, it was found that the average number of active members per HH was 2 persons. The study showed that most of the HH in the study area

were located within a radius of only 1 Kilometer from the Juba River. The household livestock asset base was also investigated. The findings suggested that the overall average number of any type of livestock kept by the HH was not even approximate to 1. A small proportion (39%) of the HH in the study actually kept at least some kind of livestock. Valued at the market price, the average revenue of cattle stock approximated to $186, shoats to $41, donkeys to $49, and chickens to $3 only. However, the potential revenue from the livestock was highly varying across HH as evidenced by their respective high standard deviations. A further discussion on their importance in food security is discussed in later sections of this thesis.

Investigation on land ownership showed that each HH owned, on average, 5 acres of land. Also valued at market price, the average economic value per HH stands at US $3,500, but with a high standard deviation (1601). This means that the variations between households are very wide despite the reported average. Furthermore, the study looked at whether HH had crop stock at the time of the study. The study identified that the average market value of crops in stock is $180 only. The resultant mean statistics are presented with their respective standard deviations, minimum and maximum observations in Table 4.

Table 4: Descriptive summary of HH socio economic characteristics

Variable	Obs	Mean	Std. Dev.	Min	Max
Age of HH head	359	43.38	11.21	22	78
No. of males in HH	366	2.34	1.19	0	6
No. of females in HH	366	2.53	1.31	0	7
Total HH size	366	4.87	2.02	1	11
No. of HH members below 18 years old	355	2.12	1.68	0	8
No. of HH members 18 years and above	356	2.72	1.44	0	10
HH workforce					
No. of working males	368	0.92	0.64	0	3
No. of working females	368	1.00	0.65	0	3
Total adults working	363	1.94	0.83	1	5
No. of adults not working	353	0.44	0.96	0	5
Distance from the Juba River					
Distance (Km)	335	0.83	1.03	0.1	10
HH Livestock ownership					
No. of cattle	368	0.31	1.87	0	20
No. of shoats	368	0.41	3.98	0	70
No. of donkeys	368	0.16	0.55	0	7
No. of chickens	368	0.32	5.24	0	100
HH Land ownership					
Land size (acres)	356	5.12	2.59	0	20
Land value (US $)	345	3510.03	1601.23	700.00	11200.00
HH Income last year (2014) – (US $)					
Livestock	8	50.31	81.71	7.50	250.00
Crop	356	21.62	34.34	0.01	375.00
HH Livestock value (US $)					
Cattle	368	185.87	1120.83	0.00	12000.00
Goats	368	41.03	398.19	0.00	7000.00
Donkeys	368	48.91	165.89	0.00	2100.00
Chickens	368	3.23	52.38	0.00	1000.00
HH crop in stock (US $)					
Crops	325	180.14	146.26	0.00	850.00

HH food production dynamics were also investigated among the study respondents. The result illustrated that 76% HH reported that all the adults in the HH were working unlike 24% who said some they did not, mainly caused by various reasons such as physical

disabilities, old age, and lack of jobs in the area. However, a majority of the adults in the study area were found to be participating either in food production directly or contributing to food purchase through other means such as revenue earned from casual work elsewhere. It was also found that an overwhelming majority HH (93%) obtained food from their own farms, while only about 7% could access food mainly from the market. There is remarkable evidence that the HH embrace food production on their farms more than relying on food from the market, to which they do not have much access due to lack of money.

Despite the proximity to the Juba River, only 22% of the study respondents had access to and were using irrigation technology to farm their land while the remaining 78% were not. As earlier studies have indicated, most of the irrigation facilities that were in place for farmers during pre-war times have been dilapidated and abandoned. This study, through qualitative discussions with key informants, found that this was the main constraint to households' lack of use of irrigation on their farms. The interviews with key informants also suggested that despite efforts by humanitarian agencies to rehabilitate the irrigation schemes, not much has been done on the ground for the farmers in the study area.

Farmers and agro-pastoralists were also found to rely mainly on local seeds (75% HH) than improved seed varieties. Additionally, seed shortages were rampant during the past planting season among a majority of HH (76%). An earlier study, by Longley et al (2001), for the European Union (EU), indicated three distinct types of seed systems exist in Somalia: (i) the formal seed system, as it existed in pre-war times; (ii) the local/informal seed system, and; (iii) the relief seed system by relief agencies. It is argued that since the

collapse of a functional government in 1991, the formal seed sector vanished, and farmers have been left to struggle amidst their vulnerable economic situations. Yet another study by the FAO (2011), argued that agricultural success in Somalia is partly linked to availability and access to improved quality of genetic material and fertilizers. The same study further suggested that, despite potential for booming agricultural production, yields are low mainly due to the lack, among others, of improved varieties of seeds. Given the strong linkage between food security and seed security (Longley *et all.*, 2001), the consequence of lack of quality seeds of required quantities is stagnation of agriculture at the subsistence levels leaving HH struggling to meet their regular food needs (FAO, 2011). What a seed type and seed shortage influence food security in the study area are presented and discussed in later sections of this study.

The study further examined the key crop varieties grown by farmers and agro-pastoralists in the study area. It was found that the main crops grown by most farmers (over 65% HH) in the study area were maize, sorghum and sesame. However, vegetables and fruits were also common among the farmers (Figure 6). The key perennial crop grown by all farmers (100%) in the study area is bananas. A summary highlighting the food production issues in the area is presented in Table 5.

Table 5: Food production dynamics in the study area

Variable	Obs	Percent	95% Conf. Interval	
Working adults				
All adults in the HH	363	75.76	71.01	80.08
Not all adults in the HH	363	24.24	19.92	28.99
Main food source				

Farm	335	93.13	89.88	95.6
Market	335	6.87	4.4	10.12
Use of irrigation technology				
Irrigated farm	367	22.07	17.93	26.67
Non-irrigated farm	367	77.93	73.33	82.07
Seed planted last season				
Improved seeds	349	24.48	20.48	29.81
Local seeds	349	75.52	70.19	79.52
Seed shortage last season				
Shortage experienced	349	75.93	71.09	80.32
No shortage experienced	349	24.07	19.68	28.91

4.2.1 Household Food Security Status in the Jubaland Region

This section provides findings of the analysis for Household Food Security status. The HFIAS module yields information on food security (access) at the household level while at the same time provides some essential four indicators computed to help understand the characteristics of and changes in household food security (access) in the surveyed population. These four indicators will provide summary information on Household Food Security Access (HFIA) – related Conditions, HFIA – related Domains, HFIAS Score, and HFIA Prevalence. Another indicator presented is the household hunger scale (HHS). The results from the analysis of these indicators have been presented and discussed below.

4.2.2 Household Food Security Access-related Conditions

Based on the 9 indicator questions in the HFIAS questionnaire, the percentage of households experiencing the condition at any given level of severity, relative to the frequency of occurrence, in the past one month from the date of interview of this study

were calculated (Table 8). Accordingly, the following results were obtained about the HH in the Juba Valley Basin.

Respondents were asked to report their personal experience with uncertainty and anxiety about acquiring food during the previous month. It was found that about 80% of the respondents did report any occurrence of worrying about food in the past month. However, a majority HH (54%) indicated that they experienced this situation sometimes (2-10 times) in the month while some (33%) said they experienced it quite regularly (> 10 times). In terms of whether any household member was not able to eat according to their preference due to lack of resources in the past month, 80% respondents gave an affirmative answer to this question. It was found that 34% HH experienced this condition often times (> 10 times), that is, having limited choices in the type of food they eat due to lack of resources. Meanwhile about 20% experienced this condition sometimes (2-10 times) only in the past month. The study also looked at the dietary choices related to variety, that is, whether the household had to eat an undesired repetitive diet in the past month. The results indicate that 80% of the HH depended entirely on monotonous diets but not a preferred wide variety of types of foods. With respect to specific frequency, 34% HH experienced this situation often times (more than 10 times).

Table 6: Household Food Security Access Conditions

HH situation in past 4 weeks from data of interview	Freq.	Percent	95% Conf.	Interval
Worry about food				
Not at all	75	20.38	16.38	24.86
Rarely (1-2 times)	94	25.54	21.16	30.32
Sometimes (2-10 times)	79	21.47	17.38	26.02
Often (> 10 times)	120	32.61	27.84	37.66
Unable to eat preferred foods				
Not at all	72	19.57	15.64	23.99
Rarely (1-2 times)	96	26.09	21.67	30.89
Sometimes (2-10 times)	74	20.11	16.13	24.57
Often (> 10 times)	126	34.24	29.4	39.34
Eat just a few kinds of food				
Not at all	70	19.02	15.14	23.41
Rarely (1-2 times)	89	24.18	19.9	28.89
Sometimes (2-10 times)	85	23.1	18.89	27.75
Often (> 10 times)	124	33.7	28.88	38.78
Eat foods they really do not want to eat				
Not at all	71	19.29	15.39	23.7
Rarely (1-2 times)	75	20.38	16.38	24.86
Sometimes (2-10 times)	76	20.65	16.63	25.15
Often (> 10 times)	146	39.67	34.64	44.87
Eat a smaller meal				
Not at all	69	18.75	14.89	23.12
Rarely (1-2 times)	73	19.84	15.88	24.28
Sometimes (2-10 times)	78	21.2	17.13	25.73
Often (> 10 times)	148	40.22	35.17	45.43
Eat fewer meals in a day				
Not at all	78	21.2	17.13	25.73
Rarely (1-2 times)	81	22.01	17.88	26.6
Sometimes (2-10 times)	64	17.39	13.66	21.66
Often (> 10 times)	145	39.4	34.38	44.6
No food of any kind in the HH				
Not at all	123	33.42	28.62	38.5
Rarely (1-2 times)	69	18.75	14.89	23.12
Sometimes (2-10 times)	46	12.5	9.3	16.32
Often (> 10 times)	130	35.33	30.44	40.45

Almost tantamount to the dimension of limited choices in the preceding paragraph, the study investigated whether any household member had to eat food that they found socially or personally undesirable due to lack of resources. About 81% of the respondents affirmed that they did experience such a situation. More specifically, 40% HHs reported that they experienced it quite often during the past month. Respondents were asked whether they felt that the amount of food (of any kind) that any meal household member ate during the past four weeks was smaller than they felt they needed due to a lack of resources. 81% said members experienced this condition. It was further identified that about half of this group of HH actually experienced this situation often times (>10 times) during the past month. The study respondents were again asked whether any household member, due to lack of food, had to eat fewer meals than recommended. 79% HH reportedly experienced this situation saying at least their members ate fewer meals than expected. In terms of frequency of occurrence, it was found that again about half of this group of households experienced the condition often times (> 10 times) during the past month. The findings were triangulated with the qualitative results from the key informants and discussants. In one question, the respondents were asked; what would you say about the status of food security in Jubaland Region, and what do you think are the contributing factors? The respondents pointed out that differently as follows.

> *"Jubaland, like other regions in Somalia, faces significant food security challenges. Right now, half of the region's households are experiencing Emergency food insecurity. This means that their access to enough and nutritious food is severely restricted, putting their lives and livelihoods in urgent danger". [KII 01]*

That was the response of key informant one who was keen about how there were emergency reports in the region.

I a different response from the focus group discussions, one member posited;

> *"Somali people have demonstrated incredible resilience and drive. For example, the narrative of Fatumo and her family, who were displaced for a decade as a result of natural catastrophes and violence, exemplifies Somali women's resilience in the face of hardship. Humanitarian partners, including local communities, organizations, and the government, have played critical roles in preventing famine. Nevertheless, the situation remains serious. In Somalia, one out of every five individuals have such inadequate food availability that their lives are in urgent risk. The efforts to avert starvation must continue, and more resources are required to provide ongoing lifesaving aid". [FGD 01]*

The findings depicted the need and erasures of coping mechanism that the people of Jubalnad had taken to survive in the food insecure Jubaland.

In another FGD, one member noted;

> *"The present state of food security in Jubaland is influenced by various factors beyond Floods disrupt agricultural activities, destroy crops, and displace communities. Droughts led to water scarcity, crop failure, and livestock losses. War and conflict have devastating effects on food security. Displaced populations often lose their livelihoods, access to land, and food sources. Insecurity disrupts also trade routes and hinders food distribution]" [FGD 02]*

The member pointed out the factors that were associated with food insecurity in Jubaland region by highlighting the natural disasters including floods and drought. Similarly, war and conflicts in the area also emerged as causes of the food insecurity. The FGD findings were emphasized in key informant interviews as one member posited;

> *"Recurrent droughts, pests and diseases are big problems for crop production. Other problems including lack of fertilizers, appropriate seeds and farm implements tools". [KII01].*

In other different key informant interviews, the causes emerged as conflicts, challenge sin access to seeds and other farm inputs were highlighted as challenges that lead to food insecurity in the area.

"Agriculture thrived during times of relative calm. Stability enabled farmers to invest in their land and increase productivity. Unfortunately, decades of violence have interrupted agricultural activity. Civil conflict, displacement, and instability had a significant influence on food production and distribution. Such as off-farm employment are non-existent and income generating activities are very minimal in our community." [KII 04].

"Most of us are severely food insecure. Our food insecurity is related to many things. We are rural farmers and are too poor to access agricultural inputs. The crop yields are very below what we produce only last for short periods, leaving the households hungry for the most part of the year." (KII6)

"we utilize local seeds that are prone to diseases, drought, and were of low yield. Also, we face seed shortages during planting season. A productive year, harvests can supply the households with 5 months of sufficient food. With poor harvests year, the food can last for 3 and a half months." (KII5).

"We mainly grow maize and sorghum and rely on rain-fed substance farming. Lack of access to farm inputs, security, climate shocks, weak copping mechanism and the absence of the government planning role factors undermined the livelihood potential of the farmers and threatened food access." (KII7).

A situational search was made on whether the household at any one time no food had to eat, of any kind in the home. In other words, a condition where food was not available to household members through the households' usual means, for example, through purchases, from the garden or field, from storage, among others. It was interesting to find that over 60% HH experienced this undesirable situation in the past month. It was rather sad to note that about 35% experienced this condition so often (more than 10 times) in the past month. The study also investigated whether the respondent felt hungry at bedtime because of lack of food or whether the respondent was aware of other household members who were hungry at bedtime because of lack of food in the past one month. Empirical data showed that at least over 60% HH passed through this humiliating circumstance during the past month. In terms of relative frequency of occurrence, it was reportedly

found that 37% went through this humbling experience often times (> 10 times) in the past one month. The study further inquired whether any household member did not eat from the time they awoke in the morning to the time they awoke the next morning due to lack of food. Surprisingly, 65% HH responded affirmatively to this question. Additionally, 38% of the sample HH reported experiencing this condition regularly (> 10 times) in the past one month. Therefore, it is perturbing to find that households in the study area experience such socially undesirable conditions despite the natural resource endowments of the study area. Despite these descriptions of the food security situation, it does show the general condition by experience and frequency of occurrence.

4.2.3 Household Food Security Access-related Domains

The study examined HH distribution according to Household Food Security Access-related domains (Table 9). According to the FANTA (2007), the three domains reflected in the HFIAS are: a) Anxiety and uncertainty b) Insufficient Quality, and c) Insufficient food intake and its physical consequences. The study found that 80% of the households fall in the first domain of anxiety and uncertainty. In other words, they are unsure of food what to eat in subsequent meals. 84% of the households experienced the condition of insufficient quality, that is, households resorting to eating foods they would not wish to eat because of lack of resources. Lastly, it was found that 85% HH experienced a situation of insufficient food intake and its physical consequences, that is, eating fewer meals than expected, reducing on the quantity of food to eat, going to bed hungry, as well as spending the whole day and night without eating anything. The majority (over 80%) of households in the study area were victims of this disturbing research fact. Figure 6 and Table 7 illustrates Household Food Security Access-related Domain data.

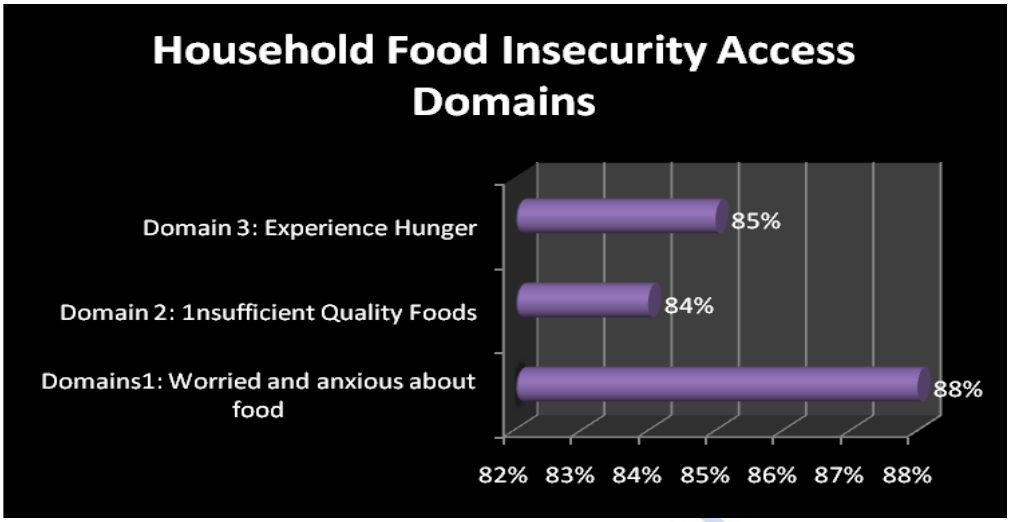


Figure 6: Household Food Security Access Domains

Table 7: Household Food Security Access-related Domain

Household Food Security Access-related domain	Freq.	Percent	95% Conf.	Interval
Anxiety and Uncertainty				
Inside	293	79.62	75.14	83.62
Outside	75	20.38	16.38	24.86
Insufficient Quality				
Inside	309	83.97	79.81	87.57
Outside	59	16.03	12.43	20.19
Insufficient food intake & its Physical Consequences				
Inside	311	84.51	80.4	88.05
Outside	57	15.49	11.95	19.6

The pairwise chi-square test of independence was conducted to assess any associations between the binary HFIA-related Domains. It was found that these domains were highly correlated with each other (p-value < 0.001). This justifies and aligns well with the theoretical expectation that most of the households that exhibit a behavior trait of being anxious and uncertain about food during the month also became vulnerable to consuming food of insufficient quality while at the same time struggle with eating insufficient

quantities of foods, thus, suffered from hunger for considerable amount of time in a month.

4.2.4 Household Food Security Access Scale Score (HFIAS)

A continuous measure of the degree of food security (access) in the household in the past four weeks revealed an approximate average HFIAS score of 15 with a standard deviation of 9.6. It was also observed that 27% HH scored exactly 27/27, indicating that they suffered all hunger domains, and the frequency was more than 10 times for each of the indicators in the past month from the date of the interview. A proportion of 15% HH did not experience food security at all, that is, HH achieved a score of 0/27, while about 13% HH scored 9/27 on the HFIAS. The rest of the HH are distributed on minority proportions (below 6%) on the HFIAS scale (Not presented in table). The HH in general are averagely food insecure according to the HFIAS.

Table 8: Household food security access scale scores

HFIAS Score	Freq	Percent	95% Conf. Interval	
0	55	14.95	11.46	19.01
9	47	12.77	9.54	16.62
27	96	26.09	21.67	30.89

4.2.5 Household Food Security Access Prevalence (HFIAP)

The Household Food Security Access Prevalence (HFIAP), a categorical food security status, was also measured among the HH in the study area. It was found that 15% HH in

the study population fall in the food secure category of the HFIAP (Table 10). Only about 0.5% HH are in the mildly food insecure group. The study identified that 10% HH are in the moderately food insecure group. Interestingly the majority of the HH (75%) fell in the severely food insecure category of the HFIAP classification. The HFIAP indicator, among the HFIAS earlier indicators, has also established that there is clear evidence of food security among the HH in the study area.

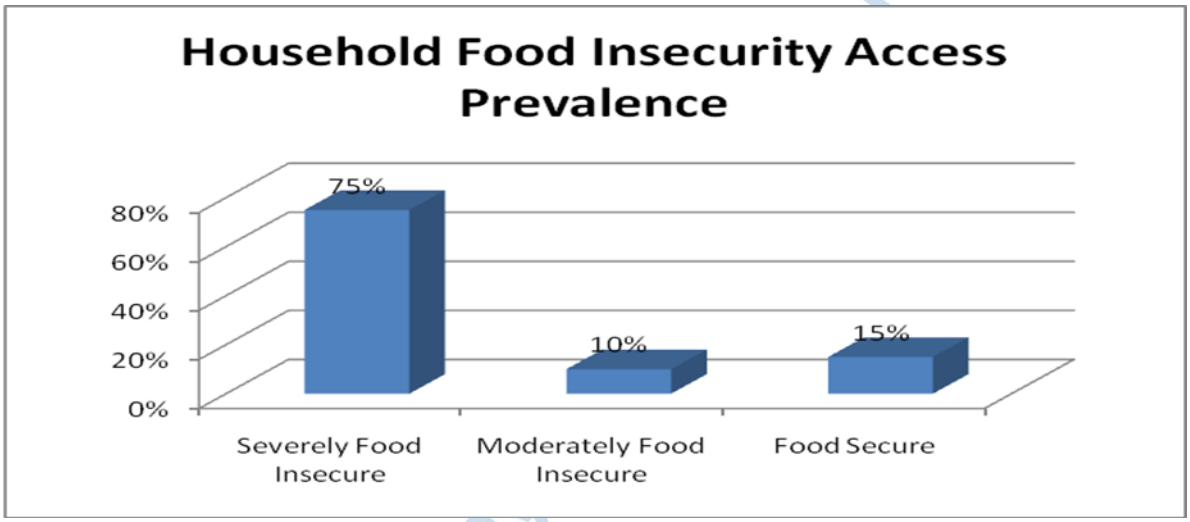


Figure 7: Household Food Security Access Prevalence

Table 9: Household food security access prevalence

HFIAP category	Freq.	Percent	95% Conf. Interval	
Food secure	55	14.95	11.46	19.01
Mildly food insecure	2	0.54	0.07	1.95
Moderately food insecure	36	9.78	6.95	13.29
Severely food insecure	275	74.73	69.96	79.09

Related to these results, the qualitative findings showed that tere were concerns about the near future on the status of food security in Jubaland. The respondents were asked; What are some of the fears you think the community still holds about the future of this area?

One key informant posited;

> *"Given the region's history of conflict, people may fear that violence and instability will persist. The impact on daily life, safety, and livelihoods can be daunting. The ongoing food crisis and high levels of malnutrition create anxiety about meeting basic nutritional needs. Families worry about having enough to eat and providing for their children. Displaced populations fear losing their homes, land, and livelihoods due to conflict or environmental factors. Uncertainty about the future exacerbates stress and anxiety". [KII 02].*

This showed that areas were still at a higher risk for food insecurity as the locals were worried about the future status of food in the region. In a different response, the concern

about the access to other social amenities including education were under threat due food insecurity. He posited;

> *"Limited access to quality education and healthcare services raises concerns about the well-being of children and families. Without proper education and health facilities, the community's future prospects may be compromised. The impact of climate change, including droughts and floods, threatens agricultural productivity and water availability. Fear of losing fertile land and natural resources looms large. Relying heavily on humanitarian assistance can create anxiety about long-term sustainability. People may worry about becoming perpetually dependent on aid" [FGD 01].*

Through the FGDs, the respondents noted the worries about other amenities like roads, and electricity being under threat as results of household food insecurity.

> *"Insufficient infrastructure (roads, electricity, sanitation) hinders progress. The fear of being left behind in terms of development and connectivity persists. Women and children face unique security risks during conflict and displacement. Fear of violence, exploitation, and abuse is a constant worry. The political landscape in Somalia remains uncertain. Fear of instability and lack of effective governance affects people's hopes for a better future. Balancing fears with resilience, hope, and determination is a daily struggle. Many individuals continue to work tirelessly for positive change despite the challenges". [FGD 02].*

4.2.6 Household Hunger Scale (HHS)

The severity of hunger experienced by the households was measured using the Household Hunger Scale (HHS) indicator. The study found that 34% HHs experienced little or no hunger at all. 28% of the HH were found to experience moderate hunger, while 38% HH experienced severe hunger during the past one month from the date of the interview (Figure 11).

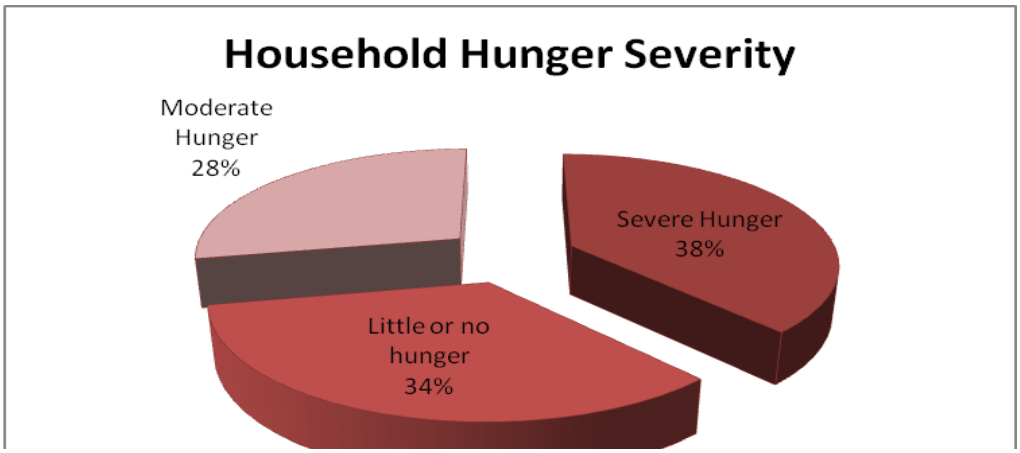


Figure 8: Household Hunger Severity

Similar to the HFIAS four indicators, the HHS further validates the fact that there exists a high degree of hunger among the HH in the study area. With 66% HH falling in the moderate to severe hunger, it clearly demonstrates that the HH in the study area are heavily constrained and lack coping mechanisms at their disposal given these findings.

Table 10: Household Hunger Scale

Hunger Scale	Obs	Percent	95% Conf. Interval	
Little or no hunger	126	34.24	29.37	39.11
Moderate hunger	103	27.99	23.38	32.60
Severe hunger	139	37.77	32.80	42.75

4.3 Household Socio Economic Determinants of Food Security in JRB

The analytical inquiries in the socio-economic determinants of food security in the study area were broadly conceptualized into two broad clusters as illustrated in the conceptual model of this study namely: household structure and household income. Like earlier

justified in Chapter Three, the outcome variable (food security variable) chosen for the regression analysis is the household food security access-related domain variables. Each indicator level of the HFIA-domains was independently regressed against the hypothesized socio-economic determinants. Model diagnostics were conducted to assess any specification error and check the appropriateness of the chosen model using multiple tests. All the models were found to be appropriate and therefore their findings are presented in Table 11. Discussion of the findings has been divided into two broad themes, that is, household structure and income.

Table 11: Socio Economic Determinants of Food Security in Juba River Basin

	Anxiety & Uncertainty			Insufficient Quality			Insufficient Food Intake		
Categorical Variable	Odds ratio	95% Conf. int.		Odds ratio	95% Conf. int.		Odds ratio	95% Conf. int.	
Sex of respondent	3.52***	1.51	8.17	3.57**	1.34	9.47	3.55**	1.31	9.59
Age category	0.16***	0.07	0.38	0.17***	0.07	0.40	0.12***	0.05	0.31
Marital status	0.48*	0.21	1.14	0.37**	0.14	0.96	0.54	0.20	1.45
Occupation	0.85	0.36	1.97	1.19	0.46	3.08	0.82	0.30	2.22
Disability condition	2.82	0.76	10.42	3.25	0.69	15.40	7.40*	0.90	60.77
Household size	0.78	0.31	1.97	0.75	0.23	2.43	0.59	0.18	1.93
Dependents	0.98	0.39	2.48	1.45	0.44	4.75	1.55	0.46	5.20
Income	1.22	0.48	3.13	1.23	0.43	3.51	1.26	0.43	3.69
Labor	0.75	0.33	1.70	1.08	0.45	2.61	0.86	0.35	2.11
Land size	0.76	0.30	1.94	0.97	0.35	2.68	0.88	0.31	2.48
Food source	0.40**	0.16	0.99	0.50	0.17	1.49	1.09	0.33	3.58
Debt for food	3.94***	1.92	8.06	3.85***	1.73	8.54	3.76***	1.66	8.53
River access (km)	1.20	0.47	3.05	1.14	0.41	3.17	0.91	0.32	2.55
Irrigation	0.71	0.30	1.67	1.01	0.38	2.67	1.01	0.38	2.72
Seed type	1.05	0.29	3.85	1.00	NA		1.00	NA	
Seed shortage	11.75***	2.24	61.67	1.00	NA		1.00	NA	
Model summary:									
Log likelihood	-119.18			-92.62			-89.18		
LR Chi-square	(16) 105.43			(14) 70.87			(14) 72.29		
Prob > Chi-square.	0.00***			0.00***			0.00***		
Pseudo R^2	0.31			0.27			0.29		
Diagnostic tests:									
Linktest:									
_hat (p-value)	0.00***			0.00***			0.00***		
_hat sq. (p-value)	0.30			1.39			0.31		
Hosmer-Lemeshow									
Chi-sq. (8)	3.68			4.76			8.22		
Prob > Chi-sq.	0.89			0.78			0.41		
Fitstat:									
AIC	0.78			0.87			0.85		
BIC	-1698.70			-1107.7			-1114.6		
Count R^2	0.85			0.84			0.85		

**** (alpha = 1%)* *** (alpha = 5%)* ** (alpha = 10%)*

4.4 Household Structure in Influencing Food Security

4.4.1 Anxiety and Uncertainty (HFIA 1st Domain)

The first binary outcome – anxiety and uncertainty domain – regressed against the hypothesized household structure variables estimated the following conditional probabilities as shown in Table 11 above. The odds ratio for gender of household head is 3.5, indicating that the probability of a female headed household to fall into the food insecure domain category one is 3.5 times more likely compared to a male headed household and this odds ratio was significant (p-value < 0.001). The odds ratio for the age of household head was 0.16 suggesting that the chances of an elderly-headed household to become anxious and uncertain about food are 0.2 times slimmer compared to a household headed by the other group (below 60 years). This conditional probability was significant at 1% critical level (p-value < 0.001). This could be attributed to agricultural experience and resource endowments of this group of household heads. They also have grown-up children who perhaps add their share of food for the household. These are possible explanations for the disparity between the two groups. This finding seems to deviate from the theoretical expectation. Although the study did not identify the exact explanation behind this, it could be influenced by low household size or resource distributional advantage of such households which would probably find it easy to cope with food demands of the household. However, the odds ratio was significant only at 10% critical level (p-value < 0.1).

The odds ratio for occupation was 0.85. This means that households that are engaged in farming as their main economic activity are only 0.85 times likely to fall into food security bracket over households that are either agro-pastoralists or purely pastoralists. This

conditional probability, however, was not significant (p-value > 0.05). The model estimated a conditional probability of 2.8 for disability status of the household heads suggesting that households headed by people with disabilities are 2.8 times likely to become food insecure compared to their counter parts. Despite this finding, the odds ratio was not as significant (p-value > 0.05).

The odds ratio for household size was 0.78 implying that the odds of a household with more members (than the current average Somali household size of 6) are less likely to fall into food security than their pairs. This could be attributed to the fact that the additional household member in an agricultural family means an extra hand for producing extra quantity of food, not forgetting the law of diminishing returns. Despite this fact, the conditional probability estimate was not significant in the model (p-value > 0.05).

Finally, the odds ratio for the number of children under 18 years was estimated to be 0.98. This suggests that the odds of a household being food insecure are 0.98 times (for households with more than half the average household size) compared to those with lesser children. This difference however turned out not to be significant according to the model (p-value > 0.05).

Therefore, in terms of anxiety and uncertainty about food to eat due to lack of resources, the most influencing factors of the household structure are gender and age group of the household head (p-value <0.05), whereas factors such as marital status, occupation, disability, household size and number of children are not very significant variables of food security in terms of households' state of anxiety and uncertainty about food (p-value > 0.05).

4.4.2 Insufficient Quality (HFIA 2nd Domain)

The second binary outcome – insufficient quality – regressed against the hypothesized household structure variables estimated the following conditional probabilities as seen in Table 11. The odds ratio for gender of household head amounted to 3.6. Similarly, like in the first domain, female headed households are 3.6 times more likely to become food insecure than their male pairs. The estimate was significant (p-value < 0.001).

On another hand the odds ratio for age category was 0.17 and was significant (p-value < 0.001). This indicates that the odds of finding a household headed by an elderly person and is food insecure are very minimal compared to those who are 59 years and below. Although this may also be a striking surprise given the age bracket, it does make sense because the mature adults have experience in growing food for years and have mastered how to preserve food stock to survive in seasons such as when food is scarce – such as at the time of this study's data collection.

The odds ratio for marital status was 0.37 (p-value < 0.001). This implies that the single household heads are better off than their married counter parts when it comes to experiencing difficulties of food security. Like discussed earlier, these single household heads may have less worries about food possibly because their smaller family sizes mean they have lesser mouths to feed, or they have a sufficient resources base to cater for the food for the better part of the month.

Compared to the rest of the variables, factors such as household head's occupation, disability status, household size and number of children below 18 years were found to be insignificant variables in explaining household variations in terms of food security (p-

value < 0.05). The key determining variables, therefore, attributable to household food security measured as insufficient quality, are gender of the household head and age group of the household head in the study area.

4.4.3 Insufficient Quantity and Its Physical Consequences

The third binary outcome – insufficient quality – regressed against the hypothesized household structure variables estimated the following conditional probabilities as shown in Table 11 above. Almost synonymous with the previous findings of the first two categories of HFIA domain, the study identified that the odds ratio for gender is 3.55 (p-value < 0.001) and that of age group is 0.12 (p-value < 0.001). Still these findings imply that female headed households are more prone to food security compared to male headed ones. Similarly, elderly household heads are much safer compared to their counterparts.

Another variable that was almost significant, based on the classification of households according to category 3 of the HFIA domain, but with at a higher critical level, is disability condition with an odds ratio of 7.4 (p-value < 0.1). However, the reported conditional probability was widely varied given the 95% confidence limit. This finding tally with the theoretical expectation, that households headed by the disabled ought to be more vulnerable to food security compared to their other colleagues. The study identified that, despite their importance, factors such as occupation, household size and number of dependents, are not really significant at influencing household food security according to the fitted model.

4.5 The Effect of Income on Household Food Security

4.5.1 Anxiety and Uncertainty

The effect of income was examined against the dependent variable HFIA Domain 1 (anxiety and uncertainty). Income, as an economic factor, is one of the most hypothesized variables influencing food security among households. In this study it was found that income is not a significant factor (p-value > 0.05) in determining household food security (Table 11). With an estimated odds ratio of 1.2, households whose income are below or equal to $3000 (including worth of disposable assets such as land and animals) are 1.2 times more likely to worry and get anxious about food than those with higher income levels. Since the actual income levels of these households is extremely low (average = $ 22 with a standard deviation = 36.17), and the fact that fixed assets such as land are also not easily liquidated for food purposes among households in the study area, the difference between the two odds was not significant despite the income brackets assigned to these two groups.

Aware that income is a derivative of multiple micro-economic factors, let alone macro-economic, some of the confounding micro-economic factors beyond household structure were investigated for their influence on food security. These included occupation of household head, household labor proportion, land size owned for production, main source of food, credit access for food, river radius from the household farm location, irrigation, seed variety used in previous season and seed sufficiency at the time of planting in previous season.

The conditional probability of labor force was 0.75, indicating that the odds of a household with lesser number of working adults (< 50% of average HH size) (either employed on-farm or elsewhere) are 0.75 times likely compared to households with more working adults. This finding contradicts theoretical expectation. However, possible

explanations would be that since food production is constrained by many factors in the study area other than labor availability, and that labor employment opportunities are rarely available in the area, given the miserable socio-economic status of most households, the effect of surplus labor in the household is not realized in terms of household food security. Therefore, having more adults in the household means more mouths to feed, yet there is inefficient use of this available production factor, *ceteris paribus*. However, despite this observation, the reported odds ratio (0.75) is insignificant (p-value > 0.05).

The odds ratio for land owned by the household is 0.76. It implies that the chances of a household with less than 5 acres of land are only 0.76 likely to fall into food security compared to their pairs. This outcome seems surprising according to theoretical expectation. The reason for this situation could possibly be because the farmers and agro-pastoralists are not making full use of the available land resources efficiently. If they were, then the reverse side of the odds ratio could be estimated. However, despite this finding, the conditional probability was not significant (p-value > 0.05).

The model estimate of the odds ratio for household main source of food is 0.4 and was found to be significant (p-value < 0.05), implying that households whose main source of food is the market are only 0.4 times likely to get trapped into food security compared to those who rely entirely on own farm produced food. Considering the situation in Somalia and especially in this study area, this finding demonstrates that farming is currently practiced on minimal subsistence scale, due to the risks amidst which these households live, and the limitations they face. Therefore, households that have the money to purchase food from the market are much more food secure compared to those that lack the

necessary income to purchase food from the market and purely rely on food from their own farms.

The odds ratio for food credit is 3.9 and estimated to be significant by the model (p-value < 0.001); implying that the chances of a household falling into food security are almost 4 times more likely for those who accessed credit for food than their peers. The explanation for this is simple and straight forward, as it reflects the poor socio-economic status of these households, which are unable to cope with food needs, leading them to access credit as a result. Most definitely, this group becomes more prone to food security than their counterparts. But it may also be a bit confusing to fully gauge the situation in terms of the above scenario, as to whether those who did not access credit could not do so as a result of not having the opportunity or they were actually able to cope with the food demands. This argument is raised in light of the fact that these households generally lacked the necessary resources to provide for food needs.

The conditional probability for river access (distance in km) is 1.2, but it was found to be insignificant according to the model (p-value > 0.05). Those who are located more than 1 kilometer from the river are 1.2 times more likely to experience food security than those closer to the river. This finding tallies with theoretical expectation. It is believed that those closest to the river have reliable access to the river's natural resources such as fish, and/or even planting crops on the banks of the river in order to manage the effects of drought. Therefore, households close to the river are more advantaged than those a little bit far away.

The odds ratio estimate for irrigation was 0.7 and found to be insignificant in influencing food security (p-value > 0.05). It was found that the chances of a household falling into food security are 0.7 times more likely compared to those using irrigation in food production. It is rather interesting to see such an observation as it contravenes theoretical expectation. However, this could have happened because of random chance as there was no empirical justification for this reported observation at the time of this study. The conditional probability for seed variety used in past season was 1.05 and was not significant (p-value > 0.05). In other words, the odds ratio estimate suggests that the chances of those using local seed varieties are slightly higher (1.05 times) in terms of facing food security than those using improved seeds. This finding tallies with theoretical expectation as the improved seeds yield much better and they can withstand stress conditions (such as drought, diseases) a lot more than does the local seed varieties. Therefore, the households using improved seed varieties are more likely to remain food secure because they register better yields.

Lastly, the odds ratio for seed shortage was found to be 11.8, indicating that the chances to find a household food insecure when they lacked seed during the past planting season are 11.5 times higher than those who did not lack seed. This also agrees with theoretical expectations, because those who were able to plant all their allotted plots of land with crops harvested according to what they needed compared to those who wanted to plant more but were constrained by seed shortage. However, despite the high odds ratio reported, the estimate was not significant in the model (p-value > 0.05).

4.5.2 Insufficient Quality

The second binary outcome – insufficient quality – when regressed against income and confounding variables that surround income and food production in general, yielded the following discussed results, as shown in Table 11. Similar to the HFIA Domain 1 finding, the odds ratio for income was estimated as 1.2, and found to be insignificant by the model (p-value > 0.05). The interpretation would similarly hold that those with lesser amount of income have slightly higher chances of falling into food security than their counterparts.

In evaluating the confounding factors, it was found that the odds ratio for credit accessibility for food was 3.9 with a significant p-value (< 0.001). This highlights the fact that households that are economically poor and access credit for food have higher chances of eating foods of lower quality, which they would not really prefer to eat or eat monotonous foods as a result of constrained resources for purchasing good quality foods.

However, the analysis revealed that the following confounding variables contributed but their effect was insignificant (p-value > 0.05) in explaining household food security in the study area namely: labor ratio, land size, main food source, access distance to the river and irrigation. On the other hand, variables such as seed type and seed shortage were found to have exactly a conditional probability of 1; meaning that the odds of finding a food insecure household in one group is the same for the other pair.

4.5.3 Insufficient quantity and its physical consequences

The third binary outcome – insufficient quantity and its physical consequences – when regressed against income and confounding variables, showed the following results, as seen in Table 11. The odds ratio for income turned out to be 1.26 but insignificant according to the model (p-value > 0.005). The implication is still that the poorer

households have a higher likelihood (1.26 times) of falling into food security than their peers. With constrained resource capabilities, the poor households suffer more consequences of going hungry than those that are a little wealthier. Among the confounding factors, the only variable that turned out to be significant in explaining household food security was credit acquisition, with an odds ratio of 3.76 (p-value < 0.001). A similar justification would be raised based on this finding, that households that lacked resources but were made to acquire credit for food are 3.8 times more prone to food security than their colleagues. This clearly further explains the finding on income despite the fact that income was insignificant.

The remaining variables such as labor, land size, food source, and distance from the river, irrigation, seed variety and seed shortage were estimated to be insignificant by the model in terms of explaining variations among households on food security condition. Therefore, the burden for households such as reducing the amount of food they eat at mealtime, cutting meal numbers, going to bed hungry and spending night and day without food is substantially caused by lack of sufficient resources and related reasons for food provisioning as evidenced by the outcomes above.

4.6 Strategies that Can Enhance Household Food Security

Objective four of the study was to identify strategies that can enhance household food security. This study identified the critical areas and suggested how food security can be improved among the households in the study area. Data from household interviews, KIIs, FGDs, secondary literature, observational methods were analyzed for identifying these critical factors for improving household food security. But, first, a revisit of the summary of the challenges identified through primary and secondary findings is necessary.

4.6.1 Food Productions Challenges

Agriculture has been and still is the backbone of the Somali economy where 70% of the country's population derive their livelihood from agriculture and related activities. The sector has a crucial role in ensuring food security, job creation, income generation and foreign exchange earnings. The smallholder farming subsector accounts for 80% of the total agriculture outputs and 70% of marketed agricultural produce (STAG.,2012). The sector is therefore a key in addressing household food security challenges. However, crop production per unit area is extremely low for most crops. For example, in maize the average yield is estimated at 0.5 to 1.5 tons/ha, whereas in sorghum the average yield ranges from 0.3 to 0.6 tons/ha (STAG.,2012). The potential yield for both crops should be much greater. This was confirmed in 2012 by SATG which tested drought resistant maize hybrids in the Afgoi district of Lower Shebelle region. The results of the trials show that maize production in Somalia can be increased 5 to 10 per ha from the baseline (0.5 to 1.5) simply by improving the seed system, using fertilizers and good production practices. SATG's experiment has set a new yield record of maize production.

The poor yield is attributed to poor seed variety and poor crop management practices. in addition to poor seed variety and poor crop management practices, various assessment conducted in recent years indicate that poor infrastructure (roads, ports, irrigation canals), lack of institutional and human capacity, and lack of an enabling environment (peace, security, government policies and regulations) are the among major challenges faced by the production sector (STAG.,2012). Recent assessments also reported a severe shortage of agriculture inputs, markets for cereal production and technical support services. The

lack of markets in cereal production is attributed to cheap imported products and food aid.

4.6.2 HH Perception on Limiting Factors to Food Production

The Juba Valley Basin is a farming region in Somalia where households predominantly practice subsistence agriculture. This study explored the perception of the household respondents cornering factors constraining food sufficiency as they see it. A majority of the respondents (18.7%) blamed it on recurrent droughts where 16.5% stated that pests and diseases were big problem for crop production. Lack of fertilizers, appropriate seeds and farm implements/tools (12%, 10.7% and 14%, were among some of the concerns of the study respondents. Figure 10 illustrates limiting factors to food production.

Collapse of agricultural production system, lack of access to farm inputs, security, climate shocks, weak copping mechanism and the absence of the government planning

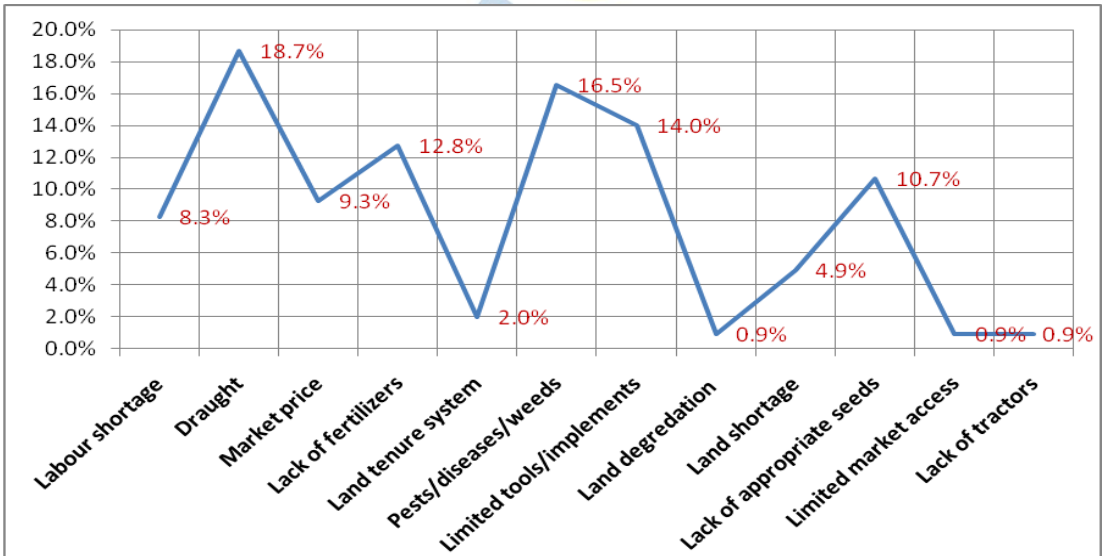


Figure 9: HH Perception on Limiting Factors to Food Production

role factors undermined the livelihood potential of the farmers and threatened food access. Unfortunately, the agricultural production system collapsed with the central government

in 1991. As a consequence, farming land, soils, and river water have been severely damaged.

The quantitative findings were triangulated with the interview and FGD results where the respondents were asked; What do you think can be done to improve food security in the area? Various suggestions for solution to food insecurity were noted. One of the key informants posited;

> *"The region's agricultural potential enabled the production of staple crops such maize, sorghum, rice, and vegetables. In addition to cereals, Jubaland was noted for its strong cattle industry. Pastoral villages reared cattle, goats, and camels, contributing to food security and livelihoods. Investment in these community livelihoods is critical" [KII 01].*

This points to the need for not only the scientific drought resistant food crops but also the indigenous ones. Through an FGD, the approach was observed as key in limiting factors to food insecurity in Jubaland.

> *"Improving food security in Jubaland requires a multifaceted approach. While traditional farming has sustained Jubaland for generations, integrating modern techniques can enhance productivity. Workshops and training sessions focused on sustainable farming, crop rotation, and soil conservation can lead to improved yields and better food security. Given the region's vulnerability to climate change, promoting climate-smart agriculture is crucial. Drought-resistant crops, efficient water management, and agroforestry can help mitigate climate-related risks". [[FGD 01].*

Another group pointed out the need for a scientific approach;

> *"Livestock rearing is integral to Jubaland's economy. Implementing better animal husbandry practices can boost food security. Vaccination programs, fodder management, and disease control are essential. Access to markets, roads, and storage facilities is vital for efficient food distribution. Rehabilitating infrastructure can facilitate trade and reduce post-harvest losses". [FGD 01].*

The need for collaboration also emerged as a suggestion for food insecurity. An interviewee posited;

> *"Joint resilience programs can address multiple aspects of food security. Establishing seed banks ensures access to a wide range of crop types that are well-adapted to their local environment. During an emergency, these seeds might be critical for resuming agriculture. Empowering women in agriculture increase production. Providing women with access to land, resources, and decision-making helps to improve food security". [KII 08]*

Educating farmers as well as stakeholder involvements also emerged as a solution to the household food insecurity in Jubaland. The informant and FGD posited as follows.

> *"Educating farmers on sustainable techniques, nutrition, and food storage is critical. Awareness initiatives on climate change adaptation and catastrophe preparedness are beneficial. Providing safety nets micro loans during a crisis benefits disadvantaged households. These activities serve as a buffer against shocks". [KII 09]*

> *"Combating food insecurity in Jubaland necessitates a comprehensive and coordinated strategy. For example, involve local communities in decision-making processes. Their ideas and skills are vital, and they give instruction in sustainable agricultural methods, water management, and nutrition. Empower farmers with the necessary skills to increase food production. Crop diversification, which encourages a varied range of crops that can survive climatic unpredictability, is my recommendation. How about fostering drought-resistant crop varieties? Stakeholders could also employ methods like limited tillage and cover farming to improve soil health". [FGD 01].*

Most survey respondents in the study area were agro-pastoralists who practice low input labor intensive subsistence farming, each cropping relatively small areas of land or working cooperatively on larger units. Because rural farmers were too poor to access agricultural inputs, the crop yields were below expected yield (20% of potential). The crop harvests they produce only last for short periods, leaving the households hungry for the most part of the year. Today, crop yields are low and have not improved for decades.

Moreover, opportunities such as off-farm employment were non-existent and income generating activities were very minimal. Farmers were faced with seed shortages during planting season, and therefore, end up not realizing the full potential of their agricultural land. Besides, most farmers also utilized local seeds that were prone to diseases, drought, and were of low yield. The amount of food realized from a unit quantity of land could not, therefore, produced sufficient food to feed the family members over the months of the year.

In addition, farmers and agro-pastoralists in the area were also marginalized from product markets due to poor transport mechanism and road network. These conditions were exacerbated by security that has limited households' access to markets and towns for trading opportunities, thus, significantly reduced the chances of improving their livelihoods. The protracted complex emergencies caused by armed militia have eroded the confidence of those engaging in productive agriculture.

Climatic shocks, especially droughts recurrent and severely affected food production in the area. Agricultural production in the study area was heavily reliant on rainfall with limited irrigation technology. Many flood-control systems and canals in the area that existed during pre-war time are in ruins where the infrastructure was looted, and/or became unusable. These factors add to the burden of recurrent food security and hunger in JVB. Lastly, there were no proper coping and adaptation strategies among households in the study area against food security. The households therefore remained vulnerable to any shocks that occur. Based on the above observations, the study presents the following suggestions for the improvement of food security in the JVB:

4.6.3 Informing Strategy to Enhance HH Food Security

The study explored the key food varieties grown by households in the study area. Captured in figure 6 below, it was found that 30.3% of household respondents grow maize annually followed by sorghum (22.2%). They also grow sesame (21.0%), fruits (10.3%) and vegetables (13.2%). Apparently, all crops grown by the households are said to be highly susceptible to drastic weather challenges such as drought. What is more, respondents reported that the productive years, harvests can supply the households with 5 months of sufficient food. With poor harvests year, the food can last for 3 and a half months.

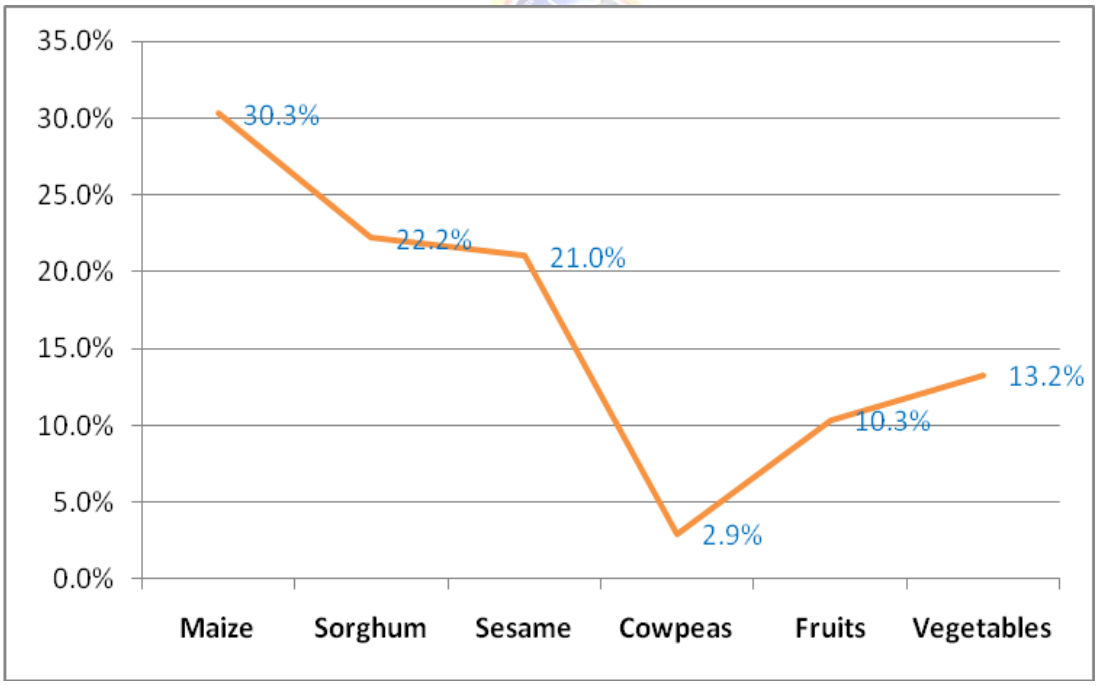


Figure 10: Proportion of HH according to crop variety grown last season

Other studies indicate that 90% of the production is under rain-fed agriculture, while 10% is under irrigation. Major cereal crops are maize and sorghum. Other crops of economic importance are fruits and vegetables, legume crops, and sesame. Among the fruit crops,

banana used to be a very popular crop, with exports to European and Middle Eastern markets. In recent years, sesame seed and lemon have become important export commodities with vegetable and fruit crops bringing in the most income

Somalia has arable agricultural land of 10.000 sq. which is equivalent of 1,000,000 ha. as a result of poor seed and poor production practices, current cereal yield is as low as 1 to 1.5 tons per ha. This low yield per unit area (<50 Mt in Gu 2013)is less than 50% pre-state collapse era (1991) and unable to meet the country's current cereal demands of 300,000 Mt which results in 250,000 Mt deficit. However, at a yield increase of just 5 tons/ha, the production level can be increased to 250,000 Mt by just improving the production practice (Planting on time, weeding on time, irrigation on time, optimum level of fertilization, and protection from insect and diseases. This can meet the current domestic consumption demand, by increase the land area and yield increase per unit area of potential 15 tons/ha, one could aim for export markets according to STAG in 2012.

Juba River communities have a long history of managing and making the most of use of agricultural resources available in their environment where the Juba River serves as main crop producing in the study site. However, agriculture today has changed in many significant ways in its modern practices. To increase agriculture productive and improve household food security, this study makes the following micro and macro activities:

Increase productivity: Increases in productivity will require improving “on farm” crop husbandry and management practices through extension and training, access to steady and affordable sources of inputs, effective crop protection services, market incentives, crops diversification and improvement of the genetic yield potential of crops by

identifying and testing improved varieties through adaptive research and on-farm testing. Particularly on the seed system, the training on use and production of seeds is crucial as well as the expansion of the genetic portfolio with rain-fed and irrigation, long and short cycle varieties. In remote areas or where ecosystems are strongly characterized (soil, water, wind, cropping techniques), seed production from local landraces will be encouraged and supported. The expected increased yield will lead to support improved seed storing methodologies and facilities.

Programs to Support and Motivate the Farmers: The government needs to have special programs to support and motivate the farmers in the South to fully realize that they are very important in the national economy by providing incentives to the farmers. Improving pricing policy, organizing farmers in groups for bulk purchase and marketing, creating national silos for grain storage, setting annual targets to produce tons of food that the country needs to sufficiently feed the population among others, will see Somalia transform into a food sovereign state. Efforts must be intensified to support poor households through the provision of farm inputs and credit facilities with minimal interests.

The Adult Literacy Programs: education programs must be tailored towards educating these farmers into modern agriculture and commercialization. Agricultural value chain management practices and post-harvest techniques should be taught in these adult literacy programs so that the communities can benefit from participating fully in the value chain, especially female headed households, and therefore, improve their overall livelihoods in order to remain food secure.

Infrastructure Rehabilitation: the rehabilitation of key in fracture is very crucial for the revival of the agricultural sector. Roads need to be reopened, broken bridges repaired, market infrastructure refurbished and new ones constructed. All these activities will lead to improved access, by the households for both inputs and outputs, to and from the markets and the farms. Because agricultural commodities are bulky, transportation of farm produce to the markets is inevitable and the infrastructure rehabilitation will stir the interest of starting commercial agriculture in the food producing regions of Somalia.

The quantitative findings were triangulated with the interview and focus group discussions findings and the several issues emerged. The following are responses to a question; Do you think the community will embrace adoption of strategies for food production given a chance? The discussions in the first FGD pointed out;

> *"The willingness of the Jubaland community to embrace strategies for food production depends on several factors. First, there needs to be awareness about sustainable agricultural practices and their benefits. Community members must understand how adopting these strategies can improve food security. Sometimes, traditional farming methods are deeply ingrained. Convincing people to change their practices can be challenging. Limited access to land, water, seeds, and tools can hinder adoption". [FGD 01)*

The FGD showed that awareness was key in informing effective strategies for enhancing foo security in Jubaland. A different key informants pointed out;

> *"Despite hardships, Somali communities have demonstrated resiliency. Given the opportunity, they may adopt new strategies. Leveraging local expertise and enlisting community leaders can help with adoption. Drought-resistant crops and climate-smart agriculture can help improve food security. Engaging local organizations has the potential to influence change. Improving farmers' access to markets and value chains encourages them to produce more surplus for sale. Involving youth in agriculture has the potential to revitalize the industry". [KII 04].*

The informant was keen to state that collaborations between the experts and the locals would be key in informing strategies to enhance household food security in Jubaland. Another one mentioned;

> *"Of course, a comprehensive strategy that considers social, economic, and environmental factors is critical. Strategies should be in line with community needs and goals. While obstacles remain, giving the Jubaland people with chances, information, and resources can encourage the adoption of sustainable food production practices". [KII 05]*

The mentioning of aligning the strategies to community needs was key in forming the effective strategies to enhancing household food security. In the last two responses, the issues of support and empowerment of the locals emerged. The respondent mentioned

> *"The future of the Jubaland community in terms of food security will depend on various factors, but some potential scenarios based on current trends and efforts include improved food security. If humanitarian organizations, governments, and local communities continue to collaborate effectively, there is hope for improvement. Efforts to enhance agricultural practices, provide access to resources, and address malnutrition can lead to better food security. The recent reduction in the number of food-insecure people compared to 2023 is a positive sign." [KII 01]*.

The last one posited;

> *"Empowering local communities to take control of their food security can have a good impact. Implementing climate-smart agriculture and drought-resistant crops can help to alleviate the effects of climate unpredictability. Water management and soil conservation are necessary. Enhancing women's participation in agriculture and guaranteeing them access to resources can result in good development. Women are frequently the primary producers and distributors of food. Jubaland's future food security is dependent on continuous efforts, teamwork, and a mix of emergency response and long-term development". (FGD 02).*

Results indicate respondents with large family size, no formal education and no employable skills. Other studies show that the more the head of household is educated more the family is food secure. Therefore, vocational trainings on employable skills should be undertaken and promoted to reduce food security in the study area.

This study argues that the national government of Somalia has the bigger task to play in securing the livelihoods of the people by ensuring agricultural research, technology dissemination, extension advisory, provision of resistant crop varieties and high yielding species, farming early warning systems, improving physical infrastructure such as roads to connect the rural areas to towns, post-harvest technology, value addition trainings and entrepreneurship, provision of mechanization technology for communities for the commercialization of agriculture among others, will drastically reverse the recurrent food security and advance the food security that the country has long awaited.

Finally, the government of Somalia should establish agriculture nation plan, policies and supportive to local producers than importers of food. The government should organize farmers in groups for bulk purchase and marketing, create national silos for grain storage to distribute back to the communities at prices that are not threatening to the local poor in case of food crises, and set annual targets to produce food that is sufficient to feed the nation.

The findings on thr ole of the government were also triangulated using the interview and FGD results through a question; What would you say about the role of government in coping with the current situations of food security in the food producing areas in Jubaland?

The respondents pointed out major issues of government role in diverse ways. One posited;

> *"The government need to invest in road rehabilitation and market infrastructure. This facilitates the movement of produce from farms to consumers. Other stakeholders can come on board and construct grain storage facilities to reduce post-harvest losses." [KII 03].*

The issues of the road infrastructure were thought about as a government intervention measure to easy household food insecurity in Jubaland. Another informant noted;

> *"While humanitarian donors have provided essential support, there is a call to transition toward more development-focused assistance. There is need to emphasize the importance of development support for the country and its people. The efforts of humanitarian organizations, combined with community resilience, are crucial in addressing this crisis. However, sustained support and collaboration are essential to ensure the well-being of millions of people". [KII 02]*

The findings showed the need for collaboration of the government with other humanitarian organizations in interventions on food insecurity.

The issue of women role and support also emerged as the respondent recommended government focusing on women empowerment. The respondent posited;

> *"I would like to advise for recognizing and supporting women's contributions to agriculture. Ensure their access to resources and decision-making. Then educate women on balanced diets and child nutrition. Establish early warning systems for disasters (floods, droughts). Train community members to recognize signs and respond swiftly". [KII 07]*

The government provision of grants also featured the suggestions on the role of the government in food insecurity interventions in Jubaland. The respondent noted;

> *"Business loan schemes and grants should be identified for access to the communities, especially women groups, so that they are able to augment*

the limited resources they have and engage more productively in addressing the widespread food security in the area". [KII 10].

In another approach, the key informants and the discussants were asked; How do you think these suggestions can best be implemented? The responses showed the options that the stakeholders can take to intervene in food insecurity in Jubaland. One discussant posited;

"Honestly, there are a range of things that need done to solve this food insecurity issue in Jubaland. There is need to link food security efforts with health and nutrition programs. Encourage alternative income sources beyond agriculture. NGOs can collaborate with organizations like FAO, UNICEF, and local NGOs and advocate for government policies that prioritize food security. Build resilience by celebrating success stories and resilience". [FGD 01].

In a different discussion, one member suggested the holding of workshops and seminars to train the locals on modern agricultural practices as an approach to ending food insecurity in Jubaland. He posited;

"Improving food security in Jubaland requires a concerted effort from various stakeholders. The government can organize workshops and training sessions for farmers, women, and youth. Educate them on modern agricultural practices, sustainable land management, and climate resilience. Identify local champions who can lead by example. Their success stories can inspire others to adopt new practices. There can also be diversification of crops. Encourage farmers to diversify their crops. Plant drought-resistant varieties like millet, sorghum, and indigenous vegetables". [FGD 01].

Finally, areas of scientific water harvesting technique, improving roads and access as well as creating seed banks emerged as possible ways of implementing the suggestions. The following were the verbatims of the various respondents.

"Promote rainwater harvesting techniques to ensure water availability during dry spells. Integrate trees with crops to improve soil fertility and provide shade. This can also be done by conducting regular vaccination campaigns to prevent livestock diseases. Moreover, fodder preservation can be taught among herders how to preserve fodder during abundant seasons for use during scarcity. Finally, develop community-based grazing plans to prevent overgrazing". [FGD 02].

"This may be accomplished by improving and maintaining roads that link rural regions to marketplaces. This promotes the flow of products. Build grain storage facilities to minimize post-harvest losses and increase access to local and regional markets. Ensure that women have equitable access to land. Strengthen women's land ownership rights, followed by assistance for their entrepreneurial and income-generating activities outside of farming". [KII03].

"Stakeholders can create communal seed banks to protect local agricultural types. Then, to preserve genetic variation, allow farmers to trade seeds. Train community people to recognize warning signals of oncoming catastrophes (floods, droughts) and create contingency plans for quick action during emergencies. Partner with organizations such as the FAO, UNICEF, and local non-governmental organizations (NGOs). They can offer technological experience and resources". [KII 05].

In regard to these findings, efforts must be intensified to support these households through the provision of farm inputs, credit facilities with minimal interests. A strategy to commercialize agriculture in the area is very important, and restoration of the irrigation schemes and rehabilitation of every infrastructure needed in order to produce food in the Jubaland region is needed.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Food security is a result of complex multi-faceted factors, whose joint role places households in a state of agitation for food to sustain its members. Many scholarly argued that micro and macro socio-economic factors contribute to household food security. At micro-economic level household factors – household size, land size, household head gender, age, education, occupation, income, among others are important determinants of food security. Equally, macro-economic factors – including political instability, security, climatic variability, agro-ecological variability, aid, trade relations and market accessibility - also play a critical role in determining a sovereign nation's food security condition. This chapter presents a summary of key findings and conclusions. It further presentment actionable recommendations based on the core study findings as well as suggestions for future research.

5.2 Summary of Findings

This study was set out to identify and quantify the magnitude of the effect of socio-economic factors contributing to household food security in Somalia which 70% of its vulnerable households remain hungry. Further, the influence of family structure and income dynamics of the households on food security was investigated. The focus was to understand the linkages between socioeconomic factors influencing household food security in the target households. Particularly, the study emphasized on the most immediate socio-economic variables affecting individual household food security-that is household structure and income base. The study also explored strategies that can enhance

household food security in the study area. The study was done in Juba Valley Basin in Southern Somalia. The region was chosen for the reason that it has been breadbasket of Somalia in both irrigated and rain-fed agriculture as well as hub of Somali's cattle and camel production which were the backbone of the Somali economy. Despite being the breadbasket of Somalia, the region failed to even feed its own 1.2m population.

To achieve these objectives, the study adopted a complex multistage probability sampling procedure including Purposive Sampling, simple Random Sampling and Systematic Random Sampling for selecting 368 households for the study. The study employed household interviews, key informant interviews, focus group discussions, literature review and direct field observation methods to collect data. The severity of hunger, the state of food security and vulnerability of the households were measured using the standard Household Food Security Access Scales (HFIAS). Socio-economic determinants of food security in the area were analyzed using mixed regression methods. First, the study described the socio-economic characteristics of the household food security among sample household groups by using descriptive statistics and analysis. Secondly, the study identified factors that influence the household food security using binary logit model of regression. The data collected were analyzed using logistic regression method to identify the significant socio-economic variables causing household food security. Qualitative data was also gathered to complement the findings from the regression outputs.

5.2.1 Current State of household Food Security in the Study Areas

The finding of household food security state measured using the household food security access prevalence showed that 75% of households were severely food insecure. Food security measured based on the household food security access-related domains revealed that 80% of the households fall in domain 1 of the food security classification where households are worried and anxious about food. Likewise, 84% of the total households fall in domain 2 of the access-related domains, indicating that these households eat insufficient quality foods where they eat less preferred foods due to lack of resources within their means. Moreover, the access-related measure found that 85% of the households are in domain 3 category of the access-related domains implying that these households experience hunger because they reduce on the number of meals per day, scale down the quantity to eat in a meal, spend a whole day hungry, go to bed hungry and some spend 24 hours without any food to eat. In terms of the hunger severity, it was found that 34% of the households suffer little or no hunger at all, while 28% experience moderate hunger, and 38% are faced with severe hunger, according to the household hunger scale. A majority of the respondents (18.7%) blamed factors constraining food sufficiency on recurrent droughts where 16.5% stated that pests and diseases were big problem for crop production. Lack of fertilizers, appropriate seeds and farm implements/tools (12%, 10.7% and 14%, were among some of the concerns of the study respondents.

5.2.2 Effect of Household Structure on Food Security

The socio-economic factors that lead to household food security were also investigated using the binary outcomes of the household food security access-related domains. The logistic regression model output with HFIA domain1 outcome variable identified that

household head's gender and age group are significant (p-value < 0.05) household structure variables plunging households into worrying and becoming anxious about food.

5.2.3 Effect of Household Income on Food Security

The findings indicate that income as a standalone variable was not significant in influencing household food security (p-value > 0.05), but its confounding variables such as households' main source of food, credit acquisition for food and seed shortage were significant variables (p-value < 0.05) at influencing household food security. The model output with HFIA domain 2 as outcome variable estimated that the gender of the household head, age and marital status were significant (p-value < 0.05) household structure variables at influencing household food security. However, income was not found to be a significant variable (p-value > 0.05), but its closest associate, debt acquisition was (p-value < 0.05). Finally, the model output with HFIA domain 3 as an outcome variable again revealed that household head's gender and age were significant (p-value < 0.05) among the hypothesized household structure variables. Once again, income as a variable was not significant (p-value > 0.05), but its derivative, credit for food was instead significant (p-value < 0.05).

5.2.4 Strategies for Enhancing household food security in Somalia

Enhancing household food security in Somalia has been threatened by multi-dimensional factors. Some of these are at the micro household level, while some at the macro level. Their collective effects lead to deep food security with the crisis escalating among households. Despite every indicator that Southern Somalia can become food secure, the achievement of this has been drastically hindered by several seemingly perpetual challenges facing the area since the early '90s- that is the collapse of the state. The

understanding of these challenges, within their local context and the critical examination of the thoughts of previous studies, have been collectively used to suggest possible remedies to the perturbing food security prevalent among households in the study area in particular, and Somalia in general. It is a central tenet of this study that building on traditional farming structures, using what people know and can do for themselves and going at their own pace are the best approaches to reconstruct food security in the Juba basin in Somalia. The study identified and proposed strategies that can enhance household food security based on empirical data from the study, as well as complemented with evidence from recent previous studies that were found to be authentic and add value to the body of knowledge about household food security in the study area.

5.3 Conclusions

The study concludes that the main socioeconomic factors influencing household food security were gender of the household head, age, marital status, disability condition of the household head, households' main source of food, lack of access to credit, seed shortage, food source, debt for food. Income, as an economic factor, is one of the most hypothesized variables influencing food security among households. In this study, it was found that income as standalone was not a significant factor (p-value > 0.05) in determining household food security. Besides the above variables estimated using regression models, intervening variables that have been found to greatly contribute to food security were political instability felt in the study area, the frequency and severity of climate shocks that have resulted in crop failure, depletion of livestock, rising food prices, deteriorating purchasing power, lack of access to the market due to destroyed physical infrastructure such as roads and bridges, destruction of irrigation infrastructure

and lack of social services delivery, and lack of improved seeds. Despite their importance, factors such as occupation, household size, number of dependents, land size, river access, irrigation and seed type, were not really significant according to the fitted model.

Agriculture was the backbone of the Somali economy where 70% of the country's population derive their livelihood from agriculture and related activities. Pre-state collapse data indicates that smallholder farming subsector constituted for 80% of the total agriculture outputs and 70% of marketed agricultural produce. Furthermore, the investing in this sector is key to ensuring household food security, job creation, income generation as well as hard currency earnings.

Unfortunately, the agricultural production system collapsed with the central government in 1991. Collapse of agricultural production system, lack of access to farm inputs, security, climate shocks, weak copping mechanism and the absence of the government planning role have undermined the livelihood potential of the farmers and threatened food access. Only 1.6% of Somalia's land mass is being utilized for agriculture currently. Most of the small-scale farmers are resource poor and without the capacity and resources to increase production and modernize their farming practices. Most households in the study area cannot afford the minimal basic needs. More importantly they cannot afford to educate their children, which further contribute to poverty by limiting the economic opportunities available to them. Currently, use of appropriate technology and inputs such as hybrid seeds, fertilizer, and pesticides, not to mention good agriculture practices, have been very limited, all of which contribute to declining agriculture productivity. Further, the frequency and severity of climate shocks that have resulted in crop failure and

depletion of livestock have resulted in deteriorating purchasing power which negatively related to household food security. Lack of access to agriculture inputs negatively related to food security in the study area.

Securing of the livelihoods of the people through agricultural research, technology adoption and dissemination, extension advisory services, provision of resistant crop varieties and high yielding varieties, establishment of farming early warning systems, improving animal genetic resources, improve physical infrastructure such as roads to connect JVB rural areas to towns, identification of feasible post-harvest technologies, capacity building in value addition and entrepreneurship for residents of JVB, mechanization for communities and agricultural commercialization are highly needed.

The government of Somalia should establish agriculture nation plan, policies and supportive to local producers than importers of food. The government should organize farmers in groups for bulk purchase and marketing, create national silos for grain storage to distribute back to the communities at prices that are not threatening to the local poor in case of food crises, and set annual targets to produce food that is sufficient to feed the nation. Efforts must be intensified to support these households through the provision of farm inputs, credit facilities with minimal interests. National mental model and attitudes towards farming need a total paradigm shift towards embracing agriculture as a meaningful economic activity rather than seeing it as an inferior sort of engagement for the least important societies in Somalia. This can be achieved through awareness campaigns and special programs to support and motivate the farmers in the South. the people to adopt new technologies and understand the knowledge behind modern farming

practices, and to tailor these technologies towards local contexts and maximize the use of indigenous knowledge that is beneficial for food production.

Infrastructure rehabilitation is very crucial for the revival of the agricultural sector of the economy. Roads need to be reopened, broken bridges repaired, market infrastructure refurbished and new ones constructed. All these will lead to improved access by the households for both inputs and outputs from and to the markets and the farms. A strategy to commercialize agriculture in the area is very important, and restoration of the irrigation schemes and rehabilitation of every infrastructure needed in order to produce food in the JVB is needed. Agricultural value chain management practices and post-harvest techniques should be taught in adult literacy programs so that the communities can fully participate in the value chain processes as income activities are currently limited among the communities. Business loan schemes and grants should be identified for access to the communities, especially women groups, so that they are able to augment the limited resources they have and engage more productively in addressing the widespread food security in the area.

5.4 Recommendations

Current state of household food security

Food security is one of many factors of household livelihood security and requires wider household livelihood considerations and understanding of dynamic and complex strategies to address it. Household livelihoods are secure when households have secure ownership of, or access to, resources, including assets, and income-earning activities to offset risks, ease shocks and meet contingencies. Gender of the household head,

households' main source of food, credit for food and seed shortages were the main socio-economic factors negatively influencing household food security.

Household Structure

Fourth five percent of this study respondents were female headed households. The results show the odds ratio of a female headed household to fall into the food insecure is 3.5 times more likely compared to a male with significant level of (p-value < 0.001). Women in the study area engage in small-scale and subsistence farming. They prepare farming land, weed and harvest. They sell farm produce to cover the cost of to feed, to clothe, to pay school fees of their children and also other family needs. The effect of female headed household on food security confirms the significant role of gender variable plays on food security. The results show the more female household head household, more the household is food security. Livelihood assets and options for women should be improved. This can be achieved by promoting and investing in women's income generating activities (IGAs) as well as providing micro-finance credits. Access to micro loans can create an opportunity to invest women's economic activity that generates income base to their families-thus food security.

Household Income

The model estimate of the odds ratio for household main source of food is 0.4 and was found to be significant (p-value < 0.05), implying that households whose main source of food is the market are only 0.4 times likely to get trapped into food security compared to those who rely entirely on own farm produced food. Considering the situation in this study area, this finding demonstrates that farming is currently practiced on minimal

subsistence scale, due to the risks amidst which these households live, and the limitations they face. Therefore, households that have the money to purchase food from the market are much more food secure compared to those that lack the necessary income to purchase food from the market and purely rely on food from their own farms. This can be achieved by providing micro-finance credits.

Strategies for household food security

Agriculture production was for both source food utilization and income for the households in the study area. Lack of access to agriculture inputs increases odds ratio of households' food security in the study area. Currently, seeds of poor quality are in use. Also seed shortages, insects and diseases are rampant. Post-harvest processing and storage practices are largely lacking. Provision of good quality seeds, provision of resistant crop varieties and high yielding varieties, provision of extension advisory and training services, pesticide treatment and post-harvest processing and storage practices are highly recommended to enhance food production strategies.

The lack of a robust private agricultural sector hampers the development of economical and efficient value chains for Somalia's agricultural produce. Some of the privet sector elements that need to be established further include; Agro-dealers, Seed producers. Agro-processing and Agro-machinery.

Also, agricultural value chain management practices and post-harvest techniques should be taught in adult literacy programs so that the communities can fully participate in the value chain processes as income activities are currently limited among the communities. Business loan schemes and grants should be identified for access to the communities,

especially women groups, so that they are able to augment the limited resources they have and engage more productively in addressing the widespread food security in the area.

The rehabilitation of Irrigation Canals very crucial for the revival of the agricultural sector. Broken bridges, and culvers need to be repaired. Water storage, Sluice gates and Silted up canals need to be refurbished and new ones constructed. In addition, the rehabilitation of key in fracture is very crucial for the revival of the agricultural sector. Roads need to be reopened, broken bridges repaired, market infrastructure refurbished, and new ones constructed. All these activities will lead to improved access, by the households for both inputs and outputs, to and from the markets and the farms. Because agricultural commodities are bulky, transportation of farm produce to the markets is inevitable and the infrastructure rehabilitation will stir the interest of starting commercial agriculture in the food producing regions of Somalia.

Lack of market for agricultural produce and food soaring food prices was found be one challenges facing farmers in study area. There's a general lack of production and marketing infrastructure for agricultural products. At present, there's no regulation/control of imported products and cheap food aid. Exploration of external markets for agricultural products is limited. There's need for Regulatory and national policy on Imported food and food Aid. Development of a market information and communication system for aggregating and disseminating is required.

5.4 Future Research

Based on the finding of this study, the following areas of research are recommended for future;

i. Research on agro-ecological condition and food security in Juba basin region

ii. A comparative study of soil fertility retention and socio-economic factors for food security in Juba basin region.

iii. A study on crops diversification as a strategy for environmental adoption for food security

iv. Technological adoption for food production and sustainability in Juba River basin.

REFERENCES

Abebaw, S., & Betru, T. (2019). A review on status and determinants of household food security in Ethiopia. Ethiopian Journal of Environmental Studies & Management, 12(5).

Adeloye, A. A. (2010). Global warming impact: flood events, wet-dry conditions and changing scene in world food security. Journal of Agricultural Research and Development (JARD), 9(1), 1–15. Retrieved from http://ajol.info/index.php/jard/about

Adeoti, A. I., & Egwudike, O. I. (2003). Determinants of household food security among urban farmers. ASSET - Series A: Agriculture & Environment, 3(3), 99–105. Retrieved from http://www.cabdirect.org/abstracts/20053043550.html

Adger, W. (2006). Vulnerability. Global Environmental Change.

Adger, W. N. (1999). Social vulnerability to climate change and extremes in coastal Vietnam. World Development.

Alinovi, L., Mane, E., & Romano, D. (2009). Measuring Household Resilience to Food Security: An Application to Palestinian Households. Retrieved from http://www.foodsec.org/fileadmin/user_upload/eufao-fsi4dm/docs/resilience_wp.pdf

AMISOM. (2010). The Somali Economy in Focus: Special Edition. Retrieved from http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&ved=0CCgQFjAA&url=http%3A%2F%2Famisom-au.org%2F%3Fwpdmact%3Dprocess%26did%3DMjIuaG90bGluaw%3D%3D&ei=xnUDU8eqOcjc2QWs1IEw&usg=AFQjCNHS2CzscZ3U3UVKOf3BDY_HB3qOCQ&sig2=YVtD6b9tSmW0bJdrW9zk-g&bvm=bv.61535280,d.b2I

Asenso-Okyere, K., Mekonnen, D. A., & Zerfu, E. (2013). Determinants of food security in selected agro-pastoral communities of Somali and Oromia Regions, Ethiopia. Journal of Food Science and Engineering, 3(9), 453.

AU. (2005). tatus of food security and prospects for agricultural development in Africa, AU. In African Union Ministerial Conference of Ministers of Agriculture, January 31-February 1, 2006, Bamako, Mali (p. 26). Retrieved from http://reliefweb.int/sites/reliefweb.int/files/resources/EA3EC4BDEDE74948C1257109004D10CD-au-afr-gen-1feb.pdf

Ayandiji, A., Ladipo, F. O., Ayansina, S. O., & Ajayi, W. O. (2012). Effects of family Income on household food security mong small scale farmers in Abeokta local government of Nigeria. In Globalization and socio-political economy of rural development, eighteenth annual congress of the Nigerian rural socio-political association (p. 7).

Bashir, M. K., & Schilizzi, S. (2013). Determinants of rural household food security: a comparative analysis of African and Asian studies. Journal of the Science of Food and Agriculture, 93(6), 1251–1258. http://doi.org/10.1002/jsfa.6038

Bashir, M. K., Schilizzi, S., & Pandit, R. (2012). Food security and its determinants at the crossroads in Punjab, Pakistan. Working Paper, School of Agricultural and Resource Economics, University of Western Australia, (1206), 23 pp. Retrieved from http://www.cabdirect.org/abstracts/20123316408.html

Bashir, M. K., Schilizzi, S., & Pandit, R. (2012). The determinants of rural household food security for landless households of the Punjab, Pakistan. Working Paper, School of Agricultural and Resource Economics, University of Western Australia, (1203), 13. Retrieved from http://www.cabdirect.org/abstracts/20123316408.html

Beyene, F., & Muche, M. (2010). Determinants of food security among rural households of central Ethiopia: an empirical analysis. Quarterly Journal of International Agriculture, 49(4), 299–318. Retrieved from http://www.agrar.hu-berlin.de/struktur/institute/wisola/publ/qjia/contents/2010/4-10/Beyene

Bindi, M., & Olesen, J. E. (2000). "Agriculture." In M. L. Parry ed. Assessment of Potential Effects and Adaptations for Climate Change in Europe: Summary and Conclusions : the Europe Acacia Project. Norwich, United Kingdom: Jackson Environment Institute, University of East Anglia (p. 17). University of East Anglia. Retrieved from http://books.google.co.ke/books/about/Assessment_of_Potential_Effects_and_Ada p.html?id=4_EXQwAACAAJ&pgis=1

Bioversity, CGIAR Consortium, FAO, IFAD, IFPRI, IICA, … WTO. (2012). Sustainable agricultural productivity growth and bridging the gap for small-family farms. Retrieved September 17, 2013, from http://www.oecd.org/tad/agricultural-policies/50544691.pdf

Bradbury, M. (1998). Normalising the Crisis in Africa | The Journal of Humanitarian Assistance. Retrieved September 17, 2013, from http://sites.tufts.edu/jha/archives/125

Burton, I. (2001). Vulnerability and Adaptation to Climate Change in the Drylands. Retrieved September 17, 2013, from http://204.200.211.31/contents/file/Vulnerability_and_Adaptation_to_Climate_Ch ange_in_the_Drylan.pdf

CAAL, C. A. (April 2010). Review and Identification of The Agriculture Programme for Somalia.

Carruth, L., & Mendenhall, E. (2019). "Wasting away": diabetes, food insecurity, and medical insecurity in the Somali Region of Ethiopia. Social Science & Medicine, 228, 155-163.

Chatterjee, B., & Kundu, S. (2011). Food security in Bangladesh: patterns, determinants, interventions and scope for regional cooperation. Man and Development, 33(3), unpaginated. Retrieved from http://www.cabdirect.org/abstracts/20123126652.html

Clay, E. (2002). Food security: concepts and measurement. Retrieved September 16, 2013, from http://ieham.org/html/docs/food_security_concepts_and_measurement.pdf

Clover, J. (2003). Food security in sub-Saharan Africa. African Secur. Rev., 12, 1–11.

Cohen, Robin. (1997). Global diasporas : an introduction. Seattle: University of Washington Press.

Collier, P. (2007). The Bottom Billion:Why the Poorest Countries are Failing and What Can Be Done About It. . New York: Oxford University Press.

Devereux, S. (2018). Food insecurity and famine. In Handbook of African Development (pp. 183-201). Routledge.

Devereux, S., & Maxwell, S., E. (2001). Food Security in Sub-Saharan Africa. Retrieved September 16, 2013, from http://www.odi.org.uk/publications/1677-food-security-sub-saharan-africa

Devereux, S., Baulch, B., Hussein, K., Shoham, J., Sida, H., & Wilcock, D. (2004). Improving The Analysis of Food Security. Food Security Measurement, Livelihood Approaches and policy:Applications in FIVIMS. Retrieved August 4, 2013, from http://portals.wi.wur.nl/files/docs/ppme/Final_Paper5.pdf

Downing, T., & Patwardhan, A. (2005). Assessing vulnerability for climate adaptation. … Policy Frameworks for Climate Change: ….

Easterly, W. (2007). The White Man's Burden: Why the West's Effort to Aid the Rest Have Done So Much Ill and So Littel Good. London, UK: Penguin Press.

Ericksen, P. (2008). Conceptualizing food systems for global environmental change research. Global Environmental Change.

FAO (1997). Agriculture, food and nutrition for Africa: a resource book for teachers of agriculture.http://www.fao.org/docrep/W0078E/W0078E00.htm)

FAO, SATG Filsan, & Ministry of National Resources. (2013). Strategic Options — Technical and Institutional — for Economic Sector Development (Agriculture , Livestock and Fisheries) in Somalia: Background Paper.

FAO. (1996a). Rome Declaration on World Food Security and World Food Summit Plan of Action. Retrieved September 16, 2013, from http://www.fao.org/docrep/003/w3613e/w3613e00.htm

FAO. (1996b). The state of Food and Agriculture. Retrieved September 16, 2013, from http://www.fao.org/docrep/003/w1358e/w1358e.pdf

FAO. (2002). The State of Food Security in the World. Retrieved September 16, 2013, from http://www.fao.org/docrep/003/w1358e/w1358e.pdf

FAO. (2003). The State of Food Security in the World 2003: Monitoring progress towards the World Food Summit and Millennium Development Goals. Retrieved from ftp://ftp.fao.org/docrep/fao/006/j0083e/j0083e00.pdf

FAO. (2005). Committee on World food Security: Thirty-first session. In International Alliance Against hunger: Food and Agriculture Organization of the United nations Thirty-first Session, Rome, 23-26 May 2005. Retrieved from http://www.fao.org/monitoringprogress/docs/CSF_May05_en.pdf

FAO. (2008). Integrated Food Security Phase Classification. Retrieved August 3, 2013, from http://www.fao.org/docrep/010/i0275e/i0275e.pdf

FAO. (2010a). The State of Food Security in the World; Addressing food security in protracted crises. Retrieved September 16, 2013, from http://www.fao.org/docrep/013/i1683e/i1683e.pdf

FAO. (2010b, May 22). A 5-Year Strategy and Plan of Action 2011-2015. Retrieved from http://faosomalia.org/uploads/FAO Somalia 5-year strategy.pdf

FAO. (2011). The State of the World's Land and Water Resources for Food and Agriculture (SOLAW): Managing systems at risk. Retrieved September 16, 2013, from http://www.fao.org/nr/water/docs/SOLAW_EX_SUMM_WEB_EN.pdf

FAO. (2014). The State of Food Security in the World. Rome: FAO.

Feleke, S. T., Kilmer, R. L., & Gladwin, C. H. (2005). Determinants of food security in southern Ethiopia at the household level. Agricultural Economics, 33(3), 351–363. http://doi.org/10.1111/j.1574-0864.2005.00074.x

FEWS NET. (2013). East Africa food Security Outlook April to September 2013.

FSAU. (2004a). Post Gu Analysis.

FSAU. (2004b). Technical Series Report No. IV.1 November 11, 2004. In Food Security Analysis Unit Strategic Development Retreat Technical Peer Review Workshop Proceedings (p. 32).

FSNAU. (2013). Food Security and Nutrition Analysis Post Deyr 2012/13. Retrieved September 16, 2013, from http://www.fews.net/docs/Publications/Somalia_SR_FSNAU_Post-Deyr_2012-13_Technical_Series_03_2013_en.pdf

Funk, C. C., & Brown, M. E. (2009). Declining global per capita agricultural production and warming oceans threaten food security. Food Security, 1(3), 271–289. http://doi.org/10.1007/s12571-009-0026-y

Garrett, J. L., & Ruel, M. T. (1999). Are determinants of rural and urban food security and nutritional status different? Some insights from Mozambique. World Development (Oxford), 27(11), 1955–1975. http://doi.org/10.1016/S0305-750X(99)00091-1

German Agro Action. (2004). German Agro Action Annual Report 2004. Retrieved April 25, 2015, from http://ghdx.healthdata.org/record/german-agro-action-annual-report-2004

Ghazvinian, J. (2007). Untapped: The Scramble for African's Oil-1st ed. Orlando, Florida, US: HARCOURT, INC.

Global Donor Platform for Rural Development. (2011). development : the search for coherence. Retrieved September 17, 2013, from https://community.oecd.org/servlet/JiveServlet/downloadBody/43180-102-1-80817/Wiggins%2C S. for The Global Donor Platform for Rural Development (2011)%2C Effective aid for agriculture and rural development the search for coherence.pd

Godfray, H. C. J., Beddington, J. R., Crute, I. R., Haddad, L., Lawrence, D., Muir, J. F., … Toulmin, C. (2010). Food security: the challenge of feeding 9 billion people. Science (New York, N.Y.), 327(5967), 812–8. http://doi.org/10.1126/science.1185383

GoK. (2011). National Food and Nutritional Security Policy. Nairobi: Agricultural Sector Coordination Unit.

Graham, R. D., Welch, R. M., Saunders, D. A., Ortiz-Monasterio, I., Bouis, H. E., Bonierbale, M., … Twomlow, S. (2007). Nutritious Subsistence Food Systems. Advances in Agronomy, 92, 1–74. Retrieved from http://www.sciencedirect.com/science/article/pii/S0065211304920019

Green, R. E., Cornell, S. J., Scharlemann, J. P. W., & Balmford, A. (2005). Farming and the fate of wild nature. Science (New York, N.Y.), 307(5709), 550–5. http://doi.org/10.1126/science.1106049

Groote, H. de, Rose, R., Tanner, C., & Bellamy, M. A. (1997). Women's income versus family income as a determinant for food security, an example from Southern Mali. In Issues in agricultural competitiveness: markets and policies. (pp. 12–22). Aldershot: Dartmouth Publishing Co. Ltd. Retrieved from http://www.cabdirect.org/abstracts/19981804705.html

Hays, J. (2008). The great famine: cannibalism, mass starvation and grain exports after the great leap forward, as many as 45 million dead. retrieved april 25, 2015, from http://factsanddetails.com/china/cat2/sub6/item2854.html

Hine, Rachel and Pretty, Jules (2007). Promoting Production and Trading Opportunities for Organic Agricultural Products in East Africa: Capacity Building Study 3: Organic Agriculture and Food Security in East Africa Centre for Environment and Society

Hussein, M., Law, C. and Fraser, I. (2021). An analysis of food demand in a fragile and insecure country: Somalia as a case study. Food Policy, Volume 101, 2021, 102092, https://doi.org/10.1016/j.foodpol.2021.102092

Hussein, W., & Janekarnkij, P. (2013). Determinants of rural household food security in Jigjiga district of Ethiopia. Kasetsart Journal, Social Sciences, 34(1), 171–180. Retrieved from http://www.rdi.ku.ac.th

IFAD. (2013). Smallholders, food security, and the environment. Retrieved September 17, 2013, from http://www.unep.org/pdf/SmallholderReport_WEB.pdf

IPCC. (1996). Climate Change 1995: The Science of Climate Change. Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change. Retrieved September 17, 2013, from http://www.ipcc.ch/ipccreports/sar/wg_I/ipcc_sar_wg_I_full_report.pdf

Jackson, R. a. (2007). Introductions to International Relations: Theories and Approaches, 3rd Edition . Oxford University Press

Jaspars, S., Adan, G. M., & Majid, N. (2019). Food and power in Somalia: business as usual? A scoping study on the political economy of food following shifts in food assistance and in governance.

Keatinge, J. D. H., Yang, R.-Y., Hughes, J. d'A., Easdown, W. J., & Holmer, R. (2011). The importance of vegetables in ensuring both food and nutritional security in attainment of the Millennium Development Goals. Food Security, 3(4), 491–501. http://doi.org/10.1007/s12571-011-0150-3

Kelly, P., & Adger, W. (2000). Theory and practice in assessing vulnerability to climate change andFacilitating adaptation. Climatic Change.

Khush, G. S., Lee, S., Cho, J.-I., & Jeon, J.-S. (2012). Biofortification of crops for reducing malnutrition. Plant Biotechnology Reports, 6(3), 195–202. http://doi.org/10.1007/s11816-012-0216-5

Lee, J. W., Shin, W. K., & Kim, Y. (2020). Impact of sex and marital status on the prevalence of perceived depression in association with food insecurity. PloS one, 15(6), e0234105.

Leichenko, R., & O'Brien, K. (2002). The dynamics of rural vulnerability to global change: the case of southern Africa. … and Adaptation Strategies for Global Change.

Little, P. D., Mahmoud, H., & Coppock, D. L. (2001). When deserts flood: risk management and climatic processes among East African pastoralists. Climate Research, 19(2), 149–159. http://doi.org/10.3354/cr019149

Masuku, M., Selepe, M., & Ngcobo, N. (2017). The socio-economic status as a factor affecting food (In) security in rural areas, uThungulu district municipality, Kwa-Zulu Natal, South Africa. Journal of Human Ecology, 58(1-2), 57-66.

Maystadt, J. F., Ecker, O., & Mabiso, A. (2013). Extreme weather and civil war in Somalia: does drought fuel conflict through livestock price shocks? IFPRI - Discussion Papers. Washington: International Food Policy Research Institute.

McMichael, A., Powles, J., Butler, C., & Uauy, R. (2007). Food, livestock production, energy, climate change, and health. The Lancet.

Menkhaus, K. (2012). No access: Critical bottlenecks in the 2011 Somali famine. Global Food Security, 1(1), 29-35.

Montani, A., & Omwega, A. (2002). Food utilization in Somalia. Retrieved from http://pdf.usaid.gov/pdf_docs/Pnado327.pdf

Moyo, Dambisa (2009). Dead Aid: Why aid is not working and how there is a better way for Africa. New York: Farrar, Straus and Giroux.

Muluken, Y., Bogale, A., & Negatu, W. (2008). Measuring rural household food security and its determinants in Assosa district of the Benishangul Gumuz region, Ethiopia. Quarterly Journal of International Agriculture, 47(4), 307–325. Retrieved from http://www.cabdirect.org/abstracts/20113278443.html

Munang, R. T., Thiaw, I., & Rivington, M. (2011). Ecosystem Management: Tomorrow's Approach to Enhancing Food Security under a Changing Climate. Sustainability, 3(7), 937–954. http://doi.org/10.3390/su3070937. My Library | Mendeley. (n.d.).

Munang, R., & Nkem, J. N. (2011). Using small-scale adaptation actions to address the food crisis in the horn of Africa: going beyond food aid and cash transfers. Sustainability, 3(9), 1510–1516. http://doi.org/10.3390/su3091510

Nhema, A. G. (2016). Modernization, Dependency and Structural Adjustment. International Journal of Social Science Research , 151.

Norgaard, R. B. (1984). Coevolutionary Agricultural Development. Economic Development and Cultural Change, 32(3), 525–546.

Omer, M. A. (2024). Climate variability and livelihood in Somaliland: a review of the impacts, gaps, and ways forward. Cogent Social Sciences, 10(1), 2299108.

Osbahr, H., Twyman, C., Adger, W. N., & Thomas, D. (2008). Effective livelihood adaptation to climate change disturbance: scale dimensions of practice in Mozambique. Geoforum.

Oxfam. (2011). Briefing on the Horn of Africa Drought: climate change and future impacts on food security., 5 pp. Retrieved from http://www.oxfam.org/sites/www.oxfam.org/files/briefing-hornofafrica-drought-climatechange-foodsecurity-020811.pdf

Oxfam. (2012). Food Crisis in the Horn of Africa: Progress Report July 2011-July 2012. Retrieved September 17, 2013, from http://www.oxfam.org/sites/www.oxfam.org/files/er-horn-of-africa-2011-2012-progress-report-050712-en.pdf

Pinstrup-Andersen, P. (2009). Food security: definition and measurement. Food Security, 1(1), 5–7. http://doi.org/10.1007/s12571-008-0002-y

Ramankutty, N., Evan, A. T., Monfreda, C., & Foley, J. A. (2008). Farming the planet: 1. Geographic distribution of global agricultural lands in the year 2000. Global Biogeochemical Cycles, 22(1), n/a–n/a. http://doi.org/10.1029/2007GB002952

Reutlinger, S. (1985). Food Security and Poverty in LDCs. Finance and Development, 22(4), 7–11.

Rhodes, M. B. (2002). Interpretive Theory", In Theory and Methods in Political Science 2nd ed., edited by David March and Gerry Stoker . New York, Hampshire: Palgrave Macmillan: Houndmills, Basingstoke.

Ribot, J. C., & Peluso, N. L. (2003). A theory of access. Rural sociology, 68(2), 153-181.

Riely, F., Mock, N., Cogill, B., Bailey, L., & Kenefick, E. (1999). Food Security indicators and Framework for the Use in the Monotoring and Evaluation of Food Aid Programs. Retrieved August 2, 2013, from http://portals.wdi.wur.nl/files/docs/ppme/fsindctr.pdf

Sachs, J. D. (2005). The End of Poverty: Economic Possibilities for Our Time. New York: Penguin Books.

Said, M., & Bashir, A. (2023). Analysis of Climate Change Impacts on Food Security in Somalia.

Sanchez, P. A., & Leakey, R. R. . B. (1997). Land use transformation in Africa: three determinants for balancing food security with natural resource utilization. European Journal of Agronomy, 7(1/3), 15–23. http://doi.org/10.1016/S1161-0301(97)00034-8

Schipper, E. (2007). Climate change adaptation and development: exploring the linkages. Tyndall Centre for Climate Change Research ….

Simelane, K. S., & Worth, S. (2020). Food and nutrition security theory. Food and Nutrition Bulletin, 41(3), 367-379.

Simmons, Anna (1995). Networks of Dissolution: Somalia underdone (Colorado: Westview Press Inc)

Singh, I., Squire, L., & Strauss, J. (1986). Agricultural household models: extensions, applications, and policy. In Agricultural household models: Extension, application and policy : Inderjit J. Singh, Lyn Squire and John Strauss, eds. (Johns Hopkins University Press, Baltimore, MD, 1986) pp. xi+335. Johns Hopkins University Press. Retrieved from http://www.cabdirect.org/abstracts/19876704081.html?freeview=trueSTAG. (2012) http://satg.org/

Thomas., T. A. (2000). Poverty and Development into the 21st Century. The Open University.

Thompson, J., & Scoones, I. (2009). Addressing the dynamics of agri-food systems: an emerging agenda for social science research. Environmental Science & Policy.

Treakle, H. C. (1989). THE AGRICULTURAL ECONOMY OF SOMALIA. WASHINGTON, D.C. 20250: UNITED STATES DEPARTMENT OF AGRICULTURE.

Tschirley, D. L., & Weber, M. T. (1994). Food security strategies under extremely adverse conditions: the determinants of household income and consumption in rural Mozambique. World Development (Oxford), 22(2), 159–173. http://doi.org/10.1016/0305-750X(94)90067-1

UN. (1948). United Nations Universal Declaration of Human Rights 1948.

UN. (2002). Consolidated Inter-Agency Appeal for Somalia 2002. Retrieved September 17, 2013, from http://reliefweb.int/report/somalia/consolidated-inter-agency-appeal-somalia-2002

UNDP. (2001). Human Development Report Somalia 2001. Retrieved September 17, 2013, from http://hdr.undp.org/en/reports/nationalreports/arabstates/somalia/Somalia_2001_en.pdf

United Nations Economic Commission for Africa. (2014). Country Profile: Somalia.

USAID. (1992). Policy Determination 19: Definition of Food Security. Retrieved September 17, 2013, from http://transition.usaid.gov/policy/ads/200/pd19.pdf

Vink, N. (2012). Food Security and African Agriculture. South African Journal of International Affairs, 19(2), 157-177.

Vogel, C., & Moser, S. (2007). Linking vulnerability, adaptation, and resilience scienceto practice: Pathways, players, and partnerships. … Environmental Change.

Vogel, C., & Smith, J. (2002). The Policy of scarcity: Conceptualizing the current food security crisis in southern African. S. Africa J. Sci., 98, 315–31. Retrieved from http://www.icidr.org/jeiad_vol5_no1_ april2013/Climate Variability and its Implications on Rural Household Food Security in Nigeria.pdf

Vorley, B., del Pozo-Vergnes, E., & Barnett, A. (2012). Small producer agency in the globalized market: Making choices in a changing world. Retrieved September 17, 2013, from http://pubs.iied.org/pdfs/16521IIED.pdf

Watts, M. J., & Bohle, H. G. (1993). The space of vulnerability: the causal structure of hunger and famine. Progress in Human Geography, 17, 43–67. http://doi.org/10.1177/030913259301700103

Wesche, S. D., & Chan, H. M. (2010). Adapting to the impacts of climate change on food security among Inuit in the Western Canadian Arctic. EcoHealth, 7(3), 361–373.

World Food Conference. (1974). Declaration on the Eradication of Hunger and Malnutrition. Retrieved April 25, 2015, from http://www.ohchr.org/EN/ProfessionalInterest/Pages/EradicationOfHungerAndMalnutrition.aspx

World Food Programme. (2007). Annual Report - World Food Programme, 2007: be part of the solution. Rome.

World Food Programme. (2009). Annual Report - World Food Programme 2009. Rome.

Zhou, D., Shah, T., Ali, S., Ahmad, W., Din, I. U., & Ilyas, A. (2019). Factors affecting household food security in rural northern hinterland of Pakistan. Journal of the Saudi Society of Agricultural Sciences, 18(2), 201-210.

Ziervogel, G., Nyong, A., & Osman, B. (2006). Climate variability and change: implications for household food security. … to Climate Change (….

APPENDICES

Appendix I: Household Survey Questionnaire

Introduction

Good day! My name is Ali Ahmed, a doctorate student at Mt. Kenya University. I am carrying out a study on the socio-economic determinants of food security in this area. Through random sampling, your household has been selected for the study. Kindly spare your time for this exercise. I assure you that whatever we discuss will be treated with utmost confidence.

Thank you.

Do I have your consent now to proceed? YES ☐ ☐

SECTION A: ADMINISTRATIVE

DATE OF THE INTERVIEW: ---------/--------/2014

DATE /MONTH

TIME STARTED:_____TIME ENDED_____

REGION: _____DISTRICT: _____ VILLAGE: _____

INTERVIEWEE'S NAME: _____

INTERVIEWER NAME_____

SIGNATURE OF INTERVIEWER: _____

NAME OF DATA ENTRY CLERK_____

SECTION B: HOUSEHOLD FOOD SECURITY			
No.	Questions	Response options	Code
1.a	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1 = Yes	|____|
1.b	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|____|
2.a	In the past four weeks, were you or any household Member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1=Yes	|____|
2.b	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|____|
3.a	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q4) 1=Yes	|____|
3.b	How often did this happen?	1 = Rarely (once or twice in the past four weeks)	|____|

		2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
4.a	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0 = No (skip to Q5) 1=Yes	|____|
4.b	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|____|
5.a	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q6) 1=Yes	|____|
5.b	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|____|
6.a	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0 = No (skip to Q7) 1=Yes	|____|
6.b	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks)	|____|

		3 = Often (more than ten times in the past four weeks)	
7.a	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No (skip to Q8) 1=Yes	|____|
7.b	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|____|
8.a	In the past four weeks, did you or any household members go to sleep at night hungry because there was not enough food?	0 = No (skip to Q9) 1=Yes	|____|
8.b	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|____|
9.a	In the past four weeks, did you or any household members go a whole day and night without eating anything because there was not enough food?	0 = No (Stop) 1=Yes	|____|
9.b	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|____|

SECTION C: HOUSEHOLD STRUCTURE	
Q1. Gender of the Household Head	Male 2. Female
Q2. The age of the Household Head	Age_____
Q3. What is the size of the household?	1. Number of Males____ 2. Number of females____
Q4. The marital status of the head of this household? Circle one	1. Unmarried 2. Married 3. Widowed/widower 4.Divorced 5. Abandoned 6. Other_____
Q5. Is the head of the household disabled?	Yes 2. No
Q6. What is the level of formal education of the household head?	No formal education 2. Primary 3. Secondary 4. Tertiary
Q7. How many members are in this household by the following age categories?	Below 18 years |___| 18 years & above |___|
Q8. Do your children go to school? If yes, number of boys and girls	Yes 2. No Number of Boys _____ Number of Girls _____

Q9. Who makes the major decision on food production/storage/purchase in this household?	Husband |___| Wife |___| Mother |___| All |___|
Q10. Does your tradition and belief permit females to own assets and make decisions on them?	Yes |___| No |___|
Q11. How many children do you think a family should have?	|___|

SECTION D: HOUSEHOLD INCOME	
Q1. What is your main occupation?	Agro-pastoralist b) Pastoralist c) Arable Farmer d) Middle level trade e) Petty trade f) Professional employment g) Casual labour h) Unemployed i) other (specify)
Q2. How many adults in your household work?	1. Men _____ 2. Women _____
Q3. What assets does your household possess? (indicate quantities where applicable)	Livestock (Cattle ____ Shoats ____ Donkeys___ Chickens____) Land (_____ acres) Business (specify) _____ Carpentry tools (Worth Somali Shillings) _____ Vehicle (Worth Somali Shs) _____ Other automobile (S. Shs) _____ Other (Specify) _____ No assets
Q4. What is the household's main source of income (Indicate monthly income per month)? (Multiple Responses are applicable)	Livestock &/ or product sales (Shs. _____) Farming/crop sale (Shs _____) Petty trade (Shs _____) 4. Casual/labour wage (shs_____) 5. Skilled/salary (Shs _____) 6. Remittance (Shs _____) 7. Self-employment (bush products/handicraft/water sales, etc.) (shs _____) 8. Gifts/zakat (shs _____) 9. .Humanitarian assistance (shs _____) 10. Fixed asset sales (house, land) (Shs _____)

	11. Begging (shs _____) 12. Debt (Shs _____) 13. Other (specify) (Shs _____)
Q5. What is the household's main source of food?	Own food production 2. Food aid 3. Buy food 4. Begging 4. Other (specify) …….....
Q6. How many meals does your household consume per day?	Adults _____ 2. Children _____
Q7. What is the household's main source of drinking water?	Household connection 2. Standing pipe 3. Tanker 4. Donkey tank 5. Spring 6. Bottled water 7. River water 8. Other _____
Q8. What were your main sources of energy for cooking in the last three months?	1. Firewood _____ 2. Charcoal_____ 3. Electricity_____ 4. Gas 5. Other (specify) _____
Q9. Is your farm irrigated or rain-fed?	Irrigated 2. Rain-fed
Q10. What is the distance from farm to Juba River	Distance: _____km
Q11. What crop did you produce last year (2013) and what were your sales of these crops in that year?	Crops produced_____ Sale value_____
Q12. Did you farm your plot this year 2014?	Yes 2. No
If no, what is the reason for not farming?	1. Drought 2. Lack of seeds 3. Shortage of tractor service 4. Shortage of labor 5. Poor soil fertility 6. Others_____
If yes, what was mainly used to plough the plot?	Ox 2. Donkey 3. Camel 4.Tractor 5. Manual labor 6. Other (specify) ----------
Q13. What type of crop(s) do you grow? Circle all that apply?	Maize 2-Sorghum 3-Sesame 4- Cowpeas 5-list fruit types _____ 6-list vegetable types _____ 7-others (specify) _____
Q14. Did you use improved seed for planting the plot?	Yes 2. No
Q15. Have you faced seed shortage this year or last year?	Yes 2. No
Q16. Which of the following farm tools do you own? Circle all that all apply	Axes 2. Plough tips 3. Hoes 4. Sickles 5. Yoke Shovels 7. Forks 8. Animal drawn cart 9. Ploughs 10. Other (specify) _____
Q17. How many months does your harvest feed your family during bad year and good years?	Months in good years ..... Months in bad years .....

Q18. a) Do you receive food relief? Yes |___| No |___|

If yes, how often?

Whenever there is shortage |___|

Only sometimes during shortages |___|

Even when there are no shortages |___|

Q19. In your opinion, do you think food relief can lead to food dependency?

Yes |___| No |___|

Q20.When you have no food what do you do?

Buy from the store |___| Get from neighbours and relatives |___|

From local authority (relief) |___| From a development partner (relief) |___|

Sell livestock |___| Other (specify) _____

Q21. a) Have you ever incurred debts because of food shortage?

Yes |___| No |___|

If yes in a), how much do you owe currently? _____ (Somali Shillings)

Q22. Have you ever sold your property because of food shortage?

Yes |___| No |___|

Q23. Do you get any remittances from relatives during food shortages?

Yes |___| No |___|

SECTION E: IMPROVING FOOD SECURITY

Q1. List the most limiting factors in crop production in your area, starting with the most. (Use the chart keys)

#1 Limiting Factor	#2 Limiting factor	#3 Limiting Factor	#4 Limiting Factor	#5 Limiting Factor

Factor Key:

Cause	Very much	Somehow	Not sure	No
Poor rainfall				
Local conflicts				
Reliance on food relief				
Poor farming methods				
Large family sizes				
No farming culture				
Lack of other means of income				
Other (Specify)				
Not sure about these factors				

Q3. Which of the following items do you need most to improve your current farm production levels?	Farm inputs (seeds, farm tools, et Water bump 3. Tractor service 4. Irrigation Cannel rehabilitation Other

1. *Shortage of labour 2. Low rainfall 3. Low market price 4. Fertilizer 5. Land tenure 6. Pests/disease / weeds*

7. Agricultural tools 8. Degraded land 9. Shortage of land 10. Shortage of appropriate seeds 11. Access to market

12. Tractor service 13. Other (specify) _____

Q2. How do the following influence food security in this area in general? Indicate magnitude

Q12. In your opinion, what should be done in order to address food security in the area?

_____

_____

THE END

Thank You

Appendix II: Key Informant Interview Guide – Government Agency

1. Generally, what would you say about the status of food security in southern Somalia (with special emphasis on the rural-poor farming and agro-pastoral communities along the Juba River basin)?
2. What reasons would you attribute the food security to in the area? (Justify your reason with clear evidence)
3. In your opinion as a government agent (with the challenges facing the area generally at the back of your mind), what do you realistically think can help improve food security in the area among the residents (both in the short term and long term)?
4. Do you and/or your other government departments have any interventions in trying to address the food security situation, as well as revive food production systems in southern Somalia? (State precisely these intervention areas/strategies in place or in the near future).
5. What would you say about the role of civil society in coping with the current situations of food security in the food producing areas of southern Somalia?
6. Any other comments on the discussed topic?

1

2

Appendix III: Key Informant Interview Guide – Civil Society Organizations

1. Generally, what would you say about the status of food security in southern Somalia (with special emphasis on the rural-poor farming and agro-pastoral communities along the Juba River basin)?
2. What reasons would you attribute the food security to in the area? (Justify your reason with clear evidence)
3. In your opinion as a civil society actor (with the challenges facing the area generally at the back of your mind), what do you realistically think can help improve food security in the area among the residents (both in the short term and long term)?
4. Do you and/or your close member organizations have any mandate in trying to address the food security situation, as well as revive food production systems in southern Somalia? (State precisely these intervention areas/strategies in place or in the near future).
5. What would you say about the role of government in coping with the current situations of food security in the food producing areas of southern Somalia?
6. Any other comments on the discussed topic?

3

Appendix IV. Discussion Questions for FGD and KII

Qn1. Food security is generally believed to be a big challenge in this community. What do you comment on this situation generally?

Qn2. How would you rate the level of food security in this community?

Qn3. Given that this community was formerly known for feeding the country and therefore called breadbasket of Somalia, what do you think were the contributing factors?

Qn4. Despite the war interferences, what other factors do you think contributed to the present sorry state of food security in the area?

Qn5. Do you think the community will embrace adoption of strategies for food production given a chance?

Qn6. What do you envision as a likely future of this community in the next 3-5 years in terms of food security?

Qn7. What are some of the fears you think the community still holds about the future of this area?

Qn8. What do you think can be done to improve food security in the area?

Qn9. How do you think these suggestions can best be implemented?

Qn10. Are there any other comments you would like to make?

Appendix V: Observation checklist – Somalia assessment

At the home:

- How much food can you see being stored in the household?
- Look to see at home – mainly men, women, children or elderly?

Children:

- Are there any children (or adults) that are very weak, obviously too thin and that have no energy to play?
- Are there any signs of any difference in malnutrition between the sexes of children?

Water source:

- What is the condition of the water source?
- Is there any queuing at the tap-stands? (Urban)
- Can you see any standing water or blockages in the drains (urban)

Livestock:

- Visible herd sizes & frequency of seeing herds?
- Describe the animal body condition
- Carcasses on the road

Production (agro-pastoral & riverine areas)

- What are the main production systems and crops in the area?
- What are the main crops produced within the area and at what stage of production?
- What other foods are available? Wild-foods?

Markets

- Where are the main markets?

- What are the national and local market mechanisms?

- Are shops trading? Which are trading?

- Which groups (livelihood, gender, ethnic) look to have better access to the goods and services in the market?

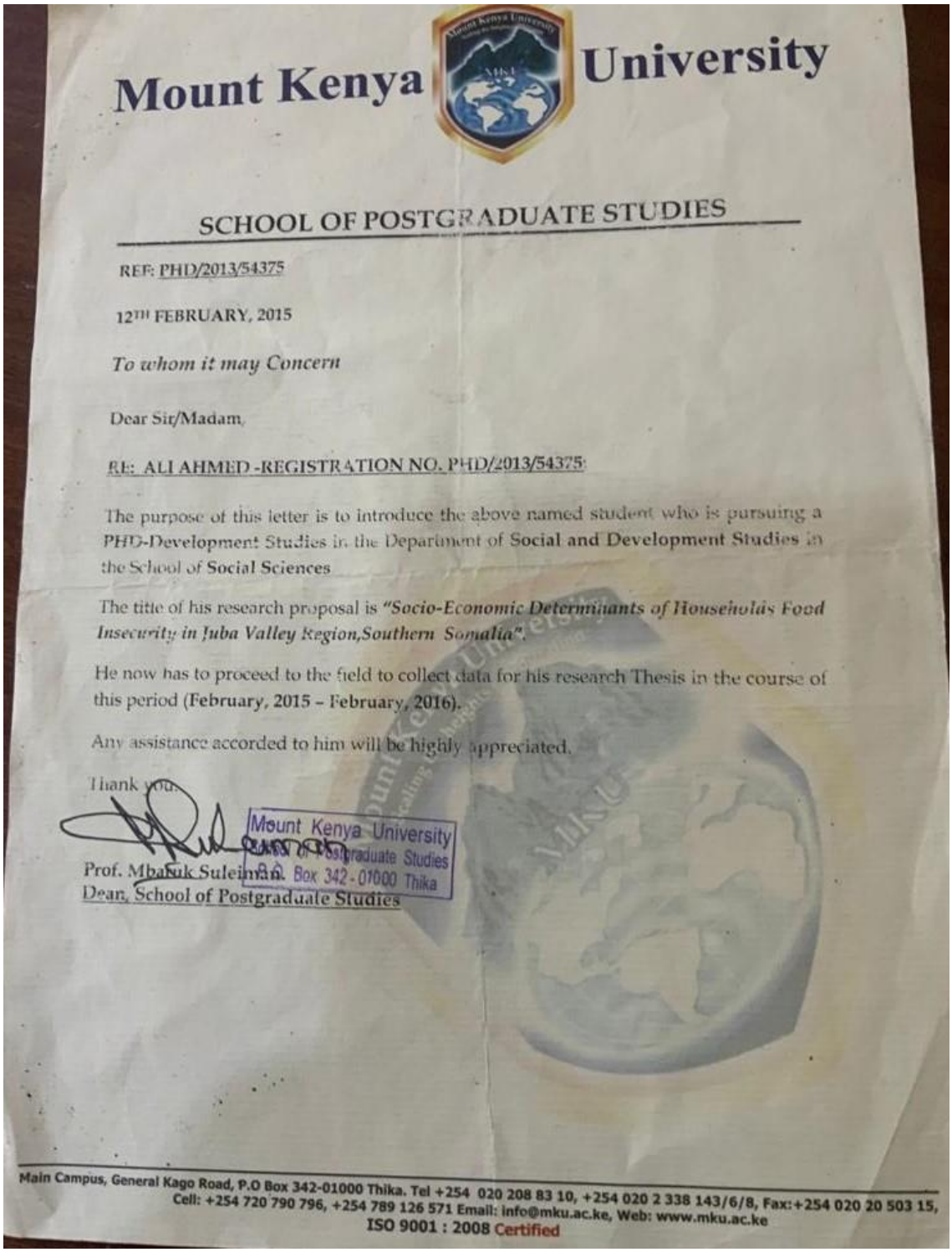
General:

- Describe the difference between the poorest and most wealthy groups?

- *Describe the division of labor and difference in responsibilities between men and women*
- *What inequalities in access to and control of resources between men and women can you observe?*
- Can you see any examples of differences between communities in the same livelihood zone? Describe them.

- What do you think can be done to protect the livelihood systems from future negative events?

Appendix VI: Postgraduate Studies Introduction Letter



Mount Kenya University

SCHOOL OF POSTGRADUATE STUDIES

REF: PHD/2013/54375

12TH FEBRUARY, 2015

To whom it may Concern

Dear Sir/Madam,

RE: ALI AHMED -REGISTRATION NO. PHD/2013/54375:

The purpose of this letter is to introduce the above named student who is pursuing a PHD-Development Studies in the Department of **Social and Development Studies** in the School of **Social Sciences**

The title of his research proposal is ***"Socio-Economic Determinants of Households Food Insecurity in Juba Valley Region,Southern Somalia"***.

He now has to proceed to the field to collect data for his research Thesis in the course of this period (**February, 2015 – February, 2016**).

Any assistance accorded to him will be highly appreciated.

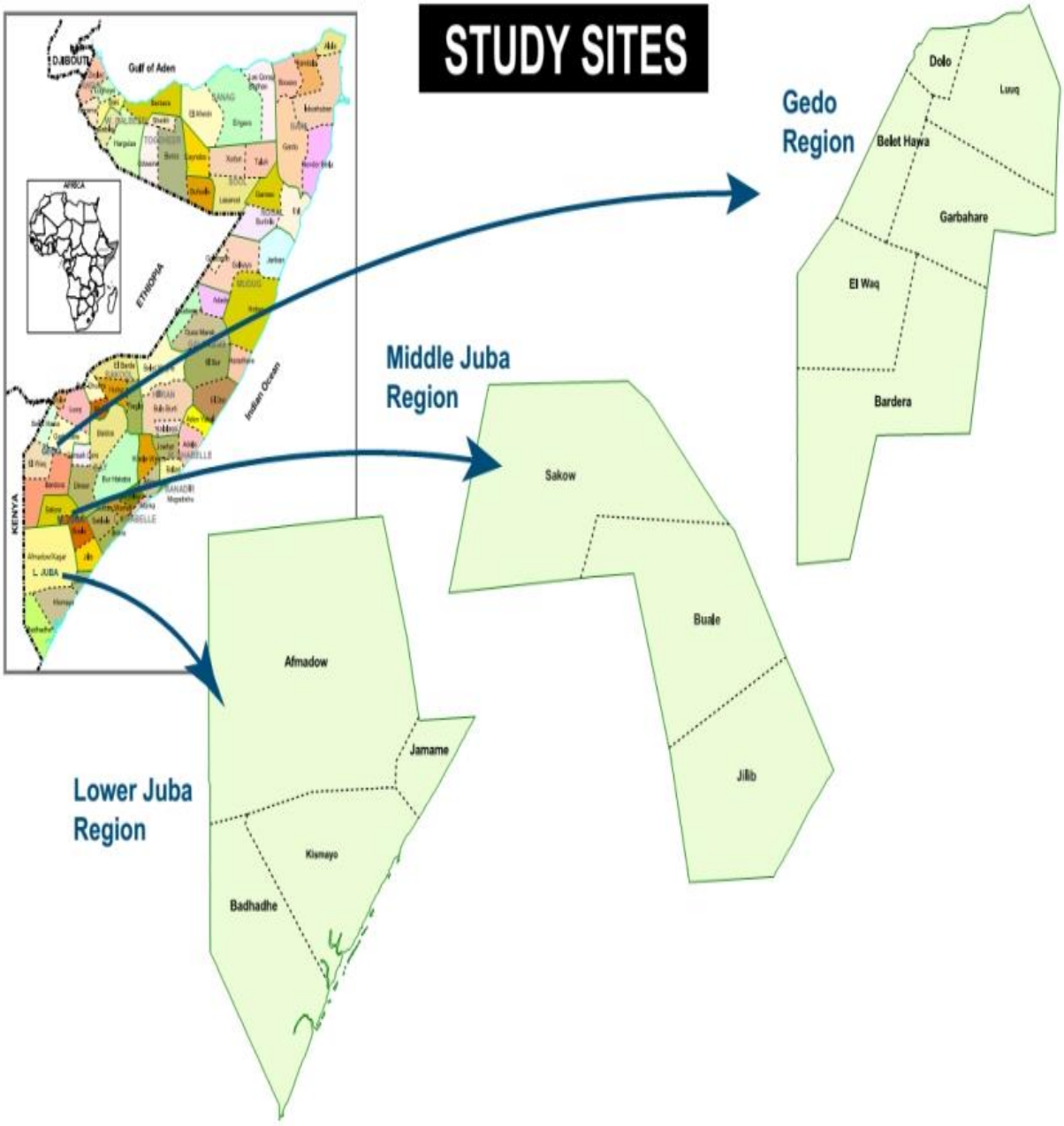
Thank you.

Mount Kenya University
School of Postgraduate Studies
P.O. Box 342-01000 Thika

Prof. Mbaluk Suleiman
Dean, School of Postgraduate Studies

Main Campus, General Kago Road, P.O Box 342-01000 Thika. Tel +254 020 208 83 10, +254 020 2 338 143/6/8, Fax:+254 020 20 503 15,
Cell: +254 720 790 796, +254 789 126 571 Email: info@mku.ac.ke, Web: www.mku.ac.ke
ISO 9001 : 2008 Certified

Appendix VII: Map of Study Sites



Appendix VIII: Plagiarism report

ANALYSIS OF SOCIO-ECONOMIC DETERMINANTS OF HOUSEHOLD FOOD SECURITY IN JUBA RIVER BASIN, SOMALIA

by Ahmed Ali

5TH SEPTEMBER 2023

Submission date: 25-Jul-2023 01:43PM (UTC+0300)
Submission ID: 2136564125
File name: FINAL_AHMED_ALI_THESIS_JULY_2023.doc (2.6M)
Word count: 50277
Character count: 279619

ANALYSIS OF SOCIO-ECONOMIC DETERMINANTS OF HOUSEHOLD FOOD SECURITY IN JUBA RIVER BASIN, SOMALIA

ORIGINALITY REPORT

15%	12%	9%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	storage.googleapis.com Internet Source	1%
2	vital.seals.ac.za:8080 Internet Source	1%
3	www.fao.org Internet Source	1%
4	etd.aau.edu.et Internet Source	1%
5	researchspace.ukzn.ac.za Internet Source	1%
6	erepository.uonbi.ac.ke Internet Source	<1%
7	Gunter Hemrich. "Matching Food Security Analysis to Context: the Experience of the Somalia Food Securitv Assessment Unit".	<1%
178	GR Joshi, NB Joshi. "Determinants of household food security in the eastern region of Nepal", SAARC Journal of Agriculture, 2017 Publication	<1%
179	Getachew Teferi Moroda, Degefa Tolossa, Negussie Semie. "Food insecurity of rural households in Boset district of Ethiopia: a suite of indicators analysis", Agriculture & Food Security, 2018 Publication	<1%
180	L. J. S. Baiyegunhi, B. B. Oppong, G. M. Senyolo. "Mopane worm (Imbrasia belina) and rural household food security in Limpopo province, South Africa", Food Security, 2016 Publication	<1%

Exclude quotes On
Exclude bibliography On
Exclude matches Off