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COLLEGE OF DEVELOPMENT STUDIES

CENTER FOR FOOD SECURITY STUDIES

FOOD SECURITY STATUS AND COPPING STRATEGIES OF AGRO
PASTORAL HOUSEHOLDS, IN KEBRI BEYAH DISTRICT, SOMALI
REGIONAL STATE, ETHIOPIA.

Mohamed Hussen Hassen

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OF SCIENCE IN FOOD SECURITY AND DEVELOPMENT

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ADDIS ABABA, ETHIOPIA.

DECLARATION

I, Mohamed Hussen Hassen, do here by declare to Addis Ababa University School of Graduate Studies that this Thesis is a product of my original research work, and it has not been submitted to any other university for any academic degree. Materials and information other than my own are dually acknowledged.

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ACRONYMS

CSA:	Central Statistics Agency
FAO:	Food and Agriculture Organization
FDRE:	Federal Democratic Republic of Ethiopia
FEWS:	Famine Early Warning System
GB:	Gigabyte
IFPRI:	International Food Policy Research Institute
KII:	Key Informant Interview
ODI:	Overseas Development Institute
OXFAM:	The Oxford Committee for Famine Relief
SES:	Socioeconomic Status
SRS:	Somali Regional State
UN:	United Nations
UNCHR:	United Nations High Commissioner For Refugees
USAID:	United States Agency for International Development
WFP:	World Food Program
WHO:	World Health Organization

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ABSTRACT

This study was carried out to identify food security status its determinants and coping strategies of agro pastoral households in kebri Beyah district of Ethiopia. Data used in this study were collected from 153 rural households, using purposive sampling technique. Household survey, field observations, key informant interviews and focus group discussions were utilized during primary data collection. Household food insecurity access scale was used to measure the food security accessibility of the household in the study area, Household Food Balance Model was used to measure the sample households' food security availability and compare the determinants of household food security and finally coping strategy index was used to identify the most practiced coping s in the study area. Besides, descriptive analysis was used including; mean, standard deviation and cross-tabulations of frequency distribution. The survey results of the study using HFIAS revealed that 80 percent of the households were food insecure, while 20 percent were found to be food secure. The main factors determining household food security status were identified as household demographic factors (sex, age, educational status and family size), economic factors (cultivated land size, farm oxen ownership, and remittance). And institutional factors (extension service, input availability and market availability). Hence, the main coping mechanisms adopted by household in the study area is used to increase household food availability through borrowing cash or grain from others and selling of more livestock than usual and limiting portion size at meal time are practiced by the largest portion of households livestock which is 88% and 66% and 58% respectively. Conversely skipping the entire day without eating and sending households to somewhere else 5%, and 11% respectively are the least practiced coping mechanisms in the study area.

KEYWORDS: Household, Food security/insecurity, determinants, dietary energy, coping mechanism, kebri Beyah.

CHAPTER ONE INTRODUCTION

1.1 Background of the Study

The issue of food security can be traced back to the 1972-1974 world food crises. And in 1984 the universal human rights declaration at least recognized the right to food as a core element of an adequate standard living (Marisol.S and Maxwell, 2002). Food security as a concept originated only in the mid-1970s, in the discussions of international food problems at a time of global food crisis. The initial focus of attention was primarily on food supply problems - of assuring the availability and to some degree the price stability of basic foodstuffs at the international and national level (Clay, 1998). Showing that nations can make their food available either by domestic production or through export to achieve food security; therefore availability and price stability of basic food-stuffs could ensure food supply at the international and national level(Meskerem and Degefa, 2015)

The number of individuals in the world that's affected by hunger as indicated by FAO's most recent estimates indicates that globally, 842 million people 12% of the global population were unable to meet their dietary energy requirements. Thus, around one in eight people is likely to have suffered from chronic hunger, not having enough food for an active and healthy life. The overwhelming majority of hungry people in the worldwide, 827 million of them live in the developing regions (Mota *et al.*, 2019).

Although there is a remarkable progress in economic growth and wel-fare improvement in the least developed countries over the last decades, food security has not been achieved in these countries. In particular food insecurity situations continue to create a deep problem in most of the sub-Saharan African countries. A report of the FAO estimates around a 10th of the global population, about 811 million people, were undernourished in 2020, around 282 million people are more undernourished in Africa (FAO, IFAD, UNICEF, 2021).

The reasons why Africa especially sub-Saharan Africa are suffering from food insecurity and failing to meet its nutrition needs is its growing population, lack of farmland management practices, recurrent drought, low domestic productions, conflicts, unchanging technology and the like (Meskerem & Degefa, 2015).

One of the causes of lack of peace and security in many sub-Saharan African countries today, coupled with the never-ending political instabilities and crises, is the ability to tackle down and overcome the existential challenges and threats such as food shortages and insecurity and widespread malnutrition on their own (FAO, 2017b).

In Ethiopia, food insecurity has been a significant problem for many years. Since the 1970s, a series of production failures have resulted in chronic food insecurity (Ayenew & Kopainsky, 2014). Even though food self-sufficiency has remained the stated goal of the Government of Ethiopia, the problem of food insecurity has continued to persist in the country. Due the recurrent drought and crop failures many rural households have already lost their means of livelihood (Feleke & Bogale, 2010). Somali region is one of the regions of the country, mostly affected by recurrent drought and food security problems. Food insecurity in the rural Somali region is subject to numerous shocks and stresses, including recurrent drought. Pastoralist and agro-pastoralist face higher risk than the urban household (Stout, 2014).

Kebri-Beyah which is one of the districts found in Somali regional state, food insecurity is a real and major problem. Therefore, it's found to be important to address the problem of food insecurity by identifying the major determinants of food insecurity. Hence the purpose of this study is to realize the food insecurity status, and coping strategies and also the major determinants of household food insecurity in the study area.

Kebri-Beyah were this study was carried out has low agricultural and livestock production and productivity due to numerous problems including irregular rainfall distribution, land degradation, poor farmland management practices. Also food insecurity is a real and major problem. Different studies undertaken in different parts of Ethiopia identify numerous determinants of household food security. For instance, household education status, sex of household head, family size, family labor, farmland size, farm oxen, livestock ownership, off-farm income, farm implements, access to market, farm inputs and rainfall distribution are mentioned in many of the studies (Mota *et al.*, 2019). Therefore, it's found to be important to point out the food security status and its major determinants in the study area.

1.2. Statement of the Problem

Despite the adequate food supplies at the worldwide level, many low-income countries experience food insecurity including African countries, Latin America , Middle East , South and South East Asia (Shapouri, 2002). Furthermore Several factors are found to be the drivers of food insecurity in Ethiopia like land degradation, limited household assets, low levels of farm technology, lack of employment opportunities and population pressure; adverse changes in climate and poor technology (Lemessa *et al.*, 2017). Rural households in Somali region are the foremost food insecure and are highly susceptible to shocks, by largely counting on rainfall, which determines the supply of water and pasture for livestock. Lowland areas in northern Somali are hooked in to the March-June Gu' (spring) rains and therefore the October-December deyr/hageya (autumn/summer) rains. Within the lowlands, inadequate or irregularly distributed rainfall affect crop production in agro-pastoral areas and cause poor livestock productivity, poor condition and increased susceptibility to disease, thereby increasing livestock mortality (FEWSNET, 2015).

Many of the Somali regional state districts are recognized as prone-drought areas where food insecurity situation is suspected from every season, in most parts of the Region, particularly those agro-pastoral areas under Fafan zone, where rangeland was captured by invasive plant species which complemented by the ever growing climate effect which successively caused to deepen food insecurity in many households (UNDP, 1999).

This research study is conducted in one the kebele of kebri Beyah District namely Labashaag. The study area, Kebri Beyah district being one among the eleven districts in Fafan zone, food insecurity is real and major problem. The matter of food insecurity among agro-pastoralists is believed to be caused mainly by low and erratic rainfall (Mohamed, 2016)

Agro-pastoralist communities are characterized by competition of water and grazing for livestock as of farm land. the most causes of food insecurity in the study area are associated with poverty and unfair rural development policies, lack and poor of technological trends, lack or poor institutional availability and recurrent droughts (Devereux, 2006).

Therefore the study found relevant information about the determinants of food security in the study area. In addition to that the study pointed out the numerous coping strategies that agro pastoral household's use whenever food shortages occur. Therefore, lack of enough farm land size and unable to seek out (being unavailable) of agricultural inputs such as fertilizer, sufficient seed plant, high yielding seeds and the like may be the reasons that agricultural production declines. Decreased production will then make households income very low and minimize the ability of the households to get and have access to food. Therefore the objective of this paper was to survey the food security status, its determinants and coping strategies of agro pastoral households.

1.3. Objectives of the Study

1.3.1 General objective

The general objective of the study is to assess the food security status, its determinants and coping strategies of agro pastoral household in kebri Beyah District.

1.3.2 Specific objectives

The specific objectives are to:

- Asses the food security situation of agro pastoral households in kebri Beyah.
- Analyze the determinants of food security in agro-pastoral households in the study area.
- Look in to the coping strategies agro-pastoral households against food insecurity in the study area.

1.4 Significance of the study

Fundamentally, this research study is done for academic intention. It is restricted to one district and is carried out at household level. In spite of its limited area coverage, the result of this study is considered to add some understandings compared to the agro pastoral household's food security situation at the national level generally and at household level specifically. The result of the study would also be a guide to understand the different coping strategies that's mostly practiced by the agro pastoral households in the district in order to make it easy for the governmental and nongovernmental interventions to the area. The result of this study would also be important to all the relevant sectors that are going to carry out projects that are associated to food security issues.

1.5 Limitations of the study area

The researcher experienced a number of problems in the data collection period. One of the main difficulties that was difficult to find enumerators at the right time, making the data collection time way longer than expected. In addition, due to the scattered respondents in different sites, and some of them refuse to give the details about their assets, and production level brought some limitations to the results of the study.

1.6 Outline of the study or organization of the study

This thesis is composed of five chapters. Chapter one deals with introduction, statement of the problem, objectives, significance and limitations, while chapter two presents the literature review. In the third chapter it is discussed methods of data collection and data analysis sample size determination and sampling techniques. Chapter four presents the findings of the study and finally chapter five propose conclusion and recommendation.

CHAPTER TWO: LITERATURE REVIEW

2.1 Concepts and definitions of food security

Food security could also be a versatile concept which has been continuously integrating new proportions and levels of study over the years, as reflected in many attempts of research and policy usage, due to this, food security issues have an extended history starting from the number that global food crisis happened within the half of the 1970s (Clay, 2002).

Food security being an idea that has evolved considerably over time and its definitions developed and diversified by different researchers, scholars and organizations. There are roughly about 200 definitions and 450 indicators of food security. Food security is such a sophisticated notion that it's virtually impossible to compute it directly, and different proxy measures are suggested. Consumption and expenditure, nutritional status, coping strategies are the foremost used measures of food security (Hoddinott, 1999).

It was with within the middle of 1970s when food security began to be seen as concept in international food problems discussions at a time of worldwide food crisis. Food supply problems were the first things to put attention on to primarily assure the availability and to point the price stability of some food staffs at international and national level. International contribution and institutional set of concerns reflected the changing organization of the global food economy that had took part in the crisis. A process of international negotiation followed, resulting to the world Food Conference of 1974, and a replacement set of institutional arrangements covering information, resources for promoting food security and forums for dialogue on policy issues (FAO, 2002).

According to world food summit (1996) Food security, at the individual, household, national, regional and global levels [is achieved] when all people, in the least times, have physical and economic access to sufficient, safe and nutritious food to satisfy their dietary needs and food preferences for a lively and healthy life (World Food Summit, 1996). Devereux et al, (2004) states that household food security indicates to when a household have the potential means to secure adequate food either by producing it from their own sources or from buying to meet the dietary need of every individual in the family. While household food insecurity are often found

as inadequate and unsustainable access to income and resources to satisfy basic needs (Devereux, 2004).

According to the above definition it can often be identified four key elements; availability which is about sufficient food supply; access covering economic physical and an social access to resources in need to acquire food; stability having access to adequate food in the least times and utilization which includes nutrition food safety clean water and sanitation (Schmidhuberand, 2007). Therefore food security only exists within the presence of the four dimensions mentioned in the above (Jones *et al.*, 2013)

2.1.1 Availability

The World Food Program defines availability as “The amount of food that's present at a rustic or area through all types of domestic production, imports, food stocks and food aid” (Russell et al., 2011). Reilly, *et al* (1995) “confirms that the term tends to be applied to food available at a regional or national level instead of at the household level, which can lead to some confusion as the word “availability” sometimes is used at the micro-level”(Reilly *et al.*, 1995)

2.1.2 Access

For many people a key factor that determines access to food is its affordability, The accessibility dimension embraces Sen’s core belief that food availability doesn't guarantee that everybody is free from hunger (Sen, 1981). Food affordability and economic accessibility are dependent not only on food cost but also on the disposable income that can be spent on food (FAO, 2013). Access is also determined by the way society allocates food to its members and food preferences (Stephen and Ingram, 2011). Access to food is primarily determined by incomes, food prices and the capability of households and individuals to find access to social support. Individuals’ access to food is additionally heavily influenced by social variables, including gender positioning and power hierarchies within households (FAO, 2013).

2.1.3 Utilization

The World Food Summit’s definition of utilization (the third element of food security) is “safe and nutritious food which meets their dietary needs”. The availability of and access to food on their own aren't enough, people need to be assured of “safe and nutritious food”. To lead a healthy and active life the food consumed has to provide sufficient energy for the consumer to

enable him/her to carry out the routine physical activities. Utilization also maintains factors including safe drinking water and adequate sanitary facilities to avoid in the spread of disease as well as of food preparation awareness and storage procedures. Therefore Utilization deals with great extent that depends on the consumer's understanding of what foods to select and how to prepare and store them (FAO, 1996).

2.1.4 Stability

Stability, the planet Food Summit states that stability must be present “at all times” in terms of availability, access and utilization for food security to exist. Stability rise the question are individuals at high risk of losing access to food for instance a person who don't have a land to cultivate and depends on agricultural wages in a region where there is unpredictable rainfall therefore such person is at high risk of finding work if crop failure happens and this will make him go hungry and food insecure (FAO, 1996). Stability plays a key element in being food secure therefore to be food secure a population, household, or individual must have an access to satisfactory and acceptable food in all times. There must not be any risk of losing access to food as a result of unexpected shocks. Therefore stability exists with the existence of both availability and accessibility of food security dimensions (Russell *et al.*, 2011).

2.2 Theoretical Literature Review

Depending on the time and existing situation so many theories have been introduced to explain about food insecurity. In addition to, acknowledging that there are many theories of food insecurity, it was declared that among the many theories of famine (food insecurity in this case) no one theory is superior or has the ability of excluding other theories (Wisner *et al.*, 1994).

The first theory to be reviewed describes that “the lack of political situations for an anti-famine contract revolve around authoritarian. tendencies that breakoff any existing democratic rights, thereby hindering timely and effective action to prevent famine, and can therefore be said to involve a famine crime” (Wisner *et al.*, 1994)

Food and agriculture organization states that in most settings, food insecurity and malnutrition arise from social and gender inequalities in the distribution of resources and in people's access to natural resources, inputs, credit, social protection, information and extension services (FAO, 2013)

Devereux s. (2002) argues that “all famines are explained by a mixture of ‘technical’ and ‘political’ factors, where political factors include bad government policies, failure of the international community to supply relief, and war.” Thus, this theory suggests that whenever official government authorities and even donors aren’t delivering what they need to, food insecurity could happen (Devereux *et al.*, 2002).

The second theory cares with food insecurity as an outcome of vulnerable livelihood. Accordingly, this theory explains that food insecurity could result when households fail to secure access to the various forms of assets, or when the mediating processes (i.e., institutions, organizations, and social relations at work) aren't serving what's expected and/or a mixture of those factors when interacting with the prevailing context (history, trends, and vulnerability/shock) (Degefa T, 2005).

The third theory is the climatic and environmental theory which deals with the fact that food insecurity happened with the possible increase of extreme events, in which natural hazards are magnified in intensity and frequency (Wisner, 2004). It was also discovered that deforestation, overgrazing, recurrent drought with the likelihood of a long-term decline in rain-fall in dry land farming areas in Africa and Asia, will cause decrease in agricultural production and worsen food insecurity”(Devereux, 2012).

2.3 Empirical Literature Review

2.3.1 Trends of food insecurity at Global and National level

Global trends

In every part of human history, we'll see repeated occurrence of famine going back to 400 B.C. But, the motives for famine during this era are mainly related to poor technology and economic progress (Fitzgerrald, 2013). The foremost famous famines in history happened in several parts of the world; in Ireland in 1845 because of devastating fungal potato mold mentioned as blight of potato; North Korea suffered a fantastic famine from 1994 to 1998 because of misguided leadership and flooding. Famine happened in Russia in 1921 caused by residual impact of world war I where farmers gave their food to the nation defenders; the Bengal famine of 1443 and 1770 because of drought and crop failure; Soviet Union famine within 1932 to 1933 thanks to

collectivization of land; Chinese famine from 1932 to 1933 due to harvest failures (Fitzgerrald, 2013)

Although many of the chronically food insecure countries like Ireland, and china have combated the matter through committed governance and development of the agricultural sector. For instance, owing to commitment of the gov't in research and extension advancement, potato diseases were removed and eventually food self-sufficiency ensured in Ireland. The revolution brought modern science in touch on a widening Asian food crisis within the 1960s. It contributed and solved the food problem and it contributed to considerable reduction in poverty and therefore the launching of broader economic process in many Asian countries (IFPRI, 2009).

National trends

Because of the severe droughts that remarkably affected the country's food production ability there were three major famines in Ethiopia in the years 1970s, 80s and 90s. It was estimated that close to 58 million people were affected by famine between 1973 and 1986 (Kumar, 1987). The drought in Northern part of Ethiopia started in the late 1960s with a number of years with shortage of rain fall or one that was below the average, reduced harvests that led up to the severe drought of 1973 to 1974 (Pankhurst, 2004). The government ignored the existence of food shortage and hunger incidence by selling a large amount of cereals in stock on the export market which leads to devastating situations (Pankhurst, 2004). When Derg as over thrown 1991, 52% of the Ethiopia's population was food insecure and were below the national food poverty level (FDRE, 2002).

Since the mid-1980s the worst famine that occurred in Ethiopia was the 2003 famine about one fifth of the population was affected and 13.2 million people survived on food aid. Every year an estimated 5 to six million people are considered chronically food insecure and between 2 and seven million additional people are deemed to be transitorily food insecure. Several factors are the drivers of food insecurity in Ethiopia including land degradation, limited household assets, and low levels of farm technology, lack of employment opportunities and population pressure; climate variability, lack of technology, and program implementation problems due the lack of experts have resulted in serious and growing problems of food insecurity in Ethiopia. Poor households are the foremost food insecure and that they are highly susceptible to shocks.

In many cases unemployed people, households with illiterate household head, old people with no help, and homeless people are the most food insecure in Ethiopia (Dermie S, 2006)

2.3.2 Causes Food Insecurity in Ethiopia

Population Growth

One of the major causes of food insecurity in Ethiopia is caused by rapid population growth. Ethiopia fails to feed relatively large proportion of population from its domestic production although more than 80 percent of the population is employed in agricultural production (Bikora, 2003). Even research shows people that are vulnerable to health problems are those that find difficult to get access to adequate food due to the population growth. Those health problems include Malnourishment, which encompasses undernourishment, diminishing people's ability to work, care for them, and exposes them to disease. Children, pregnant and lactating women, and aged adults are found to be the most vulnerable population to disease due to malnourishment (Ali and Yenenew, 2011).

Land Degradation and soil depletion

Farming takes place in often highly degraded and vulnerable environments where there is substantial loss of vegetation associated erosion and declined soil fertility, huge demand for natural resource including biogas has worsen to cause environmental degradation and decrease food production. Ethiopia in particular is vulnerable for soil degradation and has the highest rate of erosion caused by flood (Zelleke *et al.*, 2010).

Many researchers have acknowledged the varied factors contributing to soil depletion in Ethiopia including; erosion, total removal of left over after the crop has been harvested, using animal manure as a source of fireside to cook something instead of using it for input natural fertilizer, lack of suitable water soil and conservation, increasing deforestation, and increase (Keyzer and Sonneveld, 2001). Consistent with a study conducted by Zelleke *et al* (2010) shows that "The use of animal dung and crop residues for energy rather than soil fertilization results in the depletion of organic matters like organic carbon and other nutrients. Most of the agricultural production takes place within the highlands (above 1500 m). This is often where decreasing vegetative cover is extremely common. In three main forest regions of Ethiopia, 59,000 Ha forest per annum has been converted in to agricultural areas. The vulnerability of the land thanks to its

topography (steep slope) alongside poor cultivation practice causes soil losses to succeed in alarming level (Zelleke *et al.*, 2010).

Drought

According to Ayenew and Kopainsky (2014) Ethiopian agriculture depends mainly on rain fall. Therefore the amount of yearly rainfall is also highly variable and droughts are frequent in some parts of the country which severely influence agricultural production (Ayenew and Kopainsky, 2014)..

Within the country; according to FAO (2017) recurrent droughts in pastoral Ethiopia have exposed the critical feed shortage that prevails within the country. In the years between 2000 and 2017, six drought episodes have been registered, with the foremost recent two (in 2011 and 2016/17) devastating pastoral and agro pastoral livelihoods. Herders' continued reliance on natural, rain fed pasture; within the face of a number of things that are accelerating the scarcity of those resources has meant their livelihoods are less and fewer ready to deal with shocks like drought (FAO, 2017).

Also as found in the report presented by the consecutive poor/failed rains in 2016 and 2017 have affected highly pasture and water availability, causing high migrations, worsening livestock body conditions and weakened immune systems among livestock, resulting an increase livestock diseases among animals and further increasing mortality rates. Cattle Milk production has decreased by 80 percent, while also great losses have also been recorded in the milk production of camels and goats, raising serious concerns over already high malnutrition rates by the close link between milk consumption and human nutrition in pastoral communities (FAO, 2017).

2.3.3 Coping strategies against Food insecurity

Coping strategy, coping mechanism or coping technique are the actual responses to crisis on livelihood systems in the face of unwelcome situations, and are considered as short-term responses (Berkes and Jolly, 2001)

Maxwell D, (2008) pointed out that there are four sets of coping strategies that the households practice when they face food insecurity and don't have money or any other resources to buy food.

The first one is households may change their diet for preferred food to less preferred substitutes. Second option is attempting to increase supplies to using short term strategies such as borrowing, begging, consuming wild foods and the like. Third option is to reduce the number of people that they have to feed by sending some of them to other relatives or neighbors. The fourth and the most common is managing the shortfall by rationing the food available to the household through such actions cutting portion size, the number of meals, favoring certain household members over others, or skipping the whole day without eating (Maxwell, 2017).

Agro-pastoral households in Somali region have faced droughts and other repeated shocks like floods since time in memorial, nowadays the severity of drought has led the Somali agro pastoral households are internally displaced and face a humanitarian crisis, the drought has caused lack of access to clean and safe drinking water, unable to meet their basic needs also diminishing herds and dying of livestock. Pastoralists finding it hard to reconstitute sufficient herd size to help them have a semi-nomadic way of live while, drought and famine, gave difficult life to the agro pastoral societies as whole. Through time, agro pastoral households in Somali region have used their own coping strategies that can greatly contribute to managing droughts. These coping mechanisms differ from one pastoral group to another depending on the type of drought experienced, the type of geographical location and resources available to the pastoralists (FDRE, 2018)

At all levels of food security problems regardless if minor or severe, agro-pastoral households engage in various coping strategies. The less common engaged coping strategies include: to become a temporary trader, making traditional materials from trees and taking in to the towns to sell it, becoming a daily labor in the nearby places where constructions or buildings are taking place, by taking part in the food for work programs and by eating immature or wild foods were ever (Mohamed, 2016).

Agro-pastoral households in Ethiopia practice different coping mechanisms such as selling of livestock, farm employment, non-farm employment, and migrating to other areas, borrowing cash or grains collecting of wood and selling it, selling of charcoal, increase the consumption of immature and wild foods increase relying on remittances from close relatives, selling of clothes, and the like (Assefa, 2011).

2.4 Conceptual Frame Work

Determinants of food security as many literature reviews indicated include: Demographic factors containing the household head age, sex of the household head, household size. Variables like size of cultivated land, livestock ownership, number of oxen owned, remittance and income earned from off/non-farm activities and access to credit.

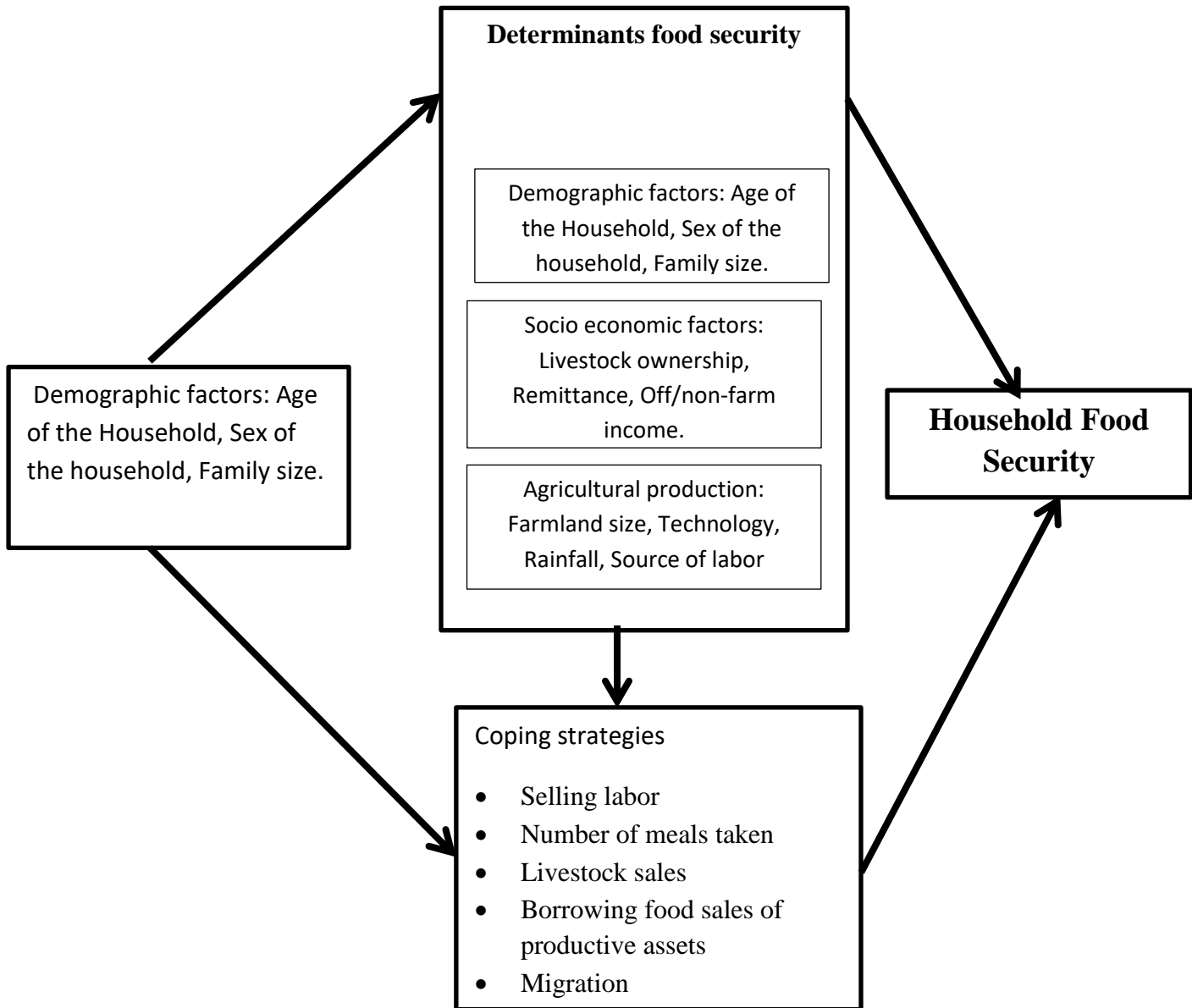


Figure 1 Conceptual framework of the study

Source: based on literature review

CHAPTER THREE METHODOLOGY OF THE STUDY

3.1 Description of the Study Area

Kebri Beyah (Somali: *Qabribayax*) district is one of the eleven districts of Fafan zone of Somali Regional State (SRS), located 50 km away from the regional capital town Jigjiga. Part of the Kebri Beyah is bordered on the south by the Degehabur Zone, on the southwest by the Fiq Zone, on the northwest by Gursum, on the north by Jigjiga and Awbare, on the northeast by Somaliland, and on the east by Harshin. The City administrative center is Kebri Beyah. The average elevation in this woreda is 1530 meters above sea level. As of 2008, Kebri Beyah has 55 kilometers of asphalt road, 48 of all-weather gravel road and 2642 kilometers of community roads. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this woreda has a total population of 165,518, of whom 89,703 are men and 75,815 women. While 25,493 or 15.4% are urban inhabitants, a further 19,806 or 11.97% are pastoralists (CSA, 2007).

Geographically it lays 90, 25' and 90, 44', North Latitude and 420, 43 and 430, 32' east Longitude. The total area of the district is 407,870 hectares; the largest ethnic group reported in Kebri Beyah was the Somali people with 160,785 or 99.0% of the total population being of Somali origin. 98.77% of the population said they were Muslim (CSA, 2007).

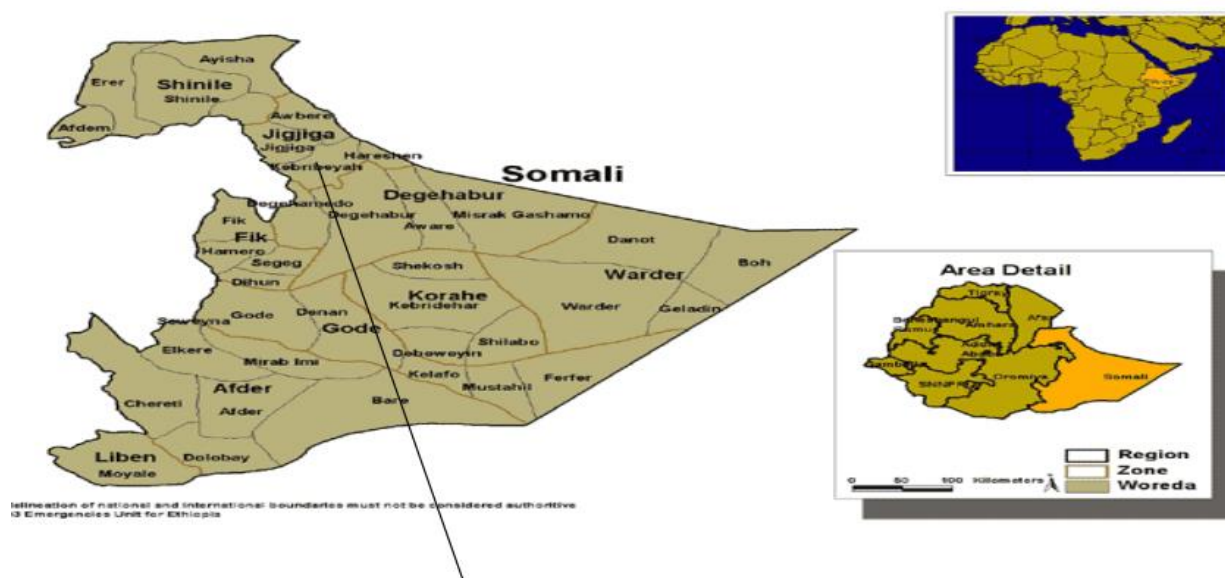


Figure 2 Map showing the description of the study area.

Source UN OCHA Ethiopia 2003

3.1.1 Farming system

The major agricultural crops produced in the study area are sorghum maize and wheat (cereal), and onion on the vegetable side. Most of the sample households in the study area do not have farm land for vegetables. Hence as revealed from the survey result every household within the study area have land for cereal production. As a result, 42.5%, 23.5%, and 34% of the sample households has grown was sorghum, wheat and maize respectively from their farm lands. A key informant interviewee addressed that the farming system in the district is characterized by agro-pastoral system. Cultivation is mostly carried out by using oxen ploughing and sometimes when available and affordable by using a tractor he also mentioned that agricultural production in this district is dependent on rain fed agriculture production. Stating that if is not received adequate amount of rain in the normal seasonal cycle farmers and livestock face drought and food shortages

3.1.2 Livestock production system

Livestock plays a big role within the agro-pastoral farming system of the study area. Livestock types kept by the farmers include camel, cattle, sheep, goats and donkeys. Oxen are kept to provide draft power, cows to provide farm households with milk and butter for consumption and sale, donkeys for transporting goods, while sheep and goats are mainly kept purchasable also as for his or her meat. The feed sources commonly used for livestock include natural grazing and crop residues.

The contribution of natural pasture as sources of feed is very limited due to the extensive coverage of the land by crops; livestock rearing is a source of income, way of life and their prestige which is closely correlated with the size of their herd. They enlarge their herd once they have surplus money and convert it to cash once they need money. They consider livestock like a bank especially camel. The major livestock production constraints are disease and lack of feed. Shortage of animal feed is closely associated with the wide spread resource degradation in the area. Crop fields fail to produce adequate bio-mass that supports the existing livestock. Forage trees in communal lands were destroyed due to increasing sell of fire wood and charcoal.

3.2 Research design and approach

The study used Cross sectional descriptive research design.to observe and measure the food security status and coping strategies of agro pastoral household in kebri Beyah.

3.3 Sample size determination and sampling techniques

In this research, purposive sampling technique was used. First, the District (kebri Beyah) was purposefully selected based on personal observation and previous exposure. Secondly, also the kebele (Labashaag) was selected purposively based on time, financial and infrastructure constraints. The selected rural kebele has a total population of 6300. (Water, Supply, 2020)

Sample Size Determination

The was sample size was determined by using the recommended formula by Yamane (1967)

$$n = \frac{N}{1 + N(e)^2}$$
$$n = \frac{6300}{1 + 6300(0.08)^2}$$
$$n = 6300/41.32$$
$$n = 153$$

Where

n=sample size

N=population size

E= level of precision which is 0.08

3.4 Tools of data collection

Since food availability and its access are critical to household food security, information was collected on the factors that play a role in limiting food availability and the options that households have for food access. In this study both primary and secondary data sources were used. Primary data was collected through survey using questionnaire based on the purposively selected 153 rural households in Labashaag kebele, Kebri Beyah district Kebeles. This study primarily relied on primary data which were collected by using a semi-structured interview questionnaire, key informant interview and focus group discussions. In addition to the questionnaire relevant Secondary data were collected from various sources. Also secondary data were collected from published documents, official websites and unpublished documents and also related literature were deeply reviewed.

3.4.1 Questionnaire survey

Questionnaire survey was conducted survey in order to gather quantitative information from the agro pastoral households in Labashaag kebele to statistically analyze their responses. Within this data collection 153 sample households were surveyed to collect information associated with food security status and coping strategies practiced in the area

3.4.2 Key informant interview (KII)

Key informant interview containing qualitative in-depth interviews were taken from persons or individuals that have a knowledge on what's going on in the. The purpose of the interview was to evaluate the environmental health and food security situation in the study area. Interview was taken from different people including kebele administrator and the head of the districts agricultural office.

3.4.3 Focus group discussion (FGD)

In the study area, a total of two focus group discussions were undertaken. There was supposed to be a third focus group discussion composed of both men and women, but this was unable to happen because of religious and traditional practices that women and men do not sit together because women are too shy to be in the same place with man because of the cultural practices in the area a grouped man and women cannot sit together and talk because women are too shy to talk or express their ideas freely in the presence of men. Thus, only 2 focus group discussions were done, one group composed of men and another group includes women each containing, five participants.

3.4.4 Household Food Insecurity Access Scale (HFIAS)

In this research household food insecurity was used measure the food security and households were asked 9 occurrence questions whether or not a specific condition associated with the experience of food insecurity ever occurred in the last four weeks or last 30 days. First the collected responses were coded in to 0 or 1 and the corresponding questions as 1,2 or 3 the minimum score of household is 0(to the household that answered no to all the questions) while the maximum is 27(those who responded yes to all the question and often to all the occurrence questions). The higher the score the more the household experiences food insecurity while the lower the more the household gets closer to being food secure. Based on the responses of the households HFIAS was categorized in four categories in the below table (1)

Table 1 HFIAS categories

category	Indicator
Food secure	If [(Q1a=0 OR Q1a=1) and Q2=0 and Q3=0 and Q4=0 and Q5=0 and Q6=0 and Q7=0 and Q8=0 and Q9=0]
Mildly food insecure	If[(Q1a=2 or Q1a=3 or Q2a=1 or Q2a=2 or Q2a=3 or Q3a=1 or Q4a=1) and Q5=0 and Q6=0 and Q7=0 and Q8=0 and Q9=0]
Moderately food insecure	If[(Q3a=2 or Q3a=3 or Q4a=2 or Q4a=3 or Q5a=1 or Q5a=2 or Q6a=1 or Q6a=2) and Q7=0 and Q8=0 and Q9=0]

Severely food insecure	If [Q5a=3 or Q6a=3 or Q7a=1 or Q7a=2 or Q7a=3 or Q8a=1 or Q8a=2 or Q8a=3 or Q9a=1 or Q9a=2 or Q9a=3]
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3.4.5 Household Food Balance Model

Household food balance model was used to measure the availability of food in the study area. The study used a modified form of a simple equation termed as household food balance model that's originally adapted by a (Degefa 1996) and thenceforth used by different researchers in this field (Meskerem and Degefa, 2015) and (Messay, 2010).

$$\text{NGA} = (\text{GP} + \text{GB} + \text{FA} + \text{GG}) - (\text{HL} + \text{GU} + \text{GS} + \text{GV})$$

WHERE

NGA = Net grain available/year/household

GP= Total grain produced/year/household

GB= Total grain bought/year/household

FA= Quantity of food aid obtained/year/household

GG= Total grain obtained through gift or remittance/year/household

HL= Post harvest loss/year/household,

GU=Quantity of grain reserved for seed year/household

GS= Amount of grain sold/year/household

GV= grain given to other within a year

After the data collection the households available food grain per year was converted in to kilograms and then by using food composition table for Ethiopia of it was converted in to kilo calorie(kcal) then it was compared with the national average daily kcal requirements (2100kcal).

3.4.6 Coping Strategy index

The CSI is applied to analyze the main household coping strategies to food shortage. The idea of using this indicator is point out the most practiced coping strategy in the study area whenever food shortages occur.

3.5 Data Analysis Method

Data in this research was collected through both qualitative and quantitative approaches therefore the qualitative data gathered from key informant interviews and focus group discussion was analyzed qualitatively. Regarding the quantitative data including household survey, HFIAS, HFBS and CSI were coded in to and entered in the computer software called statistical package for social science (SPSS).then descriptive analyses were used to analyze the quantitative data such as frequencies, percentages, and mean comparison.

3.6 Ethical consideration

First, ethical clearance was obtained from center of food security studies; Collage of developmental studies, Addis Ababa University, additional support letter obtained from kebr Beyah district administration was disseminated the respective kebele leader. Finally, after explaining the purpose and process of the research to the study subjects, informed consent was obtained from participants of each household. The confidentiality of participants' response was maintained.

CHAPTER FOUR: RESULT AND DISCUSSION

This chapter presents and discusses the results of the study through descriptive statistics including frequency, percentage mean standard deviation and mean comparison. The first section of the chapter presents shows the descriptive results of the socio demographic, socioeconomic and institutional characteristics of the study, the second section shows household food security status measured by HFIAS and HFBM, the third section discusses the determinants of food security status while the last section discusses the coping mechanism measured using coping strategy index

4.1 Socio-demographic characteristics of the respondents.

As shown in table 2 shows the socio-demographic characteristics of the respondents. In this study, a total of 153 households have been surveyed. Out of the total 153HHs, 139(90.8%) of the respondent are married and 2(1.3%) of the respondent were divorced, 3(1.96%) of the respondent were widowed and 9(5.9%) of the respondent were Polygamy which indicate that almost 97%of the respondent were married in the study area. Out of the total 153 HHs, 139(90.8%) were male household headed and 14(9.2%) of the respondent were female household headed which show that majority of the household heads were male in this study area

Regarding to age 25(16.34%) of the respondent were at the age between 20-30years old whereas 75(49%) of the respondent were at the age between 31-45, 30(19.6%) of the respondent were in between 46-60, and 23(15%%) of the household were between 61-75 years old which indicate that most of the respondent are in the age of economically active age which means majority of the respondent are in the age between 31-45.

Concerning about the household size and educational status 41(26.8%) of the respondent had household size of between 2-3 whereas 91(59.5%) of the respondent had a household size between 5-8, 21(13.7) of the respondents had 9-12 and which show that majority of the respondent have household size between 5-8 in this study area. Regarding to the educational status 112(73.2%), 31(20.3%), 5(3.3%), 3(1.96%), and 2(1.3%) of respondents were illiterate, literate and went to primary school, secondary school and has diploma respectively.

Table 2 Socio-demographic characteristics of the respondents

Variables	Frequency (n=153)	Percentage
Marital status		
Married	139	90.8
Divorced	2	1.3
Widowed	3	1.96
Polygamy	9	5.9
Sex of the household head		
Male	139	90.8
Female	14	9.2
Age of the household head		
20-30	25	16.34
31-45	75	49.02
46-60	30	19.6
61-75	23	15.03
Household size		
2-4	41	26.8
5-8	91	59.5
9-12	21	13.7
Educational status		
Illiterate	112	73.2
Literate	31	20.3
Primary	5	3.3
Secondary	3	1.96
Diploma/Degree	2	1.3

4.2 Socio economic profile of the respondents

As show on the above table 3 of the types of livestock production that exist in the area were 62(40.5%) of the sampled household responded cattle, 23(15%) of the respondent responded camel, 37(24.2%) of the respondent responded sheep whereas the remaining 31(20.3%) of the respondent responded goat which indicate that majority of the household in study area have cattle. Regarding the major crops grown in the study area 65(42.5%), 36(23.5%) and 52(33.5%) were sorghum, wheat and maize, respectively. which indicate that major crop grow in this study area is sorghum.

Majority of the households cultivated small plot of crop land 101(66%), 30(19.6%), 14(9.2%) and 8(5.2) of the sampled households cultivated the hectares between 0.20-0.99 ha, 1-2 ha, 2.01-3 ha and 3.01-5 ha respectively. About 8(5.2%) of the sampled households responded that they have access to sufficient seed plant where as the remaining 145(94.8%) of the households found it difficult to access sufficient seed plant which indicate that the majority of the households in the area finds difficult to access sufficient seed plant. A key informant interview conducted in the kebele stated absence of agricultural DA's in the kebele makes the agriculture and food security situation very poor due to lack of the crop protection managements and o purchase or lack of access to necessary materials like seed truck to enough cultivate and land which at the same time worsens the food security situations and. A FDG discussed with group discussions in Labashaag they also raised that they have never used any agricultural inputs and don't know where to find. They also mentioned they don't receive any awareness for agricultural livestock production.

Concerning about production sufficiency throughout the year and its constraints, out of the 153 households all of them 153(100%) households responded that their production is insufficient throughout the year. Regarding The constraints of having insufficient production throughout the year is that there shortage of rain fall, insufficient seed plant and lack of ploughing material out of the 153 sampled respondents 73(47.7%) of the household responded that there is minimum rain fall and the remaining 54(35.3%) and 25(17%) households responded that insufficient seed plant and Lack of ploughing material respectively. The main source of income in the study area, are agriculture and livestock 58(38%) of the households responded agriculture while the other 95(62%) responded livestock indicating that their main income relies on live stock. Average income in the study area that households earn throughout the year is3000-5000 which is not

enough for large families to sustain, majority of the respondents 98(63.2%) responded they earned 3000-5000 throughout the year,

Table 3 Socio economic profile of study participants

Variables	Frequency	Percentage
Types of livestock		
Cattle	62	40.5
Camel	23	15
Sheep	37	24.2
Goat	31	20.3
What are the major crops grown in this area		
Sorghum	65	42.5
Wheat	36	23.5
Maize	52	34
Hectares of land households cultivate		
0.20-0.99 ha	101	66
1-2 ha	30	19.6
2.01-3 ha	14	9.2
3.01-5 ha	8	5.2
Access to sufficient seed plant		
Yes	8	5.2
No	145	94.8
Applying fertilizer		
No	153	100
Sufficiency of production throughout the year		
No	153	100
If no what is your constraint		
Minimum rainfall	73	47.7
Insufficient seed plant	54	35.3
Lack of ploughing materials	26	17
Main source of income in the area		
Agriculture	58	38
Livestock	95	62
Average income of the household per year		
<1000	4	2.6
1000-300	12	7.8
3000-500	95	62.1
5000-7000	42	27.5

Source: Own survey (2021) N=153

4.3 Institutional Factors

The below table indicates that the kind of transportation that households use to take product to the market, that 89(58.2%) of the sampled household responded that they use pack of animal as transportation to take their product to the market, 64(41.8%) of the respondent said that they take their products using public transportations a. All of the sampled households responded that they have not received any type of aid in any way.

Regarding to the average time it take them to reach the nearest market 65(42.5%) of the household responded that it takes two hours to reach the nearest market place, 58(37.9%) of the respondent responded that the average time it takes to reach the market place is three hour and 30(19.6%) of the sampled household responded that time take to reach market place is three and half hours we can understand from this result that there is difficult of transportation and long distance of market place in the study area.

Table 4 Institutional factors

Variables	Frequency	Percentage
Transportation used in the area to take products to the market		
Animals	89	58.2
Vehicles	64	41.8
Human	–	–
Others	–	–
Have you received any aid?		
None	153	100
Average market distant you travel to		
1 hour	58	37.4
2 hours	65	43.2
3 hours	30	19.4

Source: Own survey (2021) N=153

4.4 Measuring Household's Food Security Status

To measure household's accessibility to food and level of food insecurity HFIAS was utilized. Based on the response to the nine HFIAS questions and their frequency of occurrence over the last 30 days, HHs was assigned a score that ranges from 0 to 27. A higher HFIAS is indicative of poorer access to food and greater HHs food insecurity. Accordingly, the mean score of HHs was 1.72 with minimum and maximum value of 0 and 26 respectively.

82(53.6%) of the households have experienced having an anxiety or uncertainty about the households' food access. 92(60.1%) of the households have experienced being not able to eat the kinds of foods they preferred to eat. 83(54.3%) of the respondents also stated that they experienced in eating limited variety of foods because of lack of resource. Around 49(31.4%) HHs said that they ate foods that they really didn't want to consume, 58(37.2%) of the respondents have experienced eating smaller meals than they needed, 43(27.6%) of the households have reduced their meal frequency, 19(12.3) households have said that there is no any type of food available, 16(10.3%) of the households experienced skipping dinner or went to sleep without eating. 5(3.2%) of the respondents have also experienced or have went the hole day without eating

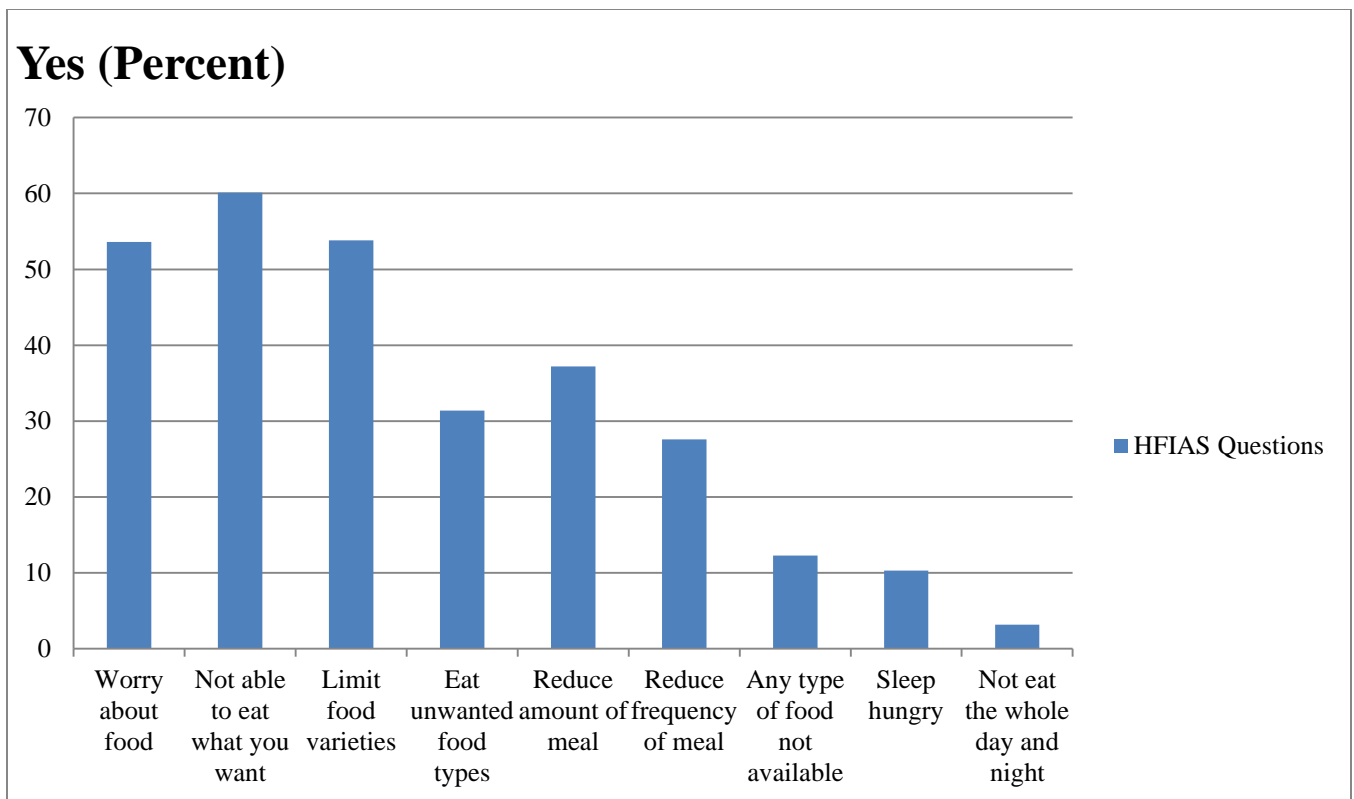


Figure2 Household food insecurity access scales

Based on their responses to the occurrence and frequency questions, HHs were classified into four categories of food security. As shown in the results of the above figure, out of the total 153 households, 31(20%) were food secure while 122(80%) were food insecure. According to this 40(26.3%) HHs, were severely food insecure while 31(20.5%) and 51(33.3%) were mildly and moderately food insecure respectively.

4.5 Household Food Balance Model

The food security status of households can be measured by different indicators; in this study household food balance model was used to measure the availability of food grain in the household. The 2100kcal available energy per day was compared with the calculated household's available dietary energy. So if the household member dietary energy was less than the recommended amount the household was categorized as food insecure and food secure if it was greater than or equal to the recommended adult dietary energy calorie. Therefore 77% and 23% of the households were food insecure and food secure respectively.

Table 5 Available Energy in kcal for the sampled households

AE in Kcal (N=153)	Food insecure N=111(73%)	Food secure N=42(27%)	Total
Minimum	548	2102	1219
Maximum	1985	2895	2895
Mean	1437.6	2323.7	1690
Standard deviation(SD)	119	181	440

Source: survey result 2021 N=153

4.6 Determinants of Household Food Security

To scape and overcome food insecurity there are various factors that determine household attributes. The variables presented below are factors that determine the food security status of the households. Such factors are household head's age, sex, educational level and household's access to productive resources like land and livestock and cash income etc. & household's size. Food is one of the basic necessities of humans and it stands first among all, It's important as it nourishes the human body, therefore everyone has the right to access enough quantity and quality which needs to be available and sustainable..

4.6.1 Demographic characteristics of the households

4.6.1.1 Age of the household head

According to table 6 out of 153 sampled households 25(16.3%) and 75(49%) of the households that are 20-30 and 31-45 years old got mean dietary energy of 2286.14kcal and 1717.71kcal respectively, also 30(19.6%), 23(15%) household heads with the age between 46-60 and 61-75 has mean dietary energy of 1547.80kcal and 1489.67kcal respectively. This indicates that the older the household head age the lower dietary energy available, it may be due to the fact that old aged farmers may not have the ability to work and required labor force or may have health issues to cultivate more food production.

Table 6 Household head age and mean dietary energy available

Household head age	Mean	N	Std. Deviation
20-30	2286.14	25	458.975
31-45	1717.71	75	435.694
46-60	1547.80	30	296.255
61-75	1489.67	23	221.550
Total	1692.17	153	438.876

Source: Survey result N=3

4.6.1.2 Household size

The findings of the this study agrees with study conducted by (Drammeh et al., 2019) that revealed Large family size puts an extra burden on food consumption, and more likely to

experience food insecurity in contrast to households with a small family size. As shown in table 7 out of the sampled households 41(26.8%) and 91(59.5%) and 21(13.7%) got mean dietary energy available of 2294.46kcal, 1512.75kcal and 1264.57kcal respectively. This indicates that household members with large families tend to compete for the limited resources available in the household while households with small family size got more available and is more probably able to have enough dietary energy that those households with large size members (children)

Table 7 Family size and mean dietary energy available

Family size	Mean	N	Std. Deviation
2-4	2294.46	41	332.716
5-8	1512.75	91	221.208
9-12	1264.57	21	208.318
Total	1684.79	153	451.355

Source: survey result N=153

4.6.1.3 Sex of the household head

A majority 139 (90.8%) of the sample households were male-headed, while 14(9.2%) were female-headed, indicating that there are more male-headed sample households than female-headed households. The mean dietary energy available result of this variable is 1732.79kcal and 1198.00kcal of male-headed and female-headed respectively, Based on the results obtained it can be understood that sex of the household head affects the household's food availability.

Table 8 Sex of the household head and mean dietary energy available

Sex of the household head	Mean	N	Std. Deviation

Male	1732.79	139	439.141
Female	1198.00	14	238.754
Total	1684.79	153	451.355

Source: survey result N=153

4.6.1.4 Education of the household head

Survey result showed that the majority of sample household head's educational status falls in to the illiterate category. About 112(73.2%) and 31(20.2%) household heads were illiterate and literate and had 1462.97kcal and 2187.61kcal mean dietary energy available respectively while 5(3.3%), 3(1.96%) and 2(1.3%) went to primary, secondary and got diploma had 2506.33kcal, 2615.00kcal and 2675.00kcal mean dietary energy available respectively. On the result shown in table 9 the mean dietary energy available for literate household heads and those who went to school and university level is larger than the illiterate household head heads.

Table 9 level of education and mean dietary energy available

Level of education	Mean	N	Std. Deviation
Illiterate	1462.97	112	230.118
Basic Literate	2187.61	31	335.884
Primary	2506.33	5	101.642
Secondary	2615.00	3	57.236
Diploma/Degree	2675.00	2	311.127
Total	1684.79	153	451.355

Source: survey result N=153

4.6.2 Economic factors

4.6.2.1 Cultivated land size

This study agrees with a study conducted by (Derara & Tolossa, 2016) indicates that farmland size positively affects the food security status of households. Because farmers with more farmland size will produce more than those with small farmland sizes.

The study showed that about 101(66%) respondents of has owned less than 1 hectare of farmland size while 30(19.6%), 14(9.2%) and 8(5.2%) has owned 1-1.2 ha, 2.01-3ha and 3.01-5ha of farmland size respectively. Also the result shown in table (10) indicates that the mean dietary energy available computed in terms of the cultivated land size shows that those households who have owned large farm size have gained higher dietary energy than those who owned small farmland size, for example households with 2.01-3ha and 3.01-5 ha has more mean dietary than those with 0.20-0.99ha and 1-1.2ha.

This could mean that households with more cultivable land could produce more food, may purchase food for consumption from the income they get from their land.

Table 10 cultivated land size and mean dietary energy available

Cultivated Land Size	Mean	N	Std. Deviation
0.20-0.99ha	1403.01	101	139.759
1-1.2 ha	2011.85	30	344.622
2.01-3ha	2380.60	14	250.206
3.01-5 ha	2553.38	8	168.301
Total	1684.79	153	451.355

Source: survey result N=153

4.6.2.2 Farm oxen ownership

The study pointed out that 53.6% of the sample households does not have access to farm oxen while the remaining 46.4% have access to farm oxen. Out of those 46% sample households who have farm oxen, 7.8%, 2.6% and 1.96% owned two, three and four oxen respectively and are able to cultivate their farmland without needing an external support and 34% of respondents owned one ox. according to (Meskerem & Degefa, 2015) ploughing was possible for those who owned one ox by getting another oxen on the basis of borrowing, from others. The result of table (11) shows big between available dietary energy of households' that have one ox and four oxes.

Households that owned one ox gained the mean dietary energy of 17312kcal while households who owned four oxen have gained up to 2643kcal.

Table 11 Oxen owning and mean dietary energy available

Oxen owning	Mean	N	Std. Deviation
0	1499.28	82	354.733
1	1731.96	52	396.831
2	2317.83	12	168.636
3	2396.00	4	104.528
4	2643.00	3	33.045
Total	1684.79	153	451.355

Source: survey result N=153

4.6.2.3 Remittance

Somali people have a culture of getting supporting from family, relatives, with better livelihood or economic. According to table 12, the economic support from relatives, in terms of money, ranged from 300 to 1500 Eth. Birr. About (59.5%) respondents didn't receive any remittance while the remaining 40.5% surveyed households received remittances solely on occasional basis. As the result shown in table (8) the contribution of remittances make to the overall household income and expenditure to fluctuate better we can see that the mean dietary of those who receive remittance is greater than those who don't receive there is mean difference according to the amount they have received as shown in the table(8) the mean dietary of those who receive 600-800, 900-1200, and 1300-1500 have more mean dietary energy than those who receive 300-500 and those who didn't receive respectively .

Table 12 Remittance and mean dietary energy available

Remittance	Mean	N	Std. Deviation
0	1390.70	91	135.423
300-500	1823.10	31	299.727

600-800	2365.90	20	140.431
900-1200	2554.71	7	69.921
1300-1500	2596.25	4	224.032
Total	1684.79	153	451.355

Source: survey result N=153

4.7 Institutional Factors

This sub-section presents different institutional services available in the area. The first two sections present the services of agricultural extension and formal credit in the study area. The next section provides a brief explanation about the input and output market situations. The final section concludes by presenting about agricultural inputs.

4.7.1 Extension service

Although there is an agricultural office in the district and extension agents assigned to rural areas in the district, much work is not done regarding extension service in the sampled kebeles. As it was discussed with group discussions in in the kebele and they have responded that they don't receive any extension service. They also mentioned that they never used inputs for agricultural production and due to lack extension service in the kebele and weak extension services in the Region in general. The agro-pastoralist households in the kebele also mentioned that the agriculture and food security situation is very poor due to lack of the capacity to purchase or have access to necessary materials like seed truck to cultivate and land which at the same time worsens the food security situations fit from extension services but they are not available in the kebele.

4.7.2 Input availability

This study also found out that there were no access to inputs such as fertilizers, improved seeds, improved breeds, pesticides and the like. Also (Abdinasir M, 2013) find out the same result with regard to the access to inputs. The input availability is related to both extension and formal credit services.

4.7.3 Market availability

The distance taken to travel from home to the nearest market place ranged from an hour of walk to three and half hours of walk. The kebri Beyah market is one of the known markets for agro-pastoralists. The agro-pastoralists of the district also used markets in the neighboring districts such as Jigjiga and Togwajale to sale and buy products. Market is an important for the agro-pastoralists from food security point of view. Access to markets can increase smallholders' income and improve their food consumption It is where they sale their animals in normal and food insecure situations to cope with. Due to improper infrastructures most of the households said they find it difficult to reach to the nearest market available.

4.8 Coping Strategy Mechanism

This section tries to analyze the main practices of agro pastoral household coping strategies to food shortage. When food shortages occur or households are falling in to the situation of becoming food insecure, agro pastoral households develop their own coping mechanisms to cope with the food shortage in the household. The study result and discussions made with focus group discussions unfolded that household in the study area respond to food problems by adopting different coping mechanisms. Although there are small differences among households, the response of most of the household life is based on production, market, consumption and transfer based mechanism. Likewise, households were asked to identify their coping mechanism while they face food shortage. This include relying on less preferred and less expensive foods, borrowing cash or food from others, sale of fire wood and charcoal, harvesting immature crops, consume seed stock held for next season, send household members to eat elsewhere, send household to beg, limiting portion size at mealtimes, selling of livestock more than usual, Seeking physically demanding jobs (construction, carrying things, etc.), reduce number of meals eaten in a day, and skip entire day without. Thus, the major coping mechanisms adopted by household in the study area is used to avoid the household's food availability decline by borrowing cash or grain from others and selling of more livestock than usual and limiting portion size at meal time are practiced by the largest portion of households livestock which is 88% and 66% and 58% respectively. Conversely skipping the entire day without eating and sending households to somewhere else 5%, and 11% respectively are the least practiced coping mechanisms in the study area.

Table 13 Coping strategies of households to food shortage

Coping mechanisms	Frequency	Percent
Rely on less preferred and less expensive foods	50	32.7
Borrow cash or grain from others	135	88
Sale of fire wood and charcoal	64	41.8
Harvest immature crops	31	20.3
Consume seed stock held for next season	65	42.5
Send household members to eat elsewhere	17	11.2
Send household to beg	0	0
Limit portion size at mealtimes	89	58.2
Sell of livestock more than usual	101	66
Seeking physically demanding jobs (construction, carrying things, etc.)	33	21.5
Reduce number of meals eaten in a day	46	30
Skip entire days without eating	9	5.9

Source: Survey result 2021 N=153

5. Conclusion and Recommendation

5.1 Conclusion

The present study found that the status of household food security can be determined mainly by access to productive resources that can meet the requirement to produce and generate income. Availability of productive resources such as enough fertile land, enough farm oxen, and access to off-farm sources of income significantly determine the household food security status. This implies that, households with no adequate amount of these resources will find it difficult to produce enough food/or increase their income to be food secure.

Since it's essential for households to be Food secure they have to find sustainable and available food production and consumption. The study pointed out due to poor access to the production and purchasing of adequate amount of food grains, large portion of households fall in to being food insecure. The study also revealed that shortage of farmland related with large family size brought more pressure on the available resources. Similar to this argument, the study found out that household with large family size acquired less dietary energy than those with small family size. The study also found that household age and sex of the house hold head has a negative effect on the house holds production implying that the older household heads has less activity in the producing of the household resources. The study also pointed out households with educated household heads has more chance to improve household food consumption and are less susceptible to food insecurity.

In general, bio-physical related problems such as lack of rainfall, recurrent drought, lack of input availability, lack of ploughing materials (truck, oxen) are found to be the main constraints to crop production, and thereby leading household to decline in food availability and increase household vulnerability to food insecurity. Moreover, poor access to productive resources such farm land, farm oxen, livestock possession, and off-farm income opportunity plays a major role to increase household food insecurity. Thus, finite access hinders household food availability and purchasing power, which, in turn would increase the problem of food insecurity.

5.2 Policy recommendation

Based on the study's findings the following issues are forwarded as recommendation to improve household food security situation in kebri Beyah district

- In order to increase household's food availability, increasing agricultural production and livestock production is majorly recommended. By improving cultivation, providing grazing land, promoting small scale irrigation and improving the livestock production with proper extension service should be taken into consideration. All these efforts have to be supported in order to support the agro-pastoralists' crop and livestock production activities by the agricultural offices at different level of the regional and district offices
- Increasing off-farm activities to increase households income, to reinvest in to agricultural production to increase the agricultural productivity
- Providing sufficient seed plants through support or credit
- Diversifying farm activities, besides the annual cropping such as vegetables and fruit through improving and expanding irrigation land and water harvesting infrastructure.

The district needs to be supported Governmental and non-governmental projects such DPPP, PSNP, PCDP NRC livelihood since these projects play an integral part in household food security improvement.

Increase animal health services by establishing adequate livestock health infrastructures and training the right man power, special attention should be given to livestock markets by constructing more markets.

Strengthening the implementation capacity of the pastoral institutions at district levels through capacity building programs in short and long term trainings on health, education, water, livestock & agriculture.

Last but not least due to little resources and some complexity (time, money and the like) the study was conducted by small sample in the kebele. Therefore, it is difficult to generalize the household food security situation in the study area. As a result, conducting similar research with large sample can be invited to understand household food security situation

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7. Appendices

Questionnaire

Title of the study: Food insecurity and coping strategies of agro pastoral households.

Dear participant, my name is_____ I am currently studying my MSc in food security and development studies at Addis Ababa University and I am collecting data for research study intended to identify Food insecurity and coping strategies of agro pastoral households in kebrri Beyah district. Now, I want to ask you, your willingness to participate on this research by your full interest. The research is important for you and for general community to understand and improve the situation of food insecurity and coping mechanisms and further more understand that food insecurity decreases the ability of countries to develop their agricultural markets and economies. I would like to tell you, that you have full rights to participate or not participate on this study and you have right to stop the participation at any time

on the process of the study duration. Additionally, all the information you give us will be confidential and used only for this study.

Dear participant, thank you for your cooperation in advance; and now I will read to you or you can read this written consent form; and you will sign for me as you agreed to participate in this study with your full will, after you understand the objective of the study, all procedures will be taken.

Part one

Social, Economic and Demographic Issues

No	Questions	Category	Code
1	Sex of the respondent	Male	1
		Female	2
		Other	3
2	Age of the respondent		[]
3	Marital Status	Single	1
		Married	2
		Divorced	3
		Widowed	4
		Polygamy	5
		Other (specify): __	
4	Are you a household head	Yes	1
		No	2
5	Level of education	Not read and write	1
		Read and write but not formal education	2
		Grade 1-4	3
		Gradw5-8	4
		Grade 9-12	5
		Diploma	6
		BSc/MSc	7
		Above BSc/MSc	8
6	House hold size		[]
7	The status of the respondent in the household?	Husband	1
		Wife	2
		Child	3
		Other	4

Part two

No	Questions	Category	Code
1	Place of living	Your house	1
		Relative's house	2
		IDP/Other collective settlement	3
2	How many hectares of land do your household own?		[]
3	How many hectares of your land are under improved agricultural methods? (Irrigation, soil treatment, pest management....)		[]
4	Does the HH cultivate the land?	Yes	1
		No	2
5	How many hectares do you cultivate		[]
6	What is the ownership form of your land?	Private	1
		lease	2
		Sublease	3
7	What agricultural assets /machinery do you have access?		
8	Who is sustaining the HH?		

Part Three Crop Production

No	Questions	Category	Code
1	Does your household or any of its members cultivate farm land during the last harvesting season?	Yes	1
		No	2
2	If yes what is the total area of farm land that your household cultivated		[]
3	How many quintals of crops did you harvest from your farm land through rain fed/irrigation during for the last year and what portion of it did you sell after harvest?		
4			
5	How much do you produce in the good harvest year?		[]
6	How much do you produce in the Normal harvesting year?		[]
7	How much do you produce in Poor harvesting year?		[]
8	Is your production enough for your family to consume throughout the year?	Yes	1
		No	2
9	If no, what are the constraints that prevent you from doing so?	Minimum rainfall	1
		Insufficient seed plant	2
		Lack of ploughing materials	3
		Others specify	4
10	Where there any damage to your crop last year?	Yes	1
		No	2

11	Did you use oxen for your farm operation?	Yes	
		No	
12	1 If yes, are your oxen enough for your farm operation? Yes =1 No=0	Yes	
		No	
13	If you do not have enough oxen, how do you get additional oxen you need?	Borrow from friends & relatives	
		Oxen obtained for labour exchange	
		Oxen obtained with sharecropping	
		Manually	
		With other livestock	
		Hire from someone/renting in	
		Others specify	

Part four

1. What is the average income for your household from all sources during the last three months?

SN	Income category	Mark X
1	less than 1,000 birr	<input type="checkbox"/>
2	1,001 birr – 3,000 birr	<input type="checkbox"/>
3	3,001 birr – 5,000 birr	<input type="checkbox"/>
4	5,001 birr – 7,000 birr	<input type="checkbox"/>
5	7,001 birr – 9,000 birr	<input type="checkbox"/>
6	9,001 birr – 11,000 birr	<input type="checkbox"/>
7	More than 11,000 birr	<input type="checkbox"/>

Part six financial status of the Household

No	Questions	Category	Code
1	Did you borrow money?	Yes	
		No	
2	How much did you borrow		[]
3	What is the term of your credit (dept.)?		[]
4	How much is your total debt in this moment?		
5	In your opinion, what is the financial status of your HH in comparison with last year? Better /	Better	
		The same	
		poor	

No	Questions	Category	Code
1	Do you use any fertilizer?	Yes	1
			2
2	What type of fertilizer do you use?	Inorganic DAP and/or Urea	1
		Organic (manure)	2
		Others specify	4
3	What kind of transportation do you use to take your product to the market?	animals	1
		Vehicles	2
		Human	3
		Other, specify	4
4	What is average market distance you travel to?	½ hour	1
		1 hour	2
		2 hours	3
		3 hours	4
5	nearest market from your home(in hours)	1 hour	2
		2 hours	3
		3 hours	4
		4 hours	5
		5 hours	6
6	Where do you get the credit from?	Local money lender	1
		Friends and relatives	2

		NGOs	3
		Others	4
7	Has the household received remittance in this year	Yes	1
		No	2
8	The amount in birr/ year		
9	Has the household received remittance in this year?	Yes	1
		No	2
10	If yes, the amount in birr/ year:		
11	Since when do you start to receive food aid (if you ever receive food aid)? (indicate the year)		
12	Are you satisfied by the quality of food aid received?	Yes	1
		No	2
		Indifference	3

Household Food Insecurity Access Scale (HFIAS) Measurement Tool

No	Questions	Response questions	Code
1.	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1=Yes	□□
1.a	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.	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.a		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.	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.a	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)	<input type="checkbox"/>
4.	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	<input type="checkbox"/>
4.a	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)	<input type="checkbox"/>
5.	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	<input type="checkbox"/>
5.a	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)	<input type="checkbox"/>
6.	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	<input type="checkbox"/>
6.a	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)	<input type="checkbox"/>
7.	In the past four weeks, was there ever no food to eat of any kind in your household because	0 = No (skip to Q8) 1 = Yes	<input type="checkbox"/>

	of lack of resources to get food?		
7.a	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)	<input type="text"/>
8.	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q9) 1 = Yes	<input type="text"/>
8.a	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)	<input type="text"/>
9.	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No (questionnaire is finished) 1 = Yes	<input type="text"/>
9.a	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)	<input type="text"/>

Consumption Coping Strategy Responses (CSI)

Behaviors: In the past 7 days, if there have been times when you did not have enough food or money to buy food, how many days has your household had to:	Frequency: Number of days out of the past seven:(Use numbers 0 – 7 to answer number of days; Use NA for not applicable)
a. Rely on less preferred and less expensive foods?	
b. Borrow food, or rely on help from a friend or relative?	

c. Purchase food on credit?	
d. Gather wild food, hunt, or harvest immature crops?	
e. Consume seed stock held for next season?	
f. Send household members to eat elsewhere?	
g. Send household members to beg?	
h. Limit portion size at mealtimes?	
i. Restrict consumption by adults in order for small children to eat?	
j. Feed working members of HH at the expense of non-working members?	
k. Reduce number of meals eaten in a day?	
l. Skip entire days without eating?	

Checklists for Key informant interview

1. What does the current health and nutrition of the area look like?
2. How do you get food normally in your area?
3. During a normal year is access to food affected seasonally if yes how? Why? What are the lean months?
4. Is there any food assistance provided in the area?
5. Have you received any aid during the last month? Food NFI or Medical?
6. When did you last received aid if any?
7. Is there any trade in the village especially food and basic items?
8. What are the main sources of income in the area?
9. Would you please explain how the livestock sector is going on by emphasizing the number of people and animals benefiting, how the individuals accessing the product from the market and number of animals the households own?
10. How the agricultural production and food security situation going on?
11. For how many months do the majority of the households are food self-sufficient per year?
12. Would you please reflect on the number of people benefiting from improved agricultural production, improved agricultural methods, access to sufficient inputs and the agricultural product marketing?

13. What does the pest and pesticide application look like? Are there persons trained in crop protection? What number and percentage of hectares protected against disease or pest attacks? What proportions of people are practicing appropriate crop protection procedures?
14. Would you please tell us in detail the coping strategies against hunger that are practiced in the area?
15. Would you please tell us the range and average farmland size in this area?
16. Is there any training that is provided in the area on live-stock and agricultural improvement?

Checklists for Focus Group Discussion

1. Would you please discuss what the situation of health and nutrition of the area in detail?
2. Please discuss on how you get food normally in the area?
3. Would you please overall discuss on the sanitation of food availability in the area?
4. Please also discuss on the situation of access to food in the area
5. Discuss situation of the livestock sub-sector what it look like? Give emphasis to number of people benefiting from the existing livestock activities, animals benefiting from the existing livestock activities, how individuals are accessing products or services from livestock market actor and number animals owned per individual
6. Discuss on the existing agricultural production and food security situation of the people (both the host community and the displaced persons)
7. What pest and pesticides mechanism are in place for the community?
8. Discuss on the overall current situation in your area in detail