



**A gender analysis of household food insecurity in the
South Eastern Region of Malawi**

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DECLARATION

I, declare that

A gender analysis of household food insecurity in the South Eastern Region of Malawi

Is my own work and that all the resources used or quoted have been duly acknowledged by means of complete references and that I have not previously in its entirety, or in part, submitted it for obtaining any qualification at any university.

HANNAH MAYAMIKO DUNGA

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To the almighty God, who has been so merciful during my entire studies; it has been a long journey of ups and downs but whenever I prayed, he never failed me. I thank God for his love, care and protection. Without him I would not have come this far. He granted me wisdom and guidance, without which this work would not have been possible.

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DEDICATION

This research output is dedicated to my hubby Steve, daughter Samantha and son Adonai. I love you guys!

ABSTRACT

The study examined a gender-based household food insecurity in the South Eastern region of Malawi. The rationale behind the study emanated from concerns regarding food insecurity around the world, especially in developing countries like Malawi. To achieve the main objective the study set both empirical and theoretical objectives as a guide.

The following theoretical objectives were set for the study: to review the background literature of food security; to review the measures of food security; to review the literature on the food security on global and regional levels; to review the nature and theoretical causes of food insecurity; to review the socioeconomic determinants of food insecurity; and to review the literature and studies on gender-based food insecurity in developing countries. Through the mentioned theoretical objectives, the study extensively reviewed the existing literature on food security both at global and region level. Some of the literature reviewed include the statistics on food security status of different countries, particularly developing countries, where the food insecurity problem is on the higher side. The study also highlighted some of the existing literature on gender disparities on food insecurity in developing countries, especially Malawi, as a reference point.

The study also had empirical objectives as follows: to assess and compare the food security status in female and male-headed households; to identify the level of food insecurity between rural and urban households; to identify the coping strategies for food insecure households both in the rural and urban areas; to determine the vulnerability of households towards food insecurity; and to assess the underlying determinants of food insecurity in female and male-headed household for rural and urban areas. The empirical objectives were addressed using data that was collected from the south eastern region of Malawi. A questionnaire was employed to collect data from 550 households from both rural and urban areas. Households to which the questionnaires were administered were randomly selected from designated EAs (Enumerator Areas) assigned by National Statics Office in the 2008 census.

The study adopted a quantitative analysis where different quantitative methods were used such as descriptive analysis (cross tabulation, frequencies and means) and two regressions were also employed to achieve the empirical objectives. The regressions employed in the study were a multiple regression and multinomial logistic regression. The results of the study were as follows: the demographic characteristics showed that the study area had more households headed by males as compared to females, and also that the majority of the households were from the rural areas. The economic characteristics of head of households indicated that there existed gender inequalities in terms of employment status, where a majority of female-headed households were unemployed as compared to their male counterparts. Similarly, in terms of literacy levels there were more females that had low levels of schooling, and others no schooling at all as compared to their male counterparts. In summary, the demographic characteristics indicated that there existed inequalities in most spheres of life between male and female-headed households.

In measuring food insecurity, the study adopted three measures namely Household Food Insecurity Access Scale (HFIAS), Household Dietary Diversity Score (HDDS) and Coping Strategy Index (CSI). After a correlation between the three measures, results showed that there was a statistically significant correlation between the three measures. This implies that the three chosen measurements complement each other in measuring the food insecurity status of households. After employing the three food insecurity measures interchangeably to identify the food security status of the households in the study areas, results indicated that there were more food insecure households in the area. Further, measuring food insecurity status based on gender and location of households, the cross tabulation results between gender and HFIAS and HDDS, as well as the difference mean scores between gender and CSI, indicated that there was a statistically significant difference ($p < 0.001$) between the household food insecurity status and gender of the household head, where more female than male-headed households were food insecure. Similar results were also obtained for location of the household with rural locations found to be more food insecure.

Results from the first regression predicted the vulnerability to food insecurity. It revealed that the usage of coping strategies can be employed to predict vulnerability towards food insecurity, where gender, location, household size, income, and employment status of households were found to be significant predictors of households' vulnerability towards food insecurity. The results also showed that female-headed households, and households in the rural areas, had a higher CSI score meaning they employed more coping strategies to mitigate food insecurity, hence were regarded as more food insecure as compared to their counterparts. Similarly, those that were unemployed had a higher CSI score, meaning they were more food insecure. Households that had a larger household size, used more coping strategies, as well as those with lower income levels. The second regression results revealed the determinants and causes of prevalence of food insecurity employing four categories of food insecurity (food secure, mildly food insecure, moderately food insecure and severely food insecure). It was found that household size, number of years of schooling of head of household, income, location, and employment status of household head were statistically significant predictors of the probability of a households falling into one of the four levels of food insecurity. It was alarming to find that female-headed households were, at all levels, found with a likelihood of falling into the worse off category in terms of food insecurity as compared to their male counterparts.

The study therefore revealed that there exist gender disparities in terms of food insecurity at the household level, where female-headed households were found to be more food insecure as compared to their male counterparts. More female-headed households were found to employ more coping strategies as compared to their counterparts, thereby indicating an increased vulnerability to food insecurity. It was also shown that the three measures adopted by the study could actually predict the food insecurity status of households, with complementary results. To deal with gender disparities in food insecurity, the study recommended that policymakers should address them by improving among others, gender disparities, for example, gender inequalities in education attainment between girls and boys, which occur in other spheres of life that could contribute to the problem of food insecurity. Such disparities results in higher

illiteracy levels of women than men and also leads to the inability of women to be able to fend for themselves. On the methodology part the study recommended coming up with a composite measure of food insecurity that is multidimensional incorporating the three measures employed in this study.

Keywords: Food security, Households, Gender, Rural and Urban households, Household Food Insecurity Scale, Coping Strategy Index, Dietary Diversity Score, multiple linear regression, multinomial logistic regression

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LIST OF ABBREVIATIONS

AFDB	African Development Bank
CAADP	Comprehensive Africa agricultural Development Programme
CSI	Coping Strategy Index
DFID	Department for International Development
EMIS	Education Management Information Systems
ERP	Economic Recovery Plan
FAO	Food and Agricultural and Agricultural Organisation
FEWS-NET	Famine Early Warning Systems Network
FHHS	Female Headed Household
FIMI	Food Insecurity Multidimensional Index
FISP	Farm Input Subsidy Programme
GDP	Gross Domestic Product
GHI	Global Hunger Index
GOM	Government of Malawi
HDDS	Household Dietary Diversity Score
HFIAP	Household Insecurity Access Prevalence
HFIARC	Household Insecurity Access Related Conditions
HFIARD	Household Insecurity Access Related Dominion

HFIAS	Household Food Insecurity Access Scale
IFIMIS	Integrated Financial Management System
IFPRI	International Food Policy Research Institution
IHS	Integrated Household Survey
IMF	International Monetary Fund
IOA	In On Africa
JCE	Junior Certificate Examination
MANEB	Malawi National Examination Board
MCDE	Malawi College of Distance Education Centres
MDGs	Millennium Development Goals
MDHS	Malawi Demographics and Health Survey
MHHS	Male Headed Household
MLR	Multinomial Logistic Regression
MOESC	Ministry of Education Science and Technology
MSCE	Malawi School Certificate Examinations
NER	Net enrolment rates
NES	National Export Strategy
NGOs	Non-Governmental Organisations
NSO	National Statistics Office

PSLC	Primary School Leaving Certificate
SPSS	Statistical Package for Social Sciences
SSA	Sub-Saharan Africa
TTC	Teachers Training College
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Education Scientific and Cultural Organisations
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VIF	Variance Inflation Factor
WFP	World Food Programme
WFS	World Food Summit
WMS	Welfare Monitoring Survey

CHAPTER 1: PROBLEM AND ITS SETTING

1.1 INTRODUCTION

The concern with food security has evolved dramatically around the world for decades, both in theory and practice (FAO 2006; FAO 2010; FAO 2013). In the mid-1970s the concept of food security was recognised at the World Food Conference on the World Food Security Summit (FAO, 1996). At the beginning of the 1980s, the concept of food security was expanded to be multi-dimensional concept. Previously, only food availability constituted the understanding of food security, consequently it was redefined as not only the availability of food but also access to food as well as stability of food supply (FAO, 2003). The continuing evolution of food security as an operational concept in public policy has reflected the wider recognition of the complexities of the technical and policy issues involved. The most recent careful redefinition of food security is one that was negotiated in the process of international consultation leading to the World Food Summit (WFS) in November 1996. This was further altered in 2001 and redefined as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2001).

With the redefined meaning of food security, there now exists three dimensions of food security, namely food availability (availability of sufficient quantities of appropriate food), food access (adequate income or other resources to buy food) and food utilisation (adequate quality of food) (USAID, 1992). Vulnerability to food insecurity was added as the fourth dimension which includes unemployment and household size as factors that may increase the vulnerability of a household to be food insecure (Tawodzera, 2011). Food insecurity still remains one of the main challenges facing most developing countries (FAO, 2012). About 794.6 million people around the world, of which 232.5 million in Africa and 220.0 million in sub-Saharan Africa, were reported to be undernourished in 2014. In this regard, undernourished means those that are in extremes levels of food insecurity (FAO, 2015). One of the millennium development goals was that of eradicating food insecurity by half by the year 2015. Whilst significant

progress was made in terms of the proportion of undernourished people in the world as a percentage of the total population, the world summit target was not achieved by 2015 (FAO, 2015). Partially, the millennium development goals were almost achieved given that the percentage of undernourished people in the world decreased from 23.3 percent to 13.9 percent (Ibid).

When Africa alone is brought into the spotlight, the picture becomes more alarming with the numbers of the malnourished population significantly falling short of the World Food Summit target and the target of the Sustainable Development goals which replaced the Millennium Development Goals (MDGs). In Africa, undernourishment increased from 181.7 million people in 1990 to 232.5 million in 2014, and in Sub-Saharan African it increased from 175.7 million in 1990 to 220 million in 2014 (FAO 2015). So even though the increase can be on account of growing populations, it could also indicate a deterioration of living standards for those that used to be better off. The problem of food insecurity is seemingly more evident in sub-Saharan Africa, and in this regard Malawi is not an exception. In Malawi, the third Integrated Household Survey (IHS3) indicated that although the country has not undergone widespread famine in recent years, nearly 33 percent of the population experiences extreme forms of food insecurity. And that the mostly affected are female headed household as compared to male headed households (NSO, 2012).

In most developing countries, scholars have addressed the issue of food insecurity at the household level from different angles bringing in mixed results. However, when the issue of gender inequalities is brought into the picture, it has been argued that women generally have, in most cases, been vulnerable to food insecurity as compared to men (Quisumbing, 1995; World Bank 2001; Dolan, 2004; Blackden *et al.* 2006; World Bank and The One Campaign 2013; Kassie *et al.* 2014; Quisumbing *et al.* 2014). Some of the issues raised as contributing factors are the fact that women have mostly been given fewer privileges in terms of access to various resources and services such as land, education, agricultural inputs and training that are crucial for agricultural productivity. That is why female-headed households are profoundly to be more food insecure and

impoverished as compared to male-headed households. (Davids & Van Driel, 2000; Bridge, 2001; Babatunde *et al.* 2008; Mallick & Rafi, 2010; Kassie *et al.*, 2014).

Similar situations are also found to be evident in Malawi. Takane (2008) describes Malawi as a country that depends mostly on subsistence farming as a source of food and income especially for the low income population. Ibid further contends that the majority of the farmers are actually women, especially those from the rural areas. Despite the pivotal role that rural women play as farmers in the country, studies (Chipande, 1987; Due & Gladwin, 1991; Minoteta, 2000; Gilbert *et al.* 2002; Ragasa, 2014) have shown that women are mostly disproportionately affected by constraints in agricultural production (availability), food utilization, access and stability which leads to a number of disparities in terms of attaining food security. Some of the problems highlighted in literature as main factors which hinders women from having equal access as men to food security are lack of access to assets, Land, resources and services, including education, health care, credit, technology, agricultural inputs, extension services and markets, in addition to constraining socio-cultural norms. However, regardless of the inequalities found in by women in for instance food production, the direct responsibility for household food provision largely falls on women, and that the improvement of household food security and nutritional levels is associated with women's access to income and their role in household decisions on expenditure. (FAO, 2011). The World Bank and The One Campaign (2013) further argue that the problem is not only through the inability of women to access of resources, but also that the returns to their resources are low. This raises the need to understand the differences that may arise in Malawi in terms of food security of households headed by women vis-à-vis that of men.

One intrinsic component when dealing with issues related to food insecurity, is that of measurement. This helps in distinguishing the separation of who is regarded food secure or insecure and further to that the levels of food insecurity. As a result, several measures have to be employed pertaining to which dimension of food security is to be measured. As noted in the definition of food security addressed previously, that food

security is a multi-dimensional concept incorporating the availability, access, utilisation and stability of food. A proper measure of food insecurity should and must incorporate all the mentioned indicators for better analysis (Maxwell *et al.*, 2013). For example if you use household income alone as a predictor of food insecurity the question may arise as to how about the non-income components. In trying to address the problem of measures of food insecurity, scholars have come up with mixed propositions that have their own pro and cons one disadvantage is what has been highlighted and there are many others. As such, this has led to the establishment of different types of food security measures. When dealing with food security, scholars have either adopted one of the already proposed indicator as a measure of food insecurity, but also a few have actually proposed other ways of measuring food insecurity like (Rose & Charlton 2002; Napoli *et al.*, 2011 & International Food Policy Research Institute (IFPRI), 2013). More on different types of measures of food security together with the pros and cons is discussed in the second chapter of this study.

Another important aspect which this study intends to consider are issues dealing with how food insecure households cope with the problem (coping strategies). Snell and Staring (2001) defines coping strategies as all strategically selected acts that individuals and households in poor socio-economic conditions apply to restrict their expenses or earn income to enable them pay for their basic necessities and not fall too far behind in society's level of welfare. Similarly, Maxwell and Caldwell (2008) defines coping strategies as simply avenues that people employ to manage household food shortages. Wood *et al.* (2009) argues that when food shortages arise, households tend to use different coping strategies to maintain adequate access to food and that the coping strategies also help in revealing the severity of food shortages. The question that follows would be what are these coping strategies? Maxwell and Caldwell (2008) outlines the coping strategies to fall into four main categories which are dietary change, short-term measures to increase household food availability, short term measures to decrease numbers of people to feed and rationing or managing the short fall. These mention categories are further divided into a number of individual coping behaviours which will be discussed later in the study.

In terms of levels of food security in Malawi, a country which is divided into three regions (Northern, Southern and Eastern Region) the southern region was reportedly to have had very high levels of food insecurity especially in the rural areas (NSO, 2017). Having this background of the existence of gender inequalities in terms of food security status, this study therefore seeks to elucidate food security status of households that are based in the selected areas of the South Eastern Region of Malawi. Emphasising on the gender gaps that exist in terms of household food security status between male and female households, as well as the food security status between those residing in rural vis-à-vis urban areas. The selected areas have been chosen based on the findings from Integrated Household Survey 2013 results which indicated that Southern region of Malawi had the highest prevalence of food insecurity as compared to other regions (NSO 2013).

1.2 PROBLEM STATEMENT

Food insecurity is a major development problem that is caused by a myriad of factors in the global, regional, national and local spheres of human life. Several efforts have been put in place to alleviate food insecurity globally and at the national level across countries (FAO, 2012). Despite these efforts, the situation continues to prevail and sometimes even increase in contemporary human society. It is therefore imperative that food insecurity gets addressed appropriately. According to the NSO (2012) report on Integrated Household Survey (IHS3), a substantial proportion of the population in Malawi experience extreme forms of food insecurity as well as extreme levels of poverty, and that the affected proportion is higher in rural areas relative to urban areas and more prevalent in female-headed households. At the regional level it was indicated that about 54 percent of households who suffered high levels of food insecurity were from the Southern Region of Malawi (NSO, 2012). Studies conducted on food insecurity in the country indicate that hunger, as well as high levels of poverty, exist in Malawi (FAO, 2011; NSO, 2012; WFP; 2016). The crux of the problem is in the fact that agriculture remains a primary source of income for most Malawians (WFP, 2016). It is

therefore a paradox that people who depend on agriculture as their source of livelihood face food insecurity.

While the concept of indications of an increase in food insecurity may be available in literature, especially in most of sub-Saharan Africa, there still remains a gap in food insecurity in as far as the gender dissection is concerned. The fact that female-headed households, as well as those in the rural areas, are more vulnerable to food insecurity in Malawi is not a new topic in the country's literature. The biggest problem rests on the fact that most of the studies conducted in this area have relied so much on national data which focuses more on food production, income, and calorie intake, which do not give a clear picture of all indicators of food insecurity (availability, access, utilisation and stability) which are discussed further in this study, but also the problem of relying on national data may not be able to capture all the household's dynamics which keeps on changing with time due to other forces (Kassie, *et al*, 2015). This confirms the need for more research on the problem of food security especially at the household level in the country since the households are the most important social unit for food preparation and consumption.

The other aspect lacking in this area of study, especially in Malawi, is on the measures of food security adopted by most studies. The fact that a majority of studies conducted on food security in Malawi have opted for a single measure, which in most cases captures a single indicator of the dimensions of food security, has its own effects. To avoid confusion but also ensure better analysis of food security status that incorporates all the four dimensions, the study adopts the three most cost effective measures that have been well validated, used across cultures and locations by different authors. These measures are able to capture the four dimensions of food insecurity individually. The first measure is the Household Food Insecurity Access Scale (HFIAS), proposed by Coates *et al.* (2007), the second measure is the Household Dietary Diversity score (HDDS) proposed by Swindale and Bilinsky (2006) and, lastly, the Coping strategy index proposed by Maxwell *et al.* (2003). The study intends to elucidate how these three

measures can individually determine the food security status of households in the study area individually

The manifesto that food insecurity exists in Malawi indicates the need for more comprehensive research on the nature and prevalence of food insecurity and also a proper identification of the kind of population affected especially at the household level. In this way it may become easier to access ways on how to address this challenge which will assist the government in coming up with more effective policies, programmes and food aid design. Having the background of existing food insecurity in Malawi, the study's main was to analyse a gender perspective of household food insecurity in selected areas of the South eastern region of the country, under the main objective the study employed three different measures of food security and hence established how in their own way each one measures food security status of households in the selected areas. Employing the Household Food Insecurity Access Scale (HFIAS), Household Dietary Diversity score (HDDS) and coping strategy index (CSI) helped the researcher address some of the empirical objectives set under the main objective of the study.

This study contributes to the body of knowledge regarding food insecurity in Malawi, as it conducts research based on a comprehensive survey that was collected by the researcher in the selected districts of the South Eastern region of Malawi to analyse the gender dynamics of food security status of household in the area. The geographical setting of the population in this area is divided into two subgroups of rural and urban populations, hence the study distinguished the two areas and addressed the problem separately and later compared the results so as to distinguish the most vulnerable group. The fact that this study collected primary data gave the researcher the ability to collect data that is otherwise not available from secondary sources. The data and the results of the study therefore contributes to the body of knowledge by making available new information and recommendations on what could be done in order to minimise this problem.

1.3 OBJECTIVES OF THE STUDY

The following objectives were formulated for the study:

1.3.1 Primary Objective

The primary objective of the study was to conduct a gender-based analysis of household food insecurity and the coping strategies employed by both rural and urban households in selected districts of the South Eastern region of Malawi.

1.3.2 Theoretical objectives

In order to achieve the primary objective, the following theoretical objectives (also known as the literature review) were formulated for the study:

- To review the background literature of food security;
- To review the measures of food security;
- To review the literature on the food security on global and regional levels;
- To review the nature and theoretical causes of food insecurity;
- To review the socio-economic determinants of food insecurity; and
- To review the literature and studies on gender based food insecurity in the developing countries.

1.3.3 Empirical objectives

In accordance with the primary objective of the study, the following empirical objectives were also formulated:

- Assess and compare the food security status in female and male headed households;
- Identify the level of food insecurity between rural and urban household;
- Identify the coping strategies for food insecure male and female headed households both in the rural and urban areas;
- Determine the vulnerability of households towards food insecurity; and

- Assess the underlying determinants of food insecurity in female and male headed household for rural and urban areas.

1.4 RESEARCH DESIGN AND METHODOLOGY

The study comprised of a literature review and an empirical study. A quantitative research method was adopted, using a survey method for the empirical portion of the study. A questionnaire was used to collect information based on the empirical objectives. The collected data was coded and captured in excel and then imported to SPSS for analysis. The study employed primary data because, during the time the study was conducted, the most recent data available in line with the study was the Integrated Household Survey 3 (IHS3) conducted in 2010 to 2011. The study does not criticise the findings in the survey but rather questions on the timing whereby it may not have been appropriate to use the data but also the study had other areas of research which could not have been found in the existing data. From the above reasons the study found it fit to collect data. This section presents a brief presentation of this study research design and methodology while a complete presentation is found in chapter 4 of this report.

1.4.1 Literature review

The study conducted a literature review from journal articles, research papers, conference papers, government reports and documents, relevant textbooks, and newspaper articles. Information on Malawi was sourced from National Statistics Office Malawi (NSO). International reports were sourced from (World Food Program) WFP, World Bank and (Food and Agriculture Organisation) FAO among others.

1.4.2 Empirical study

The empirical portion of this study comprised of the following methodology dimensions:

1.4.3 Target population

The study was conducted in selected districts of the South Eastern Region of Malawi. Malawi is a landlocked country located in South Eastern Africa and ranked as one of the

poorest countries in the world (World Bank, 2016). From the most recent census conducted in 2008, it was indicated that Malawi had a population of approximately 13 million, with an average annual growth rate of 2.8 percent and estimated a further growth to 26 million by 2030 (NSO, 2008, 2012). The country is divided into four regions, the Northern, Eastern, Central and South region. Eastern regions, as discussed earlier, statistics show that about 45 percent of food insecure households in Malawi are from the southern region. The target population for the study were households in both the rural and urban households in selected districts of the South Eastern region of Malawi, namely, Zomba, Mangochi and Machinga. The selected areas were chosen based on the findings from Integrated Household Survey 2013 results which indicated that Southern region of Malawi had the highest prevalence of food insecurity as compared to other regions (NSO 2013). The total population of the selected districts is approximately 1.5 million with 340 thousand households (NSO, 2012). A more detailed discussion on the target population is found in chapter 5 of this study.

1.4.4 Sample method

In order to gather information needed for this study, a stratified random sampling method was used, because it is the best acknowledged probability sampling, through which every element of the population has an equal chance to be selected. Households at which the questionnaires were administered were selected from existing EAs (Enumerator Areas) defined for the Malawi National census in the 2008, but also used in the Integrated Household Surveys 1, 2 and 3. A detailed methodology section is presented in Chapter 4 of this report.

1.4.5 Sample size

Sample size is basically determined through a population size fraction or through what is known as historical method (Bartlett *et al.*, 2001). In most household surveys done in big areas, a sample of 300 to 400 has been considered statistically adequate (Case & Deaton 2009; Sekhampu & Dubihlela 2012; Tchereni *et al.*, 2013). Gujarati (2004) argues that for statistical purposes, especially when one wants to apply the central limit theory, any sample of 30 and above is considered big enough to assume normality in

the variables. The population size for the selected areas where the study was conducted is approximately 1.5 million, with an average of 4.4 household size, which in total results to approximately 340 thousand households in the region (NSO, 2012). The study deployed a sample of 550 households which were randomly selected from the already designated EAs. Due to financial constraints the study did not employ any mathematical aspect in the sample size for the survey, but rather a random sampling was employed which involved simply walking into the selected EAs and select every fourth house until the desired number of household was reached. As stated earlier, the rural areas in Malawi constitute a higher percentage of the total population, therefore, a higher proportion of households to be interviewed was allocated to the rural areas.

1.5 MEASURING INSTRUMENTS AND STATISTICAL ANALYSIS

1.5.1 Descriptive statistics

Frequency distribution, percentage, means and inferential statistics (t-tests and Chi-square tests) were used to assess the demographic and socio-economic characteristics of the sample. The study also employed correlations and cross tabulations amongst different types of household characteristics in order to determine which household characteristics were associated with food insecurity.

1.5.2 Food insecurity and measuring instruments

The definition of food insecurity presented earlier has shown how, with time, the term food insecurity has actually expanded from having one single concept of access to food into a multi-dimensional concept which incorporates four dimensions of food insecurity including the availability of food, food accessibility, the utilisation of food, and the vulnerability of food. As such, with the renewed definition emphasis on addressing constraints to food security has intensified the search for accurate, rapid, and consistent measurements to food insecurity. Barrett (2010) contends that approaches to measurement of food insecurity follows its four major pillars of availability, access, utilisation and risk (sometimes alternatively labelled stability or vulnerability), which in turn tend to follow different strands of analysis. He further argues that, in practice, most

analysts use proxy measures for different aspects of food security. The choice of a measure necessarily involves trade-offs, so the objective necessitating measurement commonly drives the choice of the measure.

There exists different indicators that captures the status of food insecurity employing various aspects. The discussion of these indicators was explained in detail in Chapter two. As stated in section 1.2, this study adopted three types of food insecurity measures focusing more on the main aim of the study which was the existence of gender inequalities in food insecurity status. The first measure incorporated in the study was the validated cross-cultural Household Food Insecurity Access Scale (HFAIS) developed by Food and Nutritional Technical Assistance (FANTA). The HFIAS, is a nine-item food insecurity scale developed by the USAID FANTA project which measures anxiety about food supply, followed by questions about food quality, food quantity, and frequency of meals (Deitchler *et al.*, 2010).

The second measure incorporated is the household dietary diversity score which captures the quantity and quality of food available in the household, the presence of important nutrients and the stability of adequate food supplies. Lastly, the third measure adopted is the coping strategy index (CSI) which was proposed by Maxwell and Caldwell (2008). The CSI measure helps to determine the number and frequency of coping strategies which a household employ when there was a shortage of food, but also, since CSI takes into account the behaviour of households in future contexts it can also be employed to measure the vulnerability of households to food insecurity (Maxwell & Caldwell, 2008). A more detailed presentation of the food security measures adopted in this study are discussed in section 4 of this study.

1.5.3 Analytics regression models

The study employed two regression models. The first regression model was employed to determine the vulnerability of households towards food insecurity. In order to achieve this, an ordinary least squares (OLS) multiple regression model was employed using the coping strategies as a proxy for food insecurity at household level. The second

regression model was employed to determine the vulnerability of households towards food insecurity. In order to achieve this the study employed a multinomial logistic regression with a four pronged categorical dependent variable and seven independent variables. A more detailed presentation of the model equations and their derivation is presented in Chapter 4 of this report.

1.6 ETHICAL CONSIDERATIONS

Since primary data was sourced, ethical consideration was required. Each participating member was asked whether they wanted to participate in the study or not. No participant was forced to participate. The questionnaire was administered to heads of households. The questionnaire was taken through the ethics committee of the Faculty of Economic sciences and IT for approval, consent was given under ethics clearance number ECONIT-2016-104. Authorisation was also sought from relevant authorities in the study country (Malawi).

1.7 CHAPTER CLASSIFICATION

This study comprised the following chapters:

Chapter 1 Introduction and background to the study: This chapter presents the background of the study, the problem statement, the research objectives and research questions and a brief overview of the methodology to be used in the study.

Chapter 2 Theoretical Literature Review: this chapter reviews the literature on food security status around the globe particularly the sub-Saharan African countries and also critiques on measures of food security in the region.

Chapter 3 details of the country profile of the study (Malawi): the chapter presents a detailed profile of Malawi with focus in terms of demographics and economic background but also details on gender inequality in terms food security, agricultural production among other things.

Chapter 4 Research design and methodology: This chapter presents the methodology to be used in the study, sources of data and the model design employed.

Chapter 5 Results and discussion of the findings: This chapter presents the results and discussions of the results in reference to the models used in chapter four.

Chapter 6 Conclusions and recommendations: This chapter presents the conclusions drawn from the study and recommendations arrived at from the results of the study.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

Food insecurity remains the biggest challenge faced by many people. Especially those in developing countries where high poverty rates, lower literacy rates, high unemployment rates and high debts are amongst some of the macro economic factors that hinders the economic growth of these countries (FAO, 2017). There exists a span of literature that explains the concept of food security from the day the term was conceptualised to recent developments. This chapter reviews the literature of food security, following the set theoretical objectives of this study as follows:

- To review the background literature of food security;
- To review the measures of food security;
- To review the literature on the food security on global and regional levels;
- To review the nature and theoretical causes of food insecurity;
- To review the household socio-economic determinants of food insecurity; and
- To review the literature and studies on gender based food insecurity in the developing countries.

In an attempt to address the set theoretical objectives, this chapter addresses the first objective which relates to the historical background behind the concept of food security. Under this objective, the chapter not only highlights the levels of food insecurity also known as paradigms of food security, but also the definitions of food security. Following this, the chapter reviews the next objective which tackles the issue of measurements of food security under this section the chapter highlights the different measures of food security that have been developed by different authors. The third objective is on the literature of the global and regional trends of food security. Under this objective the chapter reviews the statistics of the population affected by this problem in the said areas. Thereafter, the chapter reviews the literature on causes of food insecurity. The chapter goes further to look at some of the socio-economic determinants that limits household to become food secure. Finally the chapter reviews literature on gender

dynamics in terms of food security in sub-Saharan Africa as well as the studies that have been done in this area of gender and food security.

2.2 HISTORICAL BACKGROUND OF FOOD SECURITY

The concept of food security has predominated around the world for decades. McDonald (2012:12) argues that, in literature, the ideology of food security can be traced back as early as World War I and II, when most countries were recovering from the effects of the wars. At this point in time the concerns were merely at country level, especially in those who were mostly affected by the war. Simon (2012:11) contends that, in essence, there have been a number of factual events that led to the concerns of food security. However, the major concerns of food security became popular when it became a concern worldwide rather than merely at a country or province, village or household level only. Friedman and McMichael, (1989), Lang and Heasman (2004) argue that the concern of food security was as a result of food shortages, starvation and meal distribution that affected many countries in the twentieth century. This signifies that the concern of food security is not a new phenomenon and should be regarded as a serious problem. In his writing, Shaw (2007:118) describes the 1970s food crisis as a major cataclysm which led to massive starvation around the world. This triggered policy makers to look into matters relating to the availability as well as access of food, both at the global and national level (Duncan, 2015).

It was only in 1974, that food security was fully conceptualised at the UN General Assembly summit on World Food security Conference that was held in Rome. The main agenda for the summit was to develop ways and means on how a global agreement could be reached to resolve the world food problem within the broader context of development as well as international economic corporation (UN, 1975). Amongst the discussions held on the day, governments reviewed the global problem of food production and consumption and proclaimed that every man or woman, whether young or old, had the right to be free from hunger and malnutrition in order to develop their physical and mental facilities. In the end a universal declaration was signed by all countries on the eradication of hunger and malnutrition (FAO, 1975). The next section

further discusses the evolution of food security referencing Maxwell's (1996) writing on the three paradigms that exist in the explanation of food security history.

2.3 PARADIGM SHIFTS IN THE EVOLUTION OF FOOD SECURITY

Maxwell (1996:156) outlines the concerns of food insecurity from 1974 to 1994. He relates the concerns of food insecurity to three overlapping paradigm shifts which are worthy noting. He addressed the shifts as being in line with various definitions of food security that have been identified in several years. The three shifts are (i) from the global and the national level to the household and the individual levels, (ii) from a food first perspective to a livelihood perspective, and (iii) from objective indicators to subjective perception. The next sections explain in detail the named three paradigm shifts in food insecurity as follows.

2.3.1 From the global and national levels to household and individual level

With the predicament of the international food crisis which occurred around the 1970s, a number of countries both from developed and developing countries requested the United Nations to organise an international conference to review the situation regarding food and agree on possible measures (UN 1975). This led to the establishment of the United Nations World Food Conference in November 1974 in Rome, under the auspice of the Food and Agriculture Organisation (FAO) as the overseer of the programme. As previously discussed, one of its objectives was to agree on measures to ensure that, within a decade, nobody would suffer from food insecurity (FAO, 2003).

Amongst the approved recommendations made at this meeting, one significant change that was agreed upon was the recognition of the growing concern of food insecurity amongst most nations. A general consensus was therefore agreed upon to put in place measures on how to achieve a 100 percent food security regime worldwide. Another important aspect achieved at this meeting was the definition of the term food security- where it was defined as the availability at all times of adequate supplies of basic food stuffs to sustain a steady expansion of food security to offset fluctuations in production and prices (FAO, 2003:5). At this point, the term food security was defined in terms of

supply and price stability at the national and global level. Davies *et al.* (1991) notes that, in the 1970s, the core concern of food security was the supply and distribution of food rather than the demand at national level, more especially in Africa where there was a production failure of food due to drought and desert encroachment. In this regard, the primary focus was on national food security, so as to ensure that there was adequate production and distribution of food throughout the world.

The idea of focusing on food supply as the only way of achieving food security at national level was challenged in the 1980s due to the occurrence of food crisis (famine) that again plagued Africa in the mid-80s. It was established that adequate food availability at the national level did not automatically translate into food security at the individual and household levels (Frankenberger, 2001). Researchers and development practitioners realised that food insecurity occurred in situations where food was available but not accessible because of an erosion to people's entitlement to food (Borton & Shoham, 1991). Most of shift were driven by the works of Amartya Sen (1981), an Indian economist also popular for his noble prize in Economics for his contribution to welfare economics and social choice theory. At this time, Sen published an essay on Poverty and Famines. In his essay, Sen (1981) developed the theory on food entitlement where he opposed the idea that famine (widespread scarcity of food) was due to lack of availability of foodstuffs. He then proposed that an individual's food security depended on their ability to access and establish entitlement to enough food.

Devereux (2001:246) articulates that though Sen's thinking was not all new, he successfully brought to the centre of development thinking, the shift away from Malthusian claims that hunger was the result of too many people and too little food and towards a focus on the inability of people to acquire food. Sen's (1981) theory on entitlements resulted in the shift in focus of food security from nations securing adequate supplies of food for their populations to a focus on the household and individuals having access to food. Further developments in the understanding of food security resulted in the expansion of the concept of food security by the FAO (1983), by incorporating food secure access for vulnerable people at the household level to

available supplies. This implied that there had to be a balance between the individual demand and supply side of the food security equation. The focus was to ensure that all people at all times have both the physical and economic access to the basic food that they needed (FAO, 1983). Thereby shifting the concern of food insecurity from the national perspective to the household and individual basis.

2.3.2. From a food first perspective to a livelihood perspective

The second paradigm shift in regards to the concerns of food insecurity changed its focus previously from a food perspective to now a livelihood perspective and beyond that, to a preoccupation with the long-term resilience of livelihoods (Maxwell, 1996:157). At this stage the concerns of food security were highlighted at individual or households livelihood (De Waal 1992). Maxwell and Smith (1992) relates to the household livelihood security model as one that allows a broader and a more comprehensive understanding of the relationships between the political economy of poverty, malnutrition, dynamic and complex strategies that the poor use to negotiate their survival. They further place particular emphasis on household actions, perceptions, and choices of food to be the one and only priority that people pursue in a way that people are constantly being required to balance food procurement against the satisfaction of other basic material and non-material needs. The evolution of this concept mainly occurred after 1985 due to the effects of the African famine that occurred around 1984/85. McCarthy (1986) indicates countries such as Zimbabwe, Kenya, Ethiopia, Angola, Somalia and Lesotho as those mostly affected. Food security was then viewed as a primary need for survival, also categorised as a psychological need in Maslow's hierarchy of needs (Maxwell, 2000:18).

In the first paradigm, the traditional view of food security was of food being the essential need of life. Hopkins (1986:4) opined that food security stood as a fundamental need, basic to all human needs and the organisation of social life, he further argued that access to necessary nutrients was fundamental, not only to life per se, but also to stable and enduring social order. However, in these modern days Hopkins' ideas have been questioned and criticised in literature. Authors like Scoones (1998), Swift and

Hamilton, (2001), and Maletta, (2014) contends that food, especially short term nutritional intake, is not the only objective people pursue. Hence it is rather ambiguous to treat food security as a fundamental need, independent of wider livelihood considerations. Maletta (2014) argues that, in life, people have a variety of different needs for example, water, food, education, health care shelter, clothing, sanitation, and many more of which they have to balance in terms of effort and resources devoted to their satisfaction, and according to the ordering of preferences and budget constraints guiding the economic behaviour of individuals and households. He further argued that, just like household needs are diverse, household livelihoods in both rural and urban areas include not only food production for subsistence, but also (and increasingly) other gainful activities and sources of income: cash crops, mining, manufacturing, transportation, construction, commerce and various services. De Waal (1990:475) cited that during the 1985 war in Darfur, Sudan, at the height of the famine, people went hungry just to preserve assets and future livelihood. They were prepared to live up to the degree of hunger just to preserve seeds for planting, cultivate their own fields or avoid having to sell an animal. Chambers and Conway (1992) made one of the first formulations of the so-called sustainable livelihoods framework, which helped to define livelihood vulnerability in terms of the entire livelihood instead of focusing only on food.

2.3.4. From objective indicators to subjective perception.

The third shift regarding the concerns of food security is called from objective indicators to subjective perception. Before this shift the discussions in terms of the convention of food security were mired around objective situations such as of food supply shortage or, to some extent, lack of access to food. Whereas, the subjective feelings, beliefs and reactions of economic agents to the food situations were largely ignored (Maletta, 2014). The concept behind the shift originates from the 1980s. During this time, most discussions around food security, especially in terms of conventional approaches, relied on its measurements. Siamwalla and Valdes (1980) specify the levels of consumption as the main component. Whereas, Reardon and Malton (1989) cited that the targets of consumption had to be less than 80 percent of WHO (World Health Organisation)

average required daily calorie intake. Staatz (1990) concluded that, generally, food supply had to be nutritious and adequate. In explaining food security using these terms there appeared to be two main shortcomings. Payne and Lipton (1994) argued that the first one was nutritional adequacy itself. They described it to be affected by socio-economic factors such as health, age, work, and the environment. Secondly, Bryceson, (1990), and Oshaug, (1985) questioned the qualitative factors relating to food quality, cultural acceptability, and human dignity that there were excluded in quantitative technique measurements. With the two major constraints it implied that nutritional adequacy was needed, but it was not an adequate condition for food security.

A need arose to identify a better approach to food security that did not address the objective situations of food supply shortage or, to some extent, lack of access to food, but also incorporated the subjective feelings or beliefs, and reactions of economic agents to the food situation. This led to the shift incorporating the concept of subjective food security/insecurity (Maletta, 2014:12). Maxwell (1988) describes the last shift as one that involves the shifting away from the objective perspective of food security (which dealt with purely the calorie-counting approach) to the subjective perspective which incorporates the subjective measure of what it means to be food insecure by the food insecure themselves. The incorporation of the subjective approach to food security became very popular in the 1990s when the USA adopted it and introduced a scale as a measure of subjective food insecurity. This further spread to other developed and developing countries (Kendall *et al.*, 1996; Frongillo, 1999). The shifts in food security described have been of great help in terms of directions towards the right definitions of food security. The next section describes the various definitions of food security.

2.4 DEFINITIONS OF FOOD SECURITY

Since the formation of the concept of food security in the 1970s, there has been many definitions in literature attached to this term. With progression in changes of this concept described in section 2.3, so to were the definitions of the term revised concurrent to paradigms of that particular time. This is why the definition of food security has spiralled. From the last count of definitions related to food security, Maxwell and Smith, (1992)

compiled 200 definitions, which clearly shows the importance of this concept. This study adopts the definitions of food security that have been established by the FAO. Since food security ideally relates to matters concerning with food it is best to firstly define the term food.

2.4.1 Definition of food

In simple terms food is defined as a solid form substance that is nutritious in nature, which can be consumed by human beings, animals and plants in order to maintain life and growth (Gross *et al.*, 2000) As such, food is regarded as one of the most important cores for human kind, which is also associated with economic development (Smith *et al.* 2006:1). That is why a lack of food, which leads to hunger has been dealt with as a major problem seeking immediate attention around the world.

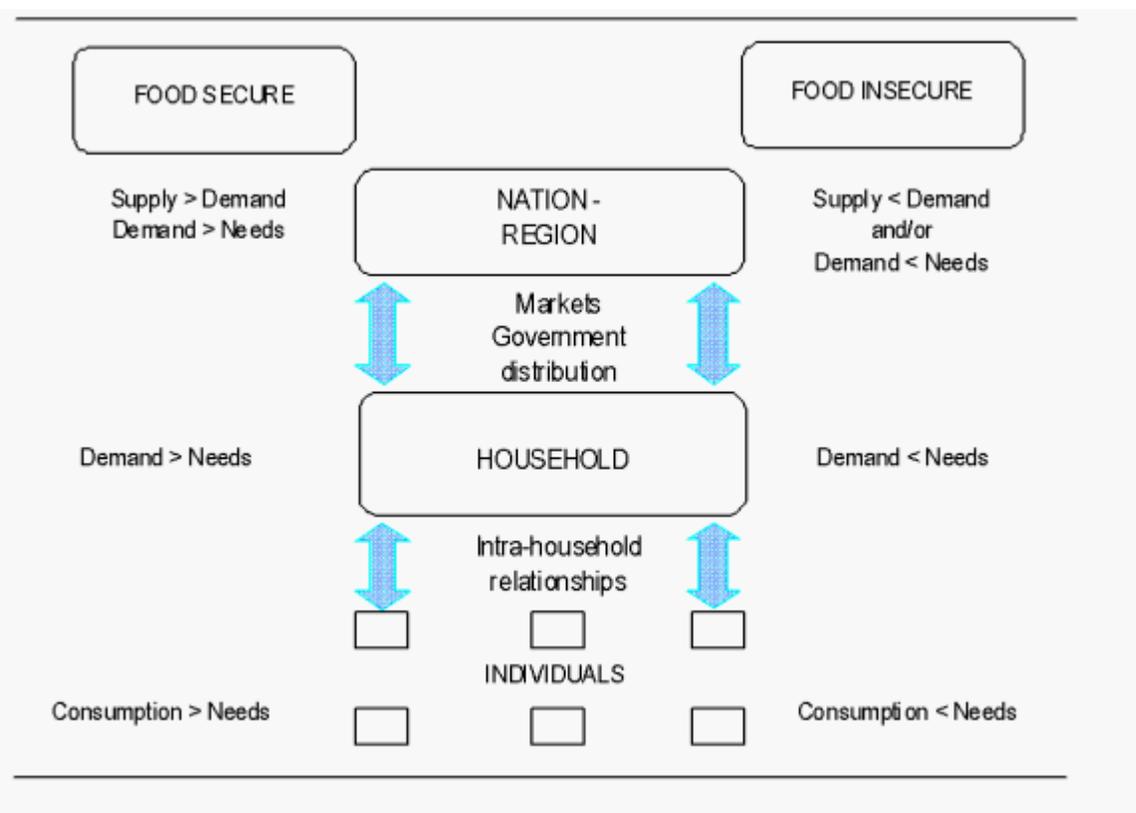
2.4.2 Definitions of food security

The definition of food security can be traced back to the 1970s when the UN World Food Conference set up a committee on World Food Security, where amongst other topics, the issues of food crisis, famine and hunger were extensively examined (FAO, 1996). At this meeting, food security was defined as the availability of adequate world food supplies at all times of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and price (UN, 1975). At this stage, the term food security was concerned with national and global food supplies. Around the early 1980s, the committee on World Food security expanded the debate around food security and adopted what is called a multi-dimensional concept of food security, which not only included the availability but also access to food as well as the stability around food security (FAO, 1983).

It wasn't until 1996 that a more generalised, complex definition of food security was adopted by the World Food summit, which included all levels (such as individual, household, national, regional and global levels). These were regarded food secure when all when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active

and healthy life (FAO, 1996). The definition was further altered in 2001 and redefined as a situation that exists when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2002). With the redefined meaning of food security, there now exists three dimensions of food security, namely, food availability (availability of sufficient quantities of appropriate food), food access (adequate income or other resources to buy food) and food utilisation (adequate quality of food) (USAID, 1992). The definition of food security is best described in terms of the interaction between the three main levels of food security (national, household and individual) as illustrated in Figure 2.1.

Figure 2. 1 Different levels of food security



Source: FAO (1998)

Figure 2.1 illustrates the three levels of food security, the first being at the national level where Thomson and Metz (1998:1) describe it as a satisfactory balance between food

demand and food supply at reasonable prices, available to most of the population. Secondly, at household level where households are identified as food secure if their entitlements, or demand for food is greater than their needs. Lastly, at the individual level where if his or her food consumption is always greater than need, as defined by physiological requirement (Thomson & Metz, 1998:1). The next section discusses the three dimensions of food security also regarded as the 3 pillars to food security.

2.5 DIMENSIONS OF FOOD SECURITY

From the definitions of food security, four main pillars were identified namely food availability, food access, food utilisation, and food stability. Subsequently, vulnerability was added as another dimension. This was added to food insecurity, which is now being accepted in literature, as it involves the well-being of individuals, households and communities in the face of a changing environment. With factors such as unemployment and household size being the main contributing factors in increasing the vulnerability of a household to food insecurity (Moser, 1998:3; Tawodzera, 2011:504). This sections to follow describes these four mentioned pillars in detail.

2.5.1 Availability of food

The first, but also regarded as the oldest dimension of food security, is called the availability of food. It is regarded as an essential component in food security at all levels whether national, household or the individual level. It was the main focus populated in the 1970s by the World Food Summit, which helped to deal with the volume and stability of food supplies. Availability of food mainly focused on the imbalances between population and food. Therefore, in order to maintain this equilibrium, the rate of growth of food availability should always be above the rate of population growth (De Muro & Burchi, 2012:2). On the national level, food availability is a combination of domestic food production, commercial food imports and exports, food aid and domestic food stocks. On the household level, food could be from own production or bought from the local markets. The availability of food relates to the supply of food through production, distribution and exchange, it mainly deals with sufficiency of food. The FAO (2006)

entails that sufficient quantities of food should be available, and every individual must have access to food at all times. WPF (2009) relates food availability to the term “sufficient” where it was referred to the amount of food that is present in a country or in an area acquired through all forms, be it domestic production, food stock imports, and food aid. Thus, it relates to the net commercial imports, once deducted the commercial and other exports.

With time, the availability of food was proven not to be the answer to achieve food security, with an increase in high production of food around the world the problem now shifted to food distribution. Shaw (2007:7) argued that food security does not depend entirely on the availability of food. Rather, it is merely one important factor in the body of food security. In his argument, Shaw stipulated that the availability of food commodities normally results in the belief that increasing food production would increase food security. He further argued that it has been proven for the last decade or so that world food production has surpassed the world population, yet some people do not have access to food. Similarly, in the works of Sen (1981), he noted that even in the severe famine of Bengal in 1943 food was available. However, many people did not have access to food because they either lacked the buying power (a situation that higher economic productivity would have diminished), the prices were excessive (a situation that freer trade or larger stocks might have diminished), or they did not have access to transfers (a situation that a greater sense of community would have diminished). Given the high likelihood that food became available in world markets for anyone with buying power in the foreseeable future, perhaps it is not surprising that accessibility became the major constraint to food security (Barraclough, 1991:42). That is why availability of food alone does not solve food insecurity.

2.5.2 Access to food

The second dimension of food security is that of access to the required food. It was incorporated by the FAO in the 1980s as another way of achieving food security. It refers to ensuring that people at all times have physical, economic, as well as social access to the basic food that they need (FAO, 1983). As noted earlier, to achieve food

security does not only depend on the availability of an adequate supply of food but also on other factors like the strategies employed by households for its acquisition. The FAO, (1996) concluded that in order for households to be able to establish access to food supply, they require access to the following three main aspects: physical, economic aspect, and social aspect. These are discussed:

- The physical aspect is also referred to in terms of production, where a household may produce food when it has the human and material resources to do so in that case such households have direct access to food. Ibid (1996) further argued, that in order for farmers to be able to produce food in adequate amounts and sufficient variety depends on their access to resources. Such resources include sufficient and fertile land, labour, tools, seeds, draught power, credit and other essential agricultural services, as the knowledge to grow crops and raise animals that provide beneficial nutritional outcomes and sustain the household's livelihood on a continuous basis (WFP, 2009:170).
- The economic aspect is defined in terms of people's purchasing power, in a sense that, despite the availability of food, the problem rests on the households' financial ability to regularly acquire adequate amounts of food to meet their requirements. This may include their ability to exchange their assets for food, for example through bartering, purchase or food for work. People's assets may include their income, their livestock, their labour and the products of their labour, their access to use of and/or ownership of land, their inheritance, gifts and transfers (WFP, 2009). Noting that the value of exchange for households or individuals varies with market forces which include wages and prices. Garrett and Ruel (1999:1958) agrees with the latter on the fact that access to food depends on whether the household has enough income to purchase food at prevailing prices or has sufficient land and other resources to grow its own food. Whereas, Benson (2004:8) argued that, the extent to which each member of a household has access to sufficient food depends on several factors such as gender, age and the employment status. Households with enough

resources can overcome unstable harvests and local food shortages and maintain their access to food (Tweenten, 1999).

- The last aspect-access to food-is that of socio-cultural factors. This arises when food commodities are available and the potential consumer having the money to buy the food but are prevented from doing so for being a member of a particular social group or even gender (WPF, 2009).

2.5.3 Utilisation of food

The third dimension to food security is utilisation. Availability and access to food alone was not adequate enough to enable people to have a safe and nutritious diet. That is why it was important to incorporate a third dimension to food security. As per the FAO definition, it is defined as a safe and nutritious food which meets people's dietary needs (FAO, 1996). Gross *et al.* (2000:5) argued that, in practice, adequate utilisation mainly deals with the biological perspective of humans which refers to the ability of a human body to be able to ingest and metabolise food which has enough nutrients for a safe diet. They further contended that adequate utilisation can be best achieved by having a good diet of nutritious foods, an adequate biological and social environment, and, lastly, proper health care to avoid diseases. If all is in place a person's body must be able to extract and use the nutrients consumed from food. This is according to the meaning of an active and health life in the definition of food security.

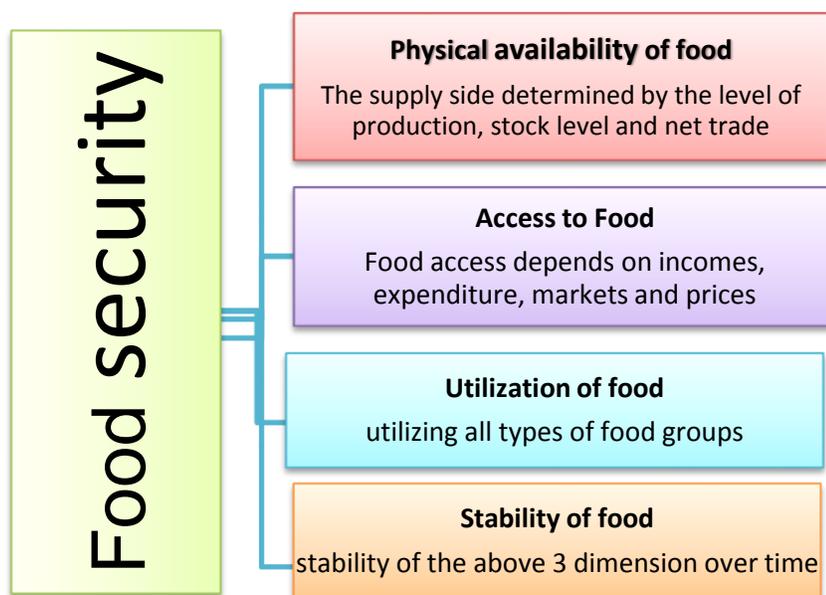
As mentioned earlier, availability of and access to food on their own are not enough, people have to be assured of safe and nutritious food. The food consumed has to provide sufficient energy to enable the consumer to carry out routine physical activities. Barrett (2010:825) describes the first three dimensions of food security as inherently hierarchical, in so far that food availability is a necessary but not sufficient condition to ensure access, on the one hand and, is necessary but not sufficient for effective utilisation on the other hand. WFP (2002:3) report on Mali cited that a number of observations were made of people living where food was available, having full access to food but yet still suffering from malnutrition mainly because of incorrect utilisation of

food commodities. Simon (2012:7) concluded that food utilisation is also related to clean water, sanitation, and health care. Thus, this dimension, not only refers to nutrition but also to other elements that are related to the use, the conservation, the processing, and the preparation of the food commodities.

2.5.4 Stability of food

The fourth dimension to food security is stability of food, also added to the definition of food security by the FAO as another important aspect in as far as achieving food security is concerned. By definition, it refers to the availability of access to food at all times, emphasising the term at all times (FAO, 2006:1). As noted, the term stability encompass the three mentioned dimensions of food security of availability, access, and utilisation, therefore it is regarded as an important component. Therefore, in order for a nation, household or individual to achieve food security the four mentioned dimensions should always be present. Figure 2.2 illustrates the link of dimensions of food security, showing how availability to food, access, utilisation, as well as stability are connected to achieving food security.

Figure 2. 2 Dimensions of food security



Source: FAO 2015

2.6 FOOD INSECURITY

The final definition of food security discussed in section 2.4.2 defines the term as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food, that meets their dietary needs and food preferences for an active and healthy life. Food insecurity is merely the opposite of food security. FAO (2002:1) defined food insecurity as a condition where there is limited availability of safe and nutritious food needed for a person to live an active and healthy life. Campbell (1991:408) defines food insecurity as a condition that exists whenever food security is limited or uncertain and that risk factors for food insecurity include any factors that affect household resources and the proportion of those resources available for food acquisition. Potential consequences of food insecurity include hunger, malnutrition and (either directly or indirectly) negative effects on health and quality of life. There are two main types of food insecurity called transitory food insecurity and chronic food insecurity:

2.6.1 Definitions of chronic and transitory food insecurity

FAO (2008:1) defined chronic food insecurity as a condition when there is a dearth of minimum requirements of food to people for a relentless period of time due to extended periods of poverty, but also due to shortages of assets and inadequate access to productive or financial resources. At a household level, chronic food insecurity is defined as a condition when households are unable, in normal times, to meet food needs because they lack sufficient income, land or productive assets, or experience high dependency ratios, chronic sickness or social barriers (DFID, 2004). Transitory food insecurity is defined as short term or temporary shortfall of food which lasts for short periods of time and that it is rooted from several factors such as short-term shocks and lack of food availability due to fluctuations in food prices (FAO 2008:8).

2.6.2 Links between transitory and chronic food insecurity

Chronic food insecurity and transitory food insecurity are seemingly interrelated as they all refer explicitly to the time dimensions of food insecurity. Despite being

conceptualised in terms of duration, there exist negative synergies between the two terms. Just from the definition provided it is noted that transitory food insecurity is short term in nature while chronic food insecurity is long term and may be persistent in nature. Staatz *et al.* (2009:159) describes the differences of the two terms from their negative effects to human kind. While both transitory and chronic food insecurity are disastrous in nature, their effects differ in a way that extremes of transitory food insecurity causes famine whereby thousands or millions of people are pushed to starvation by such disruptions. Though ironic, transitory food insecurity's effects may sound, when compared to the effects of chronic food insecurity, the latter is more disastrous in nature. Chronic food insecurity being long-term inadequate access to food and the ability to utilise it (due to poor health) affects nearly one billion people per year. It is also referred to as a silent killer, which increases morbidity and mortality especially in children, but also saps the energy of large elements of the population and slows economic growth (Staatz *et al.*, 2009:160). The next section discusses the measures of food security.

2.7 MEASUREMENT OF FOOD SECURITY

From what has been discussed so far it is noted that the concept behind the phenomenon of food security is quite complex. Maxwell (1996:291) contends that, just as the definitions and the interpretation of food security are complex, so too is its measurement. Most researchers have faced a lot of challenges in trying to find the most reliable, valid and cost-effective ways of measuring food insecurity. The biggest challenge faced when measuring food insecurity is the assessment of the methodologies that are applied, which include both qualitative and quantitative methods. Migotto *et al.* (2006:2) argues that, despite similarities which exist in different definitions of food security, its measurements and assessments of methodologies and methods can differ considerably, even within the boundaries of the qualitative and quantitative traditions.

Chung (1997:5) describes the concept of food security as a complex, cross-cutting and multifaceted problem, having literature which spans from a wide range of disciplines

such as, nutrition, public health, economics, sociology, anthropology, geography and epidemiology. Having so many complexities, it makes it difficult to have uniformity in its measurement. Jones *et al.* (2013:484) describes the metrics of measuring food security as mainly focused on food availability, access, utilisation, the stability of food security over time, or some combination of these domains. Ibid(2013) further argues that the tools used to measure these metrics sometimes vary from simple indicators for which data can be quickly collected and easily analysed, to comprehensive measures that require detailed, timed, resource-intensive data collection, and sophisticated analytic skills to yield results. Ike (2015) asserts that the challenges faced when measuring food security are contributed by the fact that the concept is multi-dimensional in nature. All four dimensions (availability, access, utilisation, and stability) must be in place simultaneously. Such being the case, food security measures may rely on data from hypothesised determinants of food security (e.g., the price of commodities) or on data from purported consequences of food security. It is therefore ideal for a researcher to firstly understand all types of food security measures before implementation. This section highlights some of the common measures of food insecurity at national as well as household level.

2.7.1 Measuring food insecurity at the global and national level

Food security can be measured at different levels. One way to do this is to measure the status of food availability at the national and global level. Jones *et al.* (2013:483) describes different measures of food security at both the national and global levels. These are described in the sections to follow.

2.7.1.1 Prevalence of undernourishment at the national level

This is a national food security measure developed for use at the country level, emphasising more on food availability. Tools for measuring food availability, such as food balance sheets, are used, which can traditionally be drawn from nationally aggregated data on food supply (total amount of food produced and imported) and utilisation, for example, the quantity of food exported, fed to livestock, used for seed,

processed for food and non-food uses, and lost during storage and transportation (FAO, 2001:1)

Labadarios *et al.*, (2009:9), also describes two measures related to national food security. One which measures the projected food supplies, calculated by using gross domestic product (GDP) over a particular period of time, which includes farming and commercial imports minus non-food uses. The second measure relates to the measurement of nutritious food supply, calculated by differentiating between the projected food supplies and the amount of food needed within a country for those individuals who cannot afford to consume enough food because they earn low income.

2.7.1.2 Global Hunger Index

The second measure of food insecurity at the national level is the Global Hunger Index (GHI), developed by IFPRI. It measures one or more aspects of food security at the country level by using three equally weighted indicators:

- Undernourishment weighed as the proportion of undernourished people as a percentage of the population;
- Child underweight weighed as the proportion of children younger than 5 year who have a low weight for their age; and
- Child mortality weighed as the mortality rate for children younger than age 5 year.

Countries are then ranked on a 100-point scale and categorised as having low to extremely alarming hunger. The data used for the child mortality and undernourishment components of the index comes from UNICEF and the FAO, respectively. The child underweight component of the index comes from 3 sources: the WHO Global Database on Child Growth and Malnutrition, Demographic and Health Survey data, and UNICEF's Multiple Indicator Cluster Survey reports. The stated purpose of the index is to highlight successes and failures in hunger reduction and raise awareness and understanding of regional and country differences in hunger (IFPRI, 2012:2)

2.7.1.3 Global Food Security Index

The Global Food Security Index (GFSI) is another multi-dimensional tool for assessing country level trends in food security. It was designed by the Economist Intelligence Unit (one of several companies of the publicly traded multinational, the Economist Group) and sponsored by DuPont. The index uses a total of 30 indicators within 3 domains of food security, affordability (6 indicators), availability (10), and quality and safety (14), to provide a standard against which country-level food security can be measured (Economics Intelligent Unit, 2012).

2.7.1.4 Global measures of food security

The above two mentioned metrics of food security deals with national measures of food security. At the global level there hasn't been much that has been discussed in literature. Jones *et al.* (2013:489) describes the only two main global metrics as follows:

- **Famine Early Warning Systems Network (FEWS NET)** is a network of international and regional partners funded by USAID that produces monthly food security updates for 25 countries. The intent is to provide evidence-based analysis to support decision makers in mitigating food insecurity.
- **The Integrated Food Security Phase Classification (IPC)** is a set of protocols for broadly assessing the food security situation within a given region. It draws upon data from a wide range of sources to establish common classifications, or phases, for the severity and magnitude of food insecurity in specific contexts. The purposes of the IPC, is then to identify the severity and magnitude of food insecurity in a given region, compare food security outcomes, and identify strategic action objectives across contexts based on these classifications.

2.7.2 Household measures of food security

Household level measures of food security are concerned with food security dynamics which are within household boundaries. As these measures rely on data from

household surveys, they are able to more accurately capture the access component of food security than measures that rely on nationally aggregated data. Qureshi (2007:5) contends that the importance of measuring food security at a household level is that it provides an understanding on how individual households are affected by the condition of food insecurity, and how they react to the circumstances related to food insecurity. It is also appropriate to identify measures of household food security for it not only helps to distinguish between households who are food secure from the food insecure households, but also helps in characterising the nature of the cause of food insecurity (Hoddinott & Yohannes 2002:1).

There exists several indicators that are used to measure household food insecurity, as Bickel *et al.* (2000:8), argued that the full array of food insecurity and hunger cannot be captured by any single indicator. Instead, a household's level of food insecurity or hunger must be determined by obtaining information on a variety of specific conditions, experiences and behaviours that serve as indicators of the varying degrees of severity of the condition. Therefore, household surveys, usually conducted in person or through the telephone are used to get this information. Researchers over the past two decades have identified a particular set of this kind of condition, experience and behaviour pattern that consistently characterises the phenomenon of food insecurity and hunger. There are different methods used to measure household food security. Due to the fact that this study's main focus is on household food security, this section discusses in detail the common measures applicable to understanding household food in/security as well as their advantages and shortfalls.

2.7.2.1 Individual food intake measure

The individual food intake data also called a 24 hour food intake recall, measures the amount of calories, or nutrients, consumed by an individual in a given time period, usually 24 hours (Maxwell, 1996:292; Hoddinott, 1999:3). This method uses two basis approaches in data collection as follows:

- The first is the observational method where an enumerator resides in the household throughout the entire day, measuring the amount of food served to each person, and the amount of food prepared but not consumed (plate waste) is also measured. In addition, the enumerator notes the type and quantity of food eaten as snacks between meals as well as food consumed outside the household.
- The second method is the recall method, where the enumerator interviews each household member regarding the food they consumed in the previous 24 hour period. This covers the type of food consumed, the amount consumed, food eaten as snacks and meals outside the household.

Maxwell (1996:293) argues that, despite the fact this method results in more reliable consumption data and captures intra-household distributional differences, it is also subject to a number of drawbacks such as memory lapses, observer bias, respondent fatigue, a short and possibly unrepresentative recall period, and such high data collection costs that resources often constrain analysis to relatively small samples.

2.7.2.2 Household income and expenditure surveys

The household income and expenditure survey method is based on interviewing respondents in their households on the information of the amount of money that they spend on food and other necessities (Smith & Subandoro, 2007:5). When collecting the data, different time reference periods are used including the weeks or months preceding the survey. The method uses the following inputs to be able to take full advantage of measuring food security:

- Quantity of food bought (or expenditures) and costs associated with different foods consumed within and outside the house;
- Foods received by any household member as either a gift or as payment for work, goods or services; and
- Foods grown for consumption by household members.

Some of the advantages of this method is that it estimates calories consumed on average per household member per day, making it essential to have access to culturally appropriate and valid food composition tables, but also it allows the identification of households at risk of food insecurity. Thus, in addition to mapping from the local to the national level, the determinants and consequence of food insecurity need to be examined (Perez-Escamilla & Segall-Corrêa, 2008:17).

Despite its advantages at hand, Jones *et al.* (2013:490) cited some of the draw backs such as (i) data on food expenditures usually reflect only the monetary value of foods. Yet more accurate measurement of household food acquisition requires estimation of the quantities of foods acquired (to be able to estimate, e.g., the quantity of foods consumed per capita, diet diversity, or dietary energy availability per capita); (ii) Measures food available but not necessarily consumed during period of interest (periodicity bias). (iii) Difficult to estimate foods consumed outside the household, (fed to animals, exchanged as gifts or payment of work). (iv) It is difficult to standardise methodology across countries. (v) It is expensive and logistically difficult but also data usually is not available annually.

2.7.2.3 Household dietary diversity

The household dietary diversity (HDD) food group is another common measure of household food security. It refers to a qualitative measure of different types of food or food groups consumed over a given reference period (Hodditt & Yohannes, 2002:11). The dietary diversity score is measured by adding the number of food and food groups consumed over a given reference period, using data that is collected through a questionnaire (Ruel, 2002:3). The HDD is mostly associated with various measures of household socio-economic status that are commonly considered as proxy indicators of household food security, including food and non-food expenditures, per capita daily caloric availability, household assets and education and household income (Ruel, 2002; Savy, *et al.* 2005; Rah *et al* 2010). Studies show that the diversity of household diets may be linked to these measures in part, because poor households will frequently use additional income to purchase non-staple foods, thereby increasing household dietary

diversity (Torlesse, *et al.* 2003; Ruel *et al.*, 2004; Thorne-Lyman, *et al.*, 2010). Since the kinds of foods available to households vary widely across cultural contexts, there is no unique definition of dietary diversity for all settings. It now sets a challenge of measuring dietary diversity across settings using indicators of dietary diversity to represent the same underlying phenomenon (Jones *et al.*, 2013). Similarly, Hoddinott (1999:10) argues that it is not applicable to ask individual households about the frequency of the amount of food consumed and as such inadequate diets cannot be estimated. Therefore, the dietary indicator is most likely to become an effective tool only in households that consume most common foods such as cereal (Swindale, 2007).

2.7.2.4 The household coping strategies index

The household coping strategies index (CSI) is an indicator developed by the World Food Programme, to capture the short-term food sufficiency element of food security at the household level. Mainly for use in a survey intended to quantify the determinants and impacts of a long-term households' adaptive strategies. It employs a series of questions regarding how households cope with food shortages in order to construct a numeric score that can be used for targeting food aid, monitoring the impact of food aid, and estimating long-term changes in food security (Maxwell, *et al.*, 2003). An outline of some of the generic coping strategies is shown in section 4.8.1.3 of the study.

In most cases the CSI is formulated from a list of coping strategies which households rely on in times of food deprivation or that they may use to manage problems of predictable shortages of food access in future. Otherwise, a list of generic coping strategies is suggested along with common coping domains. This generic coping strategy list is a locally adapted list that is generated through focus group discussions with stakeholders who represent the population of interest. Information on the relative frequency of use of the strategies over the previous month is also collected during these interviews and combined with the information on the strategies themselves. This is necessary because in most cases the same perceptions and behaviours do not always indicate the same severity of food insecurity across contexts (Coates, *et al.*, 2006).

A second round of focus group interviews is then suggested to assign severity weightings to the established list of coping strategies. These weightings are then grouped and scores are then assigned to each group. Frequency categories are also assigned, and then the scores are combined to yield a final index score from household survey data that incorporates questions on the identified coping strategies. The higher the CSI, the more food insecure a household is, as a household is using coping strategies more frequently and/or more severe coping strategies. The final CSI score for any given household is not very meaningful by itself. However, when compared with CSI scores calculated for other households in the same community or region using the same adapted index, or when comparing scores on the same households over time, the CSI serves as a comparative indicator of household food security (Maxwell, *et al.* 2003).

The CSI has been used extensively in most studies (Saaka *et al.*, 2017; Davies, 2016; McDonald *et al.*, 2015; Gupta *et al.*, 2015; Akerele *et al.*, 2013;) and has been proven to have shown fruitful results, especially in most sub-Saharan countries where both in its original and reduced forms, has been shown to be positively correlated with household assets, total expenditure per capita, and percentage of expenditures on food. It is also easy to implement as it takes a few minutes to obtain feedback, and lastly it directly captures notions of adequacy and vulnerability of a household (Maxwell, 1996; Maxwell *et al.*, 1999). Notwithstanding the fact that the CSI provides valuable information on the food security status of a household, there are limitations Hoddinott (1999:14) cites the following as some of the limitations:

- The CSI cannot be solely administered as it must be considered with other food security indicators, for example, the food consumption score;
- The CSI is a subjective measure now different people have different ideas as to what is meant by eating smaller portions this becomes a problem when comparing across households or localities, as it does not provide information on the absolute level of food insecurity of a household; and
- Poorer households tend to report smaller quantities of food than richer households. This has two implications. Firstly, that this measure can be somewhat misleading

between a richer and poorer household which may both report eating smaller quantities, but this does not imply an equal increase in food insecurity. Secondly, evaluating the impact of an intervention solely in terms of this measure risks setting a lower target for poorer households than for richer ones.

2.7.2.5 The household food insecurity access scale

The household food insecurity access scale (HFIAS) is a nine-question food insecurity scale which has been validated cross-culturally. It was developed by the funded Food and Nutritional Technical Assistance (FANTA) project under the United States Agency for International Development (USAID) (Deitchler, *et al.*, 2010:4). The HFIAS is based on the impression that the experience of food insecurity (access) causes predictable reactions and responses that can be captured and quantified through a survey and summarised in a scale. Therefore, qualitative research, with low-income households in the U.S. provided insight in ways in which households experience food insecurity (access) (Radimer *et al.*, 1990; Radimer *et al.*, 1992; Wehler *et al.*, 1992; Hamilton, 1997). The HFIAS uses a nine question food insecurity scale which includes questions measuring the anxiety about food supply, quantity of food consumed, quality of food consumed, and experiences of sleeping hungry or going all day and night without (Deitchler, *et al.*, 2010).

Once the Data is obtained, the HFIAS score is then calculated as a continuous measure of the degree of food insecurity (access) for the past four weeks (30 days), which adds up to a score of 27 for a household that has severe food insecurity to a minimum of score of zero for households that are food secure. Households are then classified into four categories, starting with food secure household, then mildly food insecure, moderate food insecure and lastly severe food insecure ranked into categories one to four respectively (Coates, *et al.*, 2007:20). Table 2.1 shows the nine generic questions that are included in the HFIAS.

Table 2. 1: Household Food Insecurity Access Scale

No	Occurrence questions
1	In the past four weeks, did you worry that your household would not have enough Food?
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?
3.	In the last four weeks did you or any household member have to eat a limited variety of foods due to lack of resources?
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?
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?
6.	In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?
7.	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?
8.	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?
9.	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?

Source: USAID (1992)

The mentioned are just a few of the many methods of measuring food security that have been discussed in literature. This study adopts and adapts three measures, the Household Food Insecurity Access Scale, the Household Dietary Diversity Score and the Coping Strategy Index as the measure of food security status between male and female households of the South Eastern Region of Malawi. A detailed discussion on this method will be done in Chapter four.

2.8 GLOBAL TRENDS ON FOOD INSECURITY

The year 2015 marked the end of the monitoring period set to achieve the well-known MDGs. Part of the set MDGs was to eradicate poverty and hunger. FAO (2000) contends that progress towards food security and nutrition targets requires that food is available, accessible, and of sufficient quantity and quality to ensure good nutritional outcomes. Proper nutrition contributes to human development as it helps people realise their full potential and take advantage of opportunities offered by the development

process. Though a number of indications show that there's still world progress in fighting against hunger, the worrisome part is that the progress is seemingly unevenly distributed. This can be seen from many reports on unacceptably high levels of food insecurity in some parts of the world. This section highlights some of the world trends on food security emphasising more on regions that have high levels of food security, but also review some of the empirical evidence on same.

2.8.1 Food insecurity in the world

The progress in the fight for eradicating hunger still continues around the world, yet there are still an unacceptably large number of people lacking the basic food they need for an active and healthy life. FAO (2015:8) reports on the latest available estimates of undernourishment around the world, as shown in Table 2.2 that about 795 million people in the world were undernourished in 2014, which entails that about one in every nine people was undernourished. However, when considering the trends of undernourished population or the prevalence of undernourished people in the world, there has been a decrease in the trends from 18.6 percent in 1990–92 to 10.9 percent in 2014–16*, reflecting fewer undernourished people in a growing global population. This signifies that, since the years 1990–2014, the number of undernourished people has declined by 216 million globally, a reduction of 21.4 percent, notwithstanding the fact that the world total population had increased by 1.9 billion within the same period. Table 2.2 also shows that a majority of the undernourished population resides in the developing countries as compared to developed countries. In developed countries the percentage of undernourished population has been less than five percent across board that is from year 1990 to 2014.

Table 2. 2 Undernourished population in the World (Millions)

	1990-92		2000-02		2005-07		2010-12		2014-16*	
	No	%	No	%	No	%	No	%	no	%
World	1010.60	18.6	929.6	14.9	942.3	14.3	820.7	11.8	794.6	10.9
Developed regions	20	<5	21.2	<5	15.4	<5	15.7	<5	14.7	<5
Developing regions	990.7	23.3	908.4	18.2	926.9	17.3	805.0	14.1	779.9	12.9

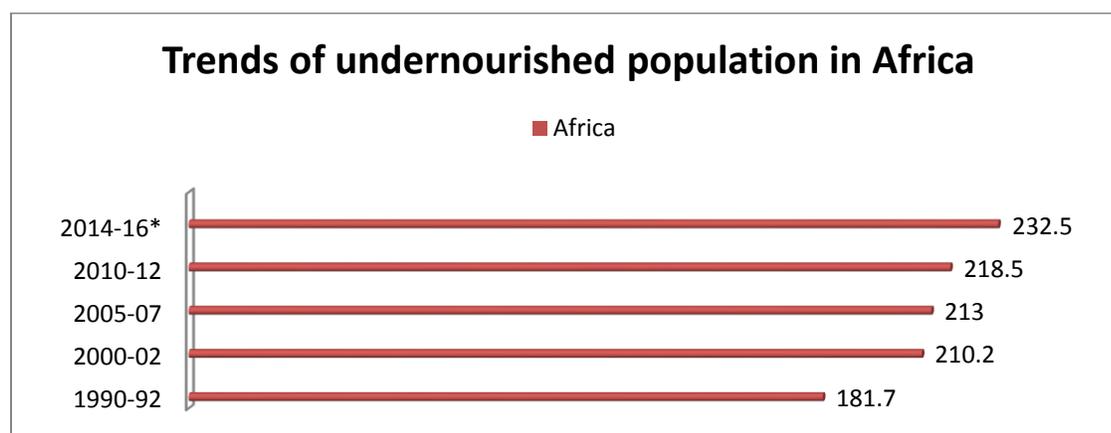
Source: FAO (2015)

*data for 2014-2016 is based on estimates

2.8.2 Food insecurity in Africa

Although significant progress has been achieved around the world as regards to reduction of food insecurity, the same has not materialised in most developing regions like Africa. . When Africa alone is brought on the spotlight, trends have shown that Africa's food security and nutrition situation is growing worse. IOA (2012:1) contends that most countries in Africa have been experiencing several episodes of acute food insecurity which is causing an immense loss of life and livelihoods over the past decade. FAO (2015:9) report on food insecurity in Africa shows that there has been an increase in the population of undernourished population as illustrated in figure 2.3, undernourishment in Africa increased from 181.7 million to 232.5 million people between the years 1990 to 2014 respectively. Africa's population is projected to surge from 1.01 billion in 2009 to 2 billion in 2050 if current demographic conditions remain constant. With the projected increase in population, how will Africa be able to cope with its food security challenge?

Figure 2.3 Undernourished population in Africa (Millions)



Source: FAO (2015)

Wide differences in eradicating food insecurity persist at the regional level in Africa. Such differences can be noted in the uneven progress towards improving food insecurity situations in the continent (FAO 2015:10). Despite the fact that other regions have shown better progress in eradicating hunger, the case is not the same in sub-Saharan countries where the progress has been very slow leaving significant pockets of food insecurity in a number of countries. As illustrated in Table 2.3, sub-Saharan Africa has an overall high rate of food insecurity in Africa as compared to other regions. In sub-Saharan region alone, undernourishment increased from 175.7 million to 220.0 million from 1990 to 2014 respectively. The table also shows good progress in eradicating hunger in the northern Africa with less than 5 percent of undernourished population as well as southern Africa which only has a marginal increase in the number of undernourished people from 3.1million in 1190 to 3.2 million in 2014 (FAO, 2015).

Table 2.3 Undernourished population in sub-Saharan Africa (Millions)

	1990-92		2000-02		2005-07		2010-12		2014-16*	
	No.	%	No.	%	No.	%	No.	%	No.	%
Africa	181.7	27.6	210.2	25.4	213.0	22.7	218.5	20.7	232.5	20.0
Sub-Saharan Africa	175.7	33.2	203.6	30.0	206.0	26.5	205.7	24.1	220.0	23.2
Northern Africa	6.0	<5.	6.6	<5.5	7.0	<5.0	5.1	<5.1	4.3	<5.0
Southern Africa	3.1	7.2	3.7	7.1	3.5	6.2	3.6	6.1	3.2	5.2

2.9 THEORETICAL CAUSES OF FOOD INSECURITY

The causes of food insecurity are diverse, multifactorial, but also interlinked in nature. There exists a lot of backing evidence in literature on prevalence of food insecurity across countries in the world, most studies have specifically analysed such prevalence at national level with a few studies conducting a cross country analysis. This section highlights some of the causes of food insecurity as well as discusses some of the outcomes in studies conducted on food insecurity.

2.9.1 Natural hazards

Natural hazards to the environment such as extreme climate changes and natural disasters are the main contributing factors of causes to food insecurity. Such occurrences negatively affects most developing countries which do not have proper infrastructure preventing major losses. FAO (2015a) reported that approximately 1.9 billion people in developing countries were affected by natural hazards between 2003 and 2013 which led to USD 494 billion worth of losses in the agricultural sector.

The physical damage caused by disasters can have a direct, as well as indirect impact on agricultural production with serious repercussions on future harvests, agriculture related manufacturing and industrial outputs. Such negative consequences can be felt along the food chain, which includes the disruption of the flow of agricultural inputs such

as fertilizers and seeds, but also the linkages with processing and distribution between markets and retailers (FAO 2015). In most cases, poor people are more vulnerable mostly because they are not able to cope with the impacts of climate shocks and variability.

A number of studies indicate that the negative impact of climate change on food security and malnutrition is highest among sub-Saharan African Countries, where most of the population depends on climate sensitive agro-economic activities (Wlokas, 2008; Ludi, 2009; Thompson, *et al.*, 2010; Badolo, 2012). In a study conducted by Zewdie (2012) concluded the effects of food insecurity based on the three pillars of food security (availability, accessibility and utilisation) in the analysis the author gathered literature from different parts of the region and found that, climate changes is one main challenge to the development of Sub-Saharan Africa in reducing food insecurity and achieving the first MDG of hunger reduction.

2.9.2 Increases in food prices

Fluctuations in food prices affect food security status of people at all levels, be it national, regional and households levels. The impact is more noticed when the cost of food increases. Increases in food prices generally negatively impacts almost everyone, but much effect is felt by those that are poor, struggling to make ends meet, who in the end are pushed further into the poverty and hunger trap. FAO (2008) describes the impact of soaring food prices in particular to the increases in food price crisis of 2007-2008, as a phenomenon which brought in so much political unrest but also contributed to reversing the complacency of governments around the world regarding the unconscionably high levels of chronic hunger.

The impact of rising of food prices differ amongst groups of people, when food price increases, FAO (2011) argued that the poor households, regardless of their country's GDP, spend a much higher proportion of their income on staple food such as maize, wheat and rice as compared to wealthier households. That being the case, any drastic rise in the price of maize, wheat or rice consequently has a much smaller impact on the

cost of the food for the wealthy people as compared to the poor. Ibid further gave examples of countries such as Bangladesh, Malawi and Viet Nam, where the poor often spend 35 percent or more of their income on staple cereals. On average, in developing countries, total food purchases represent about 70 percent of the expenditures as compared to only 10 percent in the US.

Female-headed households are also regarded as among the most vulnerable group to the nutritional effects of high food prices, as they are more likely to suffer from micronutrient deficiencies when driven to consume less diversified daily diets (FAO, 2008). As discussed a higher percentage of women in developing countries are food producers for household consumption hence they are harder hit by food price increases but also benefit less as producers from price increases. As producers, they face a number of gender-related constraints, such as more limited access to credit and land, which limit their ability to produce more food for the market and take advantage of higher prices. As consumers, female-headed households tend to spend more of their income on food than male-headed households, so higher prices affect their total expenditures more (Kumar & Quisumbing 2011:3).

A number of studies have been conducted on the impact of increase in food prices found that increase of prices have negative impact on food security especially amongst the poor (Robles *et al.* 2008; Devereaux, 2009; Dailo *et al.*, 2009; Compton *et al.*, 2010 Hossain & Green, 2011). For example, Devereux's (2009) study on the volatile effect of food market seasonality in Ghana, Namibia, Malawi, and Ethiopia and concluded how damaging this price volatility was for nutrition, especially for Malawi where malnutrition in children increased drastically as a result of increase in food prices and fell with a decrease in food prices. Another study by Robles *et al.* (2008) concluded that 21 million people were pushed into poverty because of rising food prices in middle-income Latin America from January 2006 to March 2008. Dávila (2010) found that higher prices for maize affected Mexican household's living standards and food security both in urban and rural areas, with the poorest net buyers of maize being the most affected. Block *et al.* (2004), found in Indonesia that when rice prices increased in Indonesia in the late

1990s, mothers in poor families responded by reducing their calorie intake in order to feed their children better, leading to an increase in maternal wasting. In Malawi, Lewin (2011) showed that a 25 percent increase in the price of maize flour would increase the likelihood of food insecurity in Northern Malawi by 12 percent, while a similar increase in fertilizer prices would increase food insecurity by 30 percent in the central region.

2.9.3 Rapid population growth and urbanisation

Human population growth is one of the most significant causes of the complex problems the world is facing today. The world population has been increasing rapidly in the past decade. The UN (2012) reported that by 2050, the world's population will have grown by 2.7 billion to 9 billion, Ibid (2012) further reported Asia and Africa and Latin America as countries that are contributing to rapid population growth. The rise in the population growth has negative repercussions to such countries especially that most of them have a majority of people that are very poor. When it comes to food security, rapid population growth increases the burden to meet the demand for food production to feed millions of people worldwide (Cargill, 2012:3).

Different scholars have addressed the impact of population growth on food security. The first was Malthus (1826) who proposed the theory that the power of population is indefinitely greater than the power of the earth to produce subsistence for man. He argued that population growth is a primary determinant of food insecurity in a way that with an increase in population results in decreasing agriculture production, consequently limiting a country's ability to provide food for its citizens. Quinn (1997) questioned Malthus' scarcity theory by proposing that increases in food supply are responsible for population growth. Hopfenberg (2003) supported this hypothesis and determined Earth's carrying capacity by studying the dynamics between food production and agriculture. He estimated future population numbers by using past food production numbers, which were similar to those estimated by FAO. Hopfenberg cited that, in the absence of limitations of resources such as space and food, populations will grow exponentially. If resources are limited, the growth rate will begin to decline as the

population reaches the maximum that the environment can support. Population will continue to decline until equilibrium is reached.

Although Hopfenberg and Quinn's hypotheses have strong biological foundations, they do not seem to maintain when confronted with cases such as Africa, where population sizes have continued to increase despite declining food production on the continent as expected by the Malthusian model. Currently, African nations such as Ethiopia, Tanzania, Kenya, Nigeria and Uganda have among the highest population growth rates in the world (World Bank, 2009). The rapid population growth has bred the problem of urbanisation. Globally, the percentage of the urban population was at 53.6 percent in 2014 but is projected to increase to 67.2 percent by 2050 (UN, 2014b). The worse cases are found in developing countries where most people migrate from rural to urban areas for better job opportunities. The increase in urbanisation in developing countries brings in a lot of challenges. The modernisation theories postulated that, with an increase in urbanisation, would drive development and improve people's lives in most countries, as had happened during Europe's industrialisation.

Studies have shown that it may not be the same with most developing countries where urbanisation has taken place without industrialisation. As such, most developing countries are likely to struggle just to adapt to their food production systems to meet the demand and needs of people living in urban areas (FAO, 2011). For example, in Zimbabwe, Tawodzera (2011) in a study conducted in one urban settlement in Harare, on food insecurity status found that a higher percentage of the population in the areas lived below the poverty line which resulted in most of the household being food insecure. Similar results have also been found in Kenya, Ethiopia, Malawi, South Africa and Bagladesh (Satterthwaite *et al.*, 2010; Crush & Frayne, 2011; Sanjedaa, 2014; Korir, *et al.*, 2015). Mentioned are just a few of the studies from many others. There is therefore need for policy makers in these countries to come up with proper ways of mitigating this problem in order to reduce food insecurity cases.

2.9.4 Poverty

The link between poverty and food insecurity is complex and multi-dimensional in nature, and there are no appropriate measures of poverty and food insecurity. Bhatt (2004:1) contended that poverty alone encompasses a variety of economic, historical, social, cultural, psychological, spatial, national, international, and environmental issues. He further noted that the effects of it leads to malnutrition, hunger, starvation, illiteracy and reduces life expectancy. Studies (Clover, 2003; Migotto, *et al.*, 2006; Suryanarayana & Silva 2007; Zezza & Tasciotti, 2010) have indicated that most households that are living with the condition of poverty are most likely to be food insecure the sensible reason behind this argument is the fact that if people are poor it's mostly very unlikely for them to be able to cultivate or rather buy food. It is also difficult for poor people to be able to access (purchase) food that may be available because of inequalities in income distribution on the market economy which hinders the poor.

2.9.5 Health outcomes

Food insecurity has diverse health implications at all levels be it household, individual as well as national level. It has been argued that houses that are food insecure are more prone to be affected by most diseases, particularly in children (UNICEF, 2012:2). When children do not acquire all the necessary nutritious food in their body, are prone to various diseases particular malnutrition. Another major problem is the continued high prevalence of diseases such as HIV/AIDS, malaria, diabetes and others, which worsens food and nutrition security. The HIV/AIDS epidemic is regarded as a disease that has very fatal effects on human kind, in terms of food production. HIV/AIDS increases vulnerability to food insecurity at the household level because it affects economically active adults, and thus it reduces the ability of members of a household to work and grow or consume food. As such, the quantity and quality of food available to a household will decline as productive family members become sick or die (Gillespie & Kadiyala, 2005:7).

Other causes of food insecurity worth mentioning are, wars and civil conflict, which brings so much unrest in most nations. Corruption and national policies that do not promote equal access to food for all, environmental degradation, barriers to trade, insufficient agricultural development, low levels of education, social and gender inequality and cultural insensitivity. The next section looks at the impact of socio-economic characteristics on food security status of the households.

2.10 FOOD INSECURITY AND HOUSEHOLD SOCIO-ECONOMIC CHARACTERISTICS

Dealing with food insecurity at the household level has so many challenges, studies have indicated resources of individual household as well as several household socio-economic characteristics as main indicators that influence food insecurity at the household level. This sections details some of these household socio-economic characteristics in detail.

2.10.1 Household size

Household size is referred to but also measured by the number of people in the household. Maxwell (1996) contended that, families that have large family size have significant relationship with much greater risk of poverty hence are more likely to fall into the category of food insecure population. An increase in household size, increases the food consumption as well. In a study conducted by Tefera and Tefera (2014:97) in Ethiopia on the impact of household size and food security, it was found that any increase in household size negatively influenced household food security status, whereby with an increase in the size of family by one person, increased food insecurity by a factor of 0.4 unit. Similarly, in other studies conducted (Maharjan & Chhetri, 2006; Olayemi 2012:138; Grobler, 2015) in Nepal, Nigeria, and South Africa respectively, found that household size and food security were negatively correlated. This is because as household size increased food security decreased. Aidoo *et al.* (2013:519) observed that an increase with one additional member of a household generally increases food insecurity status especially among the poor people. They further argued that an

increase means that there are more people to feed and indirectly reduces income per head, expenditure per head and per capita food consumption. The issue becomes more evident when there's only one bread winner in the home in this case, the higher the number of inactive individuals in households the higher the burden for active individuals in the provision of food, which in turn increases the likelihood of food insecurity. The likely explanation is that, in an area where households depend on less productive agricultural land, increasing household size results in increased demand for food. This demand, however, cannot be matched with the existing food supply from own production and this ultimately end up with the household becoming food insecure reduces expenditure per, head income per head and per capita food consumption. This is because larger household sizes demand more food.

2.10.2 Household income

Household income refers to a collective of all total monthly income earned by household members. Income is an important determinant of food security because, with enough income, households are able to acquire all required foods needed for body consumption. Studies conducted on determinants on food security and household income have cited the existence of negative relationship between food security and household income. The common outcome being that, in relative terms, low income households are more likely to suffer from food insecurity as compared to middle income and wealthier households. Though one can argue that non-poor household spend more on food because of the type of food they buy but if calculated using the absolute terms non-poor household already have a higher income hence the percentage spent on food items is not really felt or rather has a small dent unlike the poor bracket.

In a study on determinants of food insecurity conducted by Carter *et al.*, (2010) in New Zealand, found that there existed a strong inverse linear relationship between income and food insecurity with four times the odds of being food insecure in the lowest income quintile compared to the highest. That being the case, the study revealed that most low income households were found to rely on welfare payments, food banks and food vouchers in order to purchase food. As a result, most of low income

households ended up in debt partly due to having inadequate income to meet their household expenses. Similarly Bashir *et al.*, (2012:4) in Pakistan, using a logistic regression to determine whether income had an effect on household food security status. The study concluded that income was positively significant, meaning that there was a positive relationship between the food security status and monthly income. A rise in income of Rs1000 (Rupees) was found to increase the probability of being food secure by 10.5 percent. Carter *et al.* (2005:5) reported that disposable income had a direct influence on food security. The study further showed that there was a negative correlation between income and food insecurity by four times the odds of becoming food insecure for lowest income households as compared to the highest income households. Low income households are found to depend on social welfare transfer and food aid to consume food.

2.10.3 Household expenditure patterns

When household income is related to household expenditure patterns, the outcome is slightly different. There exist a lot of studies in literature that have evaluated the relationship between income and expenditure patterns. Most of these studies follow the pioneering work by a German statistician, Ernst Engel (1821-1896). Engel studied the expenditure patterns of Belgian households in Germany in the year 1857. He found a highly consistent relationship between the share of consumption expenditure on food and income across households (Kaus, 2007).

Most studies have indicated that households with lower incomes tend to spend a higher percentage of their income on food whilst those with higher levels of income spend less on food. Engels law (1857) states that, as income rises, the proportion of income that is spent on food decreases. This proportion, also called Engel's Coefficient, means that consumers increase their spending on food by a smaller amount than the increase in income. For example, a household which sees their income double is unlikely to double their spending on food. The law implies that poor households spend a greater proportion of their income on food than higher-income households. When the costs of food increase, it will hit the poorest the hardest. This is because they already spent a

large proportion of their income on food so when food prices increase further, they may not be able to feed themselves adequately (Houthakker 1957:534). Subsequent studies conducted on household expenditure patterns and food security have, in most cases, analysed their outcome on the basis of Engels Law. An analysis of farm household food expenditure and its implications for food security in rural Nigeria carried out by Umeh and Asogwa (2012) revealed that household income was significant in determining food expenditure, when it showed the share of the household budget spent on food decreased as the household income increases. Similarly, Grobler and Dunga (2015a) found similar results in South Africa in their study on spending patterns of food insecure households, they discovered that poor households spent more on food consumption as compared to the non-poor households.

An opposite relationship from that of Engels, between food security and household expenditure patterns, is observed from other studies, evidence from a study by Kedir (2007) in Ethiopian urban households for people living below or near subsistence levels, shows that their levels of food increased until a threshold value and then they start to follow Engel's law. This contradiction is regarded as an exception. In this case, Engel curves were used for welfare analysis to influence policy to target food accessibility to the food insecure. Other studies have argued that the Engel relationship is not linear and some papers have recognised this and opted not to impose any relationship between the log of total expenditure and the share spent on food through nonparametric estimation (Blundell, 1997). Some authors have used income as an instrumental variable for expenditure with the assumption that income is exogenous (Bopape, 2007). However income is likely to be an inadequate measure of how much a poor household can afford to spend on food, especially when there is no consistent flow of income (Kedir, 2007). More variables influence expenditure and some of them are not easy to control for example the power each member has on influencing the total expenditure of a household (Anker, 2011). Sampson *et al.*, (2004) state that, contrary to Engel's Law of spending less on food as income increase, grant recipients in South Africa spend proportionally more on food than non-grant recipients. Booysen and Van Der

Berg (2005) found that grant income leads to higher expenditure on food and that individuals with a higher level of education spend more on food.

2.10.4 Education level of household head

Education is an important aspect to all. A household that is headed by an educated person is seen to have more benefits as compared to the counterpart. That is because educated people have more chances of getting employment in which they are able to sustain themselves. The benefits increase more with any addition in the education levels one can attain. In terms of household food security, studies have indicated the positive relationship between household head education attainment and food security. A study in Nigeria by Nyako (2013) on the effect of education attainment and food security found, educational attainment had a negative and statistically significant relationship with food insecurity. In his analysis he observed that household heads that had a basic level of education were about 13 percent points less likely than households whose household heads had no formal education to experience food insecurity. An even stronger relationship was observed among households whose heads had higher levels of education. These households were about 27 percentage points less likely than households whose household heads have no education to be food insecure. Similar results were also obtained in Kenya a study by Mutisya *et al.* (2016), they used a random effects generalised ordered probit model to determine the effects of education on two rural settlements in Kenya. Their results showed that there was a significant effect of education on food security. The results further showed that, for a unit increase in the average years of schooling for a given household, the probability of being food insecure decreased by 0.019. He thus included that the effect of education, remained significant, even after controlling for household wealth index, a more proximate determinant of food security in a cash-based economy such as the urban slums.

So far the study has discussed the general concept of food security from the historical background, measures, causes as well as the global trends of food security. The study goes further to address the main aim of the study which is the existence of gender

inequalities in food security attainment. A clear understanding of the same is discussed in the next chapter and subsequent chapters.

2.11 GENDER AND FOOD SECURITY IN DEVELOPING COUNTRIES

As previously discussed, food security (access to adequate food at all times) is a fundamental prerequisite for all human beings. Most studies conducted on gender and food security in developing countries, have established the existence of gender inequalities in food security where a majority of female-headed households have been found to be food insecure as compared to male-headed households (Mallick, 2010; Argarwal, 2012; Kassie, *et al.*, 2012; Kassie, *et al.*, 2015). The study acknowledges the fact that there exists different types of female-headed households. Studies on female headship have addressed the fact that female headed household do not form a homogenous group. For instance some are regarded as *de jure* female-headed households while others *de facto* female-headed households. (Fuwa, 1999; Lampietti & Stalker 2000) distinguish the two, where in a *de facto* female-headed household the husband is temporarily absent, but may still play an active role in supporting the household through remittances, while in a *de jure* female-headed household the male head is permanently absent. These include unmarried women, widows and those who are divorced or separated with their partners. A third type of female-headed household was identified in South Africa by Rogan (2012:7) of co-existent female-headed households, where the house is headed by a married/co-residing female who lives with her partner.

Although limited data sources are available that distinguish the types of female-headed households, few studies (Chipande, 1987; Appleton, 1996; Fuwa, 2000; FAO, 2010) found that approximately 70, 63, 83 and 80 percent of female-headed households in Malawi, Panama, Uganda and Cambodia respectively, were *de jure*. Seebens (2010) argued that most of the *de jure* households are more likely to suffer from economic and social disadvantages amongst them being food insecurity. Most of those studies are old hence there's need for more recent studies to address the recent developments.

2.11.1 General concerns of gender and food security

In recent years, there has been increased recognition of the crucial importance of women's contribution to food security. Yet there are also a number of concerns of increase in number of food insecure female-headed households, especially in developing countries (Kassie *et al.*, 2015). Such concerns have mostly been challenged with the existence of gender inequalities in most development projects. Part of the concerns regards the existence of gender inequalities in agriculture development which is argued to contribute to lower productivity, higher levels of poverty and under-nutrition and utmost the existence of household food insecurity. Studies (Quisumbing, 1996; Agarwal, 2012; Kassie *et al.*, 2014;) have shown that agriculture is one main source of food both for direct consumption and as raw material for refined foods, and that women unlike men are crucial in the translation of the products of a vibrant agriculture sector into food and nutritional security for their households. In most cases, despite the diversity in household production patterns, women in most developing countries play a predominant role in household food security through agricultural and food production. This gives women the direct responsibility for household food provision, hence the reason why the improvement of household food security and nutritional levels are associated with women's access to income and their role in household decisions on expenditure. Women also often take the lead as farmers who cultivate food crops and produce commercial crops alongside men in households as a source of income. With such, women are usually responsible for growing and preparing most of the food consumed in the home and raising small livestock which provides protein (Agarwal, 2012:6; FAO, 2016).

According to the FAO (2015), on average, women represent approximately 43 percent of the world's agricultural labour force and 47 percent of the global fisheries labour force. Despite being less than half the labour force, Ibid further argued that these hard working women produce more than half of the world's food. Additionally, women account for 60 to 80 percent of food production in developing countries (FAO 2015). Despite the decisive role women play in the three components of food security (food

availability, access, and utilisation), there always exists a crop yield gap between male and female farmers every year, but also women headed households unlike male headed household are more prone to food insecurity. Diverse gender-based reasons (less access to land, livestock, other assets, credit, education, health care, markets, and extension services) have been argued in literature to play a vital role in the existence of such inequalities (Chipande 1987; Takane, 2009; FAO, 2011). Relating to the three pillars of food security, the next section highlights some of the constraints faced by women to fulfil their roles in order to attain a food secure environment in their households.

2.11.2 Causes of food insecurity among female-headed households

There has been a number of studies conducted on food security that have unearthed subtle factors that impinge women to attain food security, Most studies conducted in developing countries concede to the fact that female, unlike male-headed households, are mostly food insecure. As previously discussed, in order for a household to be regarded as food secure it has to accomplish the three central pillars of food security, Food availability (adequate food production), economic access to available food and nutritional security. Women play a major role in supplying all of the three mentioned ingredients necessary to achieve food security, yet face enormous difficulties. Not undermining various efforts being rendered by many development agents especially on women empowerment, there is still a huge gap that has to be looked into in order to attain full gender equality in agriculture as well as other attributes that would contribute to attain food security. This section outlines the general factors that impinge women to attain food security.

The outline of the section will be as follows, firstly the section looks at women as food producers and the production constraints they face as farmers, as well as the potential for increasing agricultural output globally if the constraints are overcome secondly, women as consumers and key managers of food in the home, and the implications of their unequal access to food; and lastly the mechanisms, especially institutional,

for overcoming the constraints and inequalities women face as producers, consumers, and family food managers. Before focusing on the gender dimensions, however, general factors that impinge on the question of food security today are outlined. Some of the causes highlighted in literature are discussed in the sections to follow.

2.11.2.1 Limited access to land

Land is one integral asset for households especially those who depend on subsistence farming for their livelihoods. As previously discussed, women in general play a bigger role in food production, yet most women have either less access to land or if they do, it is often of poorer quality, and in smaller proportion than men, this is caused by a number of legal and cultural constraints which differ from place to place (Argawal, 2011:11). Such asymmetries in ownership of access to and control of livelihood assets negatively affect women's food production. The bigger and more controversial matter lies in the problem of land legislations. Women Land Link (2010) gives examples of African countries where in some areas, though legislation has affirmed women's basic right to land, but now the problem rests on the heavily customary practices which still limit women's land rights. Ibid further argued that the other causing factor is that many countries especially those that follow customary law, women are given access to communal or family land or else land mediated through a man relative (although women often would be deprived of this access through divorce or widowhood).

In the last report on women and agriculture on land issues, the FAO (2011) reported that women on average represent less than 15 percent of all agricultural holders in sub-Saharan Africa. Ibid further reported the lowest cases were seen in Mali, 5 percent to about 30 percent in countries like Malawi, Zambia and Botswana. This compromised land access leads women to make suboptimal decisions with regard to crop choices and to obtain lower yields than would otherwise be possible if household resources were allocated efficiently (World Bank, 2007). If gender inequalities in women's access to land and security of tenure would be addressed and resolved globally, it would

directly impact on farm productivity, and can also have far reaching implications for improving household welfare.

2.11.2.2 Limited access to credit facilities

Another predicament faced by women in food production is lack of access to credit facilities. Argawal (2012:10) observed that women, especially in the rural developing world, face major constraints when trying to acquire credit facilities. This is mainly related to the issue of collateral required to obtain the loan, in most cases such collateral has to be in the form of property and/or livestock, of which such property, as discussed in the previous section, is usually held by men. Usually, women own low value animals such as poultry. Such a system works against women as it offers lower security through their low value livestock and proves to be a serious hindrance for women to access credit due to lack of security Fletschner (2011:3).

2.11.2.3 Lower levels of Education

Education is one of the fundamental aspects in one's life as it adds to human capital. When measuring household human capital often, the education level of head of household or the average education levels of the adults in the household is used as a proxy. World Bank (2007a) contends that, the level of human capital in most times is strongly correlated with agricultural productivity, nutritional outcomes as well as household income, all of which ultimately affect household welfare and economic growth at the national level. Studies conducted on female education in various places found mixed results but most of those in developing countries like Malawi, Kenya, Ghana and Zambia found that there existed gender inequalities in education where most women have less education as compared to men (Ombati & Ombati 2012; Arku *et al.*, 2014; Dunga, 2015).

Illiterate women are deprived from access to and use of information and technology to produce more food, and are more unlikely to take advantage of extension services and credit facilities. Educated women are more likely to provide better health care and

nutrition to their family members, and encourage their children to pursue education. Higher education attainment for women (Women scientists, research managers, lecturers and professors) can help to provide different insights and perspectives and help research agencies to address more effectively the unique and pressing challenges that women farmers face. They may also serve as role models to young females and other women in agriculture. This shows that there is indeed a strong positive relationship between reducing the gender gap in education in order to achieve food security in female headed household.

2.11.2.4 Limited access to food

Access to food is the second important pillar to food security yet most women, especially in developing countries, struggle to access the required food. Women's access to food is closely connected to households' food access because they are typically responsible for food supply in households. Women can gain access to food through producing it for their own consumption or purchasing it with income. Income is either generated from market activity or granted by redistributive mechanisms in the form of government's social protection measure or community's solidarity. World Bank (2008) cited that most women's face so many challenges in trying to access food such constraints maybe both physically or more frequently economically due to a number of gender roles which more often puts women on the disadvantaged side. Ibid further describes the physical and economical aspects that contribute to women food access. On the physical side, women in most cases are less mobile and more time constrained due to both gender based division of labour in household and socio-cultural norms, while men on the other hand are generally responsible only for income generating activities. Women are in charge of not only childcare but also time consuming domestic activities. FAO (2013) gave an example of sub-Saharan Africa, where most women spend large amount of time to transport supplies of domestic use such as water and fire wood and also to travel between home and field for domestic task.

On the economic access part to food, most women have weak economic independence in household as they in most circumstances contribute smaller amount of household

income as well as less chances for income generating activities in the market compared to men, as such they have less decision making power in household. Such cases have been seen especially in most gender and poverty studies. The existence of gender gaps where women are always inferior to men, whether in or outside households is so common especially in most developing countries where such is considered as cultural norms. If women do not have economically constructed and better alternative to staying with their husbands, they are more unlikely to make a voice against ruthless husbands hence deteriorating their ability to economic access to food (Hadley *et al.* 2008; Kassie *et al.*, 2012; Frongilo & Namana, 2012; FAO 2013). The mentioned are just a few of the many problems faced by women. The next section addresses some of the empirical evidence found in literature to support what has been discussed so far on gender and food security.

2.11.3 Empirical evidence of food insecurity among female-headed households

There exists a number of studies that compare the food security status between male and female-headed households, looking at developing countries only, studies conducted so far have brought in mixed results but most studies indicate that female-headed households were more food insecure as compared to male-headed households for a number of reasons. On studies conducted in Nigeria, Akinsanmi and Doppler (2005), found that female-headed households in the South Eastern Nigeria were poorer and more vulnerable than their male counterpart. This was caused by unequal access to and control of productive resources. The study concluded that the standard of living of the female headed households could be enhanced if they are given full legal rights of resources that would make them eligible for loans and make for efficient use of productive resources. Similar results were found in Ethiopia study, by Kebede (2009) who further observed that not only were female-headed households more food insecure and less sufficient as compared to male-headed households but also that they were mostly concentrated in the poorer strata of the society but also had less incomes than male-headed households.

Likewise, Babatunde *et al.*, (2008) study on a gender analysis of the determinants of Vulnerability to food Insecurity in Nigeria, found that female-headed households were more vulnerable to food insecurity than male-headed household but also that there was a gender inequality in terms of resources available to male and female headed households in the study area. They discovered that male headed households possessed more resources than female headed households. They also found that crop output, off-farm income, total household income, and available labour hours were significantly higher in male than female headed households.

Similar results were also found in Kenya and Malawi for example in a study conducted by, Kassie *et al.*, (2014) in Kenya, measured the food security status between female and male-headed households, using advanced econometric methods to observe the characteristics and resources that determines the food security situation in both male and female headed household, their results showed that, 9.6 percent of female-headed households as compared to only 4.6 percent of male-headed households suffered from chronic food insecurity, but also that the chances of FHHs to become food insecure was 6 percent higher as compared to their counterparts. They also discovered that if women in the area were to be given the same characteristics as MHHs, their food insecurity gap went down 6 percent to 2 percent. The same study was conducted in Malawi where Kassie *et al.* (2015) found similar results were found in Malawi but also that though the gender gaps would be narrowed if women were given the same characteristics of resources as men, the gender difference gap would not be closed completely due to other unobservable factors such as discrimination as well as other unobservable gender differences.

On the contrary, a contrast view to the fundamental aspect of female-headed household being found to be more food insecure as compared to male-headed household was discovered by Mallick and Rafi (2010) in Bangladesh, who found no significance differences in the food security between MHHs and FHHs among the indigenous ethnic groups in the country. There could be other studies that found similar results as that of Bangladesh which this study has not come across.

2.12 SUMMARY AND CONCLUSION

The chapter has reviewed various literature that exists in determining the concept of food security. The layout of the chapter was in line with the set theoretical objectives of the study outlined in section 2.1 of the chapter. The theoretical objectives were set under the primary objective of the study which was to analyse the household food insecurity and the coping strategies employed by both male and female-headed household from rural and urban households in selected districts of the South Eastern Region of Malawi. A synopsis of the chapter is as follows: in the first section the chapter highlighted the historical background of the concept of food security where issues of conceptualisation of the term food security were discussed in detailed. The chapter went further to review the shifts or paradigms established by different authors which helped in shaping the concept of food security. Following the chapter reviewed literature on the dimensions of food security (also called the main four pillars) which are categorised in four dimensions of, food availability, access to food, utilisation and stability to food. Theses sections discussed in detail how these four categories originated but also the importance of the four main pillars in determining food security. Added to that, the chapter discussed the definitions of food security. In this section the chapter acknowledged the existence of different definitions that explains the term food security, but the preference was given to the mostly acknowledged definition set by the FAO. A clear indication was shown that the definitions of food security have been changing since the day the term food security was conceptualised part of the changes were linked to the developments in the paradigms shifts of the concept. The section also showed how the four main pillars are linked in terms of defining the concept.

The chapter went further to review different measures that exist to determine food security status. A clear distinction was shown on how national and household food security status can be measured. The section concluded that, since food security is multi-dimensional in nature, scholars have not yet established a composite measure that incorporates all the four pillars. Thereafter, the chapter reviewed the global trends of food security status, it was revealed that food insecurity is still on high levels

especially in African countries. In the last three sections the chapter reviewed some of the causes of food security as well as the socio-economic determinants of food security. It was revealed that Natural hazards, increase in food prices, rapid population growth, high levels of poverty are amongst some of the causes of food insecurity. At household level, increase in household size, lower incomes, and lower levels of education attainment were some of the socio-economic characteristics found by studies to influence food insecurity in households.

Lastly, the chapter concluded by reviewing literature on gender and food security at household level, it was revealed that there exist a huge outcry of gender disparities on food security status amongst most developing countries, which has been indicated by scholars and developmental organisation. The section highlighted some of the empirical results found by most studies, it has been unearthed that the problem is indeed common in isolated countries. It has been conceded that female, unlike male-headed households, are mostly food insecure. Some of the reasons unearthed were due to the various limitations women face to attain food security, such as accessibility to land, limited access to credit facilities, and lower education levels just to mention a few. The literature presented so far has been on the general outlook of food security, most of the emphasis has been on the global and regional view of food security. The next chapter narrows the discussion to the study country, namely, Malawi.

CHAPTER 3: COUNTRY PROFILE OF MALAWI

3.1 INTRODUCTION

Food insecurity remains one of the major problems faced by most countries, particularly developing countries where poverty levels are high. The previous chapter detailed the literature behind food insecurity as well as some of the empirical findings on the existence of food insecurity among many countries. This chapter furthers and highlights the problem of food insecurity in the Malawian context with an emphasis on the gender inequalities that exist when dealing with this problem.

The presentation of the chapter will be as follows: the first section presents a detailed profile of Malawi as a case study country. The subsequent sections review the economic characterises as well as the food security status of the country in terms of poverty rates, education levels, employment status, health outcomes, and other socio-economic outcomes. Later, the study details the food security status of the country in terms of food production, the percentages of those that are food insecure, and the coping strategies employed by the food insecure population. Lastly, the chapter reviews the empirical findings of studies conducted on food security in the country accentuating more on those that dwelt on gender gaps in food security.

3.2 COUNTRY PROFILE

Malawi, formally known as Nyasaland, is a land locked country found in the south-eastern part of Africa. It is bordered by Zambia to the northwest side, Tanzania to the northeast side, and Mozambique on the east, south and west. The country has four major cities: Lilongwe is the largest and also the capital city, the other three are Blantyre, Mzuzu and Zomba (old capital city). The country is about 900km long and it lies within a geographical area of 118,484km² (World Bank, 2012). The geography of Malawi is depicted clearly in Figure 3.1, showing all major cities, towns as well as its neighbouring countries.

Figure 3.1 Map of Malawi



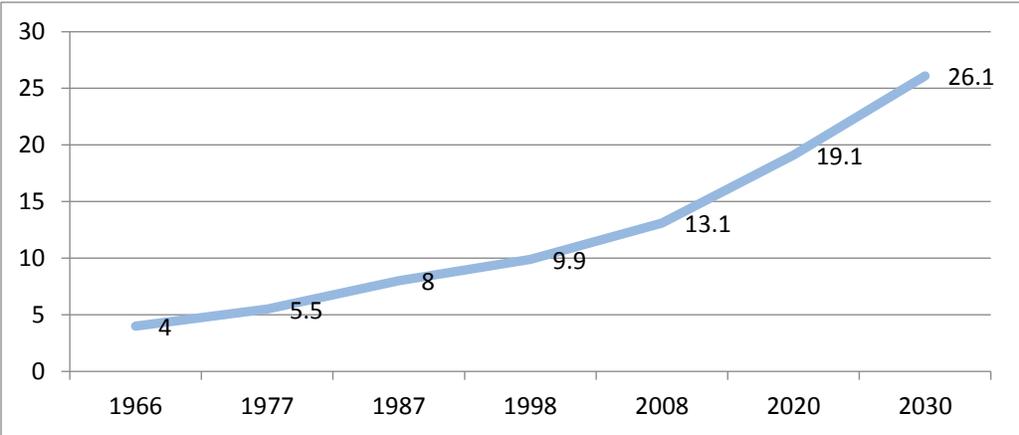
As shown in Figure 3.1, Malawi is divided into three main administrative regions, namely, the northern part, central, and southern region. There are 28 districts in the country, six districts are in the northern region, nine in the central region, and 13 in the southern region. Administratively, the districts are subdivided into traditional

authorities (TAs), presided over by chiefs. Each TA consists of villages, which are the smallest administrative units, and are presided over by village heads. One the eastern side of the country lies a lake called Lake Malawi with fresh water which covers approximately 475km and stretches from the northern part of the country to the southern part. The lake connects with Shire River which goes down to the tip of the southern part of the country. This shows that Malawi is fully covered with inland waters and, having proper irrigation facilities, the country would be able to produce food all year round. Figure 3.1 also shows all the districts in the country, which are 28 in total, as well as the four major cities mentioned (NSO, 2014).

3.2.1 Population of Malawi

A population is referred to all inhabitants of a particular place. The population census in Malawi has been comprehensively administered since the country got its independence in 1966, since then country has regularly participated in the recommended UN decennial *census* programme (NSO, 2008). The population of Malawi has been growing and is still increasing. Figure 3.2 shows the trend in population growth from 1966 until future projections. As illustrated, the country’s population was estimated at 4 million in 1966, from that time to the last census in 2008 the population had increased to 13.1 million, with projections of population growth to 20.1 million by 2020 (NSO: 2012).

Figure 3. 2 Population trend in Malawi (in millions)



Source: NSO 2012

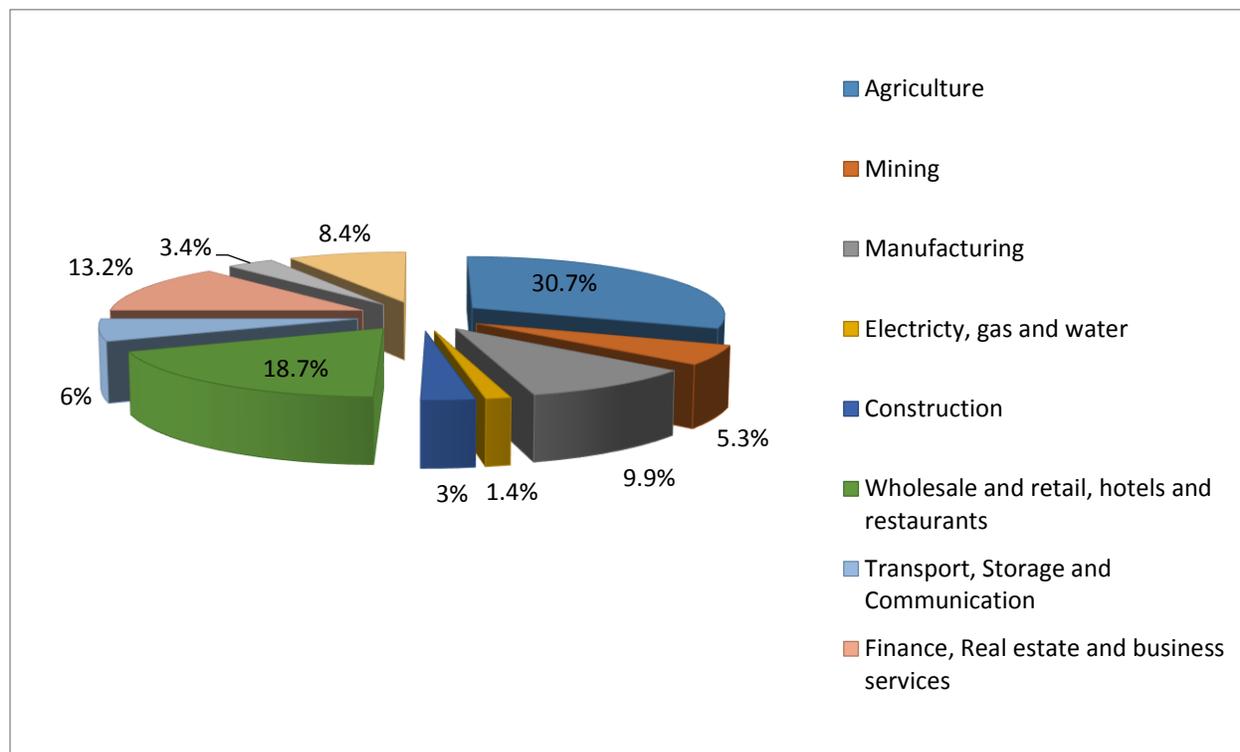
The population of the country is projected to keep increasing even further and in order to understand population concentration and distribution, district data provides such in-depth undertaking. In summary, within the country, the annual district population growth rates were highest and above the national average of 2.8 percent in the districts of the northern and central regions, while slower growth rate has been observed in the southern region. However, looking at population density-which is population per square kilometre-the southern region still has the highest at 258 people per square kilometre, the central region with 194, while the north has 64 people per square kilometre (Tversky & Kahneman, 2014:116). When the country's population is disaggregated according to gender, place of residence and household size, Malawi is reported to have more females than males. NSO (2012:10) in an Integrated Household Survey 3 (IHS3) report, at the national level, 49 percent of country's population were males and 51 percent were females. Surprisingly, 75 percent of the homes in the country were headed by males and the rest by females. The report also revealed that the average household size at that point was 4.6 persons per household with approximately 85 percent of people living in rural areas, while only 15 percent lived in urban areas. In terms of rural areas, the highest percentage of the population lived in the southern region, followed by the central region, and then the northern region (NSO, 2012:11).

3.3 ECONOMIC OUTLOOK OF MALAWI

Malawi is one of the poorest of the least developed countries in the world, ranking 153 out of 169 countries on the Human Development Index for 2010 (UNDP, 2010:1). Malawi predominantly relies on agriculture as the main economic base, with subsistence and smallholder farming being prevalent among the rural population. According to the African Development Bank (2016) report on Malawi's economic outlook, Malawi's GDP reached the highest in the year 2011-12 at 8 percent but slowed to 2.8 percent by 2015 due to adverse weather conditions, but mostly due to weak fiscal discipline, which has been a core driver of macroeconomic instability during recent years. The most contributing sector to Malawi economy is that of agriculture, Figure 3.3

shows the ratios of different sectors in the country and how they contribute to Malawi's economic outlook.

Figure 3.3 Malawi GDP contributions by sector



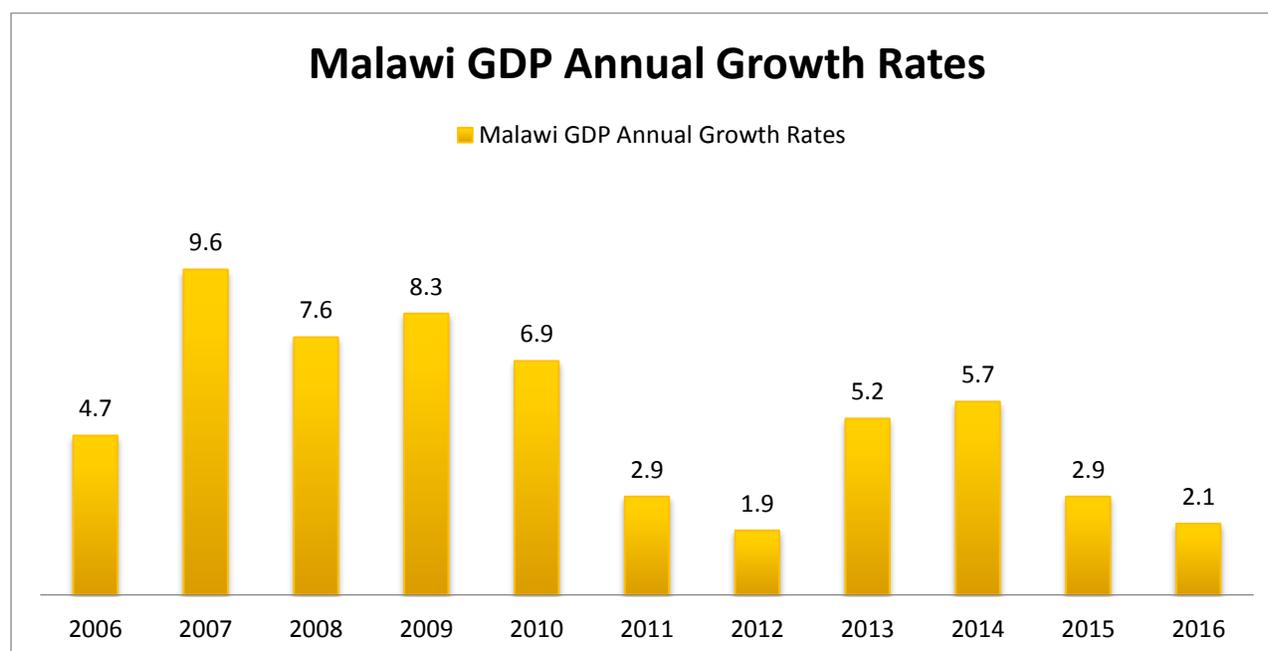
As shown in Figure 3.3, agriculture contributes 31 percent towards the country's GDP marking the highest sector as compared to other sectors, followed by the wholesale and retail, hotels and restaurant with 19 percent. The least is electricity, gas and water at 1.4percent. Similar to the energy statistics shown in Figure 3.1 were findings in a study by Tchereni (2012) on energy poverty in Lunzu Township in Malawi. The findings indicate that almost 90 percent of the sampled population could not access electricity, yet energy is one of the most important economic drivers of any country.

Malawi, being a poor country, relies on foreign aid which comes in different forms (momentary and food aid) from World Bank, IMF and other non-governmental organisations to cover most of the countries shortfalls (World Bank 2016). For the past few years, the country has been receiving substantial economic aid to capture its

shortfalls. As part of alleviating food insecurity, the country receives aid from different relief organisations especially in the lean season where food becomes very scarce. WPF (2016) during the lean period of 2015/2016, provided food assistance to about 2.07 million people and an extra 1,640,700 beneficiaries with in kind food assistance and nearly 432,100 with cash based transfers. Other food Aid assistance comes from organisations like USAID in partner with other smaller organisation bringing in a continuous food aid.

There has been times where the country was not able to receive the required aid for example, in the 2013/14 fiscal year, the value of grants received by the Malawi Government was barely a quarter of that expected at the time of its budget preparation. The gap was largely as a result of the withdrawal of support by development partners following the looting of public funds through the Integrated Financial Management System (IFMIS), known as cash-gate, in September 2013. This led to sharp reductions in the level of on-budget development assistance received by Malawi. Since then, the Government has run persistently large fiscal deficits which led to the widening of the fiscal debt gap (World Bank 2015:1). Having such fiscal deficits, expenditures in the country has been under pressure due to rising debt service costs, increasing public sector wage demands, costly subsidy schemes and the settlement of outstanding arrears (AFDB, 2016:1).

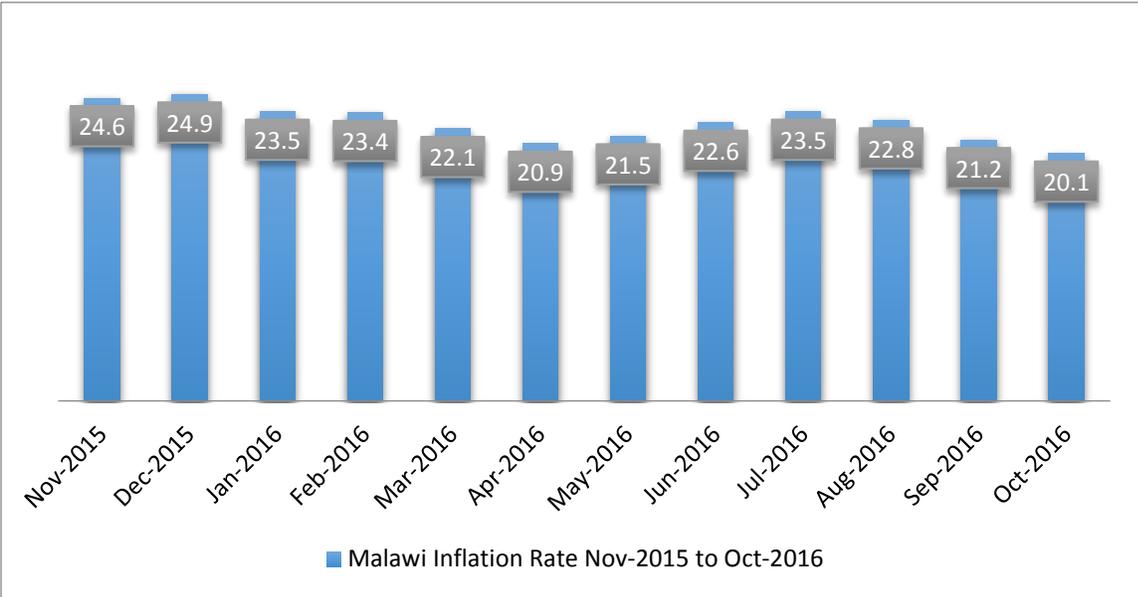
Figure 3.4 Malawi GDP Annual Growth Rates 2006-2016



The country is, however, reported to have high prospects of economic growth in near future. As seen in Figure 3.4 on annual growth rate, the country experienced a drop in GDP from 6.9 in 2010 to 1.9 in the period 2011/2013 due to issues surrounding governance and other fiscal challenges in particular the suspension of foreign aid by donors (IMF, 2015:5). The country regained stability and experienced an economic recovery in 2013. This was due to changes in Government leaders as well as macroeconomic reforms that were pursued under the Economic Recovery Plan (ERP) by the new Government. This improved the foreign exchange availability and provided better incentives for producers of export commodities (African Development Bank, 2014:2). However, the economy continued to face some macroeconomic pressures including inflation, exchange rate volatility and excessive government domestic borrowing. While government continues to implement a tight monetary policy stance and implementing austerity measures towards fiscal discipline, the pace in curbing high inflation has been slower than expected because of the sharp depreciation of the Malawian kwacha (IMF, 2015:5).

Inflationary pressures are continuing to have a negative impact on the Malawian economy (World Bank 2016:7). The rate of inflation began to decline in the first quarter of 2014, following significant increases to the prices of both food and non-food items in the fourth quarter of 2013. However, there was a significant upward pressure in the second half of the year, mostly as a result of non-food inflation, which in turn was exacerbated by the weakness of the local currency. With these fluctuations, by the end of 2014 the annual average head line inflation rate stood at 23.8 percent, compared to a rate of 27.3 percent at the same point in 2013. In recent developments, as illustrated in Figure 3.5 on inflation rates in Malawi for the fiscal year 2016, there has been a general upward and downward fluctuation in the inflation rate with highest rate of 24.6 experienced in January 2016, and lowest in October 2016 at 20.1. However, overall, the inflation rate remains high in the country (RBM, 2016).

Figure 3.5 Malawi inflation Rate FY-2016



Source: Trading economics (2016)

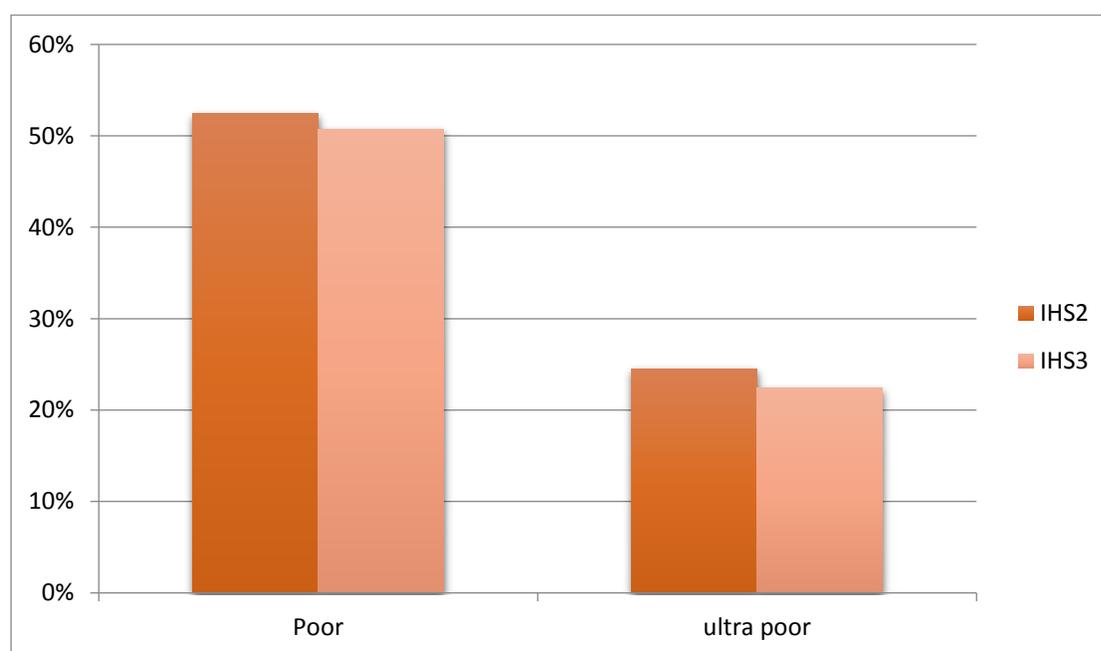
3.4 POVERTY IN MALAWI

Malawi, being one of the poorest countries in the world, suffers from high rates of poverty which brings in a lot of detrimental effects to peoples livelihood. Over the past

years the government of Malawi, in coordination with other non-governmental organisations, have made tremendous efforts in poverty reduction efforts through various strategies by emphasising economic growth, infrastructural development, and the provision of basic services. These strategies include the Poverty Alleviation Program (1994), the Malawi Poverty Reduction Strategy (2002–2005); and the more recent, the Malawi Growth and Development Strategy (MGDS) (2006–2011; 2011–2016) (Pauw & Mussa, 2011:2).

When the current poverty rates are compared with past statistics it shows there has been substantial achievements made towards poverty reduction in the country. In this study, the poverty statistics for Malawi will be referenced from reports of the Household Integrated Survey 2 and 3, which were conducted by the National Statistics Office of Malawi (NSO) between the years 2004/2005 and 2010/2011. Between 1998 and 2011, the percentage of people living below the national poverty line fell from 54 percent to 52 percent, and according to regions, the southern region had the highest percentage (63 percent) of rate (NSO 2012:217). Despite such reductions, poverty and inequality still remains very high in the country. The 2010/11 Integrated Household Survey showed that as high as 50.7 percent of the population was poor which is over half of the population and a quarter of the population living in ultra-poverty (NSO, 2012:207). This is the number of people whose total consumption is below MK37 002 (USD235.23) per person per year (NSO, 2012:207). Figure 3.6 shows the poverty rates in Malawi between the poor and ultra-poor population but also between comparing the changes between the Integrated Household Survey 2 (IHS2) conducted in 2004/2005 and Integrated Household Survey 3 (IHS3) conducted in 2010/2011.

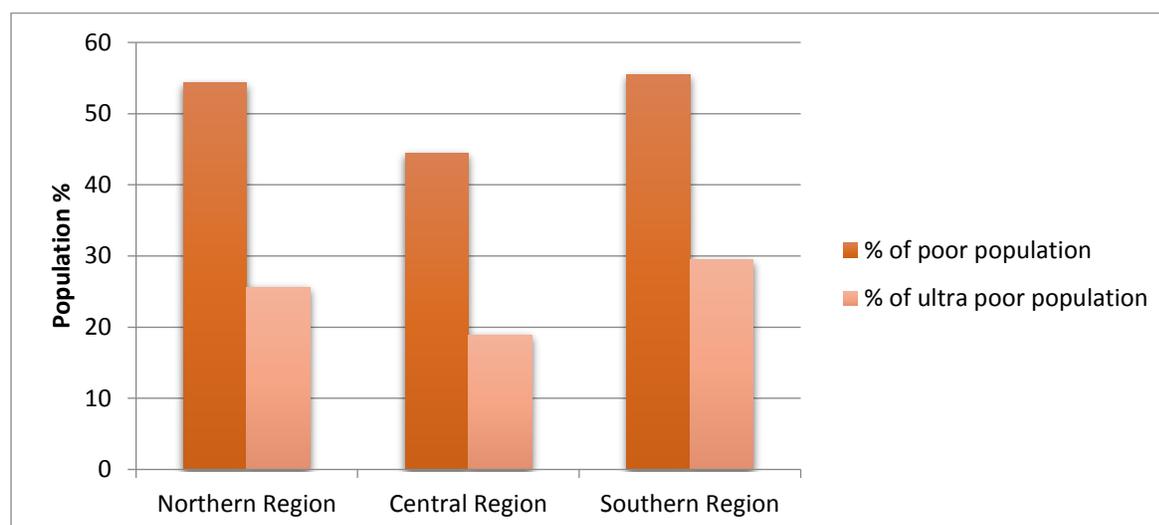
Figure 3.6 Proportion of poor and ultra-poor persons, Malawi



Source: NSO (2012:205)

As shown in Figure 3.6, the poverty rates in Malawi remain high, even though there was a decrease of about 2 percent among the poor population between IHS2 and IHS3. When the rates of the ultra-poor population is taken into consideration it shows that over 20 percent of the total population are ultra-poor in both IHS2 and IHS3, which means that about one in every four people lives in dire poverty, such that they cannot even afford to meet the minimum standard for daily recommended food requirement (NSO, 2012:204). It is projected that these figures are not expected to change much with the new estimates to be available in 2017. When a comparison of poverty rates is drawn between regions, the southern region has the highest rates of poverty as compared to the other two (Northern and Central). Figure 3.7 depicts the variations of poverty rates between regions.

Figure 3.7 Poverty in Malawi as per regions



Source: NSO (2012)

As indicated in Figure 3.7, the southern region has the highest population of both poor and ultra-poor people with a peak of above 50 percent for the poor and close to 30 percent for the ultra-poor. When poverty rates are compared between locations, which is divided between rural and urban areas, the IHS3 report shows that poverty has been increasing in rural areas where 85 percent of the population lives. About 17 percent of the population in urban areas are living in poverty compared to 57 percent of the rural poor population. That is, approximately three out of every five people in rural areas live in poverty compared to only one out of every five people in urban areas (NSO, 2012:205). This is where poverty and food insecurity in Malawi actually relates. As indicated, in Malawi more poor people are found in the rural areas hence increasing the poverty rates. These people rely on agriculture as a source of livelihood. With no proper agricultural inputs, most of these people cannot produce enough to sustain them, let alone be able to harvest some for sale. Hence, one key obstacle to reducing poverty in Malawi is low agricultural productivity. An in-depth discussion on agriculture, food security and poverty in Malawi will be discussed later in this study.

The report also revealed that poor households in Malawi also tend to have a larger number of people living in the household as compared to non-poor population (NSO

2012:217). In Malawi, poverty has a distinct gender dimension. The report discloses that the incidence of poverty among female-headed households was higher at 58 percent as compared to male-headed household at 51 percent. Ultra-poverty was higher amongst the female-headed households at 27 percent as compared to only 21 percent for male-headed household. With such high levels of poverty amongst female-headed households it may not be surprising to find that a large number of food insecure households are those headed by females.

3.5 EDUCATION SYSTEM AND LITERACY LEVELS IN MALAWI

Education is a very important tool to every individual that is why universal access to education (ability of all people to have equal opportunity in education, regardless of their social class, gender, and ethnicity) is highly discussed in most education forums as well as countries. In Malawi, education is regarded a fundamental tool to all, of which the benefits are realised both at the individual and national level. Malawi's education system follows a formal structure of an eight-four-four education pattern, which comprises of three levels, namely the primary, secondary and tertiary level. At the end of each level a final exam is written which is administered by the Ministry of Education, Science and Technology through a governing body called the Malawi National Examination Board (MANEB) (Chimombo, 2005).

Excluding pre-primary education, the first official entry into the education system in Malawi is primary school, which has eight classes (grade one to grade eight). The official entry age for both boys and girls for the first grade is six years old (Kadzamira & Rose 2001). At the end of grade eight, the final level of primary education, students sit for the Primary School Leaving Certificate of Education (PSLCE) examination to qualify for entry into secondary school. All those who pass very well at this level are selected into Government secondary schools, while others merely graduate with a pass and have to find their own private secondary schooling (NSO, 2014:166). Pre-primary schooling in Malawi is also available but in most cases it's offered at private institutions or non-government organisations.

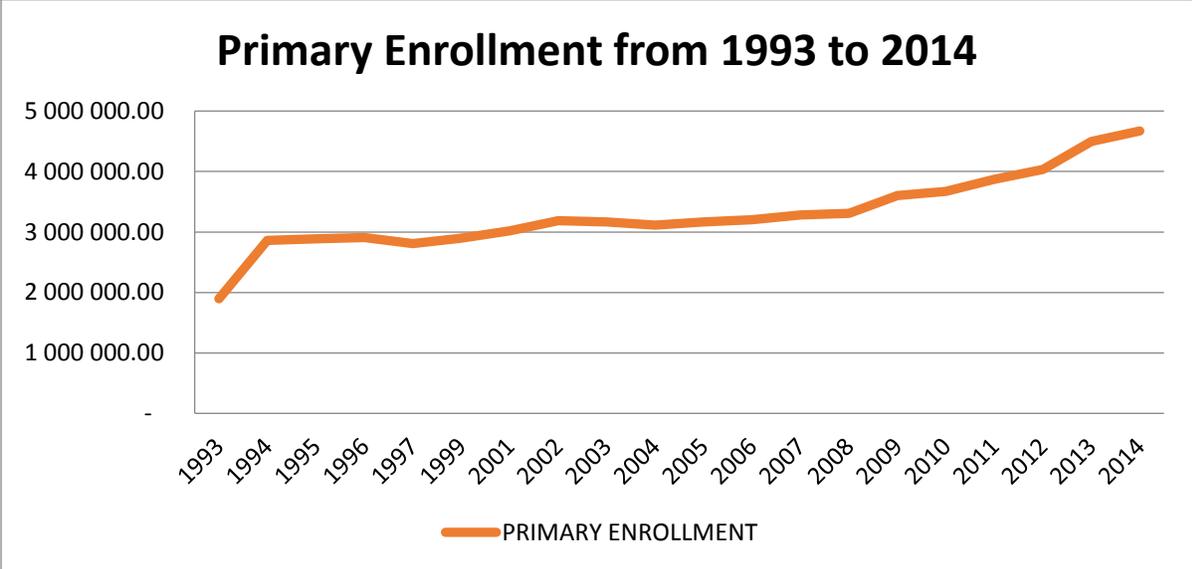
Once pupils have passed and graduated from primary school they proceed to secondary school. In Malawi, secondary schooling runs for four years, which are divided into forms one to four. In secondary school, children sit for two examinations, a Junior Certificate Examination (JCE) at Form two and a Malawi School Certificate Examination (MSCE) at Form four. Both of these examinations are set by MANEB, but are jointly administered by MANEB and the Ministry of Education. As mentioned, at Form two pupils have to sit for a JCE examination to qualify them to graduate to Form three. The Ministry of Education, Science and Technology has since abolished the JCE which will be implemented in the school calendar of 2016/17 (MoE, 2016). From now, secondary schools in Malawi will only have one government examination at the end of Form four. After this exam, those who pass very well can apply to various colleges including vocational colleges, technical colleges and universities (Maluwa-Banda, 2004:5). The biggest challenge the country is facing is that there are limited number of tertiary education facilities to cater for all students who pass the MSCE.

3.5.1 The Education policy choice and process in Malawi

The Education policy, choice and process in Malawi have, over the years, been changing. Kadzamira and Rose (2001:6) describes the policy changes for education to have shifted from emphasising secondary or tertiary education to primary education over the past decade. Such changes have been adopted in line with the changes in international policies, which have mainly been perceived as a role to reduce poverty. In line with the education for all policy (EFA) that was highlighted at the World Conference held in Thailand in 1990, and the MDGs, Malawi embarked on the free primary education policy. Among issues addressed at the conference, the problems facing primary education in developing countries, which included improved quality and narrowing the gender disparity in enrolment at all levels, and progress towards increased access to schooling, was highlighted. Since the conference, considerable attention has been focused on the improvement of primary education. Thereafter, many countries in sub-Saharan Africa, introduced free primary education for all schools, making primary education its top priority. In Malawi, free primary education was

introduced in 1994. As shown in Figure 3.8 the benefits of free primary education were appreciated mostly due to immediate response from parents by sending their children to school, which was signified by the increase in enrolment rates for both girls and boys.

Figure 3. 8 Primary Enrolment rate from 1993 to 2014



Source: EMIS (2014)

Figure 3.8 shows the most recent data on primary enrolment rate from 1993 to 2014 in Malawi. As illustrated in Figure 3.8, there has been a positive gradual trend in the pupil enrolment rates in the country for the past years, the highest was that from 1993 to 1994. The increased levels of enrolment is attributed to, apart from population growth, the continued free primary school since 1994 in the country which is part of the policies in the country has been skewed towards increasing the primary school enrolment (Chimombo, 2005:155). The statistics tells another story when the enrolment rate is described in two forms (net and gross enrolment rate) as discussed in the net section.

3.5.2 Enrolment rates in primary school and secondary school

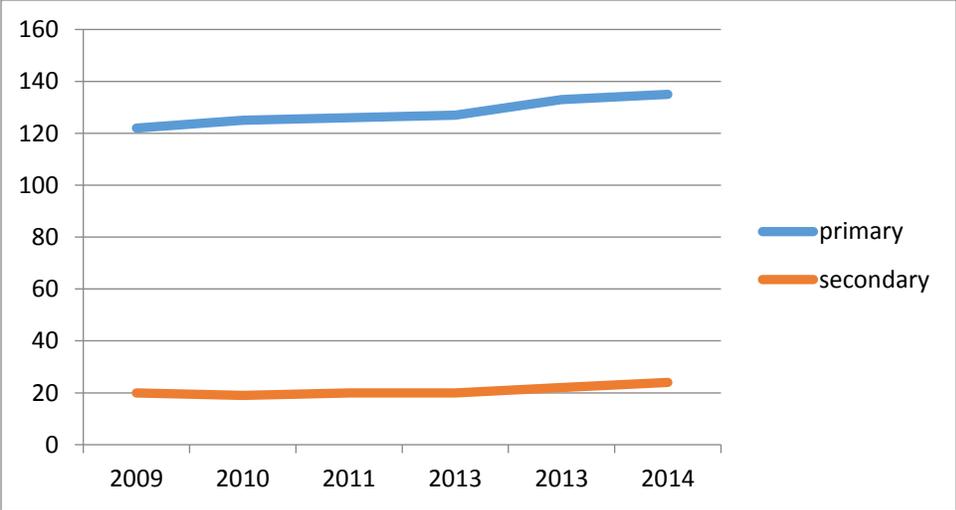
School enrolment can be measured as net enrolment rate (NER), which is defined as the number of pupils in the official school age group expressed as a percentage of the total population in that age group. Gross enrolment rate (GER) is expressed as the ratio

between pupils in a level of education, regardless of age, and the corresponding eligible official age-group population to that level of education.

3.5.2.1 Primary and secondary gross enrolment rates

Considering the gross enrolment rates in Malawi for both primary and secondary education, trends have shown that over the years there has been a huge gap between the gross enrolment for primary and secondary school. Figure 3.9 illustrates the differences as follows. The total gross enrolment for primary school has always been above 100 percent between 2009 and 2014. Whilst this could be seen as an achievement as per the definition of GER, it could also mean that, in primary schools, most pupils stay longer as a result of repeating classes or late enrolment. The GER for secondary school is seen to be less or slightly above 20 percent between the same years.

Figure 3. 9 Primary and secondary gross enrolment rate from 2009 to 2014



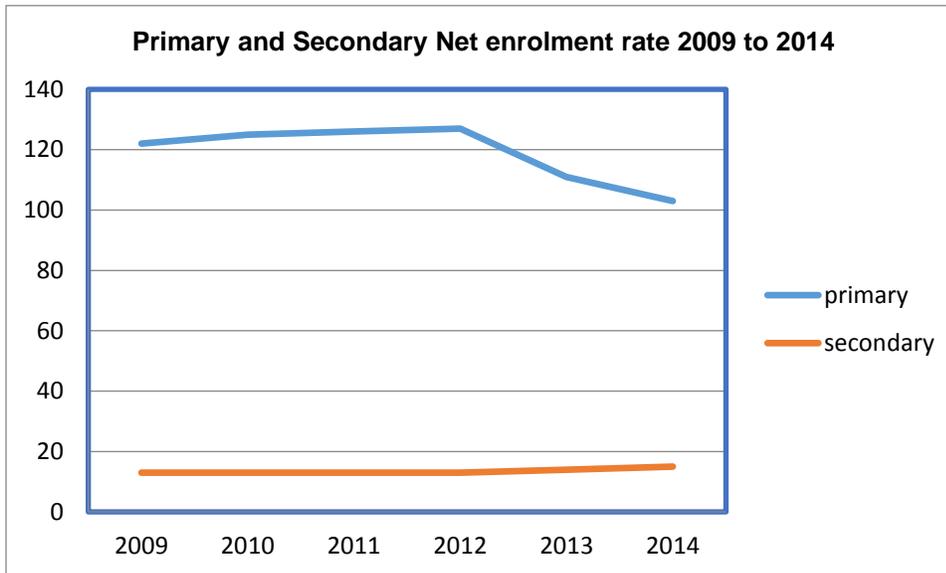
Source: EMIS (2014)

3.5.2.2 Primary and secondary Net enrolment rates

As shown in Figure 3.10, the primary school net enrolment rate for Malawi has always been above 100 percent for the past years, whereas the secondary school net

enrolment rate has always been very low below twenty percent. Questions have always been raised as to why there exist such disparities.

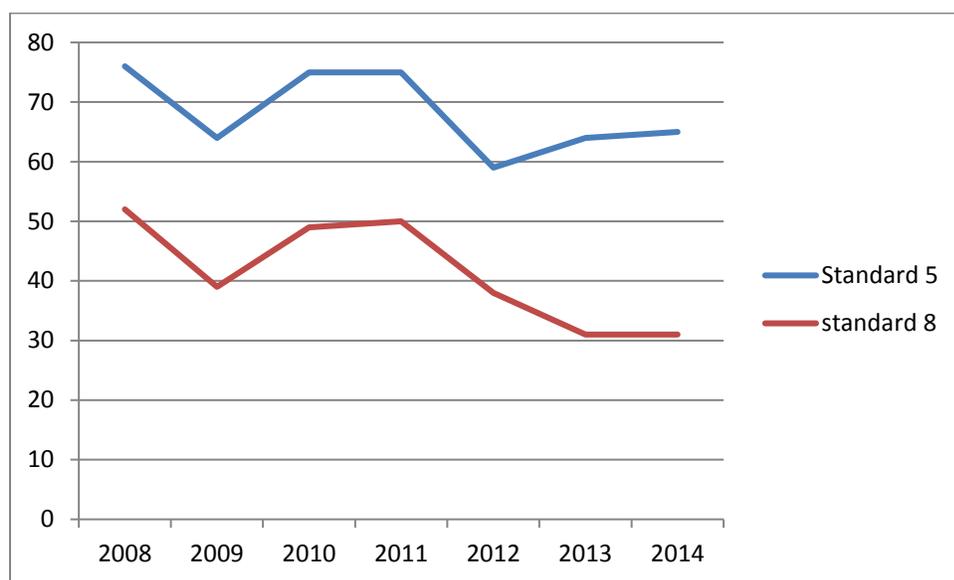
Figure 3. 10 Primary and secondary net enrolment rate from 2009 to 2014



Source EMIS (2014)

As noted in the in Figure 3.9 and Figure 3.10, in Malawi there has always been a high turnout of school enrolment, especially in primary schools. Regardless of the positive strides on increase in primary school enrolments, the challenge now lies on the success or primary completion rate. Chimombo, *et al.*, (2000:3) argued that the primary education system in the country continues to be affected by various problems. The most pressing of these problems is low internal efficiency, which is manifested through high dropout and repetition rates, mostly among females. MoE (2014:14) reported that the transition rate from primary school to secondary remains very low in the country despite efforts in increasing enrolment in schools. Most of the pupils are likely to have dropped out or still within the primary system as repeaters.

Figure 3. 11 Survival rates for grade 5 and grade 8



Source EMIS (2014)

Figure 3.11 presents the statistics of pupil survival rates between grade one to five and also six to eight. In this regard, the survival rate means the proportion of cohort of pupils who reached each successive standard expressed as percentage of pupils enrolled in the first standard of a given cycle in a given school year. Figure 3.11 shows that, between the years 2008 to 2014, pupil survival rates up to grade 5 has always been higher as compared to those between grades six to eight. Some of the main reasons that are commonly reported to have an effect on dropout rates in primary pupils are employment, no interest, lack of money, illness, marriages, pregnancies, and help at home (NSO, 2012:37). An Integrated Household Survey 2014 report (IHS3) indicates further that the dropout rate are higher in rural than urban areas but also higher amongst female students than their male counterpart. On a regional basis, the central region has on average the highest number of primary school dropouts, followed by the south and then the northern region (MoE, 2014).

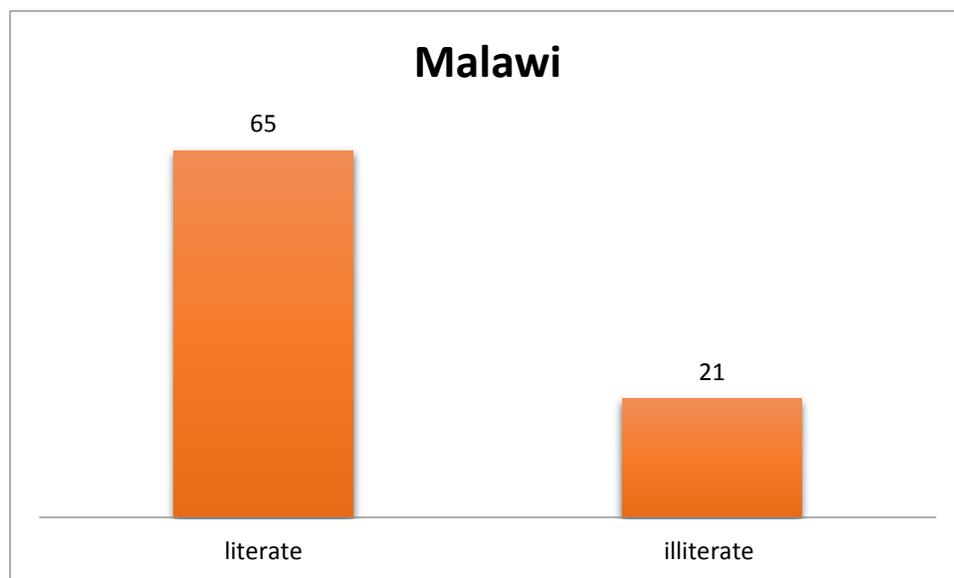
The IHS3 has however shown that the secondary school dropout rate in Malawi is at 12 percent and regional wise, the southern region of the country has the highest number of

pupils dropping out of school at around 14 percent, while the northern 13 percent and central region 9 percent (NSO, 2012:37).

3.5.3 Literacy status in Malawi

Literacy in Malawi as defined by NSO (2012:12) is described as the ability to read and write with understanding in any language. In Malawi, as illustrated in Figure 3.12, the proportion of the population aged 15 years and above that is literate is 65 percent. When genders are compared, 74 percent of males aged 15 years and above are literate as compared to 57 percent of the females of the same age group. With regards to place of residence, urban areas are registered to have a higher literacy rate at 89 percent compared to rural areas at 61 percent. At the regional level, the northern region is registered to have a higher literacy rate at 77 percent followed by the central region at 65 percent and then the southern region at 62 percent.

Figure 3. 12 Status of education level in Malawi



Source: NSO (2012)

3.5.4 Proportion of illiterate population in Malawi

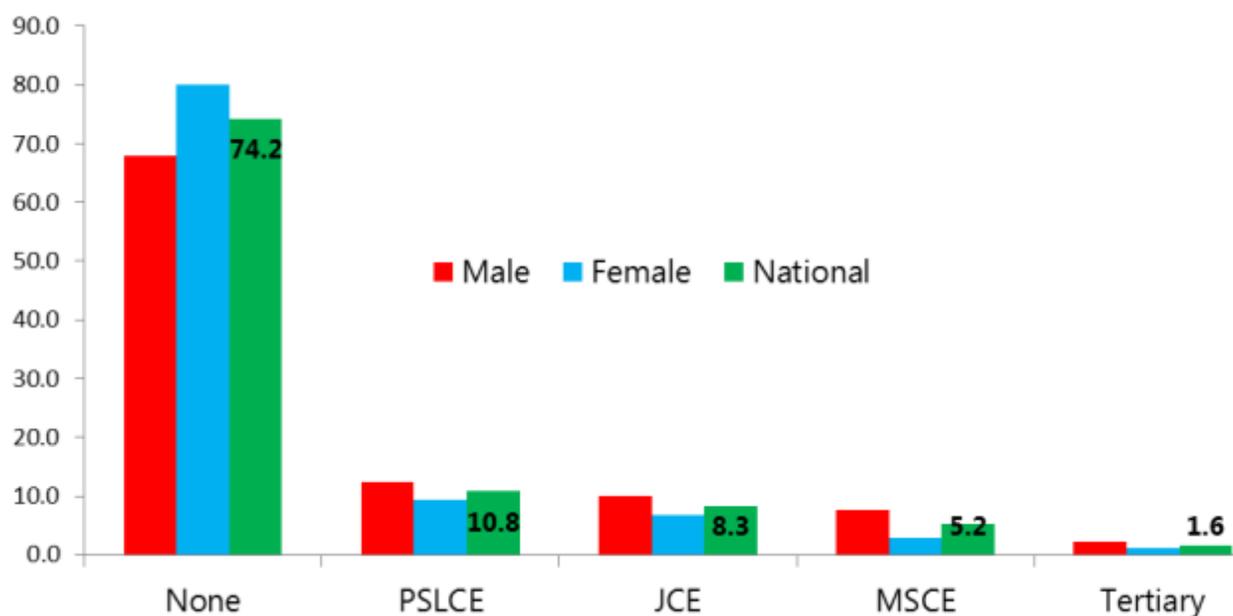
The proportion of the population in Malawi (those not being able to read or right) that is illiterate is determined by the number of people aged between 15 and above who never

attended school for various reasons. As shown in Figure 3.12, about 21 percent of the population between ages 15 and above are illiterate and have never attended any type of schooling for various reasons. By gender, 28 percent of females had never been to school compared to their male counterparts at 14 percent. By place of residence, only 7 percent of people in urban areas have never been to school compared to 24 percent of people in rural areas. At the district level, Mangochi district (one of the study areas) has the highest share, 50 percent, of the population aged 15 years and above who never attended school. Some of the reasons given were because of lack of money, no interest, and occupied by house chores (NSO, 2012:23). This shows that a majority of rural inhabitants', women in particular, have never attended school.

3.5.5 Highest qualification acquired (population aged 15 years and above)

The previous section discussed national literacy levels in Malawi. This section discusses the highest education qualifications obtained by the population aged 15 years and above. In this regard, educational qualification refers to the four main education systems of the country that is the primary school certificate (PSLCE), secondary certificate (MSCE), Junior Certificate (JCE) and tertiary. As per IHS3 (2012) report, illustrated in Figure 3.13, about 74 percent of the population aged 15 years and above do not have any qualification. Which means that only 26 percent of the population aged 15 years and above have acquired some qualifications in Malawi. By place of residence, the report also revealed that almost 80 percent of the population aged 15 years and above in rural areas have no qualification, compared to 45 percent in urban areas. At the tertiary level, only 1.6 percent of the population aged 15 and above has some sort of tertiary certificate. This picture is not good for the country, hence there is a need for more investment in the education sector in order to improve the literacy levels of the country.

Figure 3. 13 Highest qualification attained by gender in Malawi 2011



Source: NSO (2014)

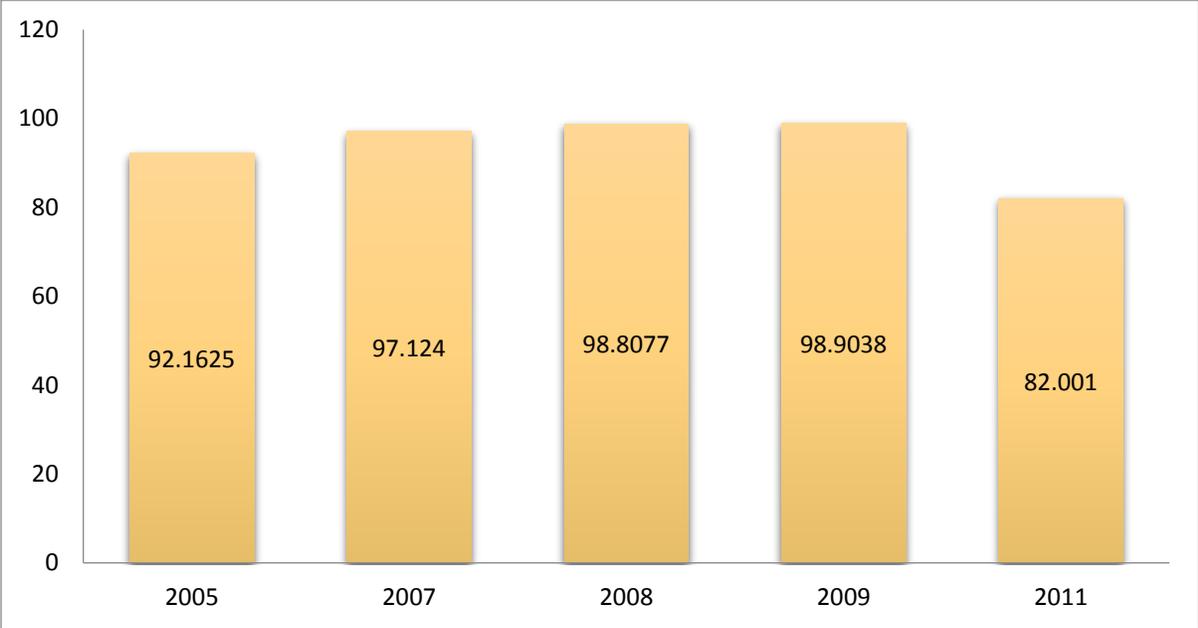
3.6 EMPLOYMENT IN MALAWI

The employment rate in Malawi is defined as the percentage of the of the population (labour force) who are aged between 15 to 65 years who, during the reference period of one week, were employed to the total working population (NSO, 2014:21). According to the Malawi Labour Force Survey (MLFS) (2013) report, a population of 7 million people within the age group 15-64 were in the labour force. From the total, 3.3 million were males and 3.7 million were females (NSO, 2014:4). The employment rate of the country as indicated in the MLFS report (2013) showed that approximately 5.5 million people were employed, representing an employment rate of 80 percent with males having a higher employment rate of 86 percent than the females at 74 percent (NSO, 2014:21). By sectors, the report shows that the agricultural sector (including forestry and fisheries) has the majority of employed persons at 64 percent, wholesale, retail and repair of motor vehicles at 16 percent whereas manufacturing, construction and mining and quarrying were at 4 percent, 3 percent and 0.3 percent respectively (NSO, 2014:5).

An illustration of the employment status for Malawi from 2005 to 2011 is shown in Figure 3.14. It is evident that the employment levels for the country have always been above 80 percent but the question now lies on what type of employment? The report highlights that most people in Malawi are engaged in informal employment, which has 89 percent of the people working, and predominantly higher in rural areas, while the formal employment is higher in the urban areas. The percentage of employed persons in informal employment is 91 percent compared to 69 percent in urban areas, while formal employment is higher in urban areas than rural areas.

In the previous section on education levels of the people in Malawi, it shows that only 5.2 and 1.6 percent of the population aged 15 and above has some sort of secondary school certificate and tertiary certificate respectively. This means that it is only a small proportion of the employed population that has sensible employment.

Figure 3. 14 Employment status for Malawi 2005 - 2011



Source: NSO (2014)

3.7 HEALTH OUTCOMES IN MALAWI

This section creates a general picture of the health outcomes and trends for the country. Human health is categorised in three forms, namely, mental, physical, and emotional wellbeing. These are all very important aspects in one's life be it in children or adults. It is therefore in the best interest for every country to see it to that the citizens are in good health. In Malawi, the overseer of all issues related to human's health is the government through the Ministry of Health. For the past years and the years ahead, the overall policy goal of the health sector in the country is to achieve health for all Malawians by not only delivering health services and disseminating health information to the general public, but also to raise the level of health status of all Malawians by reducing the incidence of illness and occurrence of death in the population (MoH, 2016:1).

3.7.1 Health care systems in Malawi

Malawi has a national healthcare service which is funded by the government through the Ministry of Health (MoH) and is free to all Malawians. The government healthcare services are provided in three forms: primary, secondary, and tertiary levels (MoH, 2014a:3). Under the primary level, the main focus is offering preventive services with minimal curative services. These are offered with community initiative, at dispensaries, health centres, maternity facilities, and community/rural hospitals by health surveillance assistants (HSAs), community based health staff, community-based distributing agents, village health committees, and other volunteers. At the secondary level, services are provided by district hospitals and acts as referral facilities for the primary level of service. This level provides both the outpatient and inpatient services and are better equipped with medical equipment and different health professionals (MoH, 2014a:6).

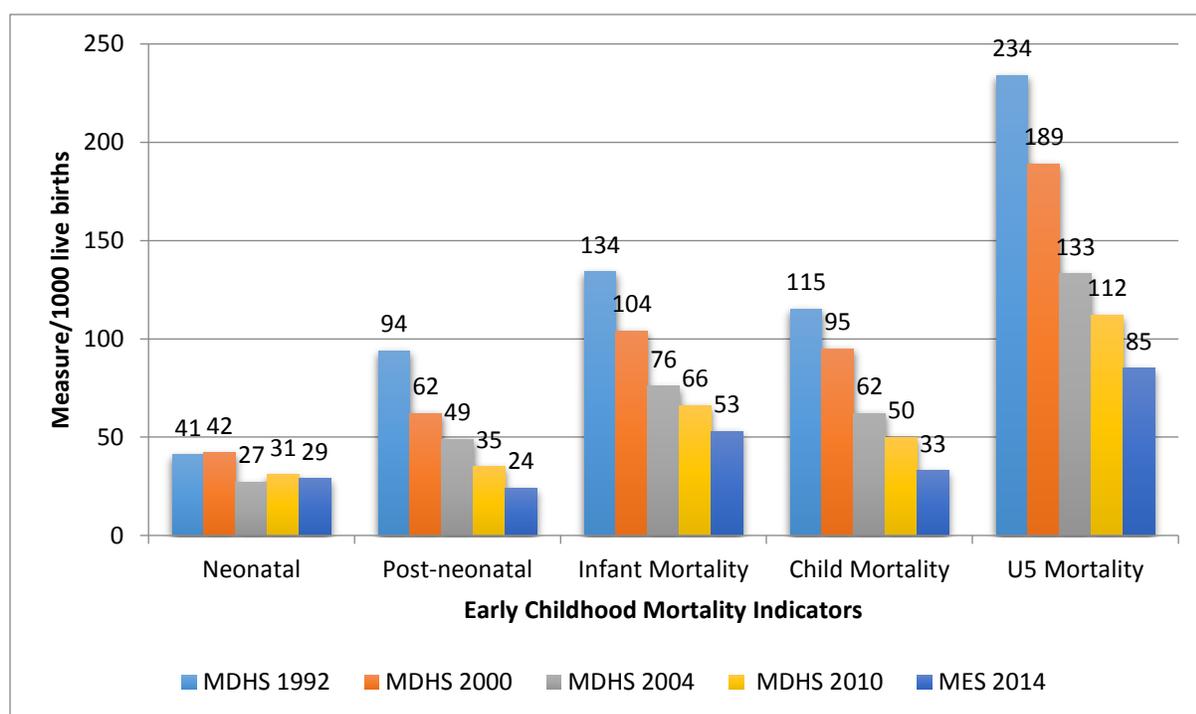
At the tertiary level, services provided include specialised health services, professional training, research, and also the provision of district level support. These are called central hospitals, which also treat in and out patients but only those that have been referred from district hospitals. Currently, in Malawi, there are five central hospitals

(MoH, 2014a). Other health care facilities are provided by private hospitals by non-profit organisations (NGO), as well as for-profit organisations.

3.7.2 Adult Life expectancy and childhood mortality

The health outcomes in Malawi have improved tremendously over the years by just looking at the adult life expectancy, which stands at an average of 60 years for females and 57 percent for males for 2015. (WHO, 2015:1). Health improvements in the country are also noted from children health outcomes which are demonstrated by the declining of childhood mortality rates over the last two decades illustrated in Figure 3.15.

Figure 3. 15 Child mortality Indicators for Malawi 1992-2014



Source: adopted from Kuyeli (2015) (data from MDHS and MDG End-line Survey 2014)

The childhood mortality rates are measured as deaths per 1000 live births. One of the major contributing factors to such progress in infant and under five mortality decline is the investments in child survival interventions. For example, the vaccines for various diseases, effective pneumonia treatment at community level, and effective prevention and treatment of malaria and diarrhoeal diseases (MoH, 2014a:1). Another noticeable

improvement on health outcomes in Malawi is the improvement of maternal mortality ratio calculated per 100 000 live births. Between 2004 and 2014, there has been a decrease in maternal deaths from 984 per 100 000 live births in 2004, to 574 per 100 000 in 2014. Part of the contributing factors has been the increase in number of women delivering at health centres, as a positive development, from 57.2 percent in 2004 to 87 percent in 2014 (NSO, 2014: IX).

3.7.3 Prevalence of diseases in Malawi

Malawi, like many other countries, is negatively impacted from high burden of wide spread diseases. Some of the main common killer diseases the country is embedded with are HIV/AIDS, Malaria, lower respiratory infections, and diarrhoea. This section highlights these four mentioned diseases in detail.

3.7.3.1 HIV/AIDS epidemic, Malaria and other diseases in Malawi

HIV/AIDS continues to be a serious health problem claiming many lives in Malawi. The epidemic accounts for nearly 10.6 percent of the total population. At regional level Malawi is reported to account for 4 percent of the total number of people living with HIV in sub-Saharan Africa (UNAIDS, 2014:26). As noted in the Malawi Demographic Health survey 2015-16 report, most of the affected population are those between the ages of 15-49 years, the age group of which the majority are part of Malawi's workforce are meant to contribute economically to the country (NSO, 2016:39). HIV/AIDS disproportionately affects women in comparison to men in Malawi.

A national assessment of the impact of HIV on the population, carried out by the Malawian Ministry of Health in 2015-2016, found that HIV prevalence among adult women aged 15-64 to be 12.8 percent, compared to 8.2 percent among Malawian adult men. Impressive progress has been made in terms of prevention, as well as combating the epidemic through behaviour change and safer sexual behaviour; the use of antiretroviral therapy, and palliative care channelled by the government in coordination with other non-governmental organisations (MoH, 2012a:28; MoH, 2014:1). Despite the positive strides to reduce HIV/AIDS in the country, a number of barriers to HIV

prevention that range from cultural, social and structural factors to legal and financial barriers, further exacerbate Malawi's HIV epidemic (NAC, 2015).

Malaria is another health problem that leads to most causes of morbidity and mortality, especially in children under the age of five years but also amongst pregnant women (MoH, 2012a:2). At the nation level, 40 percent of all hospital deaths are mainly caused by Malaria, however, there has been a 9 percent decline in deaths from 2006-2011, despite still being the highest share of the total deaths. According to the Malawi National Malaria Indicator Survey 2012, revealed that malaria prevalence rate was 43.3 percent nationally, of which 32 percent were under-five aged population, and related severe anaemia prevalence was 12.3 percent among children under five (MoH, 2012a:34). The report further indicated that the transmission of the disease is mainly determined by climatic factors: temperature, humidity, and rainfall, hence the extent and distribution of these factors influence the prevalence rate where areas in Malawi with more rains or humid coupled with proportionally higher temperatures are likely to experience more malaria incidences, unlike those hilly and cool areas such as the south and northern part of the country (MoH, 2014b:164).

To prevent the spread of the disease the government, in partner with other non-governmental organisations, embarked on different Malaria control strategies such as, the use of Insecticide Treated Nets (ITN) when sleeping, use of anti-malarial drugs for all pregnant women, and many others. There are challenges, however, such as a continued rise in the number of reported suspected cases due to a lack of diagnostic equipment and training in health facilities, low coverage of ITNs per household, and low utilisation of proven long-lasting insecticidal nets LLINs. There are also inadequate surveillance mechanisms to assess disease burden and challenges in supply chain management of antimalarial medications, basic diagnostics, equipment for treatment, and other supplies (MoH, 2014b:164).

Other health problems faced in Malawi is the widespread of tuberculosis (TB), of which the most cases are HIV/AIDS related, pneumonia and diarrhoea, especially in children. The mentioned are just a few of the many diseases in Malawi that are claiming many

lives. There are some diseases which claim people's lives which can be curable, but due to lack of proper equipment in hospitals, as well as enough medical staff in most hospitals (particularly in rural areas), most people die with diseases that are curable.

3.8 FOOD SECURITY CONTEXT IN MALAWI

As discussed in Chapter two, a person or household is regarded food secure if they at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs as well as their food preferences for an active and healthy life (FAO, 2002:1). In Malawi, the main source of food, as well as livelihood for most Malawians, is through agriculture, hence in order to have a clear picture of the country in terms of food security it is important to have an overview of the agriculture production for the country.

3.8.1 Government policy and objectives on agriculture production

As illustrated in Figure 3.3, agriculture is the main contributor to the economy of Malawi. It represents about 36 percent of the total GDP for the country and employs more than 80 percent of Malawi's labour force. This signifies that the country's economy is predominantly based on agriculture. Therefore, any changes in the agricultural sector should have significant and direct changes on the macro economy.

In Malawi, all matters related to the agricultural sector are administered by the Government of Malawi (GoM) through the ministry of Agriculture, Irrigation and Water Development (MoAIWD) (GoM, 2017). In 1998, Malawi embarked on a long term strategy, 2020 Vision, under the expectation of fostering the country's economic growth and development. The agricultural sector, being the main economic contributor to Malawi GDP, was identified as key a priority sector to foster economic growth and development. This long-term vision was later translated into a medium-term policy framework for social and economic development, namely the Malawi Growth and Development Strategy (MGDS). The first MGDS were adopted in 2006–2011, and later replaced with MGDS II for the period 2012–2016 (FAO, 2015:2). Other economic strategic goals adopted in the 2020 Vision are Economic Recovery Plan (ERP) in 2012,

which aimed at restoring economic stability through commercial agriculture, tourism, energy, mining, and infrastructure development. The National Export Strategy (NES) was developed in 2012 to boost domestic and external trade, improve the competitiveness of Malawian products, as well as economically empowering farmers with a focus on the poorest and most vulnerable groups (FAO, 2015:3).

In order to achieve other agricultural development goals, such as the Comprehensive African Agricultural Development Programme (CAADP) targets, Malawi developed the Agriculture Sector-Wide Approach, ASWAp. The main purpose of ASWAp is that it offers strategies for supporting priority activities in the agricultural sector in order to increase agricultural productivity to make Malawi a hunger free nation, enable people access nutritious foods and increase the contribution of agro-processing to economic growth (MoAFS, 2010:xi). It also advocates for and drives strategic investment towards programmes and initiatives that fall under three distinct pillars:

- Food security and risk management;
- Commercial agriculture, agro-processing, and market development; and
- Sustainable agricultural land and water management.

Currently, the ASWAp includes two major agriculture sector development programmes such as the Farm Input Subsidy Programme (FISP), and the Green Belt Initiative (GBI). The main aim of the GBI is to maximise available water resources for irrigation to increase production, productivity, and thereby increase the levels of income and food security, at both the household and national levels. In total, these programmes account for 70 percent of the total ASWAp budget towards food security and risk management (NEPAD, 2014:18). The subsequent sections chart Malawi food production and the country's food security status

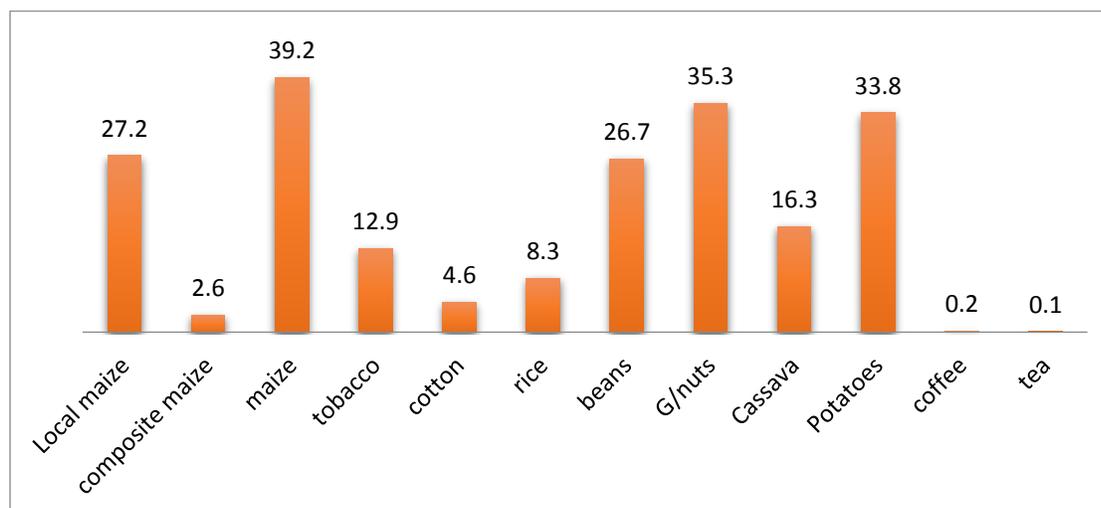
3.8.2 Agriculture production and food security in Malawi

In Malawi, crop production is the mainstay for the country for both exports and food. Almost 90 percent of Malawi's population are engaged in subsistence and peasant

farming and produce a variety of crops like maize (corn), tobacco, sugarcane, cassava (tapioca), sorghum, wheat, groundnuts, cotton, tea, corn, potatoes, coffee, and rice (BFAP, 2011:16). Overall, Malawi's most essential agricultural cash crop is tobacco which accounts for about 70 percent of all export revenues. Apart from crop production, Malawi is also engaged in other types of agriculture, for example, fish farming (aquaculture) and livestock farming (FAO, 2015). The agricultural sector is subdivided into smallholder producers and larger estate producers. While the first farm on a customary land tenure system in which the rights to sell land are restricted, the latter produces mainly export cash crops like tobacco, tea or sugar on freehold and leasehold land. On average, the smallholder ownership of agricultural land is small, estimated at 0.32 hectares per capita or 1.2 hectares per household (GOM/World Bank 2007:39).

Figure 3.16 illustrates the types of crops grown in Malawi by small holder farmers from 2013 to 2014. As shown, maize is the crop grown by most households in the country. According to types of maize grown, about 50 percent of households grew local maize and 60 percent grew hybrid maize. Ground nuts and potatoes were also grown in huge numbers at 35 percent and 34 percent respectively. As for the cash crops, 13 percent of households grew tobacco, 4.6 percent grew cotton, 02 percent grew coffee and 01 percent grew tea.

Figure 3. 16 Types of crops grown in Malawi 2013-2014

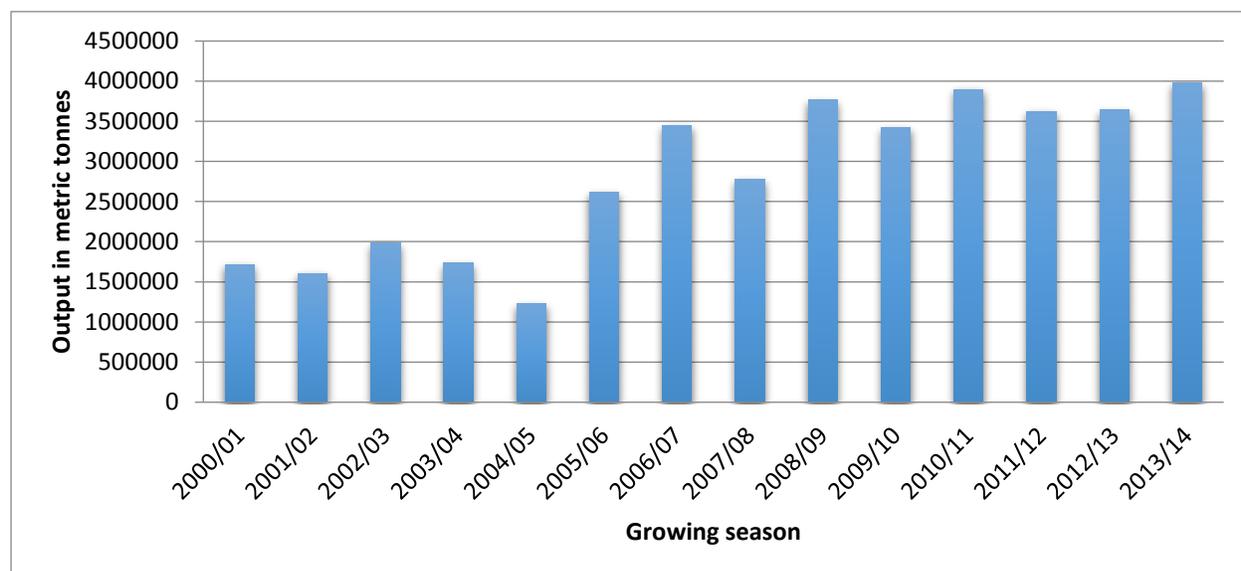


Source: NSO (2014)

As noted in Figure 3.16, maize is the most strategic crop for the country for food and as a cash crop for most subsistence farmers and it is the main focus of food policy in the country. It is grown on two-thirds of the country's arable land, largely on smallholdings farms. It is grown during the rainy season, which is usually from November to April, but in some areas, especially those along the river, the crop is grown after the season to take advantage of the residual moisture (FAO, 2015:3). Maize is cultivated across the country by almost 85 percent of the total population (NSO, 2012:139). As the dominant crop, it occupies about 67 percent of the total cultivated plots and 80 percent of cultivated land in the smallholder sector, while the rest of land has crops like cassava, groundnuts, cotton, rice, sorghum, millet, legumes and tree crops (NSO, 2012:139). Figure 3.17 depicts the trend for Maize output from 2000 to 2014. It shows that maize output has been gradually increasing over the past years. However, during the harvest of 2004/05, the country experienced a poor harvest mainly due to a dry spell, which led to the reduction of the maize output before a recovery in 05/06 growing season. Good rainfall patterns play a critical role in the production of maize in the country, as most maize farming in Malawi is rainfall-fed (NSO, 2012). Since 2006, the maize output has been high another contributing factor is the introduction of a fertilizer subsidy

programme by government 2004/05 as a way to help those who cannot afford to, thereby increasing maize production (Chirwa, *et al.*, 2008:9).

Figure 3. 17 Maize output trend in Malawi 2000-2014



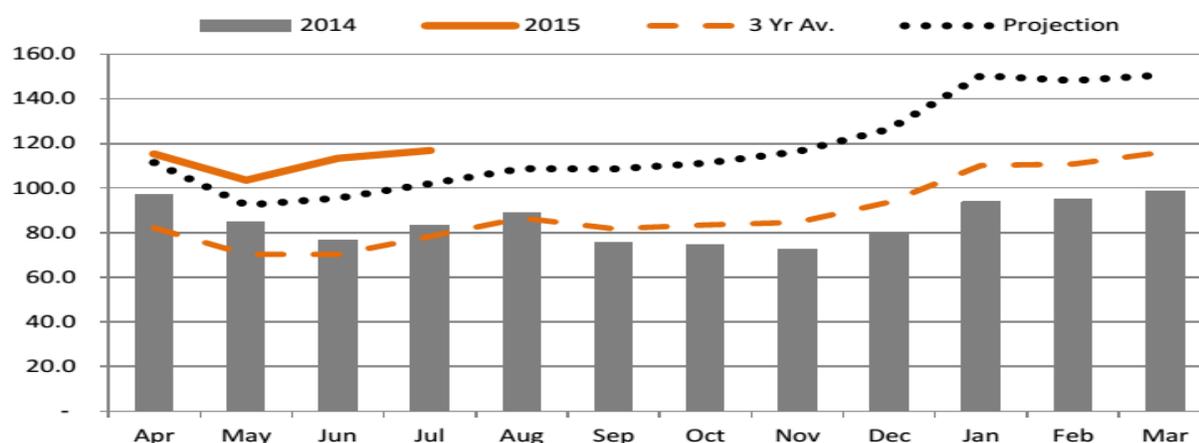
Source: NSO (2014)

3.8.2.1 Maize prices in Malawi

Prices for maize in Malawi are regarded as relatively higher as compared with other countries, despite the fact that maize is a staple food for the country and grown by the majority of the population (Minot 2010:5). Ibid further narrates that, when compared with other countries, Malawi's maize prices were found to be four times higher than on international markets in some months. Maize prices in Malawi are also reported to be much more volatile than international prices. Chapoto and Jayne (2009) calculations on the coefficient of variation for the capital cities of eight countries in eastern and southern Africa, found that Malawi had the largest volatility among them. Maize prices in Malawi are relatively lower during the harvest period (March- April) and increase gradually until the next harvest. Between the 2014/15 season, Malawi registered a 30 percent decrease in maize production as compared to the last five years average. This led to a national maize deficit which stood at approximately 500 000 metric tonnes in the 2015/2016 harvest (FEWS NET, 2015:2). Trends in the variation for maize prices are

projected in Figure 3.18. As shown, the 2014 maize prices were relatively high, especially between January-April. The 2015 prices were even higher than the three year projections. With such high maize prices, as well as low production, pressure is exerted on households especially on the poor hence increasing food insecurity in the country.

Figure 3. 18 Trend for national average maize prices



Source: FEWS NET (2015)

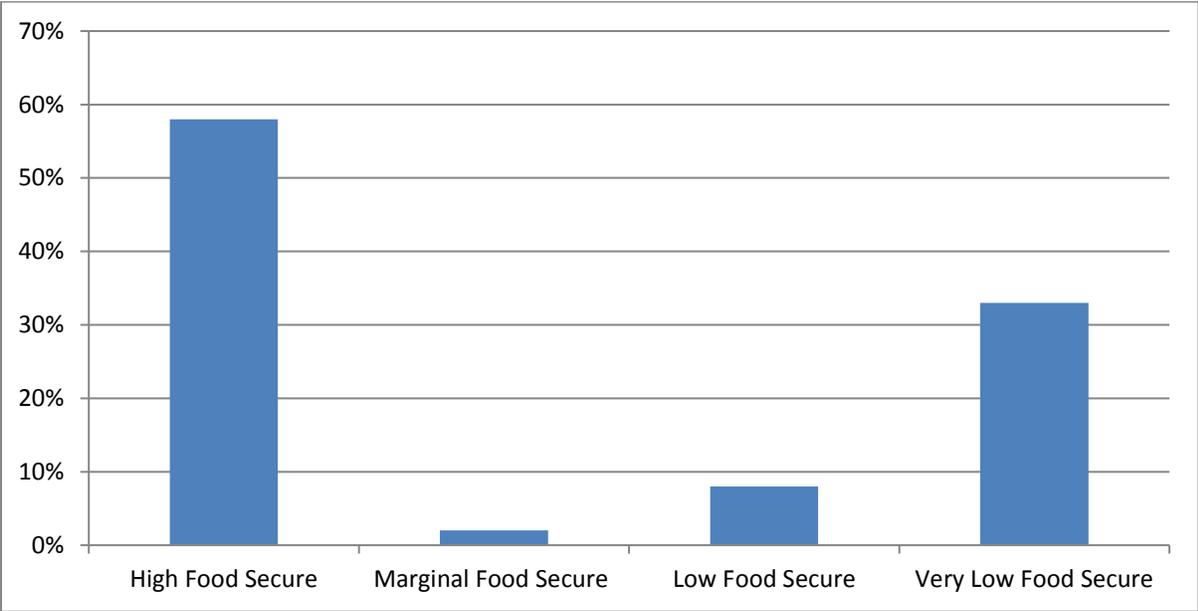
3.8.3 The status of food security in Malawi

Malawi, being one of the poor countries in the world, has experienced its own ups and downs in terms of food security. Hajdu, *et al.*, (2009) relates to the most notable ones to have been the times when the country experienced famines that occurred in 1949/50, and the drought of 1991/92, which had major detrimental effects. The worst case was the 2002 famine when most people lost their lives due to hunger. Devereux (2002) noted that, at this point, maize production (staple food) went down by nearly 30 percent and food prices went as high over 300 percent. During this time, over a third of the population were dependent on food aid (USAID/Malawi, 2004). This led the government to seek new policy measures in order to deal with the problem.

The IHS3 (NSO, 2012) report presented a classification of Malawi's food security status at the household level in four categories, each representing a different degree of food severity as follows: a high food security (where households have food adequacy and no

disruption in eating patterns); a marginal food security (where there is concern on adequacy while the rest hold); low food security (where access becomes a concern, quantity and variety of food reduced without disrupting normal eating patterns); and very low food security (where the household further does experience multiple disruption of eating patterns and food intake and dependency on relatives and friends) (NSO, 2012:188). Figure 3.19 shows the country’s household food security status as classified by IHS3 report. As noted, over 30 percent of the population had very low food security. This meant that one in every three people lives in very low food secure situation. Of the population, 8 percent were subjected to low food security with about 2 percent in the marginally food secure category and about 58 percent were food secure.

Figure 3. 19 Status of food security by category in Malawi



Source: NSO (2012)

The report further indicated that, considering place of residence, most food insecure populations were from the rural areas as compared to the urban areas, and also that food insecurity was more prevalent in female-headed households as compared to male-headed household. The food security status for Malawi is discussed in the next section in terms of number of undernourished population in the country.

3.8.4 Prevalence of undernourishment in Malawi

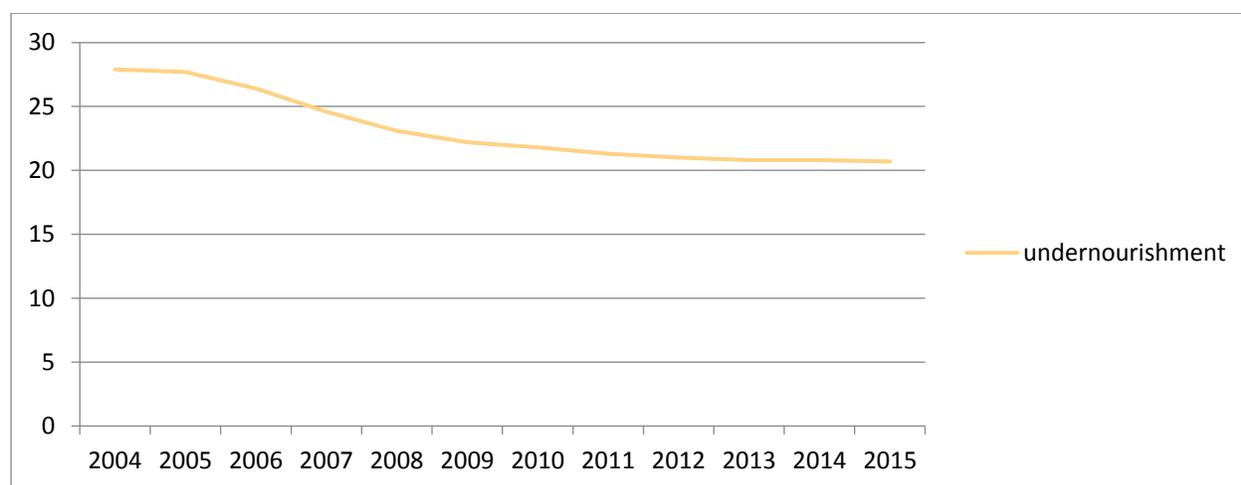
When accessing food availability, the indicators do not only capture the quantity but also the quality and diversity of food. Other factors, such as adequacy of dietary energy supply, share of calories derived from cereals, roots and tubers, average protein supply, average supply of animal source proteins, and the average value of food production, are also considered (FAO, 2015:2). It is evident that poor diet caused by lack of proper nutrition (undernourishment) exacerbates food insecurity (FAO, 2015:3). Undernourishment, which is extreme food insecurity, measures aspects of food security at the national level and exists when energy intake is below the minimum dietary energy requirement (which is the amount of energy needed for light activity and a minimum acceptable weight for attained height) (FAO, 2009b). The impact of an unbalanced diet is that a high dependence on foods such carbohydrates alone, results in a poor quality, monotonous diet that is likely to be nutritionally inadequate in proteins, fats and micronutrients. This is because while staples are high in carbohydrates, they are typically low, or very low, in lipids, protein, vitamins and minerals.

Part of the indicators used by the MDGs (2015) to determine the progress in eradicating extreme levels of poverty and hunger was the prevalence of nutrition status for under five-aged children, but also the prevalence of hunger in a population measured by the proportion of the population whose dietary intake was below the minimum dietary energy requirement (undernourishment) (FAO, 2009b). In this case, undernourishment was only used as a proxy to assess whether people were getting enough to eat in terms of total energy intake. The assumption was where prevalence of undernourishment was high, the probability of diets being adequately diversified was low, as the first response in food insecure households is often to save on food costs by cutting down on non-staple food consumption (FAO, 2009b).

Chapter two highlighted some of the trends in terms of undernourishment around the world and it was shown that most of the people suffering from hunger were from developing countries, Malawi being one of them. As noted, maize is the staple food in Malawi, of which on average 74 percent of the food energy is derived from maize which

is processed into flour and consumed in the form of a thick porridge (nsima) (Experience Malawi, 2017). Other cereals consumed include rice and cassava. Other groups of food, such as vegetables and meats, are rarely consumed by most poor households. In most cases, wealthier households who can afford these items are in the minority (NSO, 2014). In Malawi, cases of undernourishment have always been high despite the significant progress that has been made in reducing undernourishment. As per evidence from Figure 3.20 there has been a slow trend in the decrease for the undernourished population in the country, especially from 2009 to 2015. The undernourished population, as of 2015, was at 20.7 percent, which is still high. The main cause of high levels of undernourishment in the country is the high reliance on staples, which is common amongst the poor in the country who cannot afford to acquire other types of foods due to poverty (NSO, 2014). As a result, a larger portion of the population of the country is unable to meet the required diet to provide them with the minimum dietary energy requirement per day.

Figure 3. 20 Prevalence of undernourishment in Malawi 2004-2015



Source: world Bank (2015)

The situation becomes worse for children where the country is still battling with malnutrition and stunted growth, especially in children between the ages of zero to five years. The study highlights the anthropometric indicators for young children that were collected in the Malawi Demographics Health Survey (MDHS) (2015-16) to provide

outcome measures of nutritional status. Three indices of height-for-age, weight-for-height, and weight-for-age was used as indicators of growth and body composition for children and later expressed as standard deviation units from the median for the reference group. Children who fell below minus two standard deviations (-2 SD) from the median of the reference population were regarded as moderately malnourished, while those who fell below minus three standard deviations (-3 SD) from the reference population median were considered severely malnourished. The results showed that, using the height-for-age, 37 percent of children under five were considered to be short for their age or stunted (below -2 SD), and 11 percent were severely stunted (below -3 SD) (MDHS, 2016:28).

Considering age-for-weight (a composite index for all indices), nationally about 31 percent of children aged six to 59 months were underweight, with only one percent being severely underweight, and 30 percent moderately underweight. The prevalence of those being underweight was higher in rural than in urban areas. That is, 33 percent of rural children are underweight, compared to 23 percent of urban children. The report further revealed that the proportion of children who were underweight decreased with increasing levels of the mother's education and with increasing wealth quintiles (NSO, 2016:29). Chirwa and Ngalawa (2008) examined the determinants of child nutrition in Malawi, the results indicated that, overall, children from households with parents, mother/female-household heads who were economically empowered, in terms of being in salaried employment or working in a family business, were nourished. Also, the education status for females had a positive relationship with child nutrition. This supports the fact that women play a crucial role in terms of improving the food security status of their households.

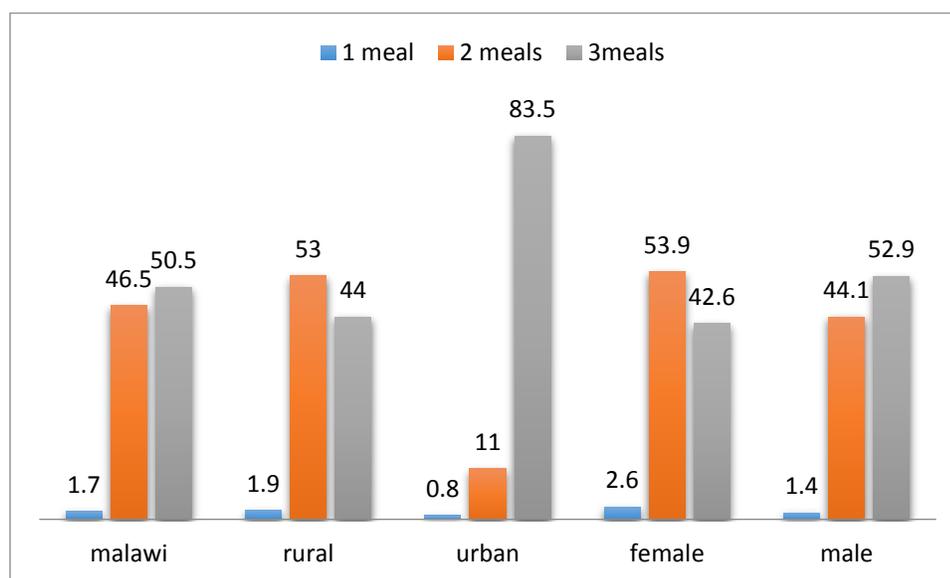
3.8.5 Frequency and types of food intake by adults and children in Malawi

In Malawi, food consumption is rationed to three meals a day (breakfast, lunch and dinner) for those households who can afford to prepare tea and some starch (bread) or porridge for breakfast; a thick porridge (nsima) with some vegetables and some protein (fish and meat) for lunch; and supper-usually the same as lunch meals. In-between-meal

snacking is not very common in Malawi, hence those three meals are served in as large a portion as possible to sustain them throughout the day. That is a picture of households who can afford that lifestyle, of which, due to high levels of poverty in the country, not many people can afford such pleasure. For most poor households, usually two meals are consumed in a day, namely, breakfast (mostly porridge, sweet potatoes and or cassava), and dinner which is usually consumed just before bedtime and is usually thick porridge served with vegetables and, in good times, fish or meat. Reference sourced from Welfare Monitoring Survey (2014) report indicated that 87 percent of surveyed households ate cereal grains in the form of a thick porridge (nsima), and 73 percent of households consumed it with vegetables, and only 18 percent consumed with fish and meat on daily basis. Other food consumed were milk and other milk products with only 7 percent of the total population consuming these on a daily basis. The report also indicated that about 30 percent of households had fruits daily and 36 percent took sugar products daily within the survey reference period (NSO, 2014:147).

Another survey report presented by NSO on IHS3 (2012:196) illustrated the statistics of food consumption per day by household members in Malawi. An illustration of the findings is shown in Figure 3.21, as noted at the national level, 51 percent of the population was able to eat three meals a day though the types of meals varied per household, and 47 percent could only eat two meals a day. When compared between rural and urban areas, 84 percent of urban inhabitants ate at least three meals a day as compared to 44 percent in rural areas. Variations between gender shows that most male-headed households consumed at least three meals a day (53 percent) as compared to female-headed household (43 percent). The figures shown so far agree with the fact that there are more people in Malawi suffering hunger and more particular in the rural female headed household.

Figure 3. 21 Frequency of meal consumption per day in Malawi-2012



Source: NSO (2012)

3.8.6 Population faced with food shortages in Malawi

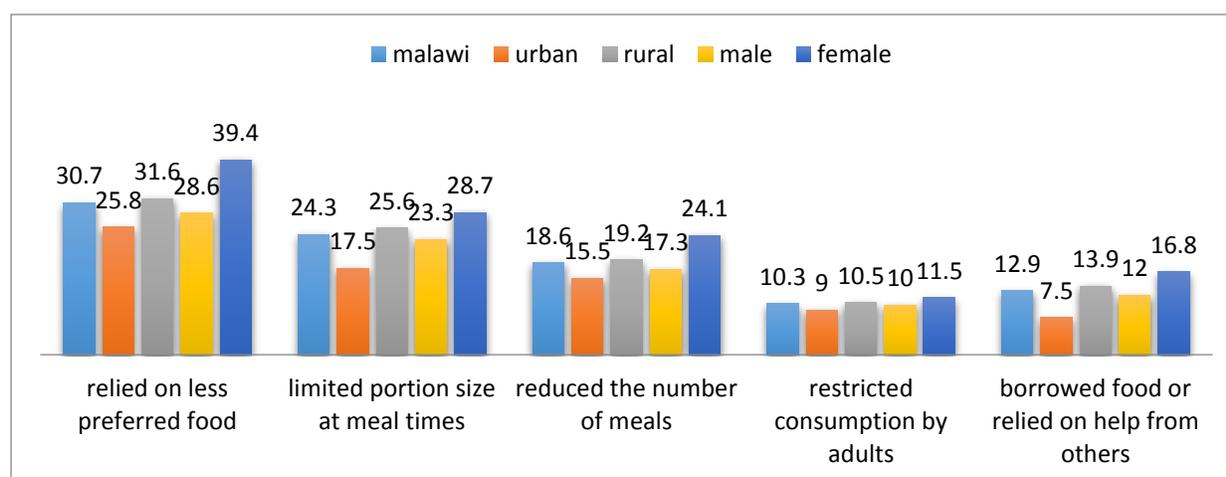
Food shortages in Malawi has been an on-going occurrence amongst most poor households. So far, in this study, discussions have been made on various issues related to same. The IHS3 (2012) surveys report indicated that 49 percent of the total population in Malawi had suffered from food shortages throughout the past 12 months preceding the survey. The situation was more pronounced in rural areas (52 percent) relative to urban areas (30 percent). The report further indicates that the proportion was higher in female-headed households (57 percent) compared to male-headed households (47 percent). When asked about some of the underlying causes of food shortages from those affected with the dilemma, the report revealed that 41 percent of the population indicated lack of farm inputs as the main cause, whereas 26 percent indicated that natural factors such as droughts, erratic rains, floods and water logging as other causes. Other causes mentioned were shortages of land (small land holding size) (11 percent), and high market prices for food (14 percent) (NSO, 2012). Recent developments on food insecurity in Malawi have indicated that the problem is deteriorating, especially amongst the poor. The country is facing high levels of poverty, increase in food prices, low food production and unfavourable climate changes, and

hence there is need for more intervention into the problem (FEWS net, 2016, WFP, 2016).

3.8.7 Coping strategies adopted by food insecure households in Malawi

With such increase in food insecurity in the country, most households vulnerable to the epidemic have employed various strategies to adapt with hunger. The IHS3 report illustrated five main coping and adaptive mechanisms employed by food insecure households in Malawi. A graphical illustration of the strategies is presented in Figure 3.22, followed by a clear explanation of the each strategy in the next section

Figure 3. 22 coping strategies employed by food insecure households in Malawi



Source: NSO (2012)

3.8.7.1 Relied on less preferred food

As noted in Figure 3.22, over 30 percent of the food insecure households in Malawi relied on less preferred or low cost food as a way of coping with food security. Prevalence shows that a higher percentage (over 32 percent) were those residing in rural areas. As for gender differences, it shows that 39 percent of female-headed household employed this coping strategy as compared to only 29 percent of male-headed households, implying that more females than male headed household employed this particular strategy.

3.8.7.2 Limited portion size at meal times

Figure 3.22 illustrates the population who limited their size of meals as a coping strategy for food deprivation at country level, 24 percent of the food insecure households reduced consumption at mealtimes by cutting the portion of their meal size. Proportionally, most of the population that utilised this strategy came from the rural areas (26 percent) as compared to urban areas (18 percent) and more predominately in the female-headed household.

3.8.7.3 Reduced number of meals

Reduced number of meals is another coping strategy that was employed by food insecure population in Malawi, as shown in figure 3.22, at the country level approximately 17 percent of the food insecure population employed this strategy, of which most of them were from the rural areas (19 percent) as compared to urban areas. It also shows that more female-households are the once who employed this strategy more 24 percent as compared to their male counterparts (17 percent).

3.8.7.4 Restricted consumption by adults

From figure 3.22, it is evident that the mentioned strategy was not very common in food insecure households as compared to the other strategies. This type of coping strategy indicates that, when resources are insufficient to provide food for all members of the household, children are usually the first to be shielded from the disrupted eating patterns and reduced food intake that characterise food insecurity. As noted in Figure 3.23, only 10 percent of the food insecure households in the country adopted this coping strategy, indicate that there are more people who reported to have experienced this condition in rural areas, (approximately 11 percent) as compared with urban areas (9 percent). It also shows there was no significant difference between male and female-headed households in the employment of this strategy.

3.8.7.5 Borrowed food or relied on help from others

The last coping mechanism strategy employed by food insecure households in Malawi was that of borrowing of food or getting help from others. Figure 3.22 shows that, at the national level, approximately 13 percent employed this strategy. The proportion was high in the rural areas (14 percent) as compared with urban (8 percent). It also shows that a higher percent was from female headed households (17 percent) as compared to their male counterparts (12 percent).

3.9 EMPIRICAL STUDIES ON GENDER AND FOOD INSECURITY IN MALAWI

The thought that food insecurity exists in Malawi isn't just a myth but rather a well-documented problem proven by various researchers. There exist a few of studies that have examined the problem of food insecurity in Malawi, which has brought in mixed results (Chilowa, 1998; Ali & Deslie 1999; Pankomera, 2009; Tsoka, 2013; Kakota *et al.* 2015). Some of these studies have either put the blame on government, others have indicated it as just being a socio-economic problem caused by other factors, like climate change, poverty and many others. Pankomera, *et al.*, (2009) study on the determinants of food insecurity in Malawi, used a logistic regression to analyse the problem. Their findings revealed that food insecurity existed among most people in the area, and that land holding, education of household head, ownership of an off-farm enterprise, livestock holding size, gender of household head, household size, and road access, were the most important determinants of food security in Malawi. Similarly, Tsoka (2013) found similar results in a study on the Permanence of Poverty and Food Insecurity in Malawi. In this study, a series of existing Afro-barometers surveys, in the surveys, respondents were asked to identify three main problems they faced which needed government intervention and the results showed that food security and famine had the highest shares.

Other studies have analysed the problem of food insecurity relating to government policies implemented to reduce food insecurity in the country (Chilowa, 1998; Holden &

Lunduka, 2012; Matita & Chibwana, 2014). Most of these studies identified the shortfalls of government policies, which led to worsening food insecurity. For instance, Chilowa (1998) blamed some policies adopted in Malawi meant to improve poor people livelihoods to have impacted food security and the general welfare of people unfavourably. Mvula *et al*, (2011) expanded the argument after reviewing some challenges met by vulnerable people in terms of accessing social grants for example farm input subsidy which were implemented by government to help farmers who could not access farm inputs such as fertilizer. I bid argued that the policy had many shortfalls which included corruption and malpractices by officials in charge. This led to inefficient ways of assisting the poor and vulnerable groups. Similarly, Holden and Lunduka, (2012) argued that, while the programmes have enhanced food production and food security, they did not target the poor. They claimed that basic problems such as illegal markets for coupons and fertilizers, leakage of coupons, failure to establish a system of beneficiary, and targeting, are amongst some of the serious problems which makes the programs ineffective. The most concerning is the findings of Killic, *et al*. (2013) who found that, on average, relatively well-off households, who are connected to community leadership and reside in agro-ecologically favorable locations, were more likely to be FISP beneficiaries. This distorts the whole idea of reducing food insecurity due to the fact that the wealthy are the ones seemingly to be the major beneficiaries of the FISP while the poor are often not targeted.

The studies addressed so far have concentrated more on a general picture of food insecurity at the country and regional level. Due to the nature of this study, it is important to address the empirical evidence of food insecurity in the country in terms of gender differences. As noted in the earlier discussion of this section there exists a number of gender disparities in Malawi in terms of employment status, education levels, poverty rates and food insecurity. With evidence from IHS3, the study has indicated that most of the deprived are female-headed households, as compared to their male counterparts. For example, in education attainment, males have higher education levels as compared to women.

Kakota, *et al.*, (2015) examined the determinants of household vulnerability to food insecurity in semi-arid regions in Malawi. They used primary data and employed a two-stage least squares regression for the analysis. Their descriptive results indicated that female-headed households were more vulnerable to food insecurity than male-headed households because of low access to resources for food production and purchases. Their regression results indicated that income, household size, land size, and access to climate information were the main determinants of household vulnerability to food insecurity. Similarly Kassie, *et al.*, (2015) examined the gender gaps in household food security status and its causes in Malawi. They employed an exogenous switching ordered probit and binary probit regression. They found that female-headed households were more vulnerable to food insecurity as compared to their counterparts. They further conducted a counterfactual analysis to determine what could improve the situation of female-headed households. They discovered that the status of food security in female headed households would improve if they had the same levels of resources as those employed in male-headed households. However, this strategy would not improve the gender gap that exists in food security in the country due to differences in returns to the resources employed. As stated earlier, most of the studies conducted on food security in Malawi have concentrated more on the problem at the country level and used existing data. During the time the study was conducted the only data that had a comprehensive household data set was the IHS3 in 2011 but this was regarded as outdated by the researcher hence, it was important for the researcher to collect a new data set in the appropriate area of study.

3.10 SUMMARY AND CONCLUSION

The chapter has profiled Malawi in terms of its economic and demographic dynamics, based on the trends and outcomes. Amongst the discussed include the geographical position of the country, employment status, population growth and distribution, health outcomes, education levels, economic status (poverty rates), agricultural production, and food security status. A detailed summary of the chapter is as follows: the first section addressed the geographical position of the country. As illustrated by Figure 3.1,

it is evident that Malawi is a land locked country that is bordered by three countries. The country is divided into three regions that are further separated into 28 districts. On the country's population status, the chapter indicated that there has been a rapid population growth. From the first census in 1966 to the last census in 2008 the population had increased from 4 million to 13.1 million, with projections of population growth to 20.1 million by 2020 (NSO: 2012).

The chapter identified some of the problems the country has been facing and may continue to be a threat if no proper measures are put in place. Considering the socio-economic factors, Malawi has more than half of its population residing in rural areas and mostly poor. Most of these people rely on subsistence farming. The chapter showed that the country had been experiencing stable economic growth since 2006, with an average real GDP growth rate of seven percent between 2006 and 2010, and later a slump in 2012 of about two percent followed by a rebound of five percent in 2013. However, due to the issue of cash-gate, the country faced many challenges, including the cessation of aid from most donors. This put the country in much jeopardy, leading to worsening conditions for most people in country. In terms of employment and education status of the country, the chapter shows that there are high illiteracy levels in the country, mostly among females. As a result, there are very few people that have well-paying jobs.

In terms of food security status, which is the main objective of the study, the chapter discussed this issue at length. It is estimated that over 30 percent of the total population in Malawi were food insecure in 2012. The most vulnerable were those residing in rural areas especially in female headed households. Recent developments on food security status in the country reveal that the problem is far from being resolved (FEWS net, 2016, WFP, 2016). Projecting the country's food security status by the number of undernourished population, the chapter revealed that cases of undernourishment in Malawi have always been high (registered at 20.7 as of 2015). Whereby most households are not able to consume the required dietary intake, which leads to undernourishment. Some of the main causes revealed have been the high levels of

poverty in the country, mostly common amongst the rural poor, in particular female-headed households, who cannot afford to acquire all required groups of foods due to poverty (NSO, 2014).

The chapter further addressed some of the coping strategies employed by the food insecure population in the country. The most common strategy employed was relying on less preferred food. This is when households seek other food types which are cheaper, though not as nutritious but are opted anyhow just to fill up the stomach. Such strategies may be part of the contributing factors to cases of undernourishment, which are so high in the country, particularly in children under the age of five. Other coping strategies employed mentioned in the chapter are limiting the portions of meals, reducing the number of meals, for example instead of eating three main meals a day households reduce them to two or even one. Restricting consumption of meals by adults in order to feed children first is another strategy employed, as well as borrowing food or relies on help from others.

It is worth noting, as revealed in the chapter, that from existing literature presented precisely the Integrated Household Survey reports there existed much gender inequality in most spheres of life in Malawi. For example, in terms of employment status, education levels, poverty levels, food insecurity and many more. The reports signified that amidst the inequalities women were found to be mostly on the disadvantaged side as compared to their male counterparts. In terms of food insecurity women than men were also found to be more deprived. The chapter also revealed that when it comes to food production in the country, almost 80 percent of food production is actually produced by women at the household level. The question is then why is it the case that women are the most disadvantaged in terms of food security. Having such knowledge of food insecurity in Malawi, the study intends to take a step further in investigating an updated food security status in the selected areas by using an updated data set which was collected by the study during the study period. The decision to use primary data was on the fact that during the time the study was being conducted the existing data

was mostly outdated but also did not accurately contain all the elements essential for this study. The next chapter addresses the methodology intended for the study.

CHAPTER 4: RESEARCH METHODOLOGY AND DESIGN

4.1 INTRODUCTION

The chapter provides an overview of the research design and the methodology employed in the study, describing all matters related to the gender gaps that exist in food security status in the selected districts of Malawi. The methodology employed in this chapter will be used as a guide to explain the results in chapter five.

The discussion of this chapter is structured around the research design and methodology, population sampling, data collection, data analysis and how ethical considerations and measures were obtained.

4.2 APPROACHES TO RESEARCH

The nature of man revolves around discovering new insights of how life can be improved. Such sensitivity probes mankind to research and discover the unknown. This is where the term research originates. In simple terms, Pellisier (2007:6) defined research as an exploration that uses applicable scientific methodology in order to discover new information, which later can be interpreted as facts, theories, behaviours, applications or events. Remler and Ryzin (2011:8) addressed the term research as a phenomenon that can be approached from different angles but the main sources being either secondary or primary sources. With secondary sources, information is gathered from existing data, usually collected for other purposes, such as information collected by governments. On the other hand, primary sources of information are gathered from original sources through first hand investigation. For example, information collected through experiments, interviews focus groups and measurements.

A good research begins with a problem and ends with a conclusion. In order for research to be successful, there are certain procedures and processes that have to be followed. De Vos *et al.* (2011:63) addressed two main approaches to research as that of being either qualitative or quantitative. They further argued that it is best for a researcher to get acquainted to these two methodological paradigms in terms of how

they differ in order to decide which would be best for their research. The mentioned approaches are described, in the sections to follow, in terms of their main characteristics.

4.2.1 Quantitative research

Leedy and Omrod (2005:94) defined a quantitative approach as a method that is used to answer questions about relationships among measured variables with the purpose of predicting, explaining, and controlling phenomena.

4.2.2 Qualitative research

A qualitative approach is used to answer questions about the complex nature of a phenomena and, thus, a qualitative researcher mainly seeks a better understanding of complex situations that are often exploratory in nature and uses their observations to build theory from scratch (Creswell, 2007:37).

The distinction between qualitative and quantitative research approaches does not imply that the two are mutually exclusive. It is in fact agreed by most researchers that the approaches can be used jointly as mixed methods. Monette *et al*, (2002:92) explains the mixed methods as a third method of research approach, they further described it as one that is built from both qualitative and quantitative research methods and allows a more complete, and in-depth understanding and analysing a research problem. This study adopts the quantitative research method, which will be addressed later in the chapter.

4.2 RESEARCH DESIGN

Another phase of the research process is to select a research design that would be ideal for the study. Several definitions exist that explain the term research design. Blaikie (2009:21) describes the term as an integrated statement and justification of technical decisions that is involved in planning a research project. Babbie (2007:112) simplifies the term to a process that focuses on the end product, which is the kind of

study being planned and what is to be achieved in the end. Research designs are categorised into three main parts, namely, exploratory, descriptive and casual research design. Each part has its own purpose, and therefore, can be used differently. Gilbert and Churchill (1996:114-115) describes them as follows:

4.2.1 Descriptive research

As opposed to the exploratory research, descriptive research is said to be quantitative in nature where it is pre-planned and structured in design so that the information collected can be statistically inferred on a population. In so doing, the researcher is able to define the opinion, attitude and behaviour held by a group of people on a given subject.

4.2.2 Casual research

Casual research is described as similar to descriptive research in a way that they are both quantitative in nature, as well as pre-planned and structured in design. The only difference comes in when explaining the cause and effect of the relationship between variables. Casual research is mainly applied to instances where there is a requirement to indicate the extent of the variation caused by one variable to another variable, but also to determine the nature of the relationship between the causal variables and the effect to be predicted.

4.2.3 Exploratory research

Exploratory research focuses on the insights and ideas of a respondent. A good example of exploratory research is that of an online survey, which has open-ended questions. As such, the respondent is not limited to a specific answer but can rather clarify a term in their own words. The responses can never be statistically measured or quantified but rather give enough information that help a researcher to discover new initiatives or problems that should be addressed. Creswell (1994) argues that every research needs to have some form of foundational layers which the researcher will

follow in trying to answer his or her research questions. These are referred to as paradigms, which will be discussed in the next section.

4.3 RESEARCH PARADIGM AND PHILOSOPHY

A good research, whether adopting the qualitative or quantitative approach, has to have its philosophy which are in union with research paradigms. Easterby-Smith *et al.* (2002:27) emphasises this point that the absence of philosophical issues in a research could lead to serious effects in the quality of the research itself. Saunders *et al.*, (2007) defined research philosophies as a process that seeks to explain the root of knowledge or research. They include the important assumptions about how one observes or views the social world, but also involves thinking about epistemology and ontology, which have important distinctions that will affect the methods in which a researcher thinks about the research process. Ibid further relates research philosophy and research paradigm as to have the same back bone. The word paradigm originates from the Greek word *paradeigma*, which means pattern and was first used by Kuhn (1962). Kuhn defined a research paradigm as a set of common beliefs and agreements shared between scientists about how problems should be understood and addressed (Kuhn, 1962). Gliner and Morgan (2000) further describes a research paradigm as a way of thinking about and conducting a research which deals more with the philosophy that guides how the research is to be conducted. A research paradigm and philosophy comprises various factors such as individual's mental model, their way of seeing things, different perceptions, variety of beliefs towards reality and many more (Easterby-Smith *et al.*, 2002). Thus, the two concepts influence the beliefs and values of the researchers, so that they can provide valid arguments and terminology to give reliable results.

TerreBlanche and Durrheim (1999), describes a research paradigm according to three elements: ontology aspects, which deals with the science of how things are done; epistemology aspect, which explains what can be known and how can it be known; and the methodology aspect, which combines different techniques that are used by the researcher to investigate different situations. In connection to the described elements of paradigms, there also exists numerous philosophies which researchers incorporate as a

guide when conducting research. Guba and Lincoln (1994) describes the following as the most common philosophical paradigms: positivists (assumes that there is a single reality, which can be measured and known, and therefore they are more likely to use quantitative methods to measure this reality); constructivists (under the believe that there is no single reality or truth, and therefore reality needs to be interpreted, and therefore they are more likely to use qualitative methods to get those multiple realities); and pragmatists (which assumes that reality is constantly renegotiated, debated, interpreted, and therefore the best method to use is the one that solves the problem).

To address this study, whose main object was to analyse the gender perspective of household food insecurity in South Eastern region of Zomba (Malawi), this study follows the paradigm of post-positivism, which has the same theoretical assumption as that of positivism described in Section 4.3 of this study. This study also follows the set philosophical elements under post-positivism as also addressed by Guba and Lincoln (1994), Creswell (2009), and Easton (2010) as follows:

- Epistemology aspect that the results obtained are true and unbiased;
- Ontology aspect of the study was based on the fact that there is one reality or truth to a phenomenon which the study tried to establish; and
- Methodology aspect of the study was based on measurement and controlled investigation.

4.4 DELIMITATION OF THE STUDY

This main aim of the study was to analyse the gender perspective on household food insecurity in the south eastern region of Malawi. In line with the main objective, the following empirical objectives were formulated;

- Assess and compare the food security status in female and male-headed households;
- Identify the level of food insecurity between rural and urban households;
- Identify the coping strategies for food insecure male and female-headed households, both in the rural and urban areas;

- Determine the vulnerability of households towards food insecurity; and
- Assess the underlying determinants of food insecurity in female and male-headed household for rural and urban areas.

4.5 SAMPLING PROCESS

Having identified the empirical research objectives for the study, this section defines the sampling process or procedures to be followed. Gilbert and Churchill (1996:477), and Kerlinger and Lee (2000:164) defines sampling procedure as a process of selecting a smaller number of units from an entire population of interest, or having particular characteristics of a total population. Raj (1968), and Salant and Dillman (1994) describes five main categories, which should be followed when identifying a research process that are interwoven hence cannot be used in isolation:

- Defining the target population;
- Identification of the sampling frame;
- Selection of the sampling techniques;
- Determining the sample size; and
- Data collection from the designed elements.

4.5.1 Target population

The first step in the sampling process is to define the target population. Malhotra (2010:372) defines the target population as the collection of elements that possess the information pursued by the researcher and about which inferences are to be made. In this regard, the target population is a very important component in research as it helps the researcher to determine whether if sampled cases are eligible or ineligible for the survey. In this study, the target population are male and female headed households from the south eastern region of Malawi.

4.5.2 Sampling frame

A sampling frame is another important element when conducting a research. It comprises of a list of all the elements in the population from which the sample is drawn

(Remler *et al*, 2011). The sampling frame for this study was replicated from IHS3 report. Households to be interviewed were selected from enumerators areas (EAs) (the smallest operational area established for the census with well-defined boundaries, corresponding to the workload of one census enumerator) established by NSO in the 2008 census. Due to financial constraints the study did not manage to replicate fully all the EAs as per IHS3 but rather sampled households were selected randomly from the EAs by the supervisor of the survey. In the urban areas Households were randomly selected and counted where by every fourth house was selected. Upon instances where household members were not available for an interview, a next pre-selected household was used and later another additional household was selected.

4.5.3 Sampling techniques

After identifying the target population and sampling frame, the third step in sampling process is to identify the sampling techniques to be followed. Gilbert and Churchill, (1996:479) defines this process as the method used in selecting the sample units. In other words, it is the process of selecting a number of individuals for a study in such a way that the individuals selected represent the large group from which they were selected. Several types of sampling techniques exist but only two are the general approaches to sampling used in social science research, namely the random (probability) sampling and non-probability sampling (Cochran 1977; Zikmund, 2000:65).

- **Probability sampling**

Is a type of sampling in which all elements (persons, households) in the population have some opportunity of being included in the sample, and the mathematical probability that any one of them will be selected can be calculated. Examples of this type of sampling are simple random sampling, systemic sampling, stratified sampling, and cluster sampling.

- **Non-probability sampling**

In contrast, non-probability sampling depends on subjective judgement where the population elements are selected on the basis of their availability or because of the

researcher's personal judgment that they are representative. As probabilities cannot be assigned to the units objectively, it becomes difficult to determine the reliability of the sample and the results in terms of probability. As explained earlier, this study adopts a random sampling technique where the enumerators would simply walk in the selected EAs defined by NSO and select households randomly until the required number of households required by the study was reached.

4.5.4 Sample size

As discussed in chapter one, sample size basically refers to the number of elements to be included in the study. Neuman (2003:232) highlights the fact that matters to deal with sample size depends on the population whereby if the population is large that means the population sample should be small and if it is small the sample should be large. However, Huysamen (1993:50) contends that the sample size can also be influenced by the relative homogeneity or heterogeneity of the population, as well as the desired degree of reliability for the purposes of the investigation. Grinnel and Williams (1990:127) and Gujarati (2004) argues that, for statistical purposes, especially when one wants to apply the central limit theory, any sample of 30 and above is considered big enough to perform basic statistical procedures. Due to financial constraints this study employed a sample size of 550 from both rural and urban areas which is statistically accepted but also a similar sample range was analysed by Case and Deaton (2009), Sekhampu and Dubihlela (2012) and Tchereni *et al* (2013). The distribution between rural and urban areas was divided into half.

4.5.5 Data collection process

The final step in the sampling process is to determine the data collection process. Creswell (2009:161) defines data collection as a process of gathering and measuring information on the required variables in an established systematic fashion, which then enables one to answer relevant questions and evaluate outcomes. In this case, the data collecting process is regarded as an important step in research whereby if not well administered, may result in false or bias findings. Hox and Boeije (2005:593) describe

two main procedures of data collection, which are primary and secondary data collection methods. The primary method deals with collecting data from sources which can be collected either through a questionnaire, open ended interviews, focus group discussions or observations. Secondary data deals with data that was previously collected by other users for other purpose which is usually sourced from archived books, journals, internet sources and reports.

In this study, both primary and secondary data was used. Primary data was the main source of data for this study, where a questionnaire was used to obtain information related to this study from randomly selected households. Six enumerators and one supervisor were employed and properly trained on how to conduct the research. A questionnaire with a set of questions was employed, to conduct structured face-to-face interviews with participants in their own households by the field workers. The supervisor was there to guide the enumerators. For respondents who could not converse in English, enumerators translated for them in their vernacular. Where the respondents were able to read and write themselves the questionnaire was given to them to fill in. Secondary data sources were employed for the literature chapter.

4.5.6 Conclusion on sampling process

The study has so far explained the sampling process employed in this study, a conclusion drawn from this section is as follows. The study's main aim was analyse a gender based food security status of households in the South eastern region of Malawi. To achieve this, the study collected Data from South eastern region of Malawi. The decision of using primary data collected by the researcher was based on problems related to existing data for example the IHS3 data which was the only data closer to the objectives of study was too old to be used. The other reason was that it did not have all the technicalities required by this study such as information on Household Dietary diversity and the Household Coping strategies.

The selection of data size and sample was replicated from one developed by NSO in the 2008 census, but due to financial constraints the study did not manage to employ all

the enumerator areas specified but rather houses were randomly picked by the research supervisor through walk-ins and selected every fourth house until the desired number was reached. A sample size of 550 households from both rural and urban areas was employed, which is statistically accepted but also a similar sample range was analysed by Case and Deaton (2009), Sekhampu and Dubihlela (2012) and Tchereni *et al* (2013). The distribution between rural and urban areas was divided into half. A random selection of households was employed where every fourth house selected in the already designated EAs was administered for the survey.

4.6 QUESTIONNAIRE

The questionnaire design was adopted and adapted to one similarly used by Grobler (2014) who has done much research on different topics relating to food security in South Africa using the same format of questionnaire. Very few questions were changed to best suit the study country (Malawi). The questionnaire for this study has ten main components, referred to in Annexure 1. The first three components dealt with the background information of households, explaining the households socio-economic and demographic characteristics, such as gender distribution, household size, household structure, education attainment, employment status, marital status of household and income (in form of wages and salaries for whole household). The third section described the household expenditure patterns. In this section respondents were asked to describe how much they spent in every month using a guideline of general expenditure items such as housing, water, food, clothing, energy, clothing, medical expenses and many more. The fourth section had questions dealing with food expenditures for the household. Specific guidelines were given on types of food common to Malawi.

Sections five, six and seven were concerned with the three different food security indicators adapted by the study namely Household food insecurity access scale (HFIAS), the Household Dietary Diversity Score (HDDS) and the Coping Strategy Index (CSI). A proper discussion of these indicators is discussed in detail in the subsequent sections. Section eight dealt with questions on the perceptions of poverty and section nine had questions that dealt with the Lived Poverty Index, which is another measure of

food security. The last section had questions that dealt with land issues since land is the most prominent issue as far as food security is concerned especially in Malawi where most people depend on subsistence farming. The sequence and wording of the questions were set in simple form, making it easier for the enumerators to be able to explain to the respondents when asking the questions, as well as the respondents to answer them. In general, close-ended questions were used in the questionnaire in order to simplify the data analysis and interpretation process.

In order to avoid errors in data collection, pilot testing was conducted before commencement of the main survey. A pilot study was conducted in selected sections of this study by conducting interviews using a small sample to determine whether the data collection plan for the main study followed an appropriate procedure. The researcher was able to observe some of the reactions made by the participants, and noticed some of the problems that respondents came across. The proper procedure was followed by eliminating some ambiguous questions and clarifying those that needed clarity. Some questions that were not relevant to the study were eliminated.

4.7 ETHICAL CONSIDERATION

De Vos *et al* (2011:114) defines the term ethics as a set of widely accepted moral principles suggested by individuals or a group of people, which offers ethical rules and behaviours expectations to be followed about the most correct conduct in research. This study acknowledges the fact that consent to participate in research must be voluntary and based on sufficient information and adequate understanding of both the proposed research and the implications of participation in it. Since primary data was sourced, ethical considerations needed to be adhered to. The research was conducted with fairness and justice by eliminating all potential risks. Ethical issues observed in a study included informed consent, right to anonymity and confidentiality, right to privacy, justice, beneficence and respect for persons.

Furthermore, after questionnaire compilation, the document was sent for approval at the North West University, Social and technological sciences research ethics committee,

faculty of economics and information technology–Vaal campus of which authorisation was granted to carry on with the survey. The study was given the following ethics clearance number: ECONIT-2016-104, Permission was also acquired from the district commissioner of the selected study areas in Malawi.

4.8 STATISTICAL ANALYSIS

The main aim of the study was to analyse the household food insecurity in the south eastern region of Malawi focusing on the gender dynamics. In order to achieve the main objective of the study, several empirical objectives were formulated as stated in chapter one. To analyse the stated empirical objective, as well as the main objective, a statistical analysis software package (SPSS) was used as the main tool of data analysis. The results were then presented in a form of charts, tables and diagrams. The general layout of the analysis was presented in line with the set objectives.

The first section of the results were presented in two parts: the first part described the general overview of the demographics of the study, detailing the numbers or percentages of household size, gender of head of household, employment status, marital status, literacy levels; the second part presented the economic status for the sampled area in terms of their income and the sources. The second section presents results from the first, second and third objectives, in which the study highlights the three core measures of food security status (Household Food Insecurity Access Scale, Coping Strategy Index and Household Dietary Diversity Score) employed in the study. In this section, the study employs cross tabulations, descriptive analysis and correlations to analyse the mentioned objectives. The last section of the study employed two regressions, a multinomial logistic regression and a multiple linear regression, to answer objectives four and five. The selected measures of food insecurity status for the study as well as the model for the regressions used for the study are discussed in detail in the next section.

4.8.1 METHODS OF MEASURING OF FOOD INSECURITY FOR THE STUDY

As discussed in chapter one and two that food security is multidimensional concept which incorporates four dimensions of food security. As such it has been very difficult for scholars to come up with one composite measure that incorporates all the dimensions (Maxwell & Coates 2012; FAO 2013b; Nathalie 2012). Some scholars have previously tried to develop composite measures for food security, for example the Rose-Charlton's composite measure developed in South Africa (Rose & Charlton 2002), the food insecurity multidimensional index (FIMI) (Napoli, 2012) and also the Global Hunger Index (International Food Policy Research Institute (IFPRI) 2013). Ike (2015) describes some of the mentioned composite measures (example IFPRI) to have other components which focuses on national level indicators like income, poverty, undernourishment, food production, and micro or macro nutrient data. While the use of composite measures can enable a broader understanding of food security, its measurement still remains a challenge.

In addition to capturing the psychological undertone of, and societal influences on, food security (anxiety, preference, experiences), the HFIAS is a valid indicator of availability, access, and stability of food in the household over a period, e.g. 30 days. The CSI equally captures the three dimensions, but in a more dynamic manner as it looks at how food was sourced and how any shortfalls were managed, giving insight to human behaviour towards lack of food, which might help us understand the ripple effects of food insecurity on the society and ecology. The DDS focuses more on the quality aspect of food and better captures the utilisation dimension than the other two. It is also static in nature as it measures the situation over the past 24 hours, but is very helpful in identifying the actual food consumption out of the available and accessed food, which is very important in determining the nutritional state of the household. Using the recommended different time frames for the three indicators improves their ability to provide a more detailed picture of the stability of availability, access and utilisation of food over time.

Several other scholars (Jacobs, 2010; De Haen *et al*, 2011; Jones *et al*, 2013) have also opposed the usage of composite measures of food insecurity, like De Haen *et al*. (2011), reflects the composite measures to be more dependent on indirect food security measures but also the fact that they neglect the problem of reflecting differences in access across a population. While Jacobs (2010) argued that composite measures have a shortfall of lacking the fine inter- and intra-household food security details and that it will always be limited by the choice of and weight given to component indicators. Jones *et al*. (2013) contends that composite indicators are mostly developed with a focus of food nutrition (for example the Global Hunger Index) and are limited by the fact that nutritional outcomes are not solely determined by food access, but also factors like healthcare and sanitation.

Due to the ongoing difficulties in developing composite indicators, researchers have in most cases isolated one measure to predict the food security status which has also its own implications due to what has been discussed so far. Other studies have also tried to combine well-validated food security indicators that measure different dimensions of food security (D'Haese, 2011; Nathalie, 2012 & Maxwell *et al*. 2013). Following (Napoli *et al*. 2011; Maxwell & Coates 2012; Headey & Ecker 2012; FAO 2013b) suggested that the most comprehensive measurement of food security can be achieved by the usage of more than one indicator which captures separately the major dimensions of food security.

This study, therefore, adopts three measures of food insecurity also referred to as the fourth generation indicators namely, Household Food Insecurity Access Scale (HFIAS), Coping Strategy Index (CSI) and the Household Dietary Diversity Score (HDDS). The selection of the three indicators was based on the fact that they have been validated and met most of the validity and equivalence test criteria of universal food security measures and also because they are the most widely used and validated indicators of food security (Maxwell & Coates 2012). Another selection criteria is based on what was discussed in chapter one of this study, that these three measures best suits the focus of

the study. As such, the study adopts three measures of food insecurity (HFIAS, HDDS and CSI).

The study employs the mentioned measures so as to be able to capture all aspects in terms of food insecurity status. As discussed in chapter two, some of the measures have shortfalls, which hinders the ability to accurately measure the food security status. For example, the HFIAS, even though it is regarded as a good standard measure of food insecurity, mainly dwells on food consumption, in that case other components are omitted for example the vulnerability to food insecurity is not measured by the scale (Maxwell, 1996). That is why the other measures such as CSI and HDDS have also been adopted. Maxwell and Cadwell (2008) indicates that CSI takes into consideration the behaviour of households in future context hence helps in identifying vulnerable households. The HDDS was also employed to capture the food security status of households in terms of their dietary intake, this is because a household may be regarded as food secure using the other measures when yet not having a balanced diet which may lead to other problems. The discussion on the chosen measures for food security of the study is as follows;

4.8.1.1 Household Food Insecurity Access Scale (HFIAS)

The HFIAS was selected as the first indicator to access the positioning of households in terms of food security status in the selected districts of the south eastern region of Malawi. As discussed in chapter two, HFIAS is a measure of food insecurity that was established by United States Agency for international development (USAID) under the project of Food and Nutritional Technical Assistance (FANTA). The HFIAS has nine questions related to food security status (scale) which includes measuring anxiety about food supply, quality of food consumed, quantity of food and experiences of sleeping hungry or going all day and night without eating (Deitchler *et al*, 2010). The questions are divided into three main food insecurity (access) domains, which were established as a common feature to most cultures examined cross-culturally (FANTA 2004, Coates, 2004). The nine questions included in the HFIAS are as follows:

The first part asks questions related to anxiety and uncertainty about the household food supply such as;

- *Did you worry that your household would not have enough food?*

The second part asks questions related to sufficiency and quality of food (includes variety and preferences of the type of food):

- *Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?*
- *Did you or any household member have to eat a limited variety of foods due to a lack of resources?*
- *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?*

The third part asks questions related to food intake and its physical consequences such as:

- *Did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?*
- *Did you or any household member have to eat fewer meals in a day because there was not enough food?*
- *Was there ever no food to eat of any kind in your household because of a lack of resources to get food?*
- *Did you or any household member go to sleep at night hungry because there was not enough food?*
- *Did you or any household member go a whole day and night without eating anything because there was not enough food?*

Using the nine frequency-of-occurrence questions of HFIAS, respondents were requested to answer yes or no to the questions, if a positive answer was given respondents were supposed to indicate how often it occurred using the following responses rarely, sometimes or often. Coates *et al*, (2007) describes the HFIAS as a module that can be used to produce four types of indicators that can help to understand the characteristics of and changes in household food insecurity (access) in the surveyed population as follows:

- Household Food Insecurity Access Scale Score;
- Household Food Insecurity Access Prevalence;
- Household Food Insecurity Access-related Conditions; and
- Household Food Insecurity Access-related Domains.

This study mainly focuses on the first two mentioned indicators, the HFIAS score and HFIAP, which were calculated based on the HFIAS Indicator Guide by Coates *et al* (2007).

1. Household Food Insecurity Access Scale Score

To calculate the HFIAS score, (continuous measure of the degree of food insecurity (access) in the household for the past four weeks ‘30 days’) the study coded all answers given to the frequency-of-occurrence to all nine questions, where no was given as an answer a code of 0 was assigned, (i.e., if Q1=0 then Q1a=0, if Q2=0 then Q2a =0, etc.). Households, who responded yes, were then scored as follows: 1 for rarely, 2 for sometimes’ and 3 for often. As indicated in the guide mentioned, the maximum score for a household is 27 (that is if a household response to all nine frequency-of-occurrence questions 1-9 was “often”, coded with response code of 3); the minimum score is 0 (that is if a household responded “no” to all frequency-of-occurrence questions). After all nine questions were assigned a code, the HFIAS score variable was then calculated by adding all of the frequency-of-occurrence during the past four weeks for the nine food insecurity-related conditions as follows;

Sum frequency-of-occurrence question response code

$$(Q1a + Q2a + Q3a + Q4a + Q5a + Q6a + Q7a + Q8a + Q9a)$$

To distinguish between the food secure and food insecure households, all households that had a higher score were determined as the most food insecure. Households with a lower score were identified as less food insecure (Coates *et al*, 2007). The study further developed an index using SPSS by summing up all responses.

2. Household Food Insecurity Access Prevalence

Coates *et al.* (2007:19) describes the HFIAP an indicator, which classifies households into four categories of household food insecurity (access), namely, food secure (1st category), and mildly food insecure (2nd category), moderately food insecure (3rd category) and severely food insecure (4th category). Households are categorised as increasingly food insecure as they respond affirmatively to more severe conditions and/or experience those conditions more frequently. A food secure household experiences none of the food insecurity (access) conditions, or just experiences worry, but rarely. A mildly food insecure (access) household worries about not having enough food sometimes or often, and/or is unable to eat preferred foods, and/or eats a more monotonous diet than desired and/or some foods considered undesirable, but only rarely. It does not cut back on quantity nor experience any of three most severe conditions (running out of food, going to bed hungry, or going a whole day and night without eating). A moderately food insecure household sacrifices quality more frequently by eating a monotonous diet or undesirable foods sometimes or often, and/or has started to cut back on quantity by reducing the size of meals or number of meals, rarely or sometimes. It does not experience any of the three most severe conditions. A severely food insecure household has graduated to cutting back on meal size or number of meals often, and/or experiences any of the three most severe conditions (running out of food, going to bed hungry, or going a whole day and night without eating), even as infrequently as rarely. In other words, any household that experiences one of these three conditions even once in the last four weeks (30 days) is considered severely food insecure.

To calculate the HFIAP, the study firstly gave specific codes to all the nine questions, and then the HFIA category was calculated for each household by assigning a code for the food insecurity (access) category in which it fell using the following formulas:

HFIA category = 1 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]

HFIA category = 2 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]

HFIA category = 3 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]

HFIA category = 4 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]

With the help of the formulas indicated above, the study further built a model in Microsoft Office Excel using IF statements and calculated the Household Food Insecurity Access categories for each household as follows, 1 = Food Secure, 2=Mildly Food Insecure Access, 3=Moderately Food Insecure Access, 4=Severely Food Insecure Access. Further the study calculated the prevalence of different levels of household food insecurity (access) using the following formula:

Number of households with HFIA category =(1,2,3,4) x 100

Total number of households with a HFIA category

Finally, the results obtained from the mentioned formulas distinguished the households into their respective category of the four food insecurity access class they belonged to.

4.8.1.2 Household Dietary Diversity Score (HDDS)

The HDDS is the second indicator adopted by the study to determine the food security status of households in the selected area of study. As previously explained in chapter 2, the HDDS was developed by the FANTA project of the FAO with an aim to focus on the nutritional aspect of food security (Swindale & Bilinsky 2006). A HDDS can be described as the number of food groups consumed by a household over a given reference period (usually 24 hour) the results obtained helps to determine the access of food at household level and also the nutrition adequacy at individual level (Kennedy *et al.* 2010). Mainly because a more diversified household (food secure) diet is positively correlated with caloric and protein adequacy, percentage of protein from animal

sources, and household income (Swindale & Bilinsky, 2006). The HDDS can therefore be used to measure food security status through the nutritional state of the respondents or area, as the diversity of food has been found to correlate well with nutritional status (FAO 2010). The HDDS has also been proven to be a good proxy indicator of food security because:

- It is highly correlated with factors such as household income and protein, micro nutrient and calorie adequacy;
- It recognises the existence of hidden hunger, which stems from micronutrient deficiency;
- It is applicable to both household and intra household level; and
- The indicator is relatively simple to understand for both field workers and respondents. It takes about ten minutes per household to collect the data (Swindale & Bilinsky 2006).

To determine the HDDS, data was then collected on household dietary diversity using a dietary diversity questionnaire implemented by FAO (2006), which contains 12 questions on food group intake for the past 24 hours as follows; 1. Cereals, 2. Root and tubers, 3. Vegetables, 4. Fruits, 5. Meat, poultry, offal 6. Eggs, 7. Fish and seafood, 8. Pulses/legumes/nuts, 9. Milk and milk products, 10. Oil/fats, 11. Sugar/honey and 12. Miscellaneous. The food groups used in the study to construct the HDDS were adjusted to suit food items commonly consumed in Malawi.

To calculate the HDDS, respondents were then asked to answer “yes” if they consumed the type of food group in the past 24 hours and “no” if they did not. The responses were then coded as follows: “Yes” was assigned a score of (1) to each food group if the household consumed at least one food item from a particular food group for the past 24hours preceding the survey. “No” was assigned (0) score for a particular food group if the household did not consume any food item from that food group. Finally, to calculate the HDDS, the number of each food group consumed at the household, which value varies among 0 and 12 were summed up, the results found was the score for the household. The higher the diversity score the more diversified the household, and thus, food secure (Swindale & Bilinsky, 2006). In this regard, the study generated a three

categorical variable to access how diversified a household is as follows, household which consume between 1 to 4 food groups falls in the first category of Low dietary diversity, those between 5 to 8 food groups in the second category as Medium dietary diversity and those between 9 to 12 food groups in the third category as High dietary diversity (highly food secure). Lastly, the average household dietary diversity score for the population of study was calculated as follows;

Average HDDS = Sum (HDDS)/Total number of households surveyed.

4.8.1.3 Coping strategy index (CSI)

The CSI is the third tool adopted by the study to determine the food security status of households in the study area. A recap to the discussion on CSI in chapter two: the CSI was described as an indicator which identifies and measures the behaviour of the food insecure when confronted with food shortages. It also serves as a pointer in characterising on how vulnerable households relate to their environment in search of food, the trade-offs between the quality and quantity of food and other livelihood assets.

Maxwell *et al.* (2003), Maxwell and Frankenberger (1992), and Maxwell (1996) describes the underlying principle behind the CSI as to how food insecure households adjust their behaviour in the face of lack or perceived lack of food to ensure food security now and in the perceivable future based on their best judgement of the situation. Researchers have identified two main coping strategies which households employ when confronted with the problem of food insecurity first one is the immediate and short-term alteration of consumption patterns. The other includes the longer-term alteration of income earning or food production patterns and one-off responses such as asset sales. While it is important to understand longer-term livelihood strategies in an emergency, research has shown that the management of short-term consumption strategies is an accurate indicator of acute food security (Coates *et al.* 2006; Bickel *et al.*, 2000; Maxwell *et al.*, 1999).

There are several short term coping strategies that have been identified in research such as rationing consumption, altering food consumption, reliance on wild food and

sale of assets and many more (Frankenberg, 1992; Davies 1993). This study adopts the consumption coping strategies suggested by Maxwell and Caldwell (2008) which are divided into four types as follows:

- Changing their diet from expensive or more preferred foods to less preferred ones;
- Using strategies that are not sustainable over a long period to increase short-term food supply;
- Reducing the number of people they have to feed; and
- Managing the shortfall by limiting the quantity of food and the consumption intervals (Maxwell *et al.*, 2003; Maxwell & Caldwell 2008).

Based on Maxwell and Caldwell (2008) findings, the assumption behind the consumption CSI is to measure the frequency (how often is the coping strategy used) on how household employ coping strategies when confronted with food shortages, but also the severity of the strategies. After which the information is then combined in a single score which is called the Coping Strategy Index, which is then used as an indicator of the household's food security status.

Maxwell *et al.* (2008) contends that the CSI is a comparative tool rather than an absolute measure of food insecurity which is unlike the HFIAS and the HDDS in that case a CSI score cannot be used alone as a tool for food security assessment because each CSI indicator is specific to its context, hence there is no designated cut-off point in a CSI scale as to which level a household would be considered "food secure" and to when it would be considered "food insecure." It can be used in cross-sectional analysis to determine which households are better off and which are worse off (Maxwell & Caldwell, 2008). The CSI was chosen in the study to help identify the frequency and the importance of different coping strategies used by the food insecure male and female headed households but also to identify the number of households vulnerable to food insecurity.

As stated earlier, the other important component which the CSI captures is that of vulnerability towards food insecurity. Deveraux (2002) defines vulnerability as the degree of exposure and sensitivity to livelihood shocks which is based on a future

oriented occurrence. Christaensen and Boisvert (2000) contends that, it is possible to capture the vulnerability of households towards food insecurity by using the coping strategies employed, because in most cases households do not wait until an outright shortfall of food to dwell on them before they begin to change their behaviours, therefore in coping strategies do not only reflect current status, they also reflect the best judgment of household decision makers about the foreseeable future thereby giving the measurement of coping strategies used some predictive ability too.

The study thus adopts the CSI to determine vulnerability, resilience and sustainability of household in the study area. The study collected data using the 15 set of questions for CSI asking respondents on what coping strategies they employed and how many times during the past 30 days prior to the survey day when they did not have food to eat. The CSI questions employed in the study are depicted in Table 4.1 as proposed by Maxwell and Caldwell (2008), which are categorised in four different groups.

Table 4.1 list of coping strategies

No.	Coping strategy
1	Dietary change
	a) Relying on less preferred/inexpensive food
2	Increase short-term household food availability
	b) borrowing food
	c) Purchase food on credit
	d) gather wild food
	e) consume seed stock held for the next season
	f) Rely on help from relatives or friends
3	Decrease numbers of people
	g) Send household members to eat elsewhere
	h) Beg for food from neighbours or relatives
4	Rationing strategies
	i) limiting portion size at meal times
	j) restricting adult consumption in favour of small children
	k) reduce the number of meals eaten in a day
	l) skip entire days without eating
	m) Feed working members
	n) Ration money to buy street food
***	o) Maintain food garden

To create the CSI as well as derive the CSI score, the study firstly quantified how frequently during the last 30 days households had resorted to using each strategy. The study recorded the following: as scores for survival strategies indicated by the household, the days indicated on the questionnaire were between zero to seven days, which were divided into the following-daily, 3 to 6 days in a week, 1 to 2 days in a week, not more than once a week, and never. For all those who indicated daily, the study recorded it as seven days, strategy employed for 3 to 6 days in week the study recorded it as 3.5, strategy used for 1 to 2 days in a week was recorded as 2, strategy used at least once a week was recorded as 1 and lastly if the strategy was not used ever in a week it was recorded as zero.

The recorded data was then loaded into SPSS for further analysis. To access the frequency of usage of the coping strategy by households, the study analysed the means scores of each coping strategies in the whole week for the study which were later divided between gender and location so as to access which households employed more coping strategies. To determine vulnerability towards food insecurity the study adopts the strategy used by Mjonono (2008). The next section details the models employed in the study to for regression analysis.

4.8.2 Model specification

To answer objectives three and four, which was to determine the vulnerability of food insecure households, the study employed a multiple linear regression and for the fourth objective which was to analyse the underlying determinants and causes of the prevalence of food insecurity in female and male-headed household for rural and urban areas the study employed a multinomial logistic regression. The two regressions are defined as follows.

4.8.2.1 Regression model one (multiple linear regression)

As indicated in the preceding section, the first regression employed in the study is a multiple linear regression, which is used to determine the vulnerability of households

towards food insecurity. Field (2009) describes a multiple regression as an extension of simple linear regression which is used to predict the value of a dependent variable (also known as an outcome variable) which should be a continuous variable based on the value of two or more independent variables (also known as predictor variables). Proposed by Maxwell *et al* (2003). The study adopts the concept employed by Mjonono (2008), who used the CSI as a proxy of food insecurity at household level. Similarly, Maxwell *et al.* (2003) describes coping strategies as a valid proxy for food insecurity at household level. To determine vulnerability towards food insecurity, this study, therefore, employs frequency of coping strategies as a proxy for food insecurity at household level. Where the coping strategy index was employed as the dependent variable and the different socio-economic determinants that may increase or decrease the use of coping strategies were used as independent variable. The formulation of the regression was indicated as follows:

The linear regression model is fomulated as follows:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots + \beta_n X_{ni} + \varepsilon_i \dots \dots \dots 1$$

Where Y is the outcome variable, β_1 is the coefficient of the first predictor (X_1), β_2 is the coefficient of the second predictor (X_2), β_n is the coefficient of the nth predictor (X_n) and ε_i is the difference between the predicted and the observed value of Y for the ith participation Field (2009). Applying the discussed model, the regression for the study will be as follows,

$$CSI_i = \beta_0 + \beta_1 \text{Gender household}_i + \beta_2 \text{household size}_i + \beta_3 \text{location}_i + \beta_4 \text{age household head}_i + \beta_5 \text{Marital statusHead}_i + \beta_6 \text{Employment statusHead}_i + \beta_7 \text{logincome}_i + \varepsilon_i$$

Where, CSI is the continuous dependent variable containing all coping strategies employed in the study which is used to predict the vulnerability of a household towards food insecurity.

$$\beta_0 \rightarrow \text{is the intercept term of the regression}$$

$\varepsilon_i \rightarrow$ is the error term of the regression

$\beta_{1,2,\dots,n} \rightarrow$ are the coefficients corresponding to independent variables $X_{1,2,\dots,n}$

All independent variable which have categorical values will be entered as dummy variables, where the number of dummies will be $n-1$; n being the number of categories. So where there are three categories, two dummies will be created and, in that case, the third dummy becomes the benchmark or the reference point. The independent variables are gender of household head, household size, location of household, employment status and income of household. These are discussed.

Gender household: Gender household head is the first independent variable which is categorical hence a dummy variable was created which was defined as 0 for males and 1 for females.

Household size: Household size is the number of people in each household at the time the survey was conducted.

Location: Location, which is also described as place of stay, is also a categorical variable separating the urban and rural households hence a dummy variable was created which was defined as 0 for rural households and 1 for urban households.

Employment status: Employment status was inputted as a categorical variable hence a dummy variable was created separating the employed from the unemployed which was defined as 1 for employed and 0 for unemployed

Income household: Income of household is the total of monthly income received in a household, income was converted to natural logs in order to have a workable scale as the other variables used in the model are not in thousands. This implies that the regression model will have a semi log in the results being that the dependent variable was not converted to logs

Before drawing a conclusion for the regression analysis several assumptions were checked such as fitness of the model where the R and R² were observed. Collinearity diagnostic was also checked where the variance inflation factor (VIF) and the tolerance were observed. Myers (1990) describes a VIF of less than 10 and a tolerance level of greater than 0.1 to be a good gesture of no multicollinearity. Anova test was also done, which indicates whether the model is a significant fit of the data which can be analysed by the significance levels (Field, 2009).

4.8.2.2 Regression model two (multinomial logistic regression)

The second regression addresses the fourth objective, which was to analyse the underlying determinants and causes of food insecurity in female and male headed household for rural and urban areas. To achieve this, the study employed a Multinomial (polytomous) logistic regression (MLR). Schwab, (2002) and Friedman (2010) describes a multinomial logistic regression as a model, which is an extension of the binomial logistic regression model, but unlike a binary logistic regression, a multinomial logistic regression has a categorical dependent variable with more than two nominal or unordered categories. Like binary logistic regression, multinomial logistic regression uses maximum likelihood estimation to evaluate the probability of categorical membership. The other benefits of a multinomial logistic regression worth noting is the fact that with most multivariate analysis requires the basic assumptions of normality and continuous data, involving independent and dependent variables, while in this case that assumption is not a necessity. Tabanick *et al* (2001) contends that with a multinomial logistic regression technique the assumptions are different in a way that (i) it is more robust to violations of assumptions of multi-variate normality and equal variance and co-variance matrices across groups, (ii) an easily interpretable diagnostic statistic, (iii) most importantly, MLR does not assume a linear relationship between the dependent and independent variables, (iv) independent variables need not be interval, (v) MLR does not require that the independent variables be unbounded and lastly (vi) normally distributed error terms are not assumed.

In the analysis to follow, the dependent variable has four categories, which is food security status grouped as (1) food secure households, (2) mildly food insecure, (3) moderately food insecure (4) severely food insecure and the independent variables are the socio-economic determinants which some are categorical and others continuous which will be explained further later in the section. That being the case, the study can employ a multinomial logistic regression to analyse the set objective.

The regression model is stated as follows:

$$P_{ij} = \frac{\exp(\beta_j X_i)}{1 + \sum_{j=1}^4 \exp(\beta_j X_i)} \text{ For } j = 1, 2, 3, 4 \dots \dots \dots (1)$$

Where x_i is a vector of contextual socio-economic characteristics of the i th household, β_j is a vector of regression parameter estimates associated with alternative j . The coefficients of explanatory variables on the omitted or base category are assumed to be zero. The probability that a base category will be chosen is calculated as:

$$P_i = 1 | X_i = \frac{1}{1 + \sum_{j=1}^4 \exp(\beta_j X_i)} \dots \dots \dots (2)$$

The probabilities of the household being in the other three categories ($j = 2, 3$ or 4) can be estimated

$$P_i = (j = m | x_i) = \frac{\exp(\beta_j X_i)}{1 + \sum_{j=1}^4 \exp(\beta_j X_i)} \dots \dots \dots m > 1 \dots (3)$$

Finally the multinomial regression model to estimate the determinants and causes of food insecurity levels in the four categories or groups was specified as:

$$P_{ij} = \ln(P_j/P_i) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} \dots \dots \beta_n X_{ni} + \varepsilon_i \dots \dots \dots (4)$$

Where the parameters estimated P_{ij} is the probability of households falling into either of the four categories of food insecurity level which are:

- (1) Food secure;
- (2) Mildly food insecure;
- (3) Moderately food insecure; and
- (4) Severely food insecure.

B_0 is the intercept term

Subscript i denotes the i -th observation in the sample

The estimated coefficients do not directly indicate the effect of change in the corresponding explanatory variables on the probability (P) of the outcome occurring. Rather, the coefficients reflect the effect of individual explanatory variables on the odds ratio of the dependent variable (Menard, 1995; Schwab, 2002).

The other parameter are defined as follows:

$\beta_{1,2,\dots,n} \rightarrow$ are the coefficients corresponding to independent variables $X_{1,2,\dots,n}$

$\varepsilon_i \rightarrow$ is the error term of the regression

Applying the discussed model, the regression for objective number two will have all the variables of interest included as follows:

$$\begin{aligned} P_{ij} &= \ln(P_j/P_i) \\ &= \beta_0 + \beta_1 X_{HH/SIZE} + \beta_2 X_{NO.YRS.SCHL.H} + \beta_3 X_{LOGINC} + \beta_4 X_{AGE.HH.} + \beta_5 X_{LOC.} \\ &\quad + \beta_6 X_{GENDER.H/H} + \beta_7 X_{EMP.STATUS} \end{aligned}$$

β_1 - β_7 are the coefficients for the corresponding variables

The description of the independent variables which are assumed to influence household to fall into a specific level of food insecurity status are shown in Table 4.2.

Table 4.2: Description of explanatory variables in the regression model

No	Variables	Description
1	HH/SIZE	Household size
2	NO.YRS.SCH	Number of years schooling for household head
3	LOGINCO	Income Computed in log
4	AGE.H/H	Age of household head
5	LOC.	Location (0 rural, 1 urban)
6	GENDER	Gender of household. (0 = Male, 1 = Female).
7	E.STATUS	Employment status of household head (1 for employed and 0 for unemployed)

The study has previously described the categorical variable with levels of one to four, but one more important aspect worth noting in a multinomial regression is that when applying a multinomial regression, it estimates $k-1$ models, where k is the number of levels of the outcome variable. For example, in the case of this study, when there are four categories as explained above, the analysis will consist of three comparisons. Which means that the fourth category is selected as a baseline category. The form in which the comparisons take depends on how an analysis is specified. For example if the study selects category 1, 2, 3 it means the reference point will be category 4 (Field 2009).

In this study, severely food insecure was treated as the reference group and, therefore, the study estimated a model for food secure relative to severely food insecure, mildly food insecure relative to severely food insecure and a model for moderately food insecure relative to severely food insecure. Therefore, since the parameter estimates are relative to the reference group, the standard interpretation of the multinomial logit is that for a unit change in the predictor variable, the logit of outcome m relative to the referent group is expected to change by its respective parameter estimate (which is in log-odds units) given that the variables in the model are held constant. The results obtained from the second regression are presented in the next chapter.

After all assumptions are taken into consideration the study now presents results for the coefficients. Field (2009) indicates that the most prominent features to consider when interpreting a multiple regression are the coefficients which explains the relationship between the dependent variable and the independent variable, if a coefficient has a positive number it indicates a positive relationship and vice versa. The second feature is that of t test and the significance levels, whereby if the coefficient and the t values are associated with a p value that is significant at either 1 percent, 5 percent and or 10 percent level of significance, then the predictor is making a significant contribution to the model. The results obtained from the tests, as well as the results of the two regression models discussed in this section, are presented in chapter five of this study.

4.9 CONCLUSION

The chapter discussed in detail the methodology adopted in this study. The primary objective of the study was to conduct a gender based analysis of household food insecurity and the coping strategies employed by both rural and urban households in selected districts of the South Eastern Region of Malawi. Amongst the chapter outline, the chapter discussed the sampling process, where a random sampling technique for data collection was employed. A total of 550 questionnaires were used to collect data from both rural and urban households in the South Eastern region of Malawi.

The study employed both primary and secondary data methods. The secondary data were collected from reports and other internet sources and it was used for chapter one and two. The primary data was the main source of data and was collected using a questionnaire, of which later a quantitative research design method was adopted to analyse the study objectives. The questionnaire covered different aspects of household characteristics from demographics, socio-economic characteristics to indicators adopted by the study to measure food security at household level. The chapter illustrated how the three different indicators of food security would be used to measure household food insecurity. The first indicator adopted was the Household Food Insecurity Access scale

(HFIAS). This was used as the main measure of food security status, which would later distinguish households into four categories of food secure, mildly food insecure, moderately food insecure and severely food insecure categories. The second indicator adopted was the Household Dietary Diversity Score (HDDS). The chapter illustrated how the HDDS was used to measure the dietary/nutrition intake of individuals in the households which later translates to whether households are food secure or not. The last indicator adopted was the Coping Strategy Index, the study showed how the CSI will be used to determine the frequency of usage of coping strategies by households and later compare them between gender and location of households, but also be used to determine households vulnerability towards food insecurity.

Lastly, the chapter outlined the regression models employed by the study. In this regard, two regression models were illustrated the first was one that answered the third objective of the study which was to determine the vulnerability of food insecurity at household level. The chapter illustrated how a multiple linear regression model was adopted to analyse this objective. The chapter further illustrated the second regression model employed by the study which is a multinomial logistic regression explaining the underlying determinants and causes of food insecurity in female and male headed household for rural and urban areas. The next chapter addresses the results obtained from the regression as well as the main descriptive characteristics in the study.

CHAPTER 5: RESULTS AND INTERPRETATION OF GENDER GAPS IN FOOD INSECURITY

5.1 INTRODUCTION

In the previous chapter, the study presented an outline of the methodology adopted in this study. The questionnaire method of data collection was used in order to collect data on the variables that were used to analyse the gender gaps that exist in food security status in the south eastern region of Malawi. A total of 550 questionnaires were collected from the sample area, comprising both rural and urban areas. After data cleaning, only 501 questionnaires were relevant and the rest were scraped off due to diverse problems. This chapter, therefore, presents the results and then discusses the findings in detail.

The study set theoretical and empirical objectives. The theoretical objectives were answered in the literature review presented in Chapter two. The empirical objectives are answered in this chapter. The empirical objectives answered in this chapter are as follows:

- Assess and compare the food security status in female and male-headed households;
- Identify the level of food insecurity between rural and urban household;
- Identify the coping strategies for food insecure male and female-headed households both in the rural and urban areas;
- Determine the vulnerability of households towards food insecurity; and
- Assess the underlying determinants of food insecurity in female and male-headed household for rural and urban areas.

The presentation of the results is as follows: the first part discusses the descriptive statistics of the demographics and socio-economic factors of the study such as, household size, gender of household head, age of the head of household, marital status, household head education attainment, the household head income and other income of the household, number of people staying in the household permanently, and

education level of parents. After the presentation of the descriptive statistics, the results for the empirical objectives described are presented and discussed in detail.

5.2 DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

This section discusses the demographic characteristics of the sample. The section describes, in detail, the distribution of household size, gender of head of household, employment status, marital status, literacy levels, and cross tabulations distinguishing gender gaps.

5.2.1 Distribution of household size

Household size describes the number of people residing in each household at the time the survey was conducted. Table 5.1 shows results on the sampled population of 501 from the south eastern region of Malawi. On average, the household size was calculated at 5.1 people per household. The minimum was 1 and maximum was 17 people in a household. The study further analysed the household size in categories, which is shown in Section 5.2.2.

Table 5. 1 Descriptive statistics on number of people in a household

	Total number of HH	Minimum	Maximum	Mean	Std. Deviation
Number of people in the household	501	1	17	5.1	2.14

5.2.2 Household size in categories

Results indicated in Table 5.1 shows that there were 501 households interviewed with a range of between one to 17 people per household. After categorising the household size, Table 5.2 shows that, out of the 501 households, 23.2 percent of the households had a size of one to three people in the household, while 66 percent of the household has a size of four to seven. Lastly, 10.8 percent of the households had a size of eight and above people in the household. The statistics presented in the study indicates that

household sizes are similar to that presented in the IHS3 report (2013) for Malawi. The results from this survey, and those of the IHS3, show that, on average, the majority of the household fall in the four to seven member household.

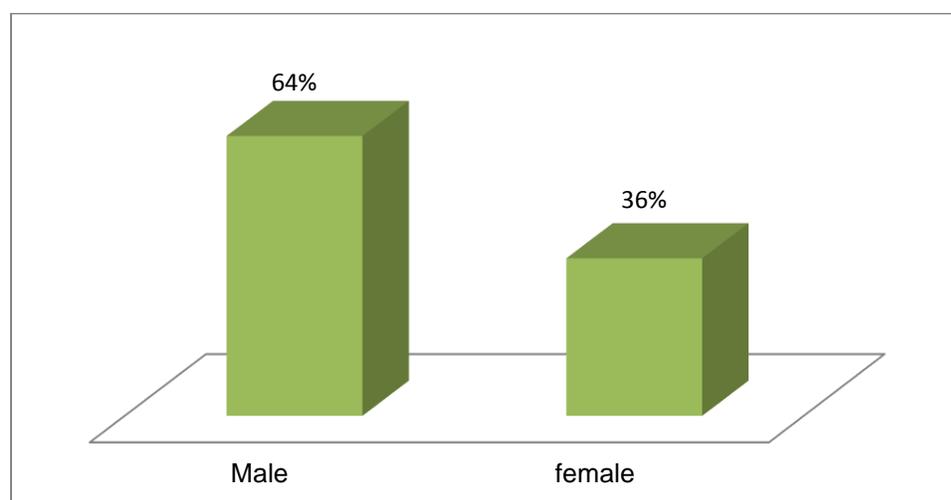
Table 5. 2 Household size in categories

Number of people in household	Frequency	Percent
1 to 3	116	23.2%
4 to 7	331	66%
8 and above	54	10.8%
Total	501	100%

5.2.3 Gender distribution of the head of household

Gender distribution describes the distribution between male and female-headed household in the sample. Figure 5.1 describes the gender distribution of the household head. It is clear from the figure that, out of the 501 households, 64 percent of them were headed by males, whereas 36 percent were headed by females.

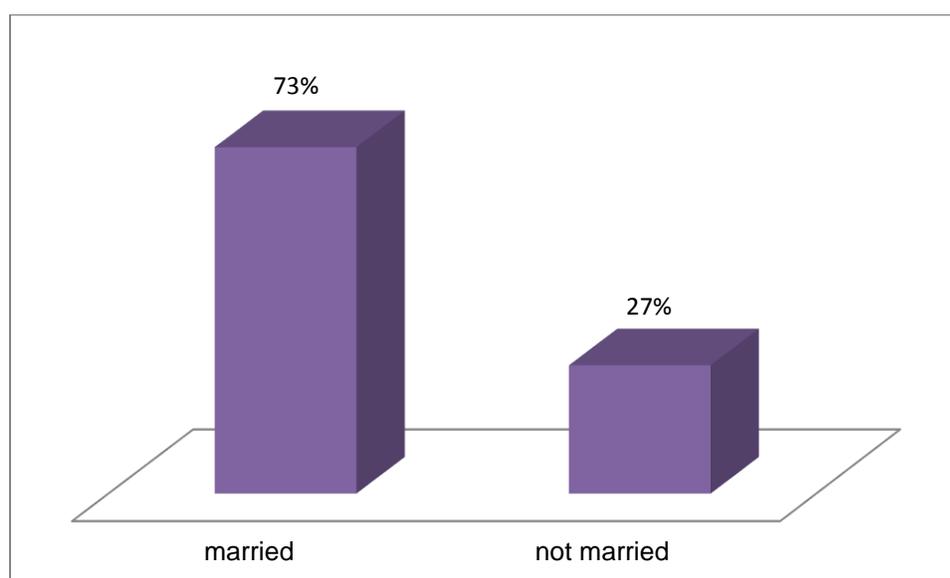
Figure 5. 1 Gender distribution of household head



5.2.4 Marital status of household head

The previous section looked at the gender of household head. This section goes further and describes the marital status of those household heads. The results are indicated in Figure 5.2, that 73 percent of the household heads were married, whereas 27 percent were not married. The statistics indicated are similar to the national marital status indicated in IHS3 (2013).

Figure 5. 2 Distribution of marital status of household head



When the marital status of household head is compared between the rural and urban households, Figure 5.3 indicates that 80 percent of the urban households were married, and 20 percent were not married, whereas 65.6 percent of the rural households were married and 34.40 percent were not. The statistics indicate that most of the urban dwellers were married.

Figure 5.3 Distribution of marital status by location

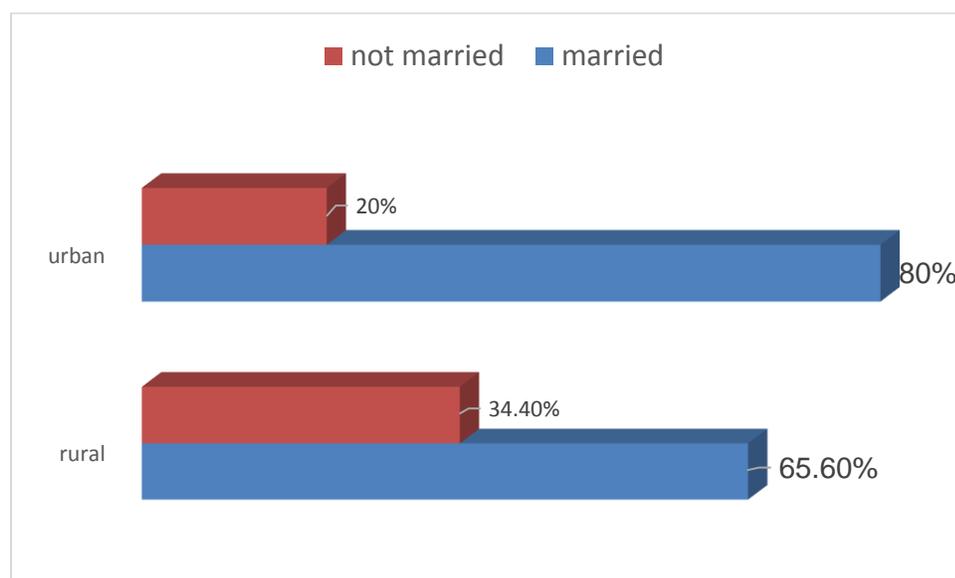


Table 5.3 presents the cross tabulation results of marital status of household head by their gender. It shows that, from the total of 501 households, 323 were headed by males, and out of those, 98 percent were married and only 2 percent were not married. The other 178 households were headed by females. From this, 26 percent were married women, while 74 percent were not married

Table 5.3 Marital status of household head by gender

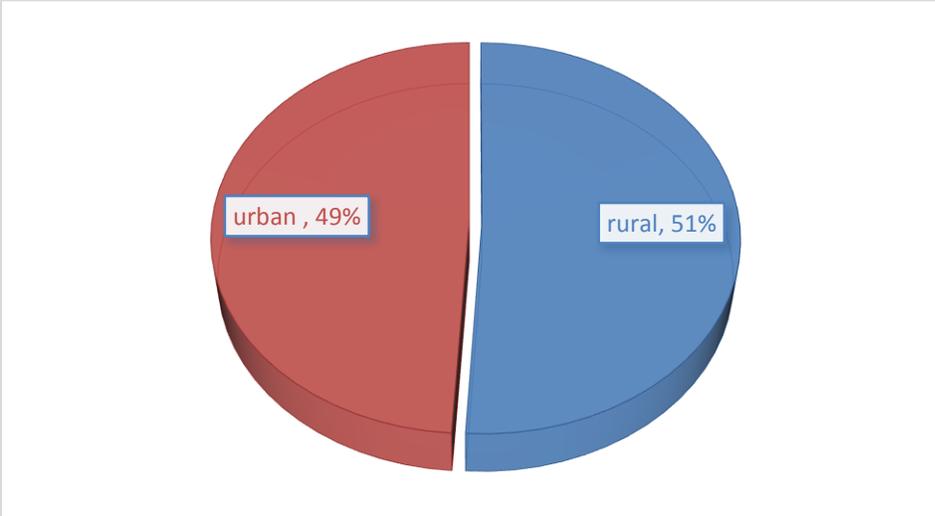
			Marital status head		Total
			married	not married	
Gender of head	Male	Count	317	6	323
		% within gender of head	98.10%	1.90%	100.00%
		% within marital status head	87.10%	4.40%	64.50%
		% of Total	63.30%	1.20%	64.50%
	Female	Count	47	131	178
		% within gender of head	26.40%	73.60%	100.00%
		% within marital status head	12.90%	95.60%	35.50%
		% of Total	9.40%	26.10%	35.50%
Total	Count	364	137	501	

The results presented implies that the majority of the female-headed households were not married and the reasons for such would be numerous. The results of the marital status by gender are also interesting, especially when looking at the 26 percent of the female-headed households that were married. The tradition in the literature is that, where there is a man and a woman, the man is considered a de-facto head of households. In this case, the study finds women heading a household where there is a man. This could indicate changes in the traditional understanding of what makes one to be the head of household.

5.2.5 Distribution of households by location

Analysing the distribution of the sample in terms of place of residence, the results in Figure 5.4 indicates that 51 percent of the households were from rural areas, whereas 49 percent were from urban areas. This relates to what was discussed in Chapter 4 that the majority of the population in Malawi resides in rural areas.

Figure 5. 4 Distribution of households by location



In Figure 5.4, the location distribution of the sample is indicated. Table 5.4 further indicates the migration statistics of the sampled population. It indicates that 23 percent of the population have recently moved into the region, which have stayed, on average, one to two years in the area. The table also shows that about 38.50 percent of the

sample have stayed in the area for more than 20 years, and the rest of the population are in-between the years. This helps to show that there is still a lot of internal migration, especially from the rural areas to the urban areas in search of better opportunities. The migration of people has a bearing on their food security status when one considers the link between access to land and access to food, wherein most cases people have access to land for subsistence farming in the rural areas. However, once they migrate to urban areas, the situation becomes different.

Table 5. 4 Number of years lived in south eastern region of Malawi

Average stay in years	Frequency	Percent
1 to 3	113	23.00%
4 to 6	67	13.40%
7 to 10	56	11.20%
11 to 19	72	14.40%
20 above	193	38.50%
Total	501	100.00%

5.2.6 Age distribution of household head

Figure 5.5 shows the results of age distribution of household head for the sample. The results indicate that 42.1 percent of the household heads were above the age of 41, whereas 22.8 percent were between the ages of 21 and 30, and only 1.6 percent were between the ages of 15 and 20. The picture becomes different when compared between male and female household head, which is illustrated in Figure 5.6.

Figure 5.5 Age distribution of household head

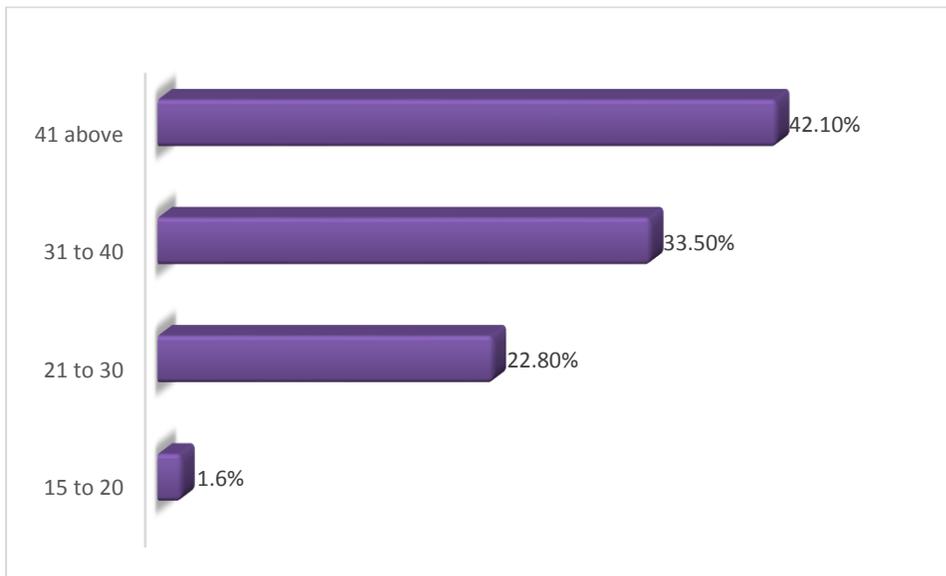
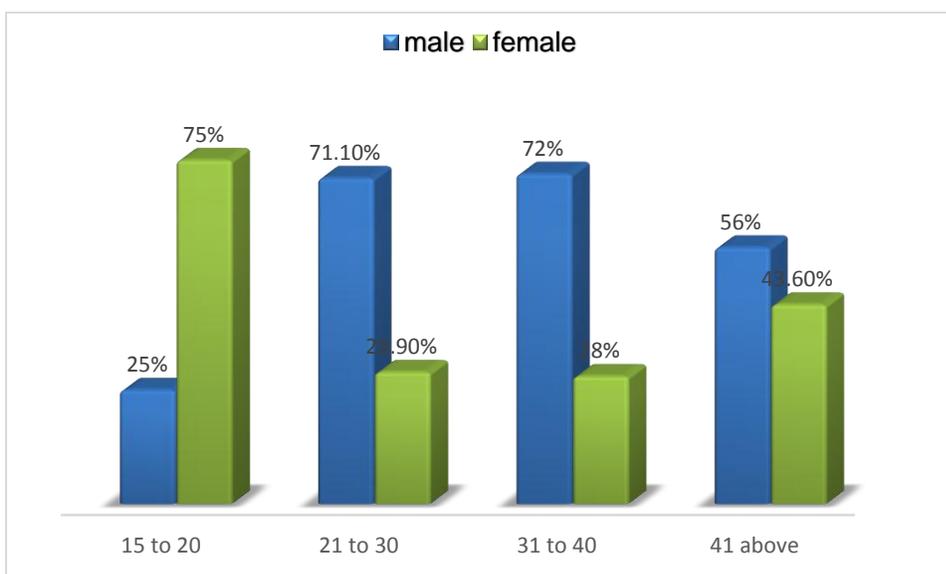


Figure 5.5 presented results of age distribution of household head for the sample. Figure 5.6 is an illustration of the same but now differentiating between male and female household heads. Figure 5.6 shows that 75 percent of female-headed households were headed by females that were between the ages of 15 to 20 years, as compared to 25 percent of male-headed households in that age category. This is a shocking scenario to find women as young as 20 years to be responsible for fending for an entire household.

Figure 5.6 Age distribution by gender of household head



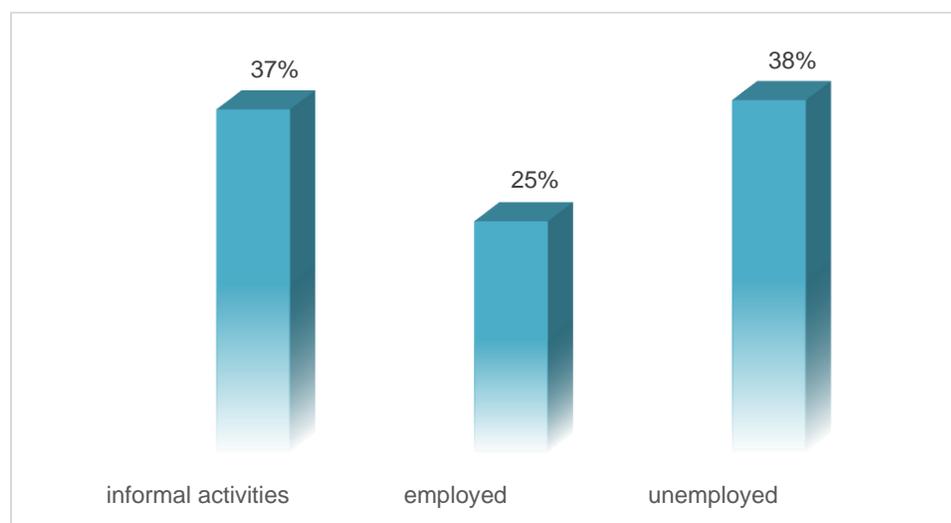
5.3 ECONOMIC CHARACTERISTICS OF THE SAMPLED POPULATION

This section highlights some of the economic features of the sampled population based on the sample households, which are the employment status of household head, income of head of household in terms of wages and or salary, as well as a total of other incomes of the whole household.

5.3.1 Distribution employment status of household head for the sample

Employment status of the household head determines the type of lifestyle of families. The opposite of being employed or having no proper source of income results in families falling in difficult situations. This section presents results of the employment status for the study.

Figure 5.7 Employment status of household head



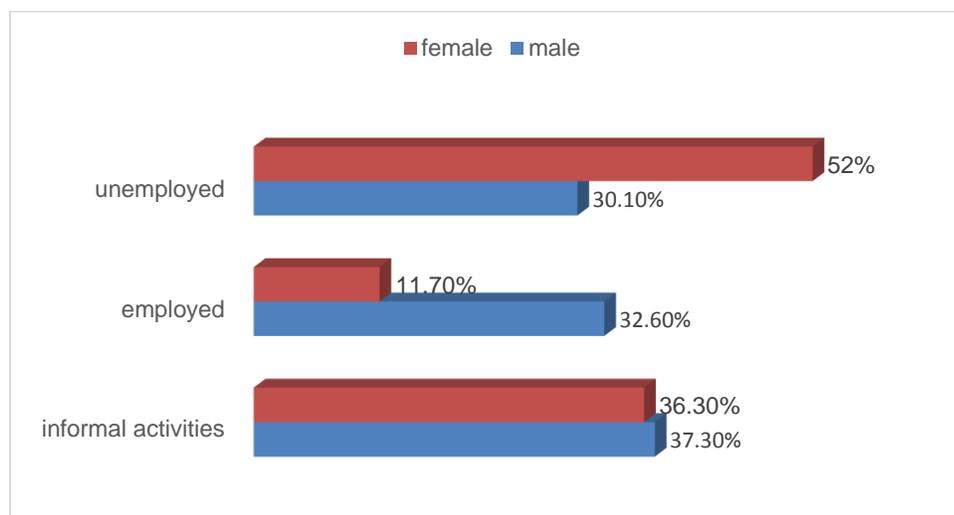
The results presented in Figure 5.7 on household head employment status indicates that 37 percent of the household heads were involved in informal activities, also known as piece jobs, which are not permanent. Of the population, 25 percent were fully employed and the other 38 percent were not employed at the time the survey was conducted. The statistics indicated in Figure 5.7 are not far from the national status of employment rate discussed in Chapter three where it shows that a huge percentage of the population in the country that is seemingly regarded employed are actually in

informal activities source. When results are compared between male and female-headed households the situation is slightly different as per the results indicated in Figure 5.8.

5.3.2 Distribution of employment status of household head by gender

Figure 5.8 presents results that differentiate between male and female household head employment status. As indicated, it shows that within those that were unemployed at the time the study was conducted, more females (52 percent) than males (30.10 percent) were unemployed. Within those that indicated they were working in informal activities there's a minimal difference between females and males of 36.30 percent and 37.30 percent, respectively. For those who indicated that they were employed permanently, 11.7 percent were females and 32.6 percent for males. This indicates that most females in the sample are involved in informal activities. In the next section the study presents results on the literacy levels for the country.

Figure 5. 8 Gender distribution of household employment status

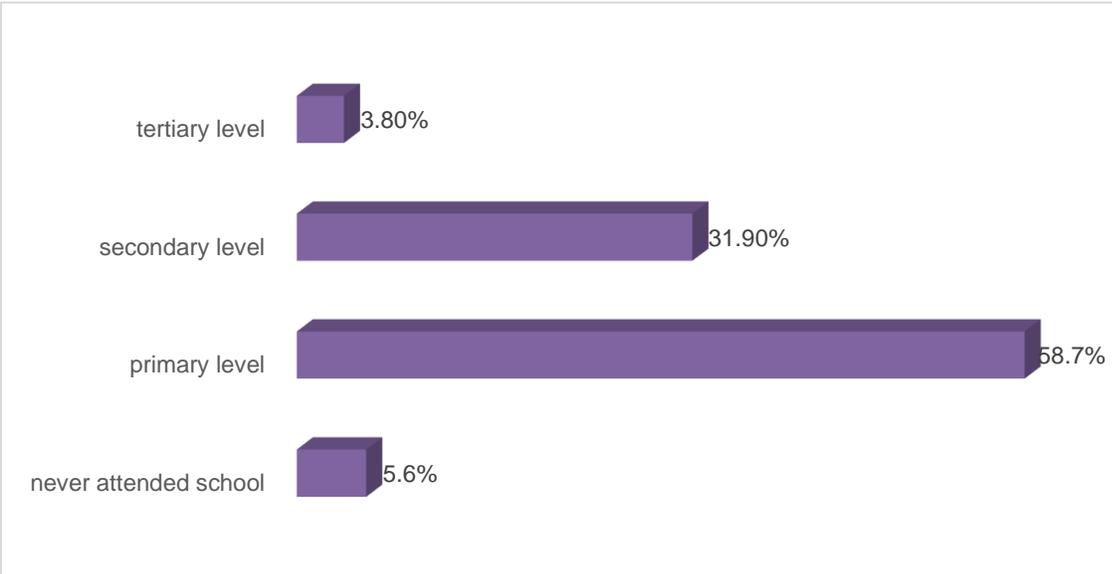


5.3.3 Distribution of Literacy levels for household head

Education attainment is one of the most important aspect in every person's life. The benefits can be appreciated after a completion of certain levels of education which in the end results in better employment and many other benefits. Table 5.9 gives an

overview of the literacy levels of the sampled household heads. It indicates that 5.6 percent of the household heads never attended school, 58.7 percent attended up to primary level, 31.90 percent attended up to secondary level, and 3.80 percent attended up to tertiary level. The statistics presented indicate that over half of the household heads have the primary level as the highest education attainment, which is not enough to equip them for the job market. Primary education may enable one to read and write but does not equip one with employable skills. When gender dynamics are presented, it shows that female heads of households are more disadvantaged. The results are presented in Figure 5.10.

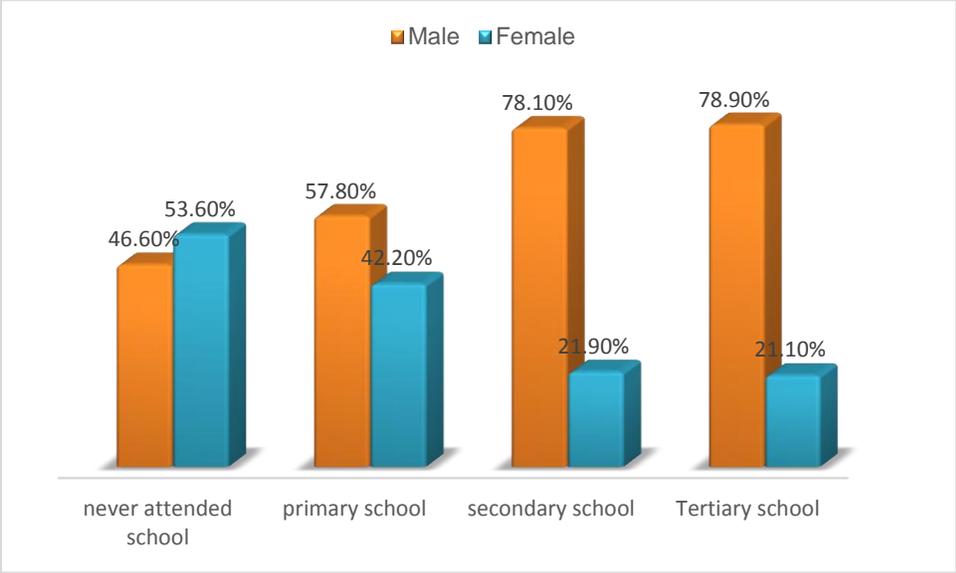
Figure 5. 9 Distribution of literacy levels for household head



5.3.4 Distribution of literacy levels by gender of household head

In figure 5.9 the study presented the levels of education attainment for the household head of the study, in figure 5.10 the study goes further to analyse the education levels by gender.

Figure 5. 10 Distribution of education levels by gender

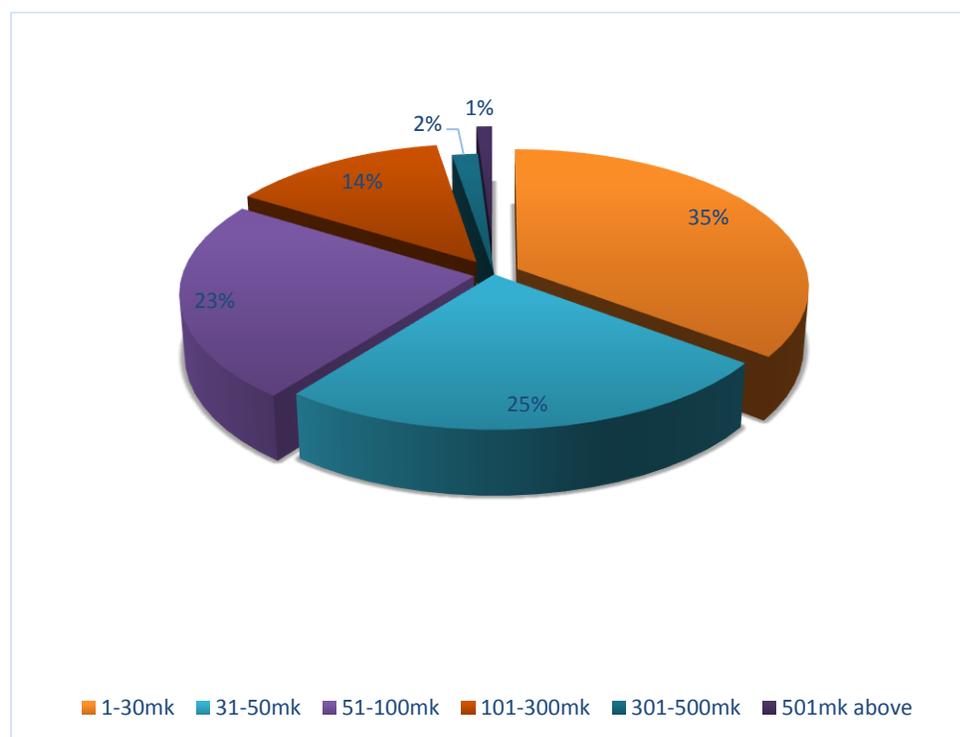


The results show that, when female and male households are compared, amongst those that never attended school, over half (53.60 percent) were women as compared to 46.60 percent of males. Within those that have primary levels of education, 57.80 percent were males as compared to 42.2 percent females. The situation becomes more of a concern when secondary levels of education and tertiary levels are compared. Within those that have secondary education, 78.10 percent were males and only 21.90 percent were females. Lastly, for tertiary levels, 78.90 percent were males and 21.10 percent were females. This indicates that women in the sample did not go further with education. Although the big disparity may be due to the representation in the sample, the fact that most of the females are in the no schooling category still reveal the gender problem that exists in education attainment. These results are similar to what was discussed in Chapter three at the national level that most women in Malawi do not attain higher education. This was also found in a study by Dunga (2015) on girl education in the country where it was indicated that most girls drop out of school as early as primary school due to various problems. Such problems of low levels of education could be one of the reasons why females in the country cannot compete for employment as compared to males as per the statistics of employment rates indicated in Figure 5.8.

5.3.5 Distribution of total Household income in the sample

The total household income in the study refers to the total of all incomes received by a household within a period of one month, which includes wages and salaries, help from friends, income from informal activities, and other income that were specified by the respondent. Figure 5.11 shows that about 35 percent of households monthly total income was between one thousand to three thousand Malawi kwacha¹. The results also show that 25 percent of the households' total income was thirty one thousand to fifty thousand Malawi Kwacha.

Figure 5. 11 Household total income for the sample



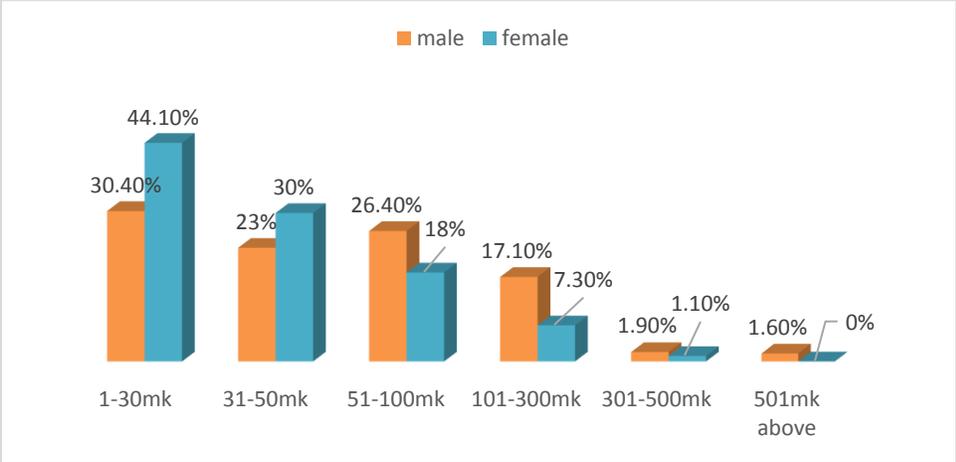
¹ US\$1 = MK 725 or ZAR1 = MK55 (27/09/2017 exchange rate)

On the total monthly income, Figure 5.11 also indicates that 23 percent of the household's monthly total income was between fifty one thousand and one hundred thousand Kwacha, 14 percent of household total income was between one hundred and one thousand to three hundred thousand Kwacha and, lastly, 2 percent and one percent of the household's total income was between three hundred and one thousand to five hundred thousand Kwacha and above five hundred thousand kwacha respectively. The statistics presented are not alarming as it has been the picture for Malawi for some time, where issues of poverty and income inequality have always been high (NSO, 2013). The study also analysed the total income for households based on gender the results are presented in Section 5.3.6 that follows. The next section presents results of monthly total income of households by gender.

5.3.6 Total income of households by gender

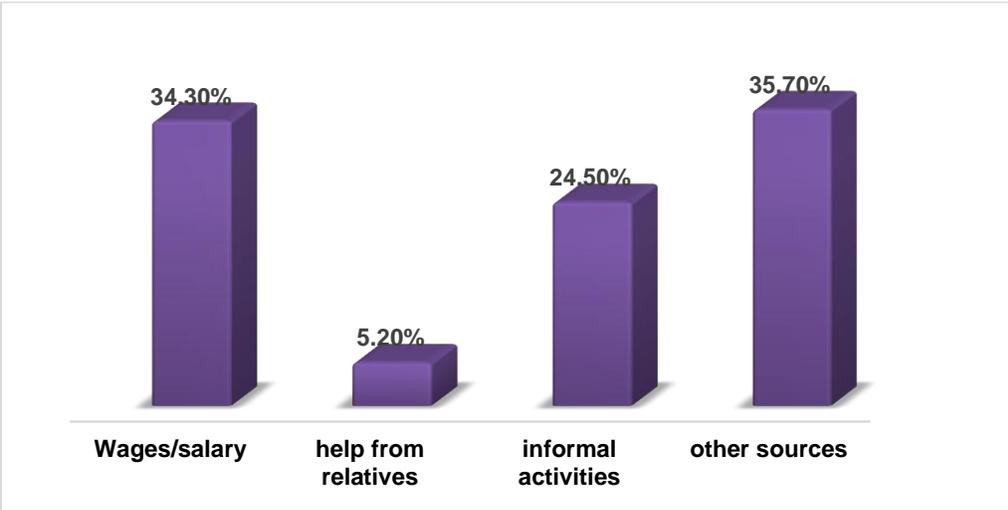
Since the focus of the study is the gender dimension of household food security, it is imperative to present the picture of these important variables by gender. When the statistics of household monthly total income are compared between male and female-headed households, the results show that women earn less as compared to males. The results presented in Figure 5.12 show a significant difference between total incomes for male versus female-headed households.

Figure 5. 12 Household total income by gender



As presented in Figure 5.12, amongst the income gap of those earning one thousand to thirty thousand Malawi Kwacha, 44.10 percent were women and 30.40 percent were males. Here, it can already be noted that more women than men had a lower total income. As noted further, the trend keeps on decreasing but mostly in female households than their male counterparts. Households that had an income between one hundred and one thousand to three hundred thousand, within gender, 17.3 percent were male households and only 7.3 percent were female. Lastly, those that have an income of above five hundred thousand, one percent were male and none for female households. This can be understood by looking at the sources of income for the households, which is presented in the subsequent section.

Figure 5. 13 Distribution of sources of household income



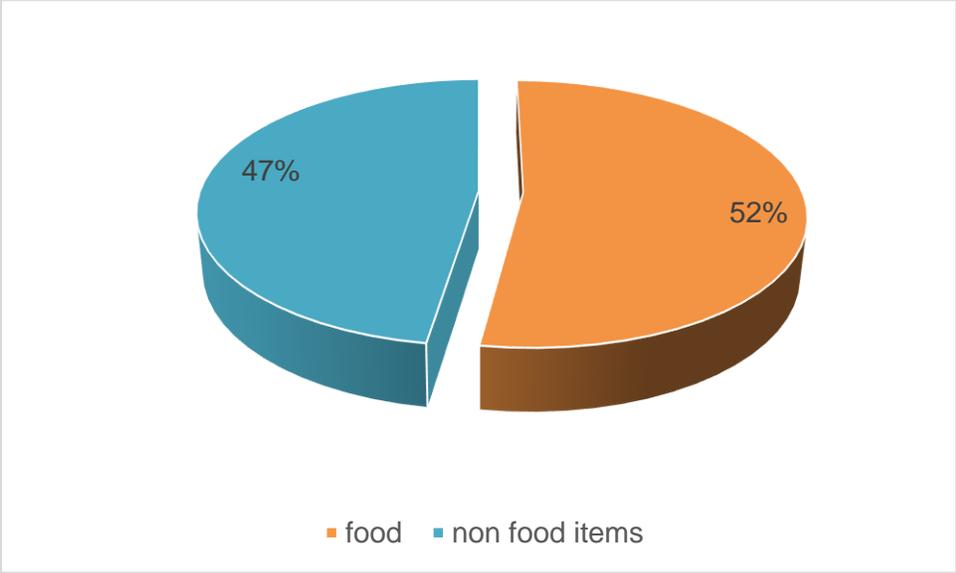
5.3.7 Distribution of sources of household income

Figure 5.13 presents results on the distribution of sources of household income. It indicates that 34.30 percent of the total income come from wages or salaries that is for the employed people, 5.2 percent come from help from relatives, 24.50 percent was indicated to be from informal activities for those who did some temporary work, and the rest (35.70 percent) was from other sources, mostly indicated as piece jobs wages. The statistics presented show that most of the household income is not from full paid jobs, which may be indicative of a systemic failure especially in this case where the people are not in informal activities by choice, but there are no jobs available for them. The next section shows results on how households spend their income.

5.3.8 Distribution of expenditure patterns for households

This section presents results on how the sampled households spend their income. The expenses have been distributed between food and non-food items. It shows that 52 percent of the income in the sampled households is spent on food items, whereas 47 percent of the income was spent on non-food items

Figure 5. 14 Distribution of expenditure patterns for households



From the results presented so far on demographics, as well as economic status of the sampled households, it is indicated that female, unlike male-headed households, have always been deprived from almost all aspects of characteristics. The fact that females are behind in almost all aspects, as discussed in the demographics presented above, point to the vulnerability that exist among women or female-headed households in Malawi. Thus, looking at the food security status of households by gender presents an opportunity to validate anecdotal postulations that are ubiquitous with regards to gender inequality. In the next section, the study goes further and presents the dynamics in terms of the study topic on gender gaps in food security status of the study area.

5.4 FOOD SECURITY STATUS OF HOUSEHOLDS

The previous section (5.3) of the study presented the demographic statistics and socio-economic characteristics of the sampled population. This section presents the overall results of household food security status using the three food insecurity measures presented in Chapter four, namely, Household Food Insecurity Access Scale (HFIAS), Household Dietary Diversity Score (HDDS) and Coping Strategy Index (CSI). Firstly, the study presents Pearson’s correlation results between the selected food security measures. The results are presented in Table 5.5.

Table 5. 5 Correlations analysis between HFIAS, HDDS and CSI

	Coping Strategy	Dietary Diversity Score	Household Food Insecurity Access Scale
Coping Strategy Index	1	-.360**	.516**
Dietary Diversity Score	-.360**	1	-.671**
Household Food Insecurity Access Scale	.516**	-.671**	1

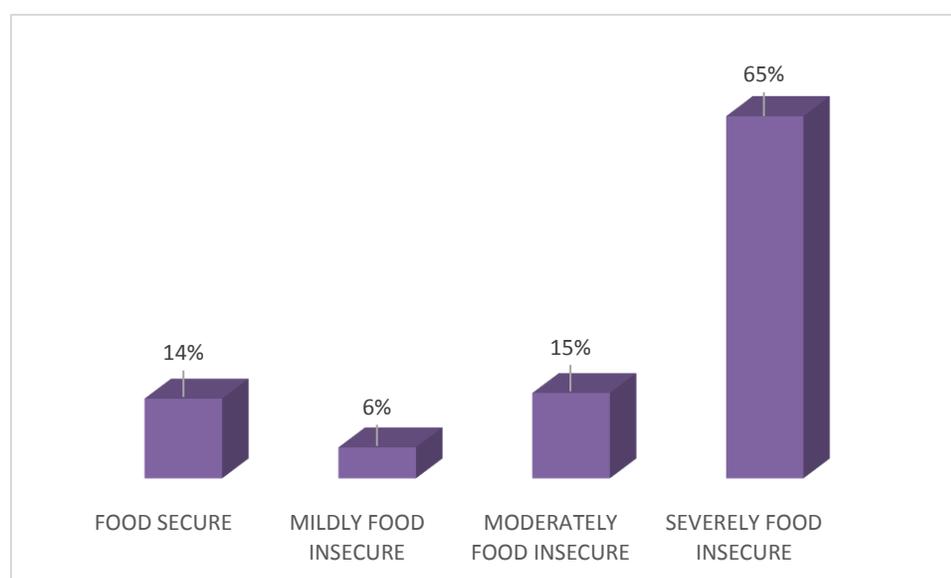
** Correlation is significant at the 0.01 level (2-tailed).

Table 5.5 presents the Pearson correlations results between the three measures of food security employed in this study (HFIAS, HDDS and CSI). In the study, the HFIAS and CSI scales were adjusted so that a higher score indicates greater food insecurity, whereas higher HDDS scores indicate greater dietary diversity and thus, less food insecurity. Based on these assumptions, it only makes sense that there exists an inverse relationship between the SCI and HDDS, and also between the HFIAS and the HDDS. For instance, examining the correlation results between CSI and HDDS, ($r=-0.360$, $p<0.001$) it shows there is a statistically significant negative correlation between the two measures. The negative correlation coefficient explains the fact that households that are more diversified (consume more food groups) are regarded food secure, hence employ less or no coping strategies and vice versa. Similarly, the correlation results between HFIAS and HDDS show ($r=-0.671$, $p<0.001$) a statistically significant negative correlation. The results also show that there exists a stronger correlation between HFIAS and HDDS as compared with the other instruments. Lastly, a positive significant correlation ($r=0.516$, $p<0.001$) was found between HFIAS and the CSI. Based on the results found between the correlations, it shows that the three chosen measuring instruments complement each other in measuring the food security status of households in the selected area, and are thus regarded viable for this study.

5.4.1 Overview of food security status for the sampled area in categories using HFIAS.

Figure 5.15 presents results of food security status for the study using the HFIAS as a measure. The severity of food security was divided into four categories, namely, food secure, mildly food insecure, moderately food insecure, and severely food insecure. The results indicate that 14 percent of the total sampled households were food secure, six percent were mildly food insecure, 15 percent were moderately food insecure, and almost two thirds of the population 65 percent were severely food insecure.

Figure 5. 15 Household food security status using HFIAS



A further analysis of the individual questions of HFIAS responses for each household is also done so as to determine which ones received more weights. Results are indicated in Table 5.6. It shows that over half of the households had concerns over the supply, quantity, quality of food on their tables. It also indicates that about 35 percent of the households at times went without any kind of food in the household for the whole day. The overall experiences of availability, supply and utilisation of food these people had were quite alarming, indicating that most people were food insecure.

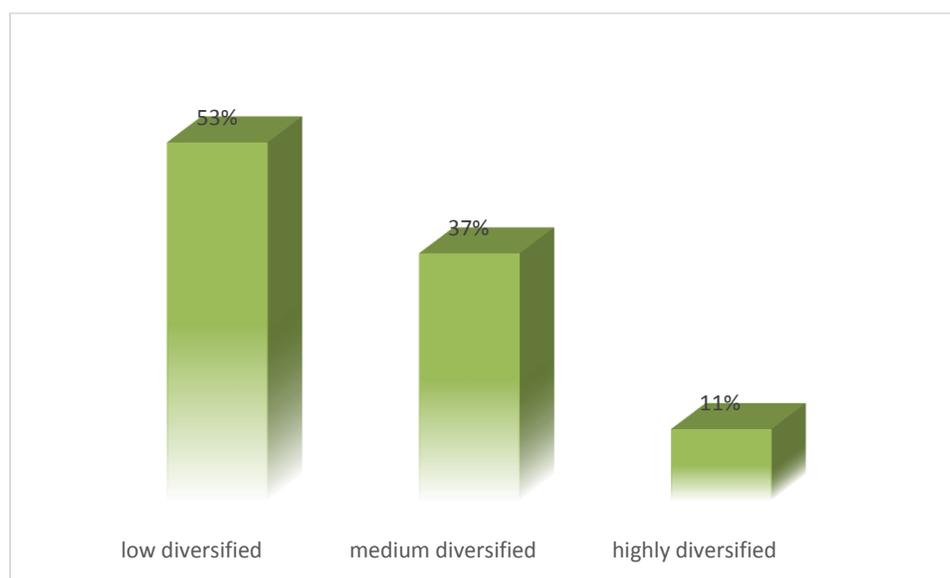
Table 5. 6 Responses from the HFIAS questions

HFIAS QUESTIONS	Rarely	Sometimes	Often	Never
Q1 : Worry about food	23.8%	41.3%	19.4%	15.6%
Q2: Unable to eat preferred food.	20.6%	42.7%	18.2%	18.6%
Q3: Eat just a few kinds of foods	20.4%	42.3%	18.6%	18.8%
Q4: Eat foods they really do not want to eat	21.0%	42.3%	17.4%	19.2%
Q5: Eat a smaller meal	21%	43.9%	14.4%	20.8%
Q6: Eat fewer meals in a day	19.6%	43.5%	12.4%	24.6%
Q7: No food of any kind in a household	20%	34.9%	8.4%	36.7%
Q8: Go to sleep hungry	20.4%	31.3%	4.2%	44.1%
Q9: Go a whole day and night	17.4%	15.8%	2.8%	64.1%

5.4.2 Food insecurity status using the HDDS

Figure 5.16 presents results of the food security status for the study, this time using the HDDS as a measure of food insecurity. It indicates that 53 percent of the sample were very lowly diversified, meaning that, from the total of 12 groups, they were only able to consume between one to four food groups, which may imply that they were food insecure. It also shows that 37 percent of the sample were medium diversified, meaning they were able to consume five to eight food groups from the total of 12. Lastly, about 11 percent of the sample were able to consume between 9 to 12 food groups, also referred to as food secure.

Figure 5. 16 Household food security status using HDDS



The study went further and calculated the average HDDS as per the results presented in Table 5.7. It shows that, from the sample of 501 households, the minimum number of food groups which the households were able to consume was one and the maximum was eleven. On average, households were able to consume approximately five types of food groups. The next section presents results on food security status using the coping strategy index measure.

Table 5. 7 Average household Dietary Diversity Score of households.

	Total number of households	minimum	maximum	mean	std. deviation
Dietary Diversity score	501	1.00	11.00	4.5070	2.28352

5.4.3 Household food insecurity and the CSI

The last section presented results on household food insecurity status using the HDDS as a food security measure. This section shows results of the same but using the CSI as the household food insecurity measure. As discussed in Chapter four, the CSI is mainly used for comparative purposes and not as an absolute measure of food insecurity. When households in the study were confronted with food shortages they

employed one or more of the 15 coping strategies to mitigate the problem. The results obtained are presented in the sections to follow.

5.4.3.1 Frequency application of coping strategy

Table 5.8 presents results of how frequently a strategy was employed by households in the study area on a weekly basis. It shows that, from all the households, 28 percent of the population employed the strategy of relying on less preferred or inexpensive food almost twice a week.

Table 5. 8 Frequency application of coping strategy

No	Coping strategy employed	Once a week	Twice a week	3.5days /week	Daily	never
1	Relying on less preferred/inexpensive food	17	28	20	16	19
2	borrowing food	29	26	15	4.4	26
3	Purchase food on credit	30	22	10	.6	37.1
4	gather wild food	10.2	8.8	2	2.2	77
5	consume seed stock held for the next season	10	6.8	2.2	0.6	80.4
6	limiting portion size at meal times	35.5	19	7.6	8.4	28.5
7	restricting adult consumption in favour of small children	27.1	5.8	5.4	4.8	46.9
8	reduce the number of meals eaten in a day	38.3	24.6	6.2	5.4	25.5
9	skip entire days without eating	21.6	15.4	3.2	1.4	58.5
10	Feed working members	5.2	2.8	1.4	1.4	89.2
11	Ration money to buy street food	9.6	10.4	4.6	5	70.5
12	Send household members to eat elsewhere	7.4	6.2	3.8	0.4	80.2
13	Beg for food from neighbours or relatives	11.6	5.6	5.8	0.6	76.4
14	Rely on help from relatives or friends	6.8	3.4	3.2	1.4	85.2
15	Maintain food garden	14.8	12.6	12.8	3.6	56.3

For the second strategy, 29 percent of the households used it once a week and 26 percent twice a week. The third strategy, 30 percent of households used it once a week and 22 percent twice a week, which is on a higher side because if these households

applied this strategy more than once a week it is likely to push them into debt, which they may be unable to recover and would hence be more prone to food insecurity. The use of reduction of numbers of meals eaten a day also had a higher percent, 38.3 percent and 25 percent of households applied this strategy at least once and twice a week respectively. This is a serious indication because it means that these households are not eating a proper diet. Maintaining a food garden is one strategy that was added by the researcher as it best suits the study area. It indicates that 15 percent and 13 percent of the households used resources from their garden at least once and twice a week respectively. Maintaining a food garden is a good practice because it may be cheaper for households to actually eat vegetables from their own garden rather than buying from the market. The next section presents results of ranks of how frequently the strategies were employed by the households in the whole week.

5.4.3.2 Ranking usage of coping strategies by households (7 days)

Table 5.9 presents the frequency, percentages and ranking results of responses of household head on the coping strategies employed by the household for the whole week. When the coping strategies are ranked in accordance to how frequent they were employed in a week, *rely on less preferred food*, which is in the category of dietary change, is ranked number one which was used 408 times by 81 percent of the households. This could mean that most households do not eat a proper diet. The second most used strategy was to *reduce the number of meals eaten a day*, which falls into the rationing of food category. Surprisingly, 63 percent of the households *purchased food on credit* in one of the seven days, which falls in the category of short-term coping strategy. This has the huge potential of putting a household in a more vulnerable position in the long-term (Maxwell, *et al.*, 2003). Another notable strategy, which was ranked number 8 but used by 42 percent of the households was to *skip the entire days without eating*. The strategy that was employed least was *feed working member first* (11 percent). Of the households, 44 percent employed *maintaining a food garden* as a strategy to food insecurity. This is a good indication in a way that it saves

money for the households to buy vegetables from the market, which may be more costly.

Table 5. 9 Ranking of usage of coping strategies by households (7 days)

Coping strategy	Ranking	Frequency	Percentage of households
Relying on less preferred/inexpensive food	1	408	81%
reduce the number of meals eaten in a day	2	373	74%
borrowing food	3	370	74%
limiting portion size at meal times	4	358	71%
Purchase food on credit	5	315	63%
restricting adult consumption in favour of small children	6	266	53%
Maintain food garden	7	219	44%
skip entire days without eating	8	208	42%
Ration money to buy street food	9	148	30%
Beg for food from neighbours or relatives	10	118	24%
gather wild food	11	116	23%
consume seed stock held for the next season	12	98	20%
Send household members to eat elsewhere	13	89	18%
Rely on help from relatives or friends	14	74	15%
Feed working members	15	54	11%

5.4.3.2 Comparing means of HFIAS categorical status of food security and coping strategies

The study went further to compare the means of HFIAS categorical status of household food insecurity with the coping strategies. The results are indicated in Table 5.10.

Table 5. 10 Comparing means of categorical status of food security using HFIAS and Coping strategies

Rank of coping strategies	Food secure	Mildly food insecure	Moderately food insecure	Severely food insecure
Relying on less preferred/inexpensive food	0.51	2.3	4.26	3.35
Borrow food/money for food	0.73	1.15	2.30	1.89
Purchase food on credit	0.34	0.62	3.00	1.37
Gather wild fruits, harvest immature crops	0.50	0.14	0.43	0.71
Consume seed stock for next season	0.09	0.71	0.44	0.71
Limit food portion size at meal times	0.45	1.50	2.03	2.04
restricting adult consumption in favour of small children	0.12	1.18	2.09	1.54
Reduce number of meals eaten in a day	0.70	1.51	2.10	2.81
skip entire days without eating	0.65	0.71	2.27	2.10
Feed working members at the expense of non-working members	0.94	0.53	1.41	0.35
Ration money to buy street food	0.32	0.03	0.93	1.07
Send household members to eat elsewhere	0.10	0.14	0.78	0.52
Beg for food from neighbours	0.05	0.10	0.78	0.69
Rely on help from relatives or friends	0.65	0.20	0.41	0.50
Maintain a food garden	0.74	0.93	1.70	1.27

Firstly, the study highlighted all the means that are closer to one and those that are above one as an indication of high usage of the coping strategy. When the means of the four categories (food secure, mildly food insecure, moderately food insecure and severe food insecure) are compared against the coping strategies, it shows that the means for those that are food secure are lower as compared to the other categories and they keep increasing as the status of food insecurity increase as well. This indicates that, as the food insecurity increases, households tend to start employing more coping strategies to mitigate the problem.

5.5 GENDER ANALYSIS OF HOUSEHOLD FOOD INSECURITY STATUS OF THE SOUTH EASTERN REGION

This section presents results from the first objective of the study which was to assess and compare the food security status between male and female-headed households. To achieve this, a Chi-square test in cross tabulation between gender and food security

status were employed where food security status of households were analysed comparing between male and female-headed households. The results presented are based on the three measures (HFIAS, HDDS and CSI) of household food insecurity status adopted by the study.

Table 5. 11 Household food security status by gender using HFIAS

Category of food security	%within Male	%within female
Food Secure	17.7%	8.4%
Mildly Food Insecure	5.9%	5%
Moderately Food Insecure	18.9%	8.9%
Severely Food Insecure	57.5%	77.7%
Total	100%	100%

Pearson Chi Square value 33.221 p value 0.000

5.5.1 Gender and household food insecurity using HFIAS

Table 5.11 presents the first results obtained from cross tabulations between household food insecurity status and gender of households (male and female) using HFIAS. It shows that, within the male-headed households, 17.7 percent were food secure and within the female-headed households, 8.4 percent were food secure. A bigger variation between genders are shown in the category of those that were severely food insecure, from the male-headed households, 57.5 percent were severely food insecure versus 77.7 percent of female-headed household. Overall, the results presented shows that female-headed households were in the worse-off scenario in all categories of food security as compared to the male counterparts.

A Pearson chi-square test presented in appendix one shows a chi-square test of 33.221 and p-value of 0.000 meaning there was a statistically significant difference between the household food insecurity status and gender of head of household, using the HFIAS.

Table 5. 12 Household food security status by gender using HDDS

Category of Dietary Diversity	%within Male	%within female
Low Diversified	48.4%	60.9%
Medium Diversified	39.8%	30.7%
Highly Diversified	11.8%	8.4%
Total	100%	100%

Pearson chi square test 21.866 p.value .000

5.5.2 Gender and household food insecurity using HDDS

Table 5.12 presents the second results obtained from cross tabulations test of household food insecurity status and gender of households (male and female) using HDDS. It shows that, within the male-headed households, 48.4 percent were low diversified meaning they were food insecure versus 60.9 percent of female-headed household. For those that were highly diversified, meaning food secure, 11.8 percent were from male-headed household versus 8.4 percent from female-headed household. A Pearson chi-square test presented in appendix two shows a chi-square test of 21.866 and p-value of 0.000 meaning there was a statistically significant difference between the household food insecurity status and gender of head of household using the HDDS. The overall results are in line with what was found in the previous section where HFIAS was employed as a measure of food security. Employing both measures shows that female headed households were highly food insecure as compared to the male counterparts.

5.5.3 CSI mean scores of household food security status by gender

This section presents results which answers part of objective number three on the food security status by gender. In this case, the CSI (coping strategy index score) measure was employed to access the gender dynamics in food security status for the sampled area. The analysis in this section uses mean CSI scores to compare the relative food insecurity between the male and female households. As discussed in the first chapter, as well as the results presented so far, it is clearly shown that female-headed households were more food insecure as compared to their counterparts, hence this

section shows a further analysis on the coping strategies that were employed more between the male and female households. The results are indicated in Table 5.13 where the overall total mean scores are considered. The results indicate that female-headed households had a total higher mean score as compared to male-headed households indicating that female-headed households used more coping strategies as compared to the later which also indicated that female-headed households were more food insecure as compared to their counterparts.

When the individual coping strategies are considered, female-headed household had the highest mean on the first coping strategy which is rely on less expensive food.

Table 5. 13 CSI mean scores of Household food security status by gender

No	Strategy	Male (mean)	Female (mean)	Chi square	P. value
1	Relying on less preferred/inexpensive food	2.29	3.03	3.567	.000
2	Borrow food/money for food	1.40	1.90	3.413	.000
3	Purchase food on credit	0.90	1.56	1.843	.066
4	Gather wild fruits, harvest immature crops	0.41	0.67	2.244	.025
5	Consume seed stock for next season	0.24	0.54	3.488	.001
6	Limit food portion size at meal times	1.26	2.20	3.531	.000
7	restricting adult consumption in favour of small children	0.99	1.32	2.058	.040
8	Reduce number of meals eaten in a day	1.35	1.67	2.038	.042
9	skip entire days without eating	0.57	1.02	4.117	.000
10	Feed working members at the expense of non-working members	0.57	0.29	0.518	.605
11	Ration money to buy street food	0.70	1.02	2.060	0.40
12	Send household members to eat elsewhere	0.24	0.57	3.914	.000
13	Beg for food from neighbours	0.32	0.73	4.210	.000
14	Rely on help from relatives or friends	0.23	0.54	3.058	.002
15	Maintain a food garden	0.98	1.29	2.686	.008
	Total	12.45	18.35		

The table also shows that female-headed households used the strategy of skip the whole day without eating more than the male-headed households which is a very bad indication because this strategy is regarded as worst case scenario of the coping strategies. Female-headed households also employed strategy number six more, which is limit food portion size at meal times, as well as strategy number eight, which is reduce number of meal times a day. The implication of the two mentioned strategies is that those households may be more prone to malnutrition since they were not eating a proper diet. Female-headed households also employed strategy number three more which is purchase food on credit. This could be because female-headed households earned less income as compared to male-headed household as discussed in Section 5.3.7 which is a very bad indication for these households because once trapped in debt it may be very difficult for them to come out hence more vulnerable to food insecurity.

Results obtained from a chi-square test of the individual coping strategies shows that the p-values obtained from the total of fifteen strategies employed, fourteen strategies had p-values that were statistically significant meaning there was a statistically significant difference between the usage of coping strategies employed between male and female-headed household in the strategies. The only one that had a higher p-value which was not statistically significant was strategy number ten which was *feeding working members at the expensive of non-working members*.

The trend of results so far have indicated that female-headed households are more vulnerable to food insecurity, hence employ more coping strategies to mitigate the problem as compared to male households. The results are similar to what was indicated in the third household integrated survey conducted by the National Statistics Office in Malawi (2012), which showed that female-headed households were more food insecure as compared to male-headed households hence used more of the coping strategies. The results obtained on gender and food insecurity also reflects as a common trend in most African countries vindicated by studies such as Mjonono *et al.* (2009) in South Africa, Adebo (2014) in the case of Nigeria. The next section presents results from the second objective of food security status between rural and urban areas.

5.6 FOOD SECURITY STATUS BY PLACE OF RESIDENCE

This section presents results for the second objective of household food security status between rural and urban dwellers employing the three measures of food insecurity (HFIAS, HDDS and CSI). This focus on rural and urban areas was seen to be important considering the fact that the majority of Malawian households are in the rural areas and hence there has been a constant migration from rural to urban area in search of better opportunities. This objective tests the common perception that urban households are better off, by comparing the food security status of the urban and the rural households.

5.6.1 Food security status by location using HFIAS

Table 5.14 presents cross tabulation results obtained from household food security status between rural and urban population using the HFIAS as a measure. It shows that within those that from the four categories of food security, two percent from rural areas were food secure versus 27.3 percent from the rural areas. In the last category of severely food insecure, approximately 92 percent were from the rural areas versus 36.3 percent from urban areas. Similar trends of rural dwellers being more food insecure as compared to their counterparts are shown in the second and third category. This is an indication that people in the rural areas are more food insecure as compared to their counterparts.

A Pearson chi-square test presented in appendix three shows a chi-square test of 169.877 and p-value of 0.000 meaning there was a statistically significant difference between the household food insecurity status and location of head of household, using the HFIAS.

Table 5. 14 Household food security status by place of residence using HFIAS

Category of Food Security	%within Rural	%within Urban
Food Secure	2.0%	27.3%
Mildly Food Insecure	2.0%	9.4%
Moderately Food Insecure	4.3%	26.9%
Severely Food Insecure	91.8%	36.3%
Total	100%	100%

Pearson chi square test 169.877 p.value .000

5.6.2 Food security status by location using HDDS

Table 5.15 presents results obtained from cross tabulation between household food security status and location using the Household Dietary Diversity Score. As shown from the three categories of dietary diversity, 82 percent of those in the rural areas were low diversified meaning more food insecure as compared to 22.4 percent from the urban areas. Those that were highly diversified meaning food secure, 1.2 percent were from the rural areas, and 20.4 percent from the urban areas. The figures presented were from within the location.

Table 5. 15 Household food security status by place of residence using HDDS

Category of Dietary Diversity	%within Rural	%within Urban
Low Diversified	82.0%	22.4%
Medium Diversified	16.8%	57.2%
Highly Diversified	1.2%	20.4%
Total	100%	100%

***Pearson chi square test 183.602 p.value .000

A Pearson chi-square test presented in appendix four shows a chi-square test of 183.602 and p-value of 0.000, meaning there was a statistically significant difference between the household food insecurity status and location of head of household, using the HDDS.

5.6.3 CSI mean scores of household food security by place of residence

This section presents results which answers part of objective number three on food security status between the rural and urban dwellers using the CSI mean scores to differentiate the two. The results are shown in Table 5.16, after adding up the total mean scores for the two locations, the results indicate that households in rural areas had a higher mean score (18.28) as compared to the households in the urban areas (12.16) which indicates that households in the rural areas were more food insecure as compared to the households in the urban areas.

When the strategy mean scores were addressed individually, the results indicate that the rural households employed strategy number one (3.34), which is *rely on less expensive food* the most as compared to the counterparts (1.78). On the extreme part rural households employed strategy number nine, which is *skip the whole day without eating the most* (1.03) as compared to urban households (0.42) this strategy is regarded as the most severe coping strategies.

Table 5. 16 CSI mean scores of household food security by place of residence

N o	Strategy	Rural (mean)	Urban (mean)	Chi square test	P. value
1	Relying on less preferred/inexpensive food	3.34	1.78	8.492	.000
2	Borrow food/money for food	1.85	1.39	1.514	.131
3	Purchase food on credit	1.26	1.10	1.531	.126
4	Gather wild fruits, harvest immature crops	0.80	0.19	5.578	.000
5	Consume seed stock for next season	0.48	0.21	3.251	.001
6	Limit food portion size at meal times	1.87	1.30	4.563	.000
7	restricting adult consumption in favour of small children	1.48	0.72	5.216	.000
8	Reduce number of meals eaten in a day	1.71	1.23	5.368	.000
9	skip entire days without eating	1.03	0.42	6.045	.000
10	Feed working members at the expense of non-working members	0.36	0.14	3.627	.005
11	Ration money to buy street food	1.02	0.60	2.807	.000
12	Send household members to eat elsewhere	0.54	0.16	4.664	.000
13	Beg for food from neighbours	0.68	0.26	4.485	.001
15	Rely on help from relatives or friends	0.50	1.83	3.315	.000
15	Maintain a food garden	1.36	0.83	4.069	.000
	Total	18.28	12.16		

Table 5.16 also shows evidence that the rural households used strategy number six, seven and eight more than their counterparts, which are *limit food portion size at meal times, restrict consumption of adults, and reduce number of meals eaten in a day* respectively. The results indicated confirms the fact that rural households are more food insecure as compared to the urban households. Pearson chi-square statistics presented in the cross tabulation shows that apart from strategies number two and three, the rest of the strategies had a p-value that was statistically significant, meaning that there was

a statistically significant difference between the individual mean score of rural households versus urban households, in terms of their usage of coping strategies. The next section presents results of the two regression models.

5.7 REGRESSION RESULTS FOR VUNERABILITY TO FOOD INSECURITY

This section presents results obtained from the first regression answering objective number four which was to determine the vulnerability of food insecure households. As described in the methodology chapter, a multiple linear regression was employed with the Coping Strategy Index (CSI) as the dependent variable and several socio-economic characteristics as independent variable, to assess how the socio-economic characteristics are associated with the use of coping strategies. Firstly, the results obtained from different assumptions proving how well a regression model fits the data are presented in the sections to follow.

5.7.1 Model summary

Results on fitness of the model are presented in Table 5.17 describing the R , R^2 , adjusted R^2 , and the standard error of the estimate. These statistics can be used to determine how well a regression model fits the data.

Table 5. 17 Model summary

R	R^2	Adjusted R^2	Std. Error of the Estimates	Change statistics				
				R^2 change	F. Change	Df1	Df2	Sig.F. Change
.436	0.190	0.182	1122583	0.190	23.187	5	495	0.00

In the first column of Table 5.17, the results of R , which is a measure of the quality of the prediction of the dependent variable is given. In this case, R is indicated to be .436 and R^2 of 0.19, meaning that the independent variables explains 19 percent of the variability of the dependent variable. This percentage is acceptable in social research where the number of variable that may affect a phenomena is usually very high and it is hardly possible to have them all included in a pragmatic model (Field, 2009).

Table 5. 18 Anova test

	Sum of Squares	df	Mean Square	F	Sig.
Regression	14609.970	5	2921.994	23.187	.000 ^b
Residual	62379.582	495	126.019		
Total	76989.552	500			

a. Dependent Variable: coping_strategy_index3

b. Predictors: (Constant), Gender, Location, Household Size, Log Income, Employment status

5.7.2 Results from Anova Test

The second table of the regression results is a test of the null hypothesis about the model as a whole. The null hypothesis under the Anova test is that the model as a whole is not a good fit, or is not significant. Results indicated in Table 5.18 shows that the independent variables significantly predict the dependent variable. The F statistic of 23.187, with a p-value of 0.00, which is less than 0.01 for the 1 percent level of significance. Statistically, the null hypothesis is rejected and hence this model is a statistically significant.

5.7.3 Multicollinearity test

Another assumption that proves whether the model is of good fit is the collinearity test. As explained in the previous chapter that multicollinearity exists when there is a strong correlation between two or more predictors in a regression Field (2009). In order to check for multicollinearity the study observed the Tolerance and VIF levels. The rule is that the VIF should be less than 10 and the tolerance should be greater than 0.1. In this model, the VIF is less than 10 and tolerance levels are all greater than 0.1. The results in Table 5.19 proves that multicollinearity does not exist in the model.

Table 5. 19 Multicollinearity test

	Tolerance	VIF
(Constant)		
Females	0.898	1.113
LOCATION	0.562	1.779
Household size	0.957	1.045
log income	0.549	1.823
unemployed	0.930	1.075

After proving the stated assumptions, which all prove that the model is a good fit, the study goes further to discuss the findings of the regression model as follows;

5.7.4 Regression results for vulnerability to food insecurity

Table 5.20 presents results of the regression model on households' vulnerability to food insecurity. As indicated, the Coping Strategy Index was used as the dependent variable and socio-economic variable such as gender, location, household size, income and employment status were used as the independent variables. In the table three predictor variables have a positive relationship which are gender, household size and employment status.

Table 5. 20 Regression results for vulnerability to food insecurity

Variable	B	Std. Error	β	T	Sig.
Constant	39.508	7.404		5.336	0.000
female households	4.582	1.106	0.177	4.145	0.000
location (urban)	-3.497	1.338	-0.141	-2.613	0.009
Household size	0.825	0.246	0.139	3.359	0.001
Log income	-2.815	0.732	-0.210	-3.849	0.000
Employment status (unemployed)	2.339	1.072	0.092	2.182	0.030

a. Dependent Variable: coping_startegy_index3

b. Predictors: (Constant), Gender, Location, Household Size, Log Income, Employment status

Gender was the first independent variable for the study, gender is a categorical variable, which was coded as 0 for male and 1 for female. Thus, the coefficient in the regression represents females. Considering the coefficient, it shows that gender had a positive of 4.582 indicating that female headed households scored 4.582 higher than males on the CSI index. The higher the score on the CSI the more strategies one is using and hence the more vulnerable to food insecurity they are. Thus, based on the coefficient on gender, female-headed households were more vulnerable to food insecurity as compared to male-headed households, hence they employed a lot more coping strategies. The predictor of female households also shows a t statistic of 4.145 and a p-value of 0.000 which are significant at 1 percent level of significance. The regression results on gender and food insecurity are similar to findings presented in the previous section where it shows that female-headed household had a higher CSI means scores which means they were more vulnerable to food insecurity hence using more coping strategies. Similar findings were also found in studies like Grobler (2015), in South African townships of Bophelong and Sharpeville.

The second variable was location, since location was a categorical variable it was coded as 0 for rural and 1 for urban, the coefficient results presented in Table 5.20 shows that urban households had a coefficient of -3.497 meaning that they scored 3.497 less than the rural households on CSI index. This implies that the urban households used lesser coping strategies as compared to the urban households. The implication is therefore that urban households were less vulnerable to food insecurity as compared to their counter parts in other words rural dweller were more vulnerable to food insecurity. The predictor's t statistic was 4.145 and the p-value at 0.000 which is significant at 1 percent level of significance. This means that, location is a significant predictor of food insecurity vulnerability.

The third independent variable was household size, the coefficient of the household size in the model was 0.825, which is a positive value indicating that a unit increase in the number of members of a household will lead to a 0.825 increase in the CSI score thus making a household more vulnerable to food insecurity. The predictors' p-value was at

0.001, which is significant at 1 percent which means that household size was a significant predictor of the household vulnerability to food insecurity.

The fourth independent variable was income, to make income usable in the model, it was converted to natural logs. In this case, income was denoted as log income, and the results indicated in Table 5.20 shows that log income had a negative coefficient value of -3.497. This is called a semi log as the dependent variable is not in natural logs. If the dependent variable was also in logs, the coefficient would have represented elasticities. In this case, it means a percentage change in income will lead to a 3.497 reduction in the CSI score. Meaning that the higher the income the lower one scores on the CSI. Since the lower the score the lower the number of coping strategies being used, and hence the more food secure the household is. Which means that those that had a lower income used the coping strategies because they would be more vulnerable to food insecurity more as compared to those that had a higher income in other words as household income decreased the more coping strategies were employed. The t statistic for log-income was -2.613 and a p-value of 0.009 which is significant at 1 percent. This means household income significantly predicted the usage of coping strategies in a way that higher income lowers the frequency of coping strategies used but also the vulnerability towards food insecurity and vice versa. The results makes sense as the study has shown earlier on that poorer households were more food insecure.

The last independent variable in the regression model was employment status, the regression focused more on those that were unemployed. Employment status being a categorical variable with two categories, namely employed and unemployed also necessitated the usage of a dummy variable. The dummy variable was defined as 0 for employed and 1 for unemployed, implying that the unemployed were represented by the coefficient in the regression. The results indicate that employment status was a good predictor vulnerability towards food insecurity. The t statistic was 2.182 and the p-value of 0.030 which means employment status was statistically significant at the 5 percent level of significance. The predictor had a positive coefficient of 2.339 meaning that unemployed heads of households scored higher on the CSI and hence were more

vulnerable towards food insecurity thereby used more frequently the coping strategies to cope with food shortages. The employed, as would be expected, scored 2.339 less than the unemployed. Thus, having a job was important in dealing with vulnerability to food insecurity.

The regression so far has indicated that all the independent variables for the model were statistically significant in describing the households vulnerability towards food insecurity whereby gender of the head of households (which is the main focus of the study) has been proven to be the most important contributor to the model with the highest coefficient meaning that female-headed households were more vulnerability to food insecurity and employed more coping strategies to mitigate the problems of food shortages. The results indicated are similar to what other studies found in Malawi, as well as in other countries such as in studies conducted by Davids and Van Driel, (2000), Bridge, (2001), Babatunde, *et al.* (2008), Mallick and Rafi, (2010), and Kassie *et al.*, (2014).

5.8 REGRESSION RESULTS ON DETERMINANTS AND CAUSES OF PREVALENCE OF FOOD INSECURITY

In order to make sure that the measures of food security complement each other, a second regression model was estimated. This section presents results obtained from the second regression, which answers the study's last objective on the determinants of household food insecurity status. As shown in the previous chapter, socio-economic and demographic characteristics were selected as the (independent) explanatory variables that may influence household food insecurity status, and the four levels of food security status were used as the dependent variable. This section first presents the same diagnostic tests that were performed to check the validity of the regression results. The results presented in this section will be as follows: firstly, the model fitting information which compares the model to the baseline. The second results are of the goodness of fit for the model, which produces the Pearson and likelihood ratio as well as the chi square statistics, The third results is the pseudo R-squared which produces the Cox and Snell and Nagelkerke R^2 statistics, which can be used as effect sizes. The

fourth results are from the likelihood ratio tests, which presents the overall significance values for the variables. The last part presents results for the parameter estimates for the model which is the most important part of the regression results.

5.8.1 Diagnostic tests results

Table 5.21 relates to how fit the model is as seen the model is significant at one percent level of significance with a p-value of 0.000, hence it is of good fit.

Table 5. 21 Model fitting information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1010.342			
Final	655.893	354.449	27	.000

Table 5.22 shows the results from the goodness of fit. This test shows an overall indication of how well the model performs. The same can be observed from the indication in the Pearson and deviance, which tests whether the predicted values from the model differ significantly from the observed values (Pallant, 2010:175). The significant values works in opposition with the norm where, in this case, if these statistics are not significant then the predicted values are not significantly different from the observed values which means the model is a good fit (Field, 2009). In the results, both statistics are not significant hence the null hypothesis which is that the model is a good fit is accepted meaning the model is adequately of good fit.

Table 5. 22 Goodness of fit

	Chi-Square	df	Sig.
Pearson	1322.171	1467	.997
Deviance	654.507	1467	1.000

Table 5.23 presents the results of the Pseudo R-squared, which also shows the usefulness of the model depicted by Cox and Snell R-squared and the Nagelkerke R-

squared. The values obtained indicate the amount of variation in the dependent variable explained by the model described as pseudo R-squared statistics (Pallant, 2010:176). The regression model shows results of values .507 for Cox and Snell, and .585 for Nagelkerke, suggesting that between 51 percent and 59 percent of variability is explained by this set of independent variables. The results represents relatively decent size effects.

Table 5. 23 Pseudo R-Square

Cox and Snell	.507
Nagelkerke	.585
McFadden	.350

Table 5.24 presents results of the general likelihood statistics for the model, which is the overall statistics that indicates which predictors significantly predict the outcome category in this case all the independent variables are statistically significant except for age of household which is not significant. From the diagnostic results presented above, it indicates that the model is of good fit, hence, it is acceptable to proceed to present the regression results.

Table 5. 24 Likelihood ratio tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	Df	Sig.
Intercept	655.893 ^a	.000	0	.
Household size	681.379	25.486	3	.000
Age of household head	662.461	6.568	3	.087
Log income	733.479	77.586	3	.000
Location	678.077	22.184	3	.000
Gender	668.472	12.579	3	.006
Employ status head	670.958	15.065	3	.020

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

- a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

5.8.2 Regression coefficients of variables in the equation

The previous section has shown results which proves the viability of the model. This section presents results of the regression showing the individual parameter estimates on how the independent variables influence the probability of households to fall in the four levels of food insecurity. As indicated previously, the model has four categories of dependent variable (food secure, mildly food insecure, moderately food insecure and severely food insecure). Following Field (2009), in multinomial logistic regression one of the categorical dependent variable is regarded as a reference point. In this case, the results will be presented into three different sections where, food secure, mildly food insecure and moderately food insecure will be dependent variables included in the results, while severely food insecure will be used as a reference point. Results for the regression model are presented in Table 5.25 which gives information about the contribution or importance of each of the predictor variables, such as coefficients, their standard errors, the Wald test statistic with associated degrees of freedom and p-values, and the exponentiated coefficients (also known as the odds ratio). In order to interpret the results, the study will use the same approach as one used in binary logistic regression since, in essence, the study will be comparing two categories at a time. The first step is to look at the Beta values, which are provided in the second column of Table 5.25. The Beta values, or the coefficients, help to calculate the probability of a case falling into a specific category or the direction of the relationship, which can be realised with either a positive or negative sign. A negative Beta value indicates that the increase in the independent variable score will result in a decreased probability of the success event, which was coded as 1 in the coding of the dependent variable. A positive Beta value indicates that an increase in the independent variable score results in an increased probability of the success event (Field, 2009:285).

The second step is to look at the odds ratio Exp (B), which is 6th column presented in Table 5.25. Tabachnick and Fidell (2007:461) describe the odds ratio as one that represents the change in odds of being in one of the categories of outcome when the value of a predictor increases by one unit. Lastly, the Wald test results, which is followed by the p-values are observed, which helps to identify if the variable contribute significantly in predicting the ability of the model. The results are presented in three

stages whereby the first stage shows the differences in food secure and severely food insecure, the second levels presents the mildly food insecure and severely food insecure and, thirdly, moderately food insecure and severely food insecure.

Table 5. 25 Regression on determinants of food insecurity

Category food security ^a		B	Std. Error	Wald	df	Sig.	Exp(B)	95% CI for Exp(B)	
								Lower B	Upper B
FOOD SECURE	Intercept	-31.577	4.233	55.662	1	.000			
	Household size	-.475	.110	18.807	1	.000	.622	.502	.771
	No.yrs.schl Hh	.081	.068	1.434	1	.231	1.085	.949	1.240
	logincome	2.818	.391	52.050	1	.000	16.739	7.786	35.991
	age_of_head	.019	.016	1.376	1	.241	1.020	.987	1.053
	[LOCATION=0]	-1.078	.587	3.371	1	.066	.340	.108	1.076
	[LOCATION=1]	0 ^b	.	.	0	.	.	.	.
	Gender=0	1.002	.381	.6922	1	.009	2.725	1.291	5.749
	gender=1	0 ^b	.	.	0	.	.	.	.
	E.status_head=0	-0.816	.360	5.125	1	.024	.442	.218	.896
E.status_head=1	0 ^b	.	.	0	.	.	.	.
MILDLY FOOD INSECURE	Intercept	-21.201	4.979	18.134	1	.000			
	Household size	-.424	.136	9.782	1	.002	.654	.501	.853
	No.yrs.schl Hh	.095	.085	1.236	1	.266	1.099	.930	1.299
	logincome	1.793	.459	15.241	1	.000	6.008	2.442	14.782
	age_of_head	.001	.021	.004	1	.953	1.001	.962	1.042
	Location=0	-.392	.647	.368	1	.544	.676	.190	2.400
	Location=1	0 ^b	.	.	0	.	.	.	.
	gender=0	.369	.469	.620	1	.431	1.447	.577	3.626
	gender=1	0 ^b	.	.	0	.	.	.	.
	E.status_head=0	-1.491	.501	8.847	1	.003	.225	.084	.601
E.status_head=1	0 ^b	.	.	0	.	.	.	.
MODERATELY FOOD INSECURE	Intercept	-16.438	3.477	22.351	1	.000			
	household_size	-.176	.086	4.217	1	.040	.838	.709	.992
	No.yrs.schl Hh	.025	.043	.344	1	.558	1.026	.942	1.117
	logincome	1.428	.327	19.086	1	.000	4.170	2.197	7.912
	age_of_head	-.011	.014	.608	1	.436	.989	.963	1.016
	Location=0	-1.857	.430	18.673	1	.000	.156	.067	.362

location=1	0 ^b	.	.	0	.	.	.	.
gender=0	1.956	.650	9.067	1	.003	7.073	1.980	25.268
gender=1	0 ^b	.	.	0	.	.	.	.
E.status_head=0	-.752	.343	4.808	1	.028	.471	.241	.923
E.status_head=1	0 ^b	.	.	0	.	.	.	.

a. The reference category is severely food insecure

- **Food secure and severely food insecure**

The first results presented in Table 5.25 is food secure as the dependent variable against the independent variables which are all compared with the reference point (severely food insecure). Household size is the first independent variable in this case and the results show that household size had a p-value of 0.000 which is significant at one percent significance level. The coefficient shows a value of -0.475 and the odds ratio of .622. The negative coefficient value indicates that an increase in household size decreases the chances of the household to be food secure thereby increasing the chances of the household to be severely food insecure and that the odds of being food secure decreases by .622 with an additional member of the family.

The second independent variable was number of years of schooling of household head. In this case, the coefficient was found not to be statistically significant but the coefficient is 0.081 and the odds ratio is 1.085. This indicates that the education level of household head increases the probability of the household to be food secure than being severely food insecure and that the odds of being food secure increases by 1.085 with a unit increase in educational levels. The results make sense because it is easier for someone with better education to get a well-paying job but also other income opportunities therefore very unlikely for such a household to be food insecure.

The third independent variable at this level is income, it indicates that income has a p-value of 0.000 which is significant at 1 percent, meaning that income is a significant predictor of a probability of household food security status. The coefficient of income is 2.818 and odds ratio is 16.739. The positive coefficient mean that an increase in income levels of a household, increases the probability of the household to be food secure than severely food insecure. Since income is in logs, the results are interpreted in

percentage, hence a percentage change in household income increases the odds of the household being food secure by 16.739.

The fourth independent variable at this level is age of household head. The p-values in both the overall statistics (likelihood ratio tests) shown in Table 5.18 ($p=.402$) as well as the p-values in the regression results ($p=.241$) shows that age of household was not statistically significant at all levels hence it is not a significant predictor of the model.

The fifth independent variable is location, which is a categorical variable where 0 is for rural and 1 for urban households. The results show that location was statistical significant ($p=0.066$) in the model at 10 percent level of significance. The coefficient of rural dwellers is -1.078 and odds ratio of $.340$, indicating that households in the rural area have lower chances of being food secure. Higher chances of being severely food insecure and also that the odds of being food secure when a household is in the rural area decreases by $.340$

The sixth independent variable is gender, which is the main focus of the study. Gender is a categorical variable coded 0 for male and 1 for female. The gender coefficient had a p value of $.009$, which is statistically significant at 1 percent, meaning that gender contributes significantly to the model. The coefficient value is 1.002 and odds ratio is 2.725 meaning that male-headed households had a higher probability of being food secure than being severely food insecure and that the odds of being food secure in male headed households were 2.725 times more than those in the female-headed household. Thus, female-headed households were more likely to fall in the severely food insecure category.

The seventh and last independent variable at this level is employment status, which is coded 0 for unemployed and 1 for those employed. The p-value is 0.024 , which means it significantly contributes to the prediction power of the model at five percent level of significance. The coefficient of employment status (unemployed) is -0.816 and the odds of $.442$ meaning that households whose head is unemployed have a lower probability to be food secure and higher chances of being severely food insecure whereby the odds

of households with unemployed head to be food secure decreases by .442. The indicated results are in line with the third variable, which is income. Households with the bread winner not being employed means they have either no steady income or no income at all therefore it is most likely for them to be food insecure.

- **Mildly food insecure and severely food insecure**

The second level of results presented in Table 5.25 is mildly food insecure as the dependent variable against the independent variables which are all compared with the reference point (severely food insecure). The first results presented on this level is that of mildly food insecure as dependent variable and household size as the independent variable. The p-value for the result is 0.002, which is significant at 1 percent significance level. Household size is a significant predictor of the probability of a household to be either mildly food insecure or severely food insecure. The coefficient was at -0.424 and odds ratio of .654. The negative coefficient indicates that an increase in household size decreases the probability of the household to be mildly food insecure but rather increases the chances of being severely food insecure, and also that the odds of such a household to become mildly food insecure decreases by .654 with an additional member of a household.

The second independent variable presented is number of years schooling for household head. The p-value is .266 which is not significant but p value results obtained on overall statistics test in Table 5.18 shows a significance level at 10 percent. The coefficient value is 0.095 and odds ratio of 1.099, which means an increase in education level of household head increases the chances for that household to be in the category of mildly food insecure rather than being severely food insecure and that the odds of this household to be mildly food insecure increases by 1.099 with a unit increase in education level. This could also mean that, if the education level for the household head would increase further, the household would actually move away from this category and move into the food secure category. Educated people have better chances of getting very well paid jobs but also the thinking capacity of such people is far much better than those with less education.

The third independent variable is income. The p-value for income is 0.000 which means income is a significant predictor of the probability at one percent of a household to either be mildly food insecure or severely food insecure. The coefficient of income is 1.793 and the odds ratio of 6.008. The positive coefficient mean that an increase in household income increases the probability of the household to be mildly food insecure than severely food insecure. Since income is in logs, the results are interpreted in percentage hence, a percentage change in household income increases the odds of the household being mildly food insecure by 6.008. If income keeps on increasing the household can actually move out of this category and fall in the food secure category.

The fourth independent variable in this level is age of household head, the p values in both the overall statistics (likelihood ratio tests) shown in Table 5.18 ($p=.402$) as well as the p values in the regression results ($p=.953$) shows that age of household was not statistically significant at all levels hence it is not a significant predictor of the model.

The fifth independent variable at this level is location, which is a categorical variable where 0 is for rural and 1 for urban population. The results shows that location was not statistical significant ($p=0.544$) but the overall statistics in table 5.18 shows a p-value of 0.000 significant at 1 percent. The coefficient of rural dwellers is $-.397$ and odds ratio of $.676$ indicating that households in the rural area have lower chances of being mildly food insecure and higher chances of being severely food insecure, and also that the odds of being mildly food insecure for them decreases by $.676$. This means that if the living standards of people in the rural areas do not change most of these people eventually would fall in the severely food insecure category.

The sixth independent variable at this level is gender, which is the main focus of the study. Gender is categorical variable denoted 0 for males and 1 for females. The gender coefficient had a p-value of $.431$, which is not significant but, as shown in Table 5.24, the overall gender statistics shows p-value of 0.006 which is significant at 1 percent. The coefficient value for gender (males) is $.369$ and odds ratio of 1.447 meaning male headed household have a higher probability of being mildly food insecure than being severely food insecure and the odds of them being mildly food insecure increases by

1.447. Thus female-headed household were more likely to fall in the severely category of food insecurity.

The seventh and last independent variable at this level is employment status, which is coded 0 for unemployed and 1 for those employed. The p-value is 0.003, which means it significantly contributes to the prediction power of the model at one percent level of significance. The coefficient of employment status (unemployed) is -1.491 and the odds ratio of .225 meaning that the households whose head is unemployed have a lower probability to be mildly food insecure and higher chances of being severely food insecure, whereby the odds of households with unemployed heads to be mildly food secure decreases by .225. The results are in line with the third variable, which is income. Households with the bread winner not being employed means they have either no steady income or no income at all therefore it is most likely for them to be food insecure.

- **Moderately food insecure and severely food insecure**

The third and last results of the regression are between moderately food insecure and severely food insecure against the seven independent variables. At this level, the households are all food insecure but looking at the severity levels those that are moderately food insecure are better off than those that are severely food insecure. The first independent variable at this level is household size, the p-value is 0.040, which is significant at the five percent significance level. This means that household size was a significant predictor of the probability of a household to fall into either of the categories. The coefficient shows a value of -0.176 and odds ratio of 0.838. The negative coefficient value indicates that an increase in household size decreases the chances of the household to be moderately food insecure but increases the probability of being severely food insecure and that, with an additional household member, decreases the odds of being moderately food insecure by 0.838.

The second independent variable at this level was number of years schooling of household head. The p-value was 0.558, which is not significant but in the likelihood results shown in Table 5.18. It shows a p-value of 0.087 significant at 10 percent. The

coefficient value is 0.025 and odds ratio of .933. This indicates that the education level of household head increases the probability of the household to be moderately food insecure than severely food insecure, and that the odds of the being moderately food insecure increases by 0.933 with a unit increase in educational levels. The results makes sense because it is easier for someone with better education to get a well-paying job and it is therefore unlikely for such a household to be food insecure.

The third independent variable for the level is income. It indicates that income has a p-value of 0.000 which is significant at one percent, meaning that income is a significant predictor of the probability of a household food security to either be moderately food insecure or severely food insecure. The coefficient of income is 1.428 and the odds ratio of 4.170. The positive coefficient mean that an increase in income levels of a household, increases the probability of the household to be moderately food insecure rather than severely food insecure. Since income is in logs, the results are interpreted in percentage, hence a percentage change in household income increases the odds of the household being moderately food insecure by 16.739. Such that if the income keeps on increasing the household can actually move out of this category and fall in the mildly food insecure category and further into the food secure category.

The fourth independent variable at this level is age of household head, the p-values in both the overall statistics (likelihood ratio tests) shown in Table 5.18 ($p=.402$) as well as the p-values in the regression results ($p=.436$) shows that age of household was not statistically significant at all levels, hence it is not a significant predictor of the model and, in this regard, the researcher omits this variable and goes on to the next variable.

The fifth independent variable in this section is location, which is a categorical variable where 0 is for rural and 1 for urban population. The results show that location was statistical significant ($p=0.000$) in the model at one percent level of significance. The coefficient of rural dwellers is -1.857 and odds ratio of 0.156 indicating that households in the rural area have a lower chance of being moderately food insecure and higher the chance of being severely food insecure, and also that the odds of being moderately food insecure for rural households decreases by 0.156. This means that, if the living

standards of people in the rural areas do not change, most of these people would eventually fall in the severely food insecure category.

The sixth independent variable at this level is gender, which is the main focus of the study. Gender is a categorical variable denoted by 0 for males and 1 for females. The gender coefficient had a p-value of 0.003 for males, which is significant at one percent, meaning that gender (male) is a significant predictor of the probability of a household to either be moderately food insecure or severely food insecure. The coefficient value for gender (male) is 1.956 and odds ratio is 7.073, meaning that male headed household had a higher probability of being moderately food insecure than being severely food insecure and the odds of them being moderately food insecure increases by 7.073 times more than those of the female-headed household. Thus, female-headed households were more likely to fall in the severely food insecure category.

The seventh and last independent variable at this level is employment status, which is coded 0 for unemployed and 1 for those employed. The p-value is 0.028, which means it significantly contributes to the model at five percent level of significance. The coefficient of employment status for the unemployed is 0-.752 and the odds ratio is 0.471, meaning that the households whose head is unemployed have a lower probability of being moderately food insecure and higher chances of being severely food insecure and also the odds of households with unemployed head to be moderately food insecure decreases by .471. The indicated results are in line with the third variable, which is income. Households with an unemployed bread winner means they have either no steady income or no income at all therefore it is most likely for them to be food insecure.

5.9 SUMMARY AND CONCLUSION

This chapter discussed results obtained from the findings on gender analysis of household food insecurity in the south eastern region of Malawi. To achieve this, the study obtained household data through the questionnaire method. The results were obtained through different steps following the set empirical objectives.

The first step was a description of the demographics and the economic status of the study area, which helps a researcher to be accustomed with the population involved in the study and their household characteristics, for example family size, gender of head of household, employment status, household income and expenditures and many more. The chapter went further to describe results on the general picture of food security status for the study area using three measures Household Food Insecurity Access Scale (HFIAS), Household Dietary Diversity Score (HDDS) and Coping Strategy Index Score (CSI). Firstly a correlation analysis between the three measures was conducted where the results indicated that there existed a statistically significant correlation between the three measures. This means that the three selected measuring instruments complemented each other in measuring the food security status of households in the selected area. The chapter then presented results on food security status of the households in the study area, it was revealed that after employing all the three measures of food security each one indicated the existence of high levels of food insecurity at household level. Results obtained from the HFIAS showed that a higher percentage of the household were actually severely food insecure (percent) during the time the data was obtained which is a serious problem. The study also obtained results from HDDS which measured the food security status of household using the dietary intake it showed that a higher percentage of the population were actually very low diversified meaning they could not afford to eat a balanced meal every day. Lastly CSI illustrated results on the frequency on usage of the coping strategies by households, results showed the most common strategy employed at least on daily basis by the households was that of relying on less preferred or less expensive foods which is in the category of dietary change.

The third step was a discussion on the main aim of the study of gender and food insecurity. The results obtained from a cross tabulation between HFIAS and gender of household showed that, there was a statistically significant difference between the two variables a higher percentage of women (78 percent) than men (58 percent) were severely food insecure and results obtained from HDDS indicated that women headed households were lower in dietary diversity as compared to their counterparts signifying

that female headed households were more food insecure than male headed households. Results obtained from the CSI indicated that female headed household had an overall higher mean scores in all coping strategies indicating that they used more coping strategies than male headed households. Overall the results presented showed that female headed households were worse off in terms of food security status as compared to their male counterparts.

Lastly, the chapter presented results from the two regressions of the study. The first regression indicated the vulnerability of households to food insecurity. Before the actual results, the chapter firstly presented results on how fit the regression model was employing the model summary, Anova test and multicollinearity test. All tests showed that the regression model was of good fit. The chapter, thereafter, presented findings from this regression. As indicated in Section 4.8.2, a multiple regression model was employed where CSI was used as a dependent variable and the socio-economic determinants that may increase or decrease the use of a coping strategy as the independent variable. The results showed that gender, location, household size, income, and employment status were statistically significant in describing the households vulnerability towards food insecurity, whereby female-headed households (which is the main focus of the study) was proven to be the highest contributor to the model with the highest coefficient meaning that female-headed households were more vulnerable to food insecurity and employed more coping strategies to mitigate the problems of food shortages.

The second regression model presented in this chapter was on determinants and causes of prevalence of food insecurity. In this regression, a multinomial logistic regression model was used where the socio-economic characteristics were selected as the (independent) explanatory variables that may influence a household's food insecurity status and four categories of food security status (food secure, mildly food insecure, moderately food insecure, and severely food insecure) as the dependent variable. After checking for viability of the model, all test results (correlation analysis, goodness of fit, pseudo R-squared and likelihood ratio tests) indicated that the model

was of good fit, hence the study went on with the regression. The results in the regression model were divided into three categories, (food secure, mildly food insecure and moderately food insecure) comparing all three to severely food insecure, which was selected as the baseline. In the first results of food secure against severely food insecure showed that male-headed households had a higher probability of being food secure than being severely food insecure and that the odds of being food secure than severely food insecure in male-headed households were 2.725 times than those in female-headed households. Similarly, the other remaining two categories showed that male-headed households had a higher probability to be in the better off category in terms of food security status. The other socio-economic determinants had different results in all three categories. The next chapter concludes the study and provides recommendations on what could be done based on the study results to improve this problem.

CHAPTER 6: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

The study proposed to analyse household food security status emphasising the gender dimensions between male and female-headed households in the South Eastern region of Malawi. The rationale behind the study was on the basis of a huge outcry on increases of food insecurity among most female-headed households, especially in developing countries. Addressing the problem of food insecurity has its own challenges, which most studies have come across. Since food security is multidimensional in nature, issues of coming up with the right measure has also added to this problem. In the context of Malawi, the problem of food insecurity has become wide spread in the past decade especially where matters of gender dissection are concerned. To achieve the main objective of this study, a number of theoretical, as well as empirical objectives, were employed.

The theoretical objectives employed in the study were to review the background literature of food security/insecurity and the measures which were discussed in the first section of chapter 2, the other theoretical objectives also discussed in detail in the same chapter two were review the literature on the food security on global and regional levels, review the nature and theoretical causes of food insecurity, review the socio-economic determinants of food insecurity, and review the literature and studies on gender-based food insecurity in the developing countries. These were discussed in detail in chapter 2 and 3. The theoretical part of the study was reviewed from journal articles, research papers, conference papers, government reports and documents, relevant textbooks, and newspaper articles. The information on Malawi was sourced from National Statistics Office Malawi (NSO). International information were sourced from reports amassed by (World Food Program) WFP, World Bank and (Food and Agriculture Organisation) FAO among others.

The study further examined the empirical objectives, which were hypothesised from the theoretical literature as follows:

- Assess and compare the food security status in female and male headed households;
- Identify the level of food insecurity between rural and urban household;
- Identify the coping strategies for food insecure male and female-headed households both in the rural and urban areas;
- Determine the vulnerability of households towards food insecurity; and
- Assess the underlying determinants of food insecurity in female and male headed household for rural and urban areas.

In a way of contributing to the body of knowledge in terms of food insecurity in Malawi, the study conducted an empirical research based on a comprehensive survey that was collected by the researcher in the selected districts of the South Eastern region of Malawi to analyse the gender dynamics of food insecurity status of household in the area. Due to the fact that the geographical setting of the population in this area is divided into two subgroups (rural and urban population), the study also included emphasis on the rural and urban distinction to determine which households were mostly affected by food insecurity. The fact that this study collected primary data gave the researcher the opportunity to access data that is otherwise not available from secondary sources. The data and the results of the study, therefore, contributes to the body of knowledge by making available new information on food insecurity dynamics in Malawi and recommendations on what could be done in Malawi or areas that have similar characteristics of those of the sample in order to minimise this food insecurity. This chapter, therefore, consists of a summary of the study with emphasis on the results from the empirical analysis and recommendation drawn from the results.

6.2 THE THEORETICAL FOUNDATION OF THE STUDY

The theoretical foundation of the study were discussed in accordance with the theoretical objectives of the study mentioned in the previous section of this chapter. The theoretical objectives were set under the primary objective of the study, which was to analyse the household food insecurity and the coping strategies employed by both male

and female-headed household from rural and urban households in selected districts of the South Eastern region of Malawi. The chapter has shown the theoretical background of food insecurity from conceptualisation to what is currently understood as the consensus position of food insecurity.

In the first section, the chapter addressed objective 1 and 2 by highlighting the historical background of the concept. It showed how the food crisis, which occurred in the mid-70s, led to the beginning of concerns around the term food security. Following this, the chapter reviewed the shifts or paradigms established by Maxwell (1996:156) and many other scholars, which helped in shaping the concept of food security. The three shifts described were a shift from (a) the global and the national level to the household and the individual levels, (b) a food first perspective to a livelihood perspective, and (c) objective indicators to subjective perception. The chapter demonstrated the first shift as one that focused on the movement from the norm of dealing with food insecurity as a nation or global problem but rather narrowing the situation further down to the household and individual level and at the same time changing the focus of the problem from being contributed by supply of food but rather the availability of food. Subsequently, the chapter described the movement in the second shift being related to shifting the concept from a food first perspective to a livelihood perspective. In this case, the motive of the shift was based on the fact that, though food was regarded as a very important element at the household level, it shouldn't be treated independently as a fundamental need. It should be studied together with other important livelihood needs which are also important, such as the need for clean water, education, health care shelter, clothing, sanitation, and many more of which they have to balance in terms of effort and resources devoted to household satisfaction. The last paradigm was described as a shift from objective indicators to subjective perception of food security which mainly dealt with people's perceptions towards food insecurity which needed to be incorporated in determining the concept.

The chapter further reviewed literature on the dimensions of food security (also called the main four pillars) which are categorised in four dimensions of food availability,

access to food, utilisation, and stability to food. These sections discussed in detail how these four categories originated but also the importance of the four main pillars in determining food security. Added to that, the chapter discussed the definitions of food security. In this section the chapter acknowledged the existence of different definitions which explains the term food security, but preference was given to the mostly acknowledged definition set by the Food and Agricultural Organisation (FAO). There was a clear indication was that the definitions of food security have been changing since the day the term food security was conceptualised. Part of the changes were linked to the developments in the paradigms shifts of the concept. The section also showed how the four main pillars are linked in terms of defining the concept.

The chapter went further to review different measures that exist to determine food security status. A clear distinction was shown on how national and household food security status can be measured. The section concluded that since food security is multidimensional in nature scholars have not yet established a composite measure that incorporates all the four pillars. Thereafter, the chapter reviewed the global trends of food security status. It was revealed that food insecurity is still high especially in African countries where poverty is also high. In the last three sections the chapter reviewed some of the causes of food insecurity, as well as the socio-economic determinants of food security. It was revealed that natural disasters, increase in food prices, rapid population growth, and high levels of poverty are amongst some of the causes of food insecurity. At the household level, increase in household size, lower incomes, and lower levels of education attainment were some of the socio-economic characteristics found by studies to influence food insecurity in households.

Lastly, the chapter concluded by reviewing literature on gender and food security at the household level. It was revealed that there exists a huge gender disparities in food security status amongst most developing countries, which has been indicated by scholars and developmental organisation. The section highlighted some of the empirical results found by most studies. It was found that the problem is common in isolated countries, and it has been conceded that female, unlike male-headed

households, are mostly food insecure. Some of the reasons identified were due to various limitations women face to attain food security such as accessibility to land, limited access to credit facilities, and lower education levels just to mention a few. The literature presented so far has been on the general outlook of food security, most of the emphasis has been on the global and regional view of food security.

6.3 MALAWI PROFILE AND ITS SOCIO-ECONOMIC CHARACTERISTICS

In this chapter, the study profiled Malawi in terms of its economic and demographic dynamics based on the trends and outcomes. Amongst the variables discussed, the geographical position of the country, employment status, population growth and distribution, health outcomes, education levels, economic status (poverty rates), agricultural production and food security status were included. A summary of the chapter was presented as follows: the first section addressed the geographical position of the country, as indicated from Figure 3.1, it is evident that Malawi is a land locked country that is bordered by three countries. The country is divided into three regions that are further separated into 28 districts. The chapter indicated that there has been rapid population growth, from the first census in 1966 to the last census in 2008. The population had increased from 4 million to 13.1 million, with projections of population growth to 20.1 million by 2020 (NSO: 2012).

The chapter revealed some of the problems the country has been facing and may continue to be a threat if no proper measures are put in place. Considering the socio-economic factors, Malawi has more than half of its population residing in the rural areas and mostly poor. Most of these people rely on subsistence farming. The chapter showed that the country had been experiencing stable economic growth since 2006 with an average real GDP growth rate of seven percent between 2006 and 2010, and later a slump in 2012 of about two percent followed by a rebound of five percent in 2013. However, due to the issue of “cash gate” the country faced a lot of challenges, including the cessation of aid from most donors. This put the country in much jeopardy leading to worse-off living conditions for most people in the country. In terms of employment and education status of the country, the chapter shows that there are high illiteracy levels in

the country mostly among females as a result there's very few people that have well-paying jobs.

In terms of food security status, which is the main objective of the study, the chapter discussed this issue at length. It is estimated that over 30 percent of the total population in Malawi were very low food secure. As of 2012 this meant that one in every three people lived in very low food secure situation. The most vulnerable were those residing in rural areas and, more prominently, in female-headed households. Recent developments on food security status in the country reveal that the problem is far from being resolved (FEWS net, 2016; WFP, 2016). Projecting the country's food security status by the number of undernourished population, the chapter revealed that cases of undernourishment in Malawi have always been high registered at 20.7 as of 2015. Whereby most households are not able to consume the required dietary intake, which leads to undernourishment. Some of the main causes revealed have been the high levels of poverty in the country, mostly common amongst the rural poor, in particular women headed households who cannot afford to acquire all required groups of foods due to poverty (NSO, 2014).

The chapter further addressed some of the coping strategies employed by the food insecure population in the country. The most common strategy employed was relying on less preferred food. This is when households seek other food types, which are cheaper, though not as nutritious but are opted anyhow just to fill up the stomach. Such strategies may be part of the contributing factors to cases of undernourishment which are so high in the country, particularly in children under the age of five years. Other coping strategies employed mentioned in the chapter are limiting the portions of meals, reducing the number of meals, for example, instead of eating three main meals a day households reduce them to two or even one. Restricting consumption of meals by adults in order to feed children first is another strategy employed as well as borrowing food or relies on help from others.

It is worth noting, as revealed in the chapter, that gender inequality exists in most spheres of life in Malawi, for example in terms of employment status, education levels and food insecurity most of those deprived, or rather the disadvantaged, are women, In terms of food security the chapter revealed that almost 80 percent of food production in the country is actually produced by women at the household level. The question lies on that why is it the case that women now become the most disadvantaged in terms of food security. Part of this and many others questions is what the study implies to investigate. The next chapter addresses the methodology intended for the study.

6.4 THE METHODOLOGY

The chapter discussed in detail the methodology adopted in this study in terms of the research designs, sampling methods and food security measures employed. The discussion in the chapter was in line with the primary objective of the study, which was to conduct a gender-based analysis of household food insecurity and the coping strategies employed by both rural and urban households in selected districts of the South Eastern region of Malawi. Based on the primary objective of the study, theoretical and empirical objectives were also formulated. The study employed a quantitative research approach in which 550 questionnaires were used to collect data from households in the study area located in the urban and rural areas. After data cleaning only 501 questionnaires were found relevant to be used for data analysis. A random sampling technique was employed for data collection which involved simply walking into the selected EAs and select every fourth house until the desired number of household was reached. The questionnaire covered different aspects of household characteristics from demographics, socio-economic characteristics to indicators adopted by the study to measure food security at the household level.

To measure food security status of households three different indicators were adopted namely, the Household Food insecurity Access scale (HFIAS). This was used as the main measure of food security status, which distinguished households into four categories of food secure, mildly food insecure, moderately food insecure, and severely

food insecure categories. The second indicator adopted was the Household Dietary Diversity Score (HDDS). The chapter illustrated how the HDDS was used to measure the dietary/nutrition intake of individuals in the households, which later translates to whether households are food secure or not. The last indicator adopted was the Coping Strategy Index. The study showed how the CSI was used to determine the frequency of usage of coping strategies by households and later compare them between gender and location of households, and also to determine household's vulnerability towards food insecurity.

Lastly, the chapter outlined the regression models employed by the study. In this regard two regression models were illustrated: the first was one that answered the third objective of the study, which was to determine the vulnerability of food insecurity at household level. The chapter illustrated how a multiple linear regression model was adopted to analyse this objective. The chapter further illustrated the second regression model employed by the study, which was a multinomial logistic regression explaining the underlying determinants and causes of food insecurity in female and male-headed household for rural and urban areas. The next chapter addresses the results obtained from the regression as well as the main descriptive characteristics in the study.

6.5 SUMMARY RESULTS ON GENDER AND HOUSEHOLD FOOD SECURITY STATUS

The presentation of the results chapter was divided into three sections. The first part discussed the demographic analysis of the study which was divided into two parts, the economic characteristics and the general demographic characteristics of the sample. The second part presented the results on gender and food security. Finally, the chapter presented results on the two regression analysis. In terms of the demographics results presented in the first section, it was observed that, from the total of 501 households, 64 percent of the households were headed by male and 36 percent by females. Despite the huge gap, which shows that there were less female headed households, the study mainly focused on the welfare of the household with focus on the gender of the head of household. In the analysis of marital status of the head of household the results

presented showed that 98 percent of male-headed household were married and only 2 percent were not married. As for females, 26 percent were married and 74 percent were not married, which entails that a majority of female-headed households were sole bread winners for the households with no help from a partner. The chapter further showed that, in terms of location, 51 percent of the households were from rural settlements and 49 percent from urban settlements. In terms of the economic status of households, it was found that there existed inequalities in terms of employment status where a majority of female-headed households were unemployed as compared to their male counterparts. Similarly, in terms of literacy levels there were more females that had no schooling at all as compared to the males. With this background it demonstrates that there existed gender inequalities with women being the disadvantaged group.

The chapter went further to describe results on the general picture of food security status for the sample using three measures of food insecurity namely the HFIAS, HDDS and CSI. Results obtained from the HFIAS demonstrated that a higher percentage of the household were actually severely food insecure during the time the data was collected. The study also obtained results from HDDS, which measured the food security status of household using the dietary intake it showed that a higher percentage of the sample were actually very low diversified meaning they could not afford to eat a balanced meal every day. Lastly, CSI illustrated results on the frequency on usage of the coping strategies by households. the results showed that the most commonly used strategy at least on a daily basis by the households was “relying on less preferred or less expensive foods” which is in the category of dietary change.

The third step was a discussion on the main aim of the study of gender and food insecurity. Results obtained from HFIAS showed that a higher percentage of women (78 percent) than men (58 percent) were severely food insecure. Results obtained from HDDS indicated that female-headed households were lower in dietary diversity as compared to their counterparts signifying that female-headed households were more food insecure than male-headed households. Results obtained from the CSI indicated that female-headed household had an overall higher mean score in all coping strategies

indicating that they used more coping strategies than male-headed households, which was also an indication of vulnerability to food insecurity.

Lastly, the chapter presented results of the two regression models. The first regression was on vulnerability of households to food insecurity. Firstly, the diagnostic tests of the model fitness were presented to show how fit the regression model was based on the model summary. ANOVA test and multicollinearity test, showed that the regression model was a good fit. The chapter thereafter presented findings from these regressions. As indicated in section 4.8.2, a multiple regression model was employed where CSI was used as a dependent variable and the socio-economic determinants that may increase or decrease the use of coping strategy as the independent variables. The results showed that gender, location, household size, income and employment status were statistically significant in describing the households vulnerability towards food insecurity, whereby female-headed households (which is the main focus of the study) was proven to be the highest contributor to the model with the highest coefficient meaning that female-headed households were more vulnerable to food insecurity and therefore employed more coping strategies to mitigate the problems of food shortages.

The second regression model presented in the results chapter was on determinants and causes of prevalence of food insecurity. In this regression, a multinomial logistic regression model was estimated where the socio-economic characteristics were selected as the (independent) explanatory variables that may influence household food insecurity status, and the four categories of food security status (food secure, mildly food insecure, moderately food insecure and severely food insecure) as the dependent variable. After checking for viability of the model all test results (correlation analysis, goodness of fit, pseudo r-squared and likelihood ratio tests) indicated that the model was of good fit hence the study went on with the regression. The results in the regression model were divided into three categories (food secure, mildly food insecure and moderately food insecure) comparing all three to severely food insecure, which was selected as the baseline model. In the first results of food secure against severely food

insecure showed that male-headed households had a higher probability of being food secure than being severely food insecure and that the odds of being food secure in male-headed households were 2.725 times higher than those in the female-headed household. Similarly, the other remaining two categories showed that male-headed households had a higher probability to be in the better off category in terms of food security status. The next section presents the conclusion for the whole study as well as recommendations on what could be done based on the study results to improve this problem.

6.6 CONCLUSION OF THE STUDY

The study analysed if there exists any gender disparities in terms of food security status between male and female headed household in the area of study. To achieve this the study conducted quantitative research using a questionnaire to collect data from 550 households in the study area. After data cleaning, only 501 questionnaires were found relevant for use. The study laid out theoretical objectives which were followed in shaping the literature on the concept of food insecurity. The study further examined empirical objectives which were hypothesised from the theoretical literature and analysed using Statistical Program for Social Sciences (SPSS).

The study acknowledged the fact that increases in gender dichotomy in food insecurity is not a new topic in Malawi. Where female-headed households, as well as those in the rural areas have been found to be more vulnerable to food insecurity in the country. However, the biggest problem, which most of the studies have not tackled, rests on the fact that most of the studies conducted in the country have relied so much on national data which focuses more on food production, income, and calorie intake, and do not give a clear picture of all indicators of food insecurity. The other gap was that overreliance on national data may not enable the researcher to capture all the household's dynamics, which keeps on changing with time due to the dynamic nature of household characteristics. The other lacking aspect in the area of food security on studies conducted in Malawi was on the measures of food security adopted by most studies. Most studies isolated one measure of food security, which ideally could not

capture all dimensions of food security/insecurity. Under these shortfalls, this study analysed food security at the household level employing three different measures of food security, which captures different aspects of food insecurity, namely, the HFIAS, the HDDS and the CSI.

In summary, the study has demonstrated findings that are in line to what was discussed in the literature chapter: that choice of food security measures has a significant value in identifying food security status of household. After employing multiple indicators to determine the status of household food security the study has shown how HFIAS, HDDS and CSI can independently determine the levels of household food insecurity but also identify those that are more vulnerable between male and female-headed households. In the results obtained from the HFIAS households were categorised as either being food secure, mildly food insecure moderately food insecure and severe food insecure. It was indicated that few male-headed household fell in the category of severe food insecure and most of them were actually in the category of food secure. The same results were identified in the consideration of location of residence where most rural dwellers as compared to urban dwellers were found in the category of severe food insecure. When the HDDS was employed, female-headed households were found to be more food insecure as they were registered to eat fewer food groups as compared to their counter parts and, lastly, with the CSI the female-headed households were found to employ more coping strategies than the counterparts hence regarded as more food insecure.

The study also established similar findings after employing two different regressions models. In the first regression model the study analysed the determinants of household's vulnerability to food insecurity, the study concluded that gender (female) had the highest coefficient in the model, meaning that female-headed households were more vulnerable to food insecurity than their male counterparts, hence they employed more coping strategies. In the second regression, the study analysed some of the causes of household food insecurity, the findings demonstrated that gender of households played part in determining which food security category a household was

placed where female households had a higher chance of falling into a worse off category than their counterpart. Other indicators such as location (rural area), household size, household total income and employment status contributed to which category of food security a household fell. Bigger households had a higher chance of falling in a worse off category of food insecurity as compared to the smaller households. Similarly, the lower the income of the household the more likely that the household fell in the worse off category of food insecurity. The next section discusses the policy recommendations of the study.

6.7 POLICY RECOMMENDATIONS

The study analysed the food security status of households, differentiating between how female and male-headed household are affected by the problem of food insecurity. The study achieved this by employing three different measures of food insecurity which captures different elements of food insecurity. The study found that, after employing all measures of food insecurity independently, each one presented results which revealed that female-headed households were worse off as compared to their male counterparts in terms of food security. In the determinants of causes of food insecurity the study revealed that income size, employment status, location, and household size were amongst some of the causes of food insecurity in the study. In terms of vulnerability to food insecurity, the frequency and severity of using the coping strategies were more in female than in male-headed households meaning female unlike male-headed households were more vulnerable to food insecurity. In the descriptive demographics of the study- it was revealed that there were more females that were not educated, or employed and had less income as compared to their male counterparts.

Based on the evidence established in the findings of this study, the study has a number of recommendations which may be of help for policymakers in order to eliminate gender inequality in terms of access to food at the household level. The study recommends policies that deals with the root cause of the problem as to why females are, in most cases, more vulnerable to food insecurity than their male counterparts. Some of the recommendations of the study are discussed in the section to follow.

6.7.1 Improve education for females

Education policies should deliberately take into account the fact that girls are still behind boys which translates into vulnerable female-headed households who cannot find employment due to lack of employable skills. Therefore, there is dire need for government to improve policies that deal with strengthening girl child education by educating not only the girls but also the parents, especially those in the rural areas, about the importance of girls' education.

6.7.2 A change in cultural practices

Linked to the lower education achievements are cultural practices that portrays women as dependent on men. Once the man dies or divorces the woman, she becomes vulnerable to anything that was initially under the control of the man, including access to land and other factors of production. Government should therefore look into some of the cultures practised in different communities and set by-laws that should discourage practices like early marriages, stopping girls from attending, for example, initiation ceremonies during school days. Policymakers should revisit the re-admission policy and access information for those that dropped out of school due to different reasons to be able to go back to school. In the end, if more girls are educated they will be able to contribute to the welfare of their families, when they are themselves mothers and be independent.

6.7.3 Promote women economic activities

Affirmative action should still be part of policies, especially to encourage girl and women participation in economic activities, which may help propel their incomes to same levels as those of male-headed households. These may include access to land for agricultural activities which in most cases female are found to be landless. Some of these land issues arise from the structure of ownership and inheritance which still put females at a disadvantage.

6.7.4 Economic independence for women

There should be civic education especially among the rural women on the importance of economic independence. Civil society organisation and other non-state actors should actively promote economic independence of women by making targeted loans and entrepreneurship training for women available, especially in rural areas. The study revealed that most of the female-headed households who were also highly vulnerable to food insecurity were widows. This implies that they depended on their husbands for their wellbeing and once a husband dies the women becomes helpless. It is also compounded by practices in the rural areas where the relatives of the deceased husband takes away the land from the widow leaving her prone to food insecurity.

6.7.5 A composite food security Index

Lastly, the study has revealed that the three measures of food insecurity, although complementary to each other, have different strengths. Thus, a combined multidimensional index that takes weighted components of all three measures is suggested. That measure of food insecurity will have within it all the attributes that currently exist in isolation. The only area that requires more work is how much weight should be assigned to each of these three measures so that the index does not become biased to one aspect of food insecurity.

6.8 LIMITATIONS OF THE STUDY AND AREAS FOR FURTHER RESEARCH

While the study has demonstrated the existence of gender inequality on food security between male and female-headed households, using the three measures of food security, the limitations observed in the study are mainly on the representation of data. As the analysis was based on a small part of the country the findings may not be generalised to the national level. Likewise, gender inequality was treated at the household level but intra-household issues, for example, between males and females

within the same household, were not subject of this discussion. The study, therefore, recommends further research on this area employing the same methodology and the three measures of food security but on a larger scale for example at national level.

Another area for further study, as pointed out in the recommendations, is the development of a composite measure of food security that combines the three measures of food security into one index. The scale for each of the three measures already exist, thus one would only need to justify the weighting of the different components to come up with a weighted composite index of food insecurity measure.

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APPENDICES

Appendix 1: Chi square test for cross tabulation of HFIAS and gender

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	21.866 ^a	3	.000
Likelihood Ratio	22.986	3	.000
Linear-by-Linear Association	15.279	1	.000
N of Valid Cases	501		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.00.

Appendix 2: Chi square test result for cross tabulation of HDDS and gender

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	33.221 ^a	10	.000
Likelihood Ratio	33.726	10	.000
Linear-by-Linear Association	12.836	1	.000
N of Valid Cases	501		

a. 3 cells (13.6%) have expected count less than 5. The minimum expected count is .71.

Appendix 3 Chi square test result for cross tabulation of HFIAS and location

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	169.877 ^a	3	.000
Likelihood Ratio	187.602	3	.000
Linear-by-Linear Association	136.239	1	.000
N of Valid Cases	501		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.69.

Appendix 4 Chi square test result for cross tabulation of HDDS and location

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	183.602 ^a	2	.000
Likelihood Ratio	201.021	2	.000
Linear-by-Linear Association	170.336	1	.000
N of Valid Cases	501		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 25.92.

Appendix 5: Questionnaire

Household questionnaire 2016

Questionnaire #		Date	
House Number		Interviewer	

Please note that the Head of the household should preferably answer the questionnaire

A BACKGROUND INFORMATION					
1	What is the position of the respondent in the Household?			Head (1)	Spouse (2)
2	Gender of the head of the household			Male (0)	Female (1)
3	Record one main material used for the roof of the dwelling				
	Iron sheets	Tiles	Thatching	Plastic	
4	How many people stay permanently on the site				
5	What language do you mostly speak at home?				
	Chichewa	English	Lomwe	Sena	Yao
	Tumbuka	Other: _____			
6	How long have you (respondent) stayed in this area(years)				

B HOUSEHOLD COMPOSITION AND HEAD OF HOUSEHOLD INFORMATION	
<i>Please provide the following information:</i>	
1	Number of people in the household

2	Age of head of household and Spouse (if applicable)	Head										Spouse																			
3	Sex (Male = 0; female = 1)	Male										Female																			
4	Marital Status of household head	Married or living with a partner										Un-married or living without a partner																			
5	Employment Status of head of household	Informal activity										Employed										Unemployed									
6	Number of years schooling of Head of Household	0	1	2	3	4	5	6	7	8	1	2	3	4	Diploma	Degree	Post Grad														
7.	Number of years schooling of Spouse	0	1	2	3	4	5	6	7	8	1	2	3	4	Diploma	Degree	Post Grad														
8	Number of Children in Household	0 – 5 Years										6 – 13 Years										14- 17 Years									

C	INCOME (Take home pay per month of all members of household) MK.....	
1	Wages/salaries (Formal) for the whole household estimate	MK
2	Help (family/relatives/help in kind) for the whole household estimate	MK
3	Informal activities for the whole household estimate	MK
4	Other (Specify) for the whole household estimate	MK

D	HOUSEHOLD EXPENDITURE	
<i>How does your household spend their income per month, as indicated above?</i>		
	ITEM	KWACHAS per month
1	Housing	
2	Water.	
3	Energy	
	Electricity	
	Firewood	
	Charcoal	
	Paraffin	
3	Food	
4	Cleaning Material	
5	Cigarettes & Tobacco	
6	Beer, wine & spirits	
7	Transport	
8	Clothing	
9	Furniture	
10	School	
11	Entertainment (Movies etc)	
12	Medical Expenses	
13	Insurance e.g. funeral scheme	
15	Gambling	

16	Savings	
18	Housekeeping Services (e.g. Garden)	
19	Communication (Cell and Telephone)	
21	Loan repayments	
22	Other: Specify	

E Household Food Expenditure	
How much do you spend on the following items,	
Maize Meal	MK
Potatoes	MK
Vegetables	MK
Fruits	MK
Meat including chicken	MK
Eggs	MK
Fish and fish products	MK
Milk and Milk products	MK
Salt	MK
Oils/Fats	MK
Sugar	MK
Other not mentioned above	MK

F Household Food Insecurity Access Scale (HFIAS)				
<i>(rarely: once or twice; sometimes: 3 to 10 times; Often: more than 10X in the last 4 weeks)</i>				
1	In the past four weeks, did you worry that your household would not have enough food? (if answer is No, skip to Q2)		1: Yes	0: No
1a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
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? (if answer is No, skip to Q3)		1: Yes	0: No
2a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
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? (if answer is No, skip to Q4)		1: Yes	0: No
3a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
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 (if answer is No, skip to Q5)		1: Yes	0: No
4a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
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? (if answer is No, skip to Q6)		1: Yes	0: No
5a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
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? (if answer is No, skip to Q7)		1: Yes	0: No
6a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
7	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? (if answer is No, skip to Q8)		1: Yes	0: No
7a	How often did this happen?	1: Rarely	2: Sometimes	3: Often
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not		1: Yes	0: No

	enough food? (<i>if answer is No, skip to Q9</i>)		
8a	How often did this happen?	1: Rarely	2: Sometimes 3: Often
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?	1: Yes	0: No
9	How often did this happen?	1: Rarely	2: Sometimes 3: Often

G		DIETARY DIVERSITY	
Now i would like to ask you about the types of food that you and or anyone else in your household ate yesterday during the day or at night please tick yes or no			
		Yes	No
1	Any bread, rice, biscuits or any other food made from sorghum, maize, rice or wheat?		
2	Any potatoes, cassava or any other roots etc		
3	Any vegetables?		
4	Any fruits?		
5	Any beef, pork, lamb, goat, chicken, liver kidney etc		
6	Any eggs		
7	Any fresh or dried fish		
8	Any foods made from beans peas or nuts		
9	Any cheese yoghurt, milk or other milk products		
10	Any foods made with oil, fat or butter		
11	Any sugar or honey		
12	Any other food such as tea coffee?		

H		Have you adopted any of the following survival strategies				
		Daily	3-6 days/week	1-2 Days/week	Not more than once/week	never
1	Rely on less preferred or less expensive foods					
2	Borrow food/money for food					
3	Purchase food on credit					
4	Gather wild food, hunt or harvest immature crops					
5	Consume seed stock held for next season					
6	Limit food portion size at meal times					
7	Restrict consumption of adults in order for children to eat					
8	Reduce number of meals eaten in a day					
9	Skip whole day without eating					
10	Feed working members at the expense of non-working members					
11	Ration money to buy street food					
12	Send household members to eat elsewhere					
13	Beg for food from neighbours or relatives					
14	Rely on help from relatives or friends					
15	Maintain food garden					
16	Other describe					

I POVERTY PERCEPTIONS: Poor people are poor because [probe for strength of opinion]							
		Strongly Agree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	
1	They lack the ability to manage money.	1	2	3	4	5	
2	They waste their money on inappropriate items.	1	2	3	4	5	
3	They do not actively seek to improve their lives.	1	2	3	4	5	
4	They are exploited by rich people.	1	2	3	4	5	
5	The society lacks social justice.	1	2	3	4	5	
6	Distribution of wealth in the society is uneven.	1	2	3	4	5	
7	They lack opportunities due to the fact that they live in poor families.	1	2	3	4	5	
8	They live in places where there are not many opportunities.	1	2	3	4	5	
9	They have bad fate.	1	2	3	4	5	
10	They lack luck.	1	2	3	4	5	
11	They have encountered misfortunes.	1	2	3	4	5	
12	They are not motivated because of welfare	1	2	3	4	5	
13	They are born inferior	1	2	3	4	5	

J LIVED POVERTY INDEX							
Over the past year, how often, if ever have you and your family gone without:							
		Never	Just once or twice	Several times	Many times	Always	Don't know
1	Enough food to eat?	1	2	3	4	5	6
2	Enough clean water for home?	1	2	3	4	5	6
3	Medicines or medical treatment?	1	2	3	4	5	6
4	Electricity in your home	1	2	3	4	5	6
5	Enough fuel to cook your food?	1	2	3	4	5	6
6	A cash income?	1	2	3	4	5	6

Are you involved in farming Y/N

Sources of land

- 1. Personal
- 2 Rented
- 3 Allocated
- 4 Other

8. Farm size

Appendix 6: Ethics clearance document



NORTH-WEST UNIVERSITY
YUNIBESITHI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
VAAL TRIANGLE CAMPUS

FACULTY OF ECONOMIC SCIENCES AND INFORMATION TECHNOLOGY

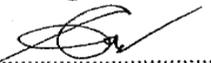
ETHICS CLEARANCE DOCUMENT

Dissertation (M)	
Thesis (PhD)	X
Article	
Hons	

SUPERVISOR			
Study Leader / Promoter / Author(s)	Prof WJC Grobler		
STUDENT / AUTHOR			
Name	Dunga HM		
Student / Staff Number			
Registered Title of Dissertation or Thesis or Project Title of Article	A gender analysis of household food insecurity in the South Eastern Region of Malawi		
School	Accounting	Economics	X Information Technology
ETHICAL CLEARANCE			
Ethics clearance number	ECONIT-2016-104		
Date (of Ethics Sub Committee Meeting)	13 September 2016		


CHAIRPERSON: ETHICS COMMITTEE

19 September 2016 ..
DATE


RESEARCH DIRECTOR

19 September 2016 ..
DATE