Determinants and Dimensions of Household Food Insecurity Risks in Hargeisa City, Somaliland

Hamda Abdullah, MIDS

Supervisor: Prof. Saed Oumer Abdullahi

Editor: Gerald Ainebyona, Research Coordinator

School of Graduate Studies and Research (SGSR), Gollis University, Somaliland

Abstract: **Even though there is long-held belief that urban populations are better off, or even favoured than rural populations, the recent food and financial crises have highlighted the problem of urban food insecurity in developing countries. The problem of urban food insecurity in Somaliland has received little attention despite its increasing importance and far reaching ramifications. Hence, the overall objective of this study was to examine the determinants and dimensions of food insecurity risks among urban households in Hargeisa city. To do so, both descriptive statistics and econometric analysis were employed. Descriptive statistics used Foster, Greer and Thorbeck distributional measure of food insecurity while econometric analysis used binary logistic regression model to analyze the data of a set of socio-economic variables as explanatory variables and food insecurity as independent variable. The head count index shows that 53.2 % of the total households are below the food insecurity line. The food insecurity gap and severity were 18.9 % and 6.4 %, respectively. The result of the logistic regression model estimate indicates that out of the 11 factors included, 5 were found to have a significant influence on the probability of being food insecure at less than 1 % significance level. The variables considered were household size, owning saving account, household head education, and access to remittance and gifts and average monthly income of households. Efforts should be made to improve income earning capacity of households, their education level with particular focus on vocational training, reduce household size with a view to reducing their dependency ratio and access of financial services to the needy and trained people needs to be provided with proper targeting standard.**

Keywords: **Food, Food insecurity, Probability of being food insecure, Severity, urban.**

I.   INTRODUCTION

Food security has over the years undergone several definitions. As Famine Early Warnings Systems Network (2014) defines food security as "a state when all people have access at all times to safe, nutritious, sufficient food to maintain an active and healthy life". It is however a complex issue that encompasses sustainable development, malnutrition, health and economic progress as well as trade, and has over the years elicited debates as different societal members voice their concerns (FAO, 2010).

The world population today is around seven point five billion which according to the world population meter has through the twentieth century only gone from 1.65 billion to six billion. This increase has incredibly come with a set of drastic effects and issues. Those population increases are positively liked to global food insecurity. One of those major effects is also urbanization. ; In 2007 the global urban population overtook the rural one and the speed of urbanization, especially in developing nations, has been phenomenal and unsustainable (Liiban obsiye, 2013). As globalization has led to a larger concentration of people internationally living in cities than ever before Without heightened efforts to reduce poverty, and to make the transition to an agriculture that is both productive and sustainable, many low income countries will find it

difficult to ensure access to adequate quantities of food for all of their populations (FAO, 2016). This shows how that urbanization processes are intertwined with nutritional transition as access and availably of food are highly affected. This proves true with the capital of Somaliland, Hargeisa, as rural to urban migration and global migration increasing the population of Somaliland rapidly in seemingly short time which enforces pressure on the fare scars resources and resulted of many disadvantages like the rise in crime rates, easier access to food of low nutritional quality at reduced prices & seemingly less health quality.

A GIS survey in 2007 placed the population somewhere between 350,000 and 850,000 people (Tempra, *et al.* 2007). However, based on rural-urban migration and the city growth in general, officials believe that the current population is actually now more than 1.5 million people (FSAU, 2013). The Somalia Food Security Assessment Unit (FSAU) had on 2003 done a base line survey that was focused on the different dimensions of food insecurity in Somaliland scope and assessing per household; seeing from three different angles availability and accessibility of each household to their needed amount of daily nutrition. This baseline study was made on a time where it was much needed where only one previous assessment to Hargeisa on 1998 and to establish an analytical framework for the assessment and monitoring of food access in urban based areas of Somaliland. Since Somaliland is a drought prone country with variant rainy seasons; rainy and dry seasons are extreme; as a result, many Somalis, and especially those from rural parts of Somaliland, are forced to live nomadic lifestyles where they travel according to weather patterns. This drastic weather in combination with the regions decreased government stability, regulations & support has led to significant food insecurity conditions throughout the region. Despite many efforts, food insecurity is still a prominent feature of Somalia, Somaliland and throughout east Africa

It is said in a rural setting, wealth groups are usually defined by their main productive assets (i.e. livestock or land holdings). In an urban setting, this definition is less relevant because large percentages of the population do not have any productive assets other than their ability to trade and their own labor. As a result, wealth groups are categorized primarily by their income levels which intern also depend hugely on remittances which shows a huge fragile system with households entirely dependent on external help. The problem of urban food insecurity in Somaliland has received little attention even though it increasing importance and far reaching ramifications.

1.1 Statement of the Problem:

Even though food insecurity is a typical disaster in developing countries, it is actually a worldwide problem that has called scientific community and governments' attention (Giraldo *et al.*, 2008). Somaliland in record is one of the poorest countries of the world, although with a unique geographical and political position it still not given the humanitarian or political attention it needs. With international humanitarian bodies nearly never giving a picture of the real situation of Somaliland separate from Somalia, government and partners receive misleading information that is focused mostly on the federal Somalia. This has lead to major errors in allocation of resources, humanitarian neglect and poor decision making on Somaliland's governments part. Food security status and the determinants could be varying over time and space. Earlier studies and findings cannot be adapted to recent trends. Despite the growing concern of improving food security, the dimension and determinants of food insecurity disaster risk among the urban households of the study area were not well documented. Hence the need for studies that focus primarily on Somalinad conditions and give an accurate picture of who the food insecure are?, what are their socioeconomic characteristics? And how drastic the situation actually is or could become. This study can help Somaliland accredited bodies and institutions on allocating and framing the right interventions, resource allocation and serve as a base for future political research.

2. RELATED LITERATURE REVIEW

2.1 Historical of Food Security:

The concept of food security had evolved more than forty years to reflect changes in policy thinking (FAO, 2006). The term originated in the mid-1970s when the world food summit defined food security in terms of food supply. Though the concept of food security dates back to a long period now, it is inherently a multidimensional concept that largely eludes precise and operational definitions (Barrett, 2002). Considering its multi-dimensional nature, food security had passed through different phases of development. Hence, this sub-topic had focused on the paradigm shifts that were caused by the changes in the development of food security. To begin with, during the 1970s, supply shortfalls created by production failures stimulated major concern on the part of international community regarding food availability (Maxwell et al.,

2003).Overtime a large number of different definitions have been proposed. There are approximately 200 definitions and 450 indicators of food security (Hoddinott, 1999). Maxwell and Frankenbergers (1992) report lists 194 different studies on the concept and definition of food security and 172 studies on indicators. The following are the major historical & conceptual paradigm shift to our current understanding and practice of Food security. The first international conference on World Food Security endorsed at the end of the World Food Conference in 1974, the first major inter-governmental conference to focus solely on the question of food. This first conference defines food security as:

The availability at all times of adequate world supplies of basic foodstuffs, primarily cereals, so as to avoid acute food shortages in the event of widespread crop failures or natural disasters, to sustain a steady expansion of production and reduce fluctuations in production and prices (FAO, 1974).

The reference to crop failures and natural disasters as the main causes of food shortages, coupled with a concern for the increasing consumption requirements of the developing countries, underpins the strictly Malthusian theory that runs throughout the final report of the conference. The world food problem is thus constructed as a natural phenomenon, a natural disaster, devoid of any political component; achieving global food security requires an international effort (primarily by the developed countries). Two main courses of action were recommended: boosting agricultural production in the developing countries and establishing international grain reserves. The specific knowledge required to achieve these goals resides primarily with agricultural experts, particularly those who have advanced technological means of agricultural production at their disposal.

Until the 1980s, discourses on food insecurity presuppose that famine were due to a decline in overall food availability. Sen (1981) challenged this view by showing that food insecurity and famine can exist while there is an abundance of food. The technical papers by Amartya Sen and World Bank Policy Study on poverty and hunger published twelve years after the World Food Conference brought a new agenda to the food security debate, articulating a new definition of the term which is still widely used today (FAO, 2009). The opening lines of text create a stark contrast with what had come before:

The world has ample food. The growth of global food production has been faster than the unprecedented population growth of the past forty years…Yet many poor countries and hundreds of millions of poor people do not share in this abundance. They suffer from a lack of food security, caused mainly by a lack of purchasing power. 'Food security'…is defined here as access by all people at all times to enough food for an active, healthy life (World Bank, 1986).

It is in this new definition of food security that Maxwell (1996) located a shift in the terms of debate from the global/national to the household/individual level. Food security apparently observed from the perspective of the food insecure; the focus has shifted from the aggregate supply of food at the global/national level to the localized demand for food at the household/individual level. We are now concerned with access to food rather than availability of food. Since food security is now not simply a question of production and supply, the FAO has been forced to modify its approach to incorporate broader policies of poverty alleviation, a goal that falls beyond the scope of its traditional mandate (FAO, 1992; 2006). The new definition of food security as the ability of people to access food and the equation of food insecurity with poverty extends to a wide range of international actors; the privileged knowledge of agricultural experts replaced by the 'expert' knowledge of social scientists, particularly those concerned with development and poverty alleviation.

The Rome Declaration and Plan of Action finalized after eighteen months of negotiations between member state representatives and adopted unanimously at the beginning of the World Food Summit (Shaw, 2007: 350). These texts continue to embody the current benchmark for international food security conceptual frameworks and have been reinforced and reiterated at all subsequent global food conferences (FAO, 2002; FAO 2008). The new definition clearly indicated that food security exists 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). This definition contains a trace of each historically conflicting idea. 'Physical access' is a new articulation of the old concern with food availability, production, and supply, representing the persistence of a Malthusian rhetoric. 'Economic access' owes its heritage to Sen's work but reduces his notion of entitlement to a purely monetary relation; the diverse means by which people are able to acquire and consume food in different cultures are excluded from consideration and reduced to a market relation between consumer and commodity. Absent from the definition is the notion of social access, inclusion of which would invite consideration of the legal and political constraints faced by some groups in their attempts to acquire food.

The declaration from the high-level conference on World Food Security with its specific focus on 'climate change' and 'bio-energy' in the context of achieving world food security reduces the complexity of food insecurity to the dynamics of the 'current crisis, which is in turn reduced to the problem of 'soaring food prices' (FAO, 2008). Explicitly, the declaration did not explain what has caused food prices to rise; the fact of high prices constitutes an unproblematic starting point from which to consider possible means to alleviate the problem. Implicitly, however, the declaration constructed a strong linkage between high food prices and climate change:

The current crisis has highlighted the fragility of the world's food systems and their vulnerability to shock. It is essential to address the fundamental question of how to increase the resilience of present food production systems to challenges posed by climate change (FAO, 2008)

2.2 Food Insecurity: Intensity and Dimension:

Most current definitions of food security include the phrase 'at all times' but do not distinguish between different durations and intensities of food insecurity (FAO, 2006). Considering the development of the thinking of food security and its elusive nature, one can find more than 200 definitions of food security (Maxwell et al., 2003). In this regard, Barrett (2002) also noted that food security is an inherently unobservable concept that has largely eluded a precise and operational definition. The most commonly cited and/or workable definition of food security is:

Food Security exists, at the individual, household, national, regional, and global levels when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for a healthy and active life (FAO, 2001; Barrett, 2002).

Such a distinction is necessary for policy development and interventions. To facilitate these processes, the concepts of chronic and transitory food insecurity developed. Despite this, the distinction between populations experiencing chronic and transitory food insecurity is often unclear in that many situations have chronic underpinnings. This has much to do with seemingly vague ways in which the concepts are defined in theory and operationalized in practice (Devereux, 2006).

2.3 Determinants of Food Security:

The dimensions of food security make it clear that the concept of food security is a complex one with many dimensions. At one level the concern is with national food security, which is the ability of countries to produce or import sufficient food in all year to meet their requirement for both private and public distribution (Omonona et al., 2007). The generation of household food security is dependent on the physical availability of food at the market or community level, the ability of the household to access the available food, the ability of individuals particularly those especially susceptible to food deficits such as women, infants, and children to eat the food, and finally the body's ability to process the nutrients consumed. The physical availability of food is a function of productive agriculture, effective trade infrastructure, and efficient food aid logistics, if necessary. Agriculture, trade, and aid policies are important in influencing the availability of staple and non-staple foods (Obayelu and Elijah, 2010). The recent concept of food security has given more attention to households and individuals than its availability at international, national and regional levels. This is because of increasing food production, supply and sufficiency at broader levels does not necessarily ensure that each and every individual is food secured. This is why, as reported by the WFP (2009), over 1 billion people throughout the world have been suffering from hunger and malnutrition despite the fact that there is more than sufficient food supply at global level at present.

At another level the concern is more with the problem of malnutrition. The levels of nutrient requirement have been determined by the World Health Organization (WHO) and the Food and Agricultural Organization (FAO). The basic minimum requirement figure has been found to be 65 grams of protein and 2500 kcal of energy per capita intake of which if consumed otherwise, leads to a state of malnutrition (FAO and WHO, 1993).

2.4 Empirical studies of urban food insecurity:

A number of studies have been conducted to measure urban household food (in)security in different context (Craig and Scanlan, 2001; Gani. and Prasad,2007 ;Vasco Molini,2006; Steffen. et al.,2007; Upendo et al., 2010, among others). A study by Wilfred et al. (2010) reveals the age of household head and household size are the most important factors influencing positively the quantity of food consumption among urban households. Also the same authors disclosed age of household heads, education level attained by household heads and households' income level are the most important factors explaining the increasing in the quantity of food kilocalories consumed by household. Conversely, sex of

household head and household size are the most important factors explaining the reduction in the quantity of food kilocalories consumed by households. Also a study conducted in South Africa (Cape Town, Msunduzi and Johannesburg) by Frayne. et.al (2009) indicates urban food insecurity is experienced at the levels of the household and individual. While aggregate food supplies may be sufficient at the metropolitan scale, access to that food is highly inequitable in South African cities, with many households chronically hungry.

Another study by Ashimogo and Hella (2000 cited in Kumbi, 2005) in Iringa, Tanzania revealed that household food security was positively influenced by total household asset disposal and income. On the other hand the study revealed that the transition to commercial agriculture has had negative influence on food security. Bergeron (2002) studied Food security in Madagascar, a situational analysis, the study reveals although urban agriculture is common in cities, food access for urban household depends more on households' purchasing capacity than on their agricultural production— although the latter remains important. Purchasing capacity is determined by prices and by income levels. The food security situation pauses related risks across the African continent and is worse in Somaliland. For example, World Food Programme stated that the common factors that cause household food-insecurity in urban areas of the country are: household size, age of household, sex of household head, marital status of household, education level of household, dependency ratio, access to credit, ownership of saving account, total income per adult equivalent, expenditure level (food and non-food), asset possession, access to social services, owner of home garden, access to subsidized food, sources of food, availability of food commodities, and supply of food commodities.

Whereas rural people can grow their own food, urban residents must buy most of what they eat. Food prices are thus especially important to urban food security for an ample supply of food does not guarantee that the urban poor will be able to afford it. Several factors conspire to raise urban prices of food. Urban marketing systems in developing countries are often inefficient, with retail markets frequently small and scattered. Poor people are often unable to lower their food costs by buying in bulk because they simply do not have enough cash to do so. In addition, many developing countries have eliminated food subsidies, increasing food prices for urban dwellers (IFPRI, 2002). Depending on the empirical evidences reviewed above in the literature most of the studies undertaken on the issues of determinate and dimensions of food insecurity use logit and probit model. In this study, logistic regression model is employed to identify the factors influencing food insecurity among the insecure part of population in Hargeisa city.

3. METHODOLOGY

3.1 Methods and Techniques:

3.1.1 Data Type and Sources:

In order to address the objectives of this study both primary and secondary data were employed. The primary data source for this research was the Hargeisa urban households' socio-economic data collected by a survey. Primary data were collected through self-administered structured questionnaire in the field survey. The primary data from household survey were collected using questionnaires. The questionnaires composed of both closed and open-ended types of questions and covered various issues: demographic and socio-economic characteristic of respondents; livelihood assets, strategies and shocks; perceptions about food security and issues related to household vulnerability to food insecurity. The researcher with three enumerators, and one supervisor, all speaking the local language conducted the survey. The enumerators were first trained by the researcher about how to present and explain each question to respondents. Hundred ninety questionnaires were distributed for the whole survey.

Secondary data were obtained from on review of policy papers and document from various sources like government ministries, Hargeisa City Administration, NGO's, research institutes and relevant academicians and researcher. This involved review of extant evidence based literature related to food insecurity problem in Hargeisa

3.1.2 Sampling procedure and Sample Size:

An important decision that has to be taken while selecting a sampling technique is about the size of the sample. Appropriate sample size depends on various factors relating to the subject under investigation like the time aspect, the cost aspect, the degree of accuracy desired (Gupta, 2002).There are two general types of sampling methods. These are probability and non-probability methods of sampling. If a probability sampling techniques is used, each element in the population has an equal chance of being chosen. If a non-probability-sampling method is used, not all elements or people have an equal chance of being included in the sample. In such instances, the results may be biased, meaning that the sample results will not be representative of the population.

In this research, cluster random sampling with proportion to size sampling technique was used to select sample respondents. The data were collected mainly from urban households located in three sub-cities in Hargeisa city. A three – stage cluster sampling technique with probability proportional to size was used in selecting the sample for the study. The first stage involved a random selection of three sub-cities of the seven sub-cities in the state namely, Ibrahim kodbur, Ahmed dagah & June 26 sub-cities. Stage two involved a random selection of twelve study sites from the list of administration blocks in each sampled sub-cities depending on the size of sub-cities & based on the number of administrative blocks in each sub-cities. The third stage involved a random selection of households in each of the selected twelve study sites. A total of one hundred eighty households were considered in this study. This will also complement with the recommended ten times variables sample size (Edriss, 2007).

During this process, the list of household in each study sites was used to make random selection of the households. A structured interview questionnaire had been prepared and pilot test of questionnaires was conducted among thirty respondents by trained enumerators after which some minor adjustments were made.

Table 3.1: Sampled districts, study blocks and respective number of households

Selected Hargeisa city districts	Location	Study blocks under districts	Number of sampled HHs
26 June	North-central Hargeisa	Duriya	16
		Almis	14
		Aingal	14
		Gol-Jano	15
Ibrahim Kodbur	Northwest Hargeisa	Hero-Alur	16
		Lihle	12
		Gul-Alla	16
		Jigjiga Yar	16
Mohamed Heybe	Southeast Hargeisa	Jame'o-Weyn	15
		Burao-Duuray	15
		Sheikh Shukri	16
		Qudha-Dheer	15
Total sampled households			**180**

3.1.3 Data preparation and analysis:

The collected data were entered into SPSS and cleaned to ensure consistency and accuracy. It is hypothesized that there are some household characteristics like household size, income, household head educational level, etc, that have got relative importance in determining the state of food insecurity at household level descriptive statistics was used to see this important characteristics of household. On the other hand, empirical analysis was also used to explain food insecurity and severity issues.

Descriptive method was employed to explain the situation of demographic and socioeconomic variables. It used to assess the level and extent of food insecurity problem of the population. The specific methods of data analysis involved tabulation and cross tabulation, frequency, percentages, and computation of descriptive statistics such as mean, and standard deviation.

3.1.4 Measuring food insecurity status of the urban household:

Dietary energy supply measured in kilocalorie (Kcal) was used to determine food security status of a household; since it is the single most important indicator of food adequacy level (Qureshi, 2007). In the calculation of kcal intake of the sample households, the amounts of calorie available to a household were determined by direct survey of household consumption. The person responsible for preparing meals was asked how much food were prepared for consumption from purchase, stock, and/or gift/loan/wage over a period of seven days. In this study, a seven-day recall method was used since such a measure gives more reliable information than the household expenditure method (Bouis, 1993). These seven days recall period was selected because it is appropriate for exact recall of the food items served for the household within that week. If the time exceeds a week, for instance 14 days, the respondent may not recall properly what she has served before two weeks.

Therefore, the consumption data collected based on seven days recall method was converted into kilocalorie using the food composition table adopted from International Food Policy Research Institute (IFPRI, 2014). Then, in order to calculate the household's daily food consumption, the total household's caloric food consumption for seven days were divided by seven. The household's daily caloric food consumption per adult equivalent was calculated by dividing the household's daily food consumption by the family size after adjusting for adult equivalent using the consumption factor for age-sex categories.

In this study, a minimum of 2200 kilocalorie per capita per day were used to differentiate food secure and food insecure households. This is because most government of East African countries including Somaliland has set the minimum acceptable weighted average food requirement per adult equivalent per day to 2200 kcal (Shimeles and Bogale, 2009; Abebaw, et al., 2011). The same reference value also used elsewhere (Migotto et al., 2007). Finally, comparison between calories available calories required by a household used to determine the food security status of households. Subsequently, households whose per capita available kilocalorie was greater than the minimum demand were categorized as food secure, while households experiencing kilocalorie deficiency were considered food insecure. In view of this, the response variable food security status of the household mentioned as a dummy variable was:

$$\textbf{HFSi} = \begin{cases} 1, & Yi < R (food\ insecure) \\ 0, & Yi \geq R (food\ secure) \end{cases}$$

HFSi = household food security status, i = 1, 2, 3, 4. . . 170

Yi = daily per capita calorie available (supply)

R = the minimum recommended national standard rate of calories per household per day (2200 kcal).

3.1.5 Econometric method of data analysis:

Having identified the food insecure and food secured groups of households, the next step is to identify the socio economic characteristics that are correlated with the food insecurity. In light of this, it is hypothesized that there are some household characteristics like household size, income, household head educational level, etc that have got relative importance in determining the state of food security at household level.

Most of the studies conducted in modeling the determinants of food insecurity used dichotomous discrete choice models (Logit and Probit) where the dependent variable is a dummy that takes a value of zero or one depending on whether or not a household is food insecured or secured. A logit model was applied to identify the determinants or factors behind household's vulnerability to food insecurity risks. In this study, the dependent variable Y (household's vulnerability to food insecurity) is dichotomous variable taking value 1 if the household is vulnerable to food insecurity risks and 0 otherwise. In the case where the dependent variable is dichotomous, probability regression models are the most fitting to study the relationship between dependent and independent variables. In the case where the response variable is qualitative, it is the probability of the dependent variable given independent variable that is determined. One the most common qualitative regression model is logit model (Gujarati, 2004).

Linear probability model like a typical linear regression model, determine the conditional expectation of the dependent variable given independent variable. Beside this, the model is encountered with many problems like non-normality and heteroscedastic variances of the disturbance and the probability fails to fall in between 0 and 1 values. For this reason, linear probability model is not attractive model and it is fallen out of use in many practical applications. Under probit and logit models the probability will fall in between 0 and 1. In most applications, these two models are quite similar. The main difference being the logistic distribution has slightly fatter tails, that is to say, the conditional probability Pi approaches zero or one at a slower rate in logit than in probit.

Therefore, there is no compelling reason to choose one over the other. In practice, many researchers choose the logit model because of its comparative mathematical simplicity (Gujarati, 2004). Therefore, in this study, we applied logit model for its simplicity of interpretation. A binary logistic regression model is considered the most appropriate model for the econometric analysis when dependent variable is dichotomous variable (Garson, 2011) such as incidence of food insecurity risks in our case.

Then, following Gujarati (2004) logit model is specified as follows:

$$Pi = E\left(Y = {}^1/_{Xi}\right) = \frac{1}{1+e^{-(\beta 0 + \beta i X i)}}$$

For ease of exposition, the probability that a given household's vulnerability to food insecurity risk is expressed as:

$$Pi = \frac{1}{1+e^{-Zi}}$$

Probability of being food secure is 1-Pi:

$$1 - Pi = \frac{1}{1+e^{Zi}}$$

Thus;

$$\frac{Pi}{1-Pi} = \frac{1+e^{Zi}}{1+e^{-Zi}}e^{Zi}$$

This is the ratio of the probability of household's vulnerability to food insecurity risks to the probability of that it is not vulnerable or food secure. It is the odds ratio in favor of household's vulnerability to food insecurity risks.

Taking the natural log of the above equation:

$$Li = \ln\left(\frac{Pi}{1-Pi}\right) = Zi$$

Where, Pi is the probability that the household is vulnerable to food insecurity risks ranges from 0 to 1 and Zi is a function of n explanatory variable and is expressed as:

$$Zi = \beta o + \beta\text{-}1X1 + \beta 2X2 + \cdots\cdots \beta nXn$$

Where, β0 is an intercept and β1, β2…..βn are the slopes of the equation and Li is logs of odds ratio in favor of food insecurity which is not only linear in parameters but also linear in terms of explanatory variables. If the disturbance term Ui is introduced, the logit model will become:

$$Zi = \beta o + \beta\text{-}1X1 + \beta 2X2 + \cdots\cdots \beta nXn + Ui$$

Finsi = Food Insecurity Status of Household i greater than zero

Z = Food Insecurity line (minimum calorie requirement)

Qi = Calorie Consumption of Household i

The independent variables are captured as:

X_1 = Household Size

X_2 = Gender of Household Head (1, if male and 0, if female)

X_3 = Marital status of household head

X_4 =Educational Level of Household Head

X_5 = Age of household head

X_6 = Dependency ratio

X_7= Access to credit

X_8 = Owning saving account

X_9= Household income

X_{10}= Remittance and gift income

X_{11} = Urban Agriculture

3.1.6 Specification of the FGT model:

3.1.6.1 Measurement of incidence, depth, and severity of food insecurity risks:

Among the various measures of food insecurity, the Foster-Greer-Thorbecke (FGT) food security index is the most commonly applied (Abebaw *et al*., 2011). This index was suggested initially by Foster *et al*. (1984) and has several desirable properties that have been enhanced in recent years for the purpose of food insecurity analysis (Abebaw *et al*., 2011; Idrisa *et al*., 2008; Maharjan and Chheteri, 2006; Tsegaye, 2009). This model was used for this study to measure the household head count index (incidence of food insecurity), food insecurity gap (depth of food insecurity), and the square of food insecurity gap (severity of food insecurity) among the food insecure households. The mathematical formula of the FGT model specified as follows:

$$f(\alpha) = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{m - Y_i}{m}\right]^{\alpha} \qquad (3)$$

$$f(\alpha) = \frac{1}{n}\left[\frac{(m-y_1)^{\alpha}}{m} + \frac{(m-y_2)^{\alpha}}{m} + \cdots \frac{(m-y_n)^{\alpha}}{m}\right] \qquad (4)$$

Where: n = the number of sample households,

q = is the number of food insecure households,

m = is the cut-off between food security and food insecurity (expressed here in terms of caloric requirement),

yi = is the food calorie intake per adult of the ith household, and

α = is the weight attached to the severity of food insecurity

In this model, if m < yi the household is food secure and if m > yi the household is food insecure. If the weight attached to the severity of food insecurity is zero, the ratio measures the incidence of food insecurity; whereas $\alpha=1$ measures the food security gap (depth of food insecurity) and $\alpha=2$ measures the severity of household food insecurity. In other words, if the food security gap is squared the result could be the severity of food insecurity. Thus, the index of severity, $f(\alpha)=2$ gives greater attention to the most food insecure households by weighting them according to the square of their short fall below the subsistence level.

4. RESULTS AND DISCUSSION

4.1 Food Insecurity Status of the Households:

In the calculation of food calorie intake of the sample households, the amounts of calorie available to a household were determined by direct survey of household consumption. Data on the available food for consumption, from home production, purchase, and /or gift/loan/wage in kind for the previous seven (7) days before the survey day by the household was collected. Then, the data converted to kilocalorie and divided to household size measured in adult equivalent (AE). Following this, the amount of energy in kilocalorie available for the household compared with the minimum subsistence requirement per adult equivalent per day (i.e. 2200 kcal/AE/day). As a result, from all 180 respondent households, 96 urban households were found to be food insecure and 84 of them food secure. It means that (53 %) of the respondent households were food insecure and (47 %) of them were food secure. The data in table 4.1 below showed the distribution of households based on their consumption level expressed as kcal/AE.

Table 4.1: Distribution of households based on their consumption (energy available per AE)

Energy Available per AE in (Kcal)	Food secure (N=84)		Food insecure (N=96)		Total (N=180)	
	Number	Percent	Number	Percent	Number	Percent
753-1087			15	14.6	15	14.2
1108-1383			17	17.8	17	13.9
1415-1598			19	22.1	19	15.6
1612-1798			25	28.6	25	22.1

1834-2189			24	24.9	24	19.7
2245-2396	24	29			24	7.4
2412-2691	43	51			43	11.5
2707-3452	17	20			17	10.7
Total	**84**	**100**	**96**	**100**	**180**	**100**
Maximum	3452		2189		3452	
Minimum	2145		753		753	
Mean	2615.4		1558.5		1870.4	
St. Deviation	279.45		324.5		575.2	
t-value = -30.2***						

Note: *** Significant at one percent probability level of significance (P<0.001)

Source: own survey

4.2 Demographic and Socio-Economic Characteristics:

Needless to mention that household's food insecurity are determined by various household attributes. Of these attributes demographic and socio-economic characteristics are the ones. Hence, this section will discuss socio - economic characteristics of sample households by age, sex, household size, education level and income level in relation to the food security status at household level. Possible explanations on factors supposed to have contribution to household food insecurity are also presented from analyses of model output.

4.3 Characteristics of Household by sex:

Sex of household head was hypothesized to be one of the variables that make a difference on the level of food security. In Somaliland, the head of a household strongly influences the household's livelihood and food security. Their demographic features would then influence, to a certain extent, the type and amount of food made available from different sources. In view of this, an attempt was made to assess the different status of food security situation that exists between households headed by men and those by women. Much more common to observe a good deal of female headed households, especially in the developing countries like Somaliland they are more likely to be food insecure as compared to their male-headed counterparts.

Table 4.2: Distribution of Sample Households by Sex of Household Heads

Household head Sex		Food security status	Total%(n=180)
	Secured%(n=84)	Insecured%(n=96)	
Female(0)	26.0	34.3	30
Male(1)	74.0	65.7	70
Total	100	100	100
Chi-square			1.146 **

Note: ** Significant at one percent probability level of significance (P<0.05)

Source: Own Survey

The survey result indicated that 34.3 percent of food insecure households were female headed whereas, the corresponding figure for male headed households was 65.7 percent. Male headed households comprise 74 percent of food secured and the remaining 26 percent food secured are female headed households. The survey result showed some systematic relationship (p >0.05) between household head sex and food security status.

4.4 Distribution of Sample Household Heads by Age:

Age of the household head is also regarded as an important variable with an impact on household food security status; i.e. older households are usually better than younger households (especially newly formed households) in terms of resource endowment. Thus, it was hypothesized that younger households are more likely to be food insecured than older households. The t-test was run to test this hypothesis and the result shows there is significant difference between food secured and insecured households on the bases of household head age even if the sign of the variable is opposite to the hypothesis made. Thus, results revealed that there is significant difference in mean age of the household heads between households, which are food secured and those which are not (t = -8.8062). The mean age of the household head for food secured and insecured households is 40.12 and 54.07, respectively. The Chi-square test also shows significant relationship (p<0.01) between age of household and food security status of households. These results tell that there is a positive relationship between food insecurity and age of household head. Therefore, the result disproof the hypothesis which says as the age of household head increase the food insecurity will decrease.

Table 4.3: Distribution of Sample Households by Age of Household Heads

		Food Security Status	
Age group	Secured%(n=84)	Insecured%(n=96)	Total%(n=180)
20-30	19.2	0	10
31-40	37.0	9.0	23.6
41-50	26.0	25.4	25.7
51-60	16.4	43.3	29.3
>61	1.4	22.4	11.4
Total	100	100	100
Mean	40.12	54.07	46.8
SE	1.142	1.089	0.986
t-value			-8.8062***
Chi-square			46.602***
p-value			0.00

Note: *** Significant at one percent probability level of significance (P<0.001)

Source: Own Survey

4.5 Food Insecurity Status and Household Heads' Marital Status:

The married and never married households accounted for 72.2% and 3,5 % of the whole sampled households. Accordingly, the widowed and the divorced accounted for 6.4 percent and 17.9 percent respectively.74.0,4.1,11.0, and 11.0 percent of married, widowed, divorced and single households respectively were found to be food secured whereas, food insecured households consisted of married (59.7%), widowed (11.9%), divorced (25.4%), and single (3.0%). The result of the survey showed no significant difference (p >0.10) among the marital status with respect to household food security status.

Table 4.4: Distribution of Sample Households by Marital Status

Marital status of	**Food Security Status**		
Household Head			
	Secured%(n=8)	Insecured%(n=96)	Total%(n=180)
Married living with spouse	74.0	59.7	67.1
Widowed	4.1	11.9	7.9
Divorced	11.0	25.4	17.9
Never married	11.0	3.0	7.10

Total	100	100	100
Chi-square			10.96
p-value			0.012

Source: Own Survey

4.5 Household Food Insecurity Status and Family Size:

Family size was considered and hypothesized as one of the potential variables that would have due contribution for food insecurity. The proportion of sample households becoming food insecure increased as the family size increases. The minimum family size in AE was 2.12. 77% of the food insecure households hold a family size that ranges from 5.23 to 13.56. On contrary, only 20.1% of food secured households got family size that ranges from 5.24 to 9.25.

The mean family size in adult equivalent of food insecure and food secure households was 4.85 and 3.87 respectively and their mean difference was statistically significant at less than 1% probability level. Where the family size in number of individuals observed by the survey indicated that the overall sampled households got a mean family size of 5.3. The food secured and food insecure households got a mean family size of 4.5 and 5.63 respectively. The result suggests that there is a pressure in terms of resource allocation from a given entitlement in this area. FAO (2012) pointed out that food security is challenged by repaid population growth in sub Saharan Africa. Thus, this growing number of population and household size is a disaster for the household food security. Taking in to consideration all these points, it is not a surprise to find the inverse relationship between food security and household size result.

Table 4.5: Distribution of Sample Households by Family Size

Family size	Secured% (n=84)	Insecured% (n=96)	Total% (n=180)
3-5	83.3	52.2	60.7
6-8	16.7	43.0	35.2
9-11	--	3.5	2.5
12-13	-	2.3	1.6
Total	100	100	100
Mean	4.5	5.63	5.3
St.dev.	1.11	1.81	1.73
Minimum	3	3	3
Maximum	10	15	15
t-value			5.26 ***

Note: *** Significant at one percent probability level of significance (P<0.001)

Source: Own Survey.

4.6 Household Food Insecurity and Education of Household Head:

In societies such as Somaliland where household heads are the major breadwinners of the households, household heads' educational status could determine food insecurity status of the entire households. Among other things, household heads play a pivotal role in shaping family members towards educational attainment thus reducing the probability of being food insecure. Thus it was hypothesized that households which are headed by relatively more educated heads are in a better position in terms of food security than those whose heads are illiterate.

The survey result showed significant relationship between household food insecurity status and household heads educational level (p<0.01). Most household heads in the survey were found to be in below primary cycle education (71.5%). It was revealed that households headed by illiterate persons were more vulnerable to food insecurity followed by primary and secondary school. In view of the fact that urban life requires engagement in formal employment activities those who are illiterate cannot find a better job and they will not have enough money for buying food items. The Chi-square test also showed a systematic association between food insecurity status and educational level of household heads.

Page | 1227

Table 4.6: Distribution of Household Heads by Education Level

Education level of household head	Food security status		
	Secured% (n=84)	Insecured% (n=96)	Total%(n=180)
Illiterate	12.0	41.6	33.6
Read and write	59.5	22.4	21.9
Elementary(1-8)	14.1	20.3	11.1
Secondary(9-12)	4.7	17.2	12.7
Certificate	2.1	0	5.7
Diploma	4.9	0	7.9
Degree or above	2.4	0	1.9
Total	100	100	100
Chi-square			70.216***
p-value			0.00

Note: *** Significant at one percent probability level of significance (P<0.001)

Source: Own Survey

4.7 Household Dependency Ratio:

The mean dependency ratio of the sampled households was 1.24 (SD=0.55) with the minimum of 0.25 and maximum of 2.56. The mean dependency ratio was 1.33(SD=0.51) for food insecure households and 1.04 (SD=0.61) for food secure households. There was statistically significant mean difference of dependency ratio between food insecure and food secure households at less than one percent probability level. Thus, the result shows that food insecure households had high dependency burden than food secure which may increase vulnerability of households to food insecurity risks.

Table 4.7: Distribution of sample households by dependency ratio

HH dependency ratio	Food secure (N=84)		Food insecure (N=96)		Total(N=180)	
	Number	Percent	Number	Percent	Number	Percent
< 1	25	69.5	20	23.3	35	28.7
1-2	9	30.5	46	53.5	62	50.9
> 2			20	23.3	25	20.5
Total	84	100	96	100	180	100
Maximum	2.56		2.35		2.56	
Minimum	0.35		0.25		0.25	
Mean	1.04		1.33		1.24	
St. Deviation	0.61		0.51		0.55	
t-value = 5.43***						

Note: *** Significant at one percent probability level of significance (P<0.001)

Source: own survey

4.8 Household Income Level:

Living in a city means living in a monetized economy, where cash must be generated to survive. Income is a determinant of household expenditure since it serves as the budget constraints to the amount that can be spent within a period, there is also bound to be correlation between income and food security status of a household, all other things being equal.

In this survey, an attempt was made to collect average household income level for the last 30 days prior to the survey period to see whether there is a relationship between income level and food insecurity status. The sampled household heads were asked on the amount of income earned during the last month from all sources.

The group statistics also showed that there is significant difference in income of household between the food secured and food insecured household groups at (p<0.001). The gap between the two groups is highly substantial. More than 63 percent of the food insecured sample households earn a monthly average income of less than US $ 100, whereas the corresponding proportion for the food secured households is 14.60 percent. On the contrary, more than 83 percent of the food secured sample households earned an average monthly income greater than US $ 100 while 22.41 percent of the food insecured earned the same amount.

Table 4.8: Distribution of Sample Households by average monthly income level

Household income		Food Security Status	
level(US $)	Secured% (n=84)	Insecured% (n=96)	Total% (n=180)
Less than 50	1.4	16.7	8.6
50-75	14.9	40.9	27.1
75-100	29.7	19.7	25.0
100-250	29.7	15.2	22.9
>250	24.3	7.6	16.4
Total	100	100	100
t-test			5.5926***

Note: *** Significant at one percent probability level of significance (P<0.001)

Source: own survey

4.9 Involvement in Urban Agriculture:

Urban farming is generally practiced for income-earning or food-producing activities though in some communities the main impetus is recreation and relaxation. Urban agriculture contributes to food security in two ways: first, it increases the amount of food available to people living in cities, and, second, it allows fresh vegetables, fruits and livestock products and byproducts to be made available to urban consumers.

It was found out that 9.58 percent of sample households were engaged in urban agriculture. The result of the survey explained that 81.86 percent of food secured households did not engage themselves in urban agriculture and only 18.14 percent of food secure was found to be involved in urban agriculture. On the other hand, those households involved in urban agriculture and found to be food insecured accounted for 6.16 percent. Statistically no significance difference (p<0.05) was observed between the two groups on the basis of their participation in urban agriculture.

Table 4.9: Distribution of Sample Households by Participation on UA

Urban	Food Security Status		
Agriculture	Secured% (n=84)	Insecured% (n=96)	Total% (n=180)
No	81.86	93.84	90.42
Yes	18.14	6.16	9,58
Total	100	100	100
Chi-square			0.005
p-value			0.094

Source: Own Survey

4.10 Classification of Households by the Remittance and Gift Received:

Remittance and gift received from relatives and clans were found to be an important source of additional income in the study area. Most of the food secured households, more than 60.34 percent received additional income in form of remittance and gifts whereas 13.75 percent of the food insecured households received remittance and gifts. Moreover, there was significant difference (p<0.01) between households that received remittance by the two sample household groups. The survey result is in full agreement with the hypothesis made in this research, which depicted that households receiving more remittance and gift have a less chance to be food insecured than those households receiving less amount of remittance & gift.

Table 4.10: Distribution of Sample Households by Remittance and Gift received

Food security status			
Remittance and gifts	Secured% (n=84)	Insecured % (n=96)	Total% (n=180)
No	39.36	86.25	72.9
Yes	60.64	13.75	27.1
Total	100	100	100
Chi-square			23.639
p-value			0.000

Source: Own Survey

4.11 Classification of Households by Ownership of Saving Account:

Ownership of saving account was found to be a significant variable in determining food insecurity status of households. The results show that more than 79 percent of food secured household had got a bank account whereas 17.9 percent of food insecured household had got a bank account; and there is significant difference (p<0.01) between the two groups. The chi-square test also verifies that there is a strong relationship between ownership of saving account and food insecurity status.

Table 4.11: Classification household's based on ownership of saving account

Ownership of bank		Food Security Status	
account	Secured% (n=84)	Insecured% (n=96)	Total% (n=180)
No	21.0	82.1	33.1
Yes	79.0	17.9	67.0
Total	100	100	100
Chi-square			31.836
p-value			0.00

Source: own survey

4.11.1 Access to Credit Services:

From the total sampled households, households that had access to credit use accounted for 46.7 percent while households that had no access to credit use accounted for 53.3 percent. The proportion of access to credit household heads was 41.9 percent of total sampled food insecure households. In addition to this; access to credit headed households accounted for about 58.3 percent of the total food secure households. Whereas, the proportion of non-access to credit users household heads out of total sampled food secure households and food insecure female headed households were 41.7 percent and 58.1 percent respectively. There was statistically significant proportion difference between food secure and food insecure households in terms of credit access at less than five percent probability level. Thus, the result shows that households that had access to credit use are more food secure than households that had no access to credit use. Thus, lack of credit access worsened food insecurity as they have no means to increase their income (Cordaid, 2009). Once we knew that credit access improves food security, at least for those who accessed it, outreaching the scope of microfinance and local saving mechanisms to urban households should be put in policy interventions.

Table 4.12: Classification household's based on access to credit service

	Total HH (n=180)	Food secures HH (n=84)	Food insecured HH (n=96)	Chi square	P value
	%	%	%		
Credit access				**2.766***	**.096**
Yes	46.7	58.3	41.9		
No	53.3	41.7	58.1		

Note: * Significant at ten percent probability level of significance (P<0.1)

Source: own survey

4.12 Econometric Model Results:

Binary logistic regression model was applied to see the relative influence of household's demographic, socio-economic, human capital and institutional variables on urban household food insecurity status. Identification of the descriptive statistics is not enough to stimulate policy actions unless the relative influence of each factor known for priority-based intervention.

4.13 Determinants of Urban Household Food Insecurity:

Empirical findings of econometric model result discussed and presented in this section. Estimates of the parameters of the variables expected to determine urban household food insecurity and the goodness-of-fit tested by the Log likelihood ratio (LR) test displayed in table 4.13 below.

Eleven predictor variables selected to explain the dependent variable (food insecurity risks). Out of the total predictor variables, eight variables were significant at less than 1%, 5%, and 10% probability levels. The Hosmer-Lemeshow statistic indicated that model adequately fits the data since the significance value (0.925) is greater than 0.05. The omnibus test of model coefficients has a Chi-square value of 103.45 on 10 degrees of freedom, which is strongly significant at $p < 0.001$ indicating that the predictor variables selected have a high joint effect in predicting the status of household food insecurity risks. The predictive efficiency of the model showed that out of the 180 sample households included in the model, 167 (92.7%) were correctly predicted. The sensitivity (correctly predicted food insecure) and specificity (correctly predicted food secure) found to be 94.0 % and 86.7%, respectively.

The Pseudo R^2 of the model was also 0.814. This verified that the model has a good fit to the data and explained 81 % of the variability in factors influencing urban household food insecurity. Among the eleven independent variables included in the model, eight variables found to be statistically significant in influencing food insecurity status while the remaining three independent variables were statistically insignificant.

The model output revealed that educational status of household head, family size, owning saving account, remittance and gift received as well as average monthly income of household head were significantly determining the urban households food insecurity status of Hargeisa city.

Table 4.13: Maximum likelihood estimates of binary logistic model

Variable	Coefficient	S.E.	Wald statistics	Significance	Odds ratio
Sex of head of HH	1.561	.583	5.390	.328	0.811
Family size	1.145	.429	7.110***	.000	0.828
Age of head of HH	0.296	2.67	3.357*	.078	0.744
Marital status of HH head	0.296	2.67	3.357	.237	0.744
Dependency ratio	1.777	.726	15.561*	.079	0.040
Education of head of HH	-2.814	0.908	9.599***	.001	0.682
Remittance and gift	-0.373	1.521	14.759***	.001	1.033
Monthly income	-3.443	1.076	10.224***	.001	0.032
Urban agriculture	0.818	3.51	1.257	.122	0.582

Access to credit	-3.733	1.637	5.203**	.023	0.809
Own saving account	-1.446	0.776	6.285***	.000	0.026
Constant	-3.345	2.385	1.988**	.042	0.354
- 2 Log likelihood					148.02
Pearson Chi-squared (x^2)					103.45***
Pseudo R^2					0.814
Correct prediction of all sample (*Count* R^2)/ (%)					92.7 %
Sensitivity/ Correct prediction of food insecure (%)					94.0%
Specificity/ Correct prediction of food secure (%)					86.7%
Sample size					180

***, ** and * are significant at less than 1% (P<0.001), 5 %(P<0.05) and 10 % (P<0.1) respectively

Source: Own survey

4.14 Prevalence, Depth and Severity of Urban Household Food Insecurity:

Among the various measures of food insecurity, the Foster-Greer-Thorbecke (FGT) index is the most commonly used method to show the incidence, gap and severity of poverty (here defined from food calorie intake only) or simply food poverty or food insecurity of the food insecure households .Sample households' incidence, depth and the severity of food insecurity presented below. The survey result showed that the calorie intake approach of head count index was 53.2% indicating that only 47 % of the sample households were able to get the minimum required calorie recommended(2200 Kcal/AE/day) for active and healthy life .The greatest virtues of the headcount index are that it is simple to construct and easy to understand. However, the above result does not take the intensity of food insecurity risks into account and does not indicate how far the food insecure household affected by food insecurity risk, and hence does not change if people below the food poverty line become poorer and destitute due to increased exposure and reduced vulnerability to different livelihood risks and become more and more food insecure.

Food insecurity gap index (the depth of food insecurity) measures how far food insecure households, on average, are below the recommended subsistence energy requirement level. This measure is the mean proportionate food insecurity gap in the sample households (where the Food secure has zero food insecurity gaps).

Some people find it helpful to think of this measure as the minimum cost of eliminating food insecurity (relative to the recommended food poverty line), because it shows how much would have to be transferred to the food insecure households to bring their daily calorie intake up to the food poverty line (2200 Kcal/AE/day). The minimum cost of eliminating food insecurity risks using targeted transfers is simply the sum of all the food insecurity gaps in the sample households; every gap is filled up to the 2200 Kcal/AE/day. However, this interpretation is only reasonable if the transfers could be made perfectly efficiently, for instance, with lump sum transfers, which is implausible. For this study, the depth of food insecurity for the food insecure households was

18.9%. This means if the local government could mobilize resources to meet 18.9 % of the daily calorie requirement and distribute these resources, it would bring each food insecure household up to the daily caloric requirement level, and then, at least in theory, food insecurity will be eliminated. In other words, the sample households have to be supplied with 18.9 % of the daily minimum calorie requirement to get out of the food insecurity problem. The extent of the calorie deficiency gap for the sampled households was therefore, 415.8 kcal per adult equivalent per day. This means on average 396 kcal per adult equivalent a day of additional food energy would be needed to take the households out of the vicious cycle of food insecurity. This evidenced that the depth of food insecurity risk was relatively moderate in the study area but still requires intervention and necessary policy attention. The above result still lacks to see the inequality among food insecure households in their capacity to attain the recommended 2200 Kcal/AE/day.

To construct a measure of food poverty that takes into account inequality among the food insecure households, some researchers use the squared poverty gap index. This is simply a weighted sum of food poverty gaps (as a proportion of the food poverty line), where the weights are the proportionate food poverty gaps themselves. The finding showed that the severity of food insecurity (calorie deficiency) for the sample households was 0.064.

That is, the square of food insecurity gap (severity of food insecurity) among the sample food insecure households was 6.4%. This measurement gives more weight to the average income shortfall of the most food insecure of the food insecure

households (Tsegaye, 2009). This finding helps us to identify the minimum cost of eliminating food insecurity risks with perfect targeting of beneficiaries where there is scarce resource for intervention. In all accounts, the extent of food insecurity in the study area is moderate and but again needs policy attention at least to minimize the risks and to reach the new sustainable development goals by 2030.

Table 4.14: Prevalence, depth and severity of food insecurity of the study area

Food insecurity index	Total households	Female headed HH	Male headed HH
Incidence of food insecurity	53.2 %	83.3 %	65.1 %
Food insecurity gap	18.9 %	21.75 %	16.7 %
Severity of food insecurity	6.4 %	7.9 %	5.6 %

Source: Own survey

5. CONCLUSION

This research presented important information, justification and findings concerning determinates and dimensions of urban household food insecurity in Hargeisa city. The study was conducted with the specific objective of examining urban household food insecurity situation, estimating the food insecurity gap and severity and identifying the determinants of food insecurity at household level in Hargeisa city.

The major findings of the study reveal that food insecurity exists severely in the city. Attempts should be made in order to address the problem and it requires participation of both governmental and non-governmental institution in order to bring change in to life of poor urban households. The model output revealed that educational status of household head, family size, owning saving account, remittance and gift received as well as average monthly income of household head were significantly determining the urban households food insecurity status of Hargeisa city. The survey result showed that the sample households' incidence, depth and the severity of food insecurity are 53.2 %, 18.9 % and 6.4 % respectively.

This study has attempted to come up with the results of the analysis with defined scope, however, a lot remained to be explored. To provide basic information on the patterns and determinants of urban food insecurity, the social, political and environmental dimensions, role of urban agriculture in urban food insecurity, descriptive data on purchasing patterns of food insecurity, specific characteristics that make urban poor more vulnerable to food insecurity and their coping mechanisms demands future researchers' attention.

REFERENCES

[1] Frankenberger, T.R., 1992.Indicators and data collection methods for assessing household food security.In: Maxwell, S., and T.R. Frankenberger (edn.), measuring food insecurity: The frequency and severity of coping strategies.

[2] FSNAU, 2010. Post Gu Analysis 2010. FSNAU, Nairobi. Technical Series Report no. VI 33. 27 September, 2010.

[3] FSNAU, 2011. Food Security and Nutrition Analysis: Post Gu 2011. FSNAU, Nairobi. Technical Series Report no. VI 42. 8 Ocbober, 2011.

[4] FSNAU and FEWS NET, 2011. Famine Spreads into Bay Region; 750,000 People Face Imminent Starvation. Press Release, FSNAU and FEWS NET: Nairobi.

[5] Food and Agriculture Organization (2008). Guidelines For Measuring Household and Individual Dietary Diversity, FAO Nutrition and Consumer Protection Division with support from the EC/FAO Food Security Information for Action Programme and the Food and Nutrition Technical Assistance (FANTA) Project, Rome, Italy.

[6] Gujarati D N and Porter D (2009). **Basic econometrics**. 5th edition. New York: McGraw-Hill. 944 pages.

[7] Gujarati, D.N., 1988.Basic econometrics.Second edition. McGrew-Hill Inc, New York.

[8] Gupta, S.P., and Gupta,M.P, 2002.Business statistics.Suttan Chand and sons, New Dehli.

[9] Haddad, L.,E. Kennedy and J. Sullivan, 1994.Choices of indicators for food security and nutrition monitoring. Journal of Food Policy 19 (3):329-343.

[10] Haddad, L., 1997.Human nutrition in the developing world. Ithaca, New York. USA.

[11] Hoddinott, J. (edn), 2001.Methods for rural development projects. Food security in practice, Vol., 1., IFPRI, Washington D.C.

[12] Hosmer, D.W., and Lemeshow, S.,1989.Applied logistic regration.A Wiley-Inter science publication, New York.

[13] Holt, J., and Lawrence, M., 1991.An end to isolation. Save the Children Fund, UK.INTERNATIONAL FOOD POLICY REASERCH INSTITUTE , 2011. *WWW.ifpri.org.* [Online] Available at: http://www.ifpri.org/publication/ 2011-global-hunger-index [Accessed 12 April 2018].

[14] Maxwell D. 1999. The Political Economy of Urban Food Security in Sub- Saharan Africa. World Development, 27(11):1939-1953.

[15] Maxwell, D. 2005. Urban food security in Sub-Saharan Africa. Available at: http://www.idrc.ca/en/ev-30583-201-1-DO_TOPIC,html. (Accessed on 11th May 2018).

[16] Maxwell, D., Levin, C., Amer-Klemesu, M., Ruel, M., Morris, S. and Ahiadeke, C. (2000). Urban Livelihoods and food and Nutrition Security in Greater Accra, Ghana Research Report 112, International Food Policy Research Institute, Washington DC.

[17] Maxwell, N. 1984. From knowledge to Wisdom: A revolution in the aims and methods of science. Oxford: Basil Blackwell.

[18] Maxwell, S. 1999. The Meaning and Measurement of Poverty, *ODI Poverty Briefing. Overseas Development Institute*

[19] Maxwel D., 1995. Measuring Food Insecurity: The Frequency and severity of 'coping Strategies', Washington, D.C.20036-3006 U.S.A.

[20] Maxwel.S., R.F. Timothy, 1992. Household Food Security: Concept, Indicators, and Measurement: A technical review, UNICEF, New York.

[21] Sen, A., 1981. Poverty and famines: an essay on entitlement and deprivation. Oxford: Oxford University Press.

[22] Smith, K. and Yamamori, T. (eds.) 1992. Growing our Future: Food Security and the Environment. West Hartford: Kumarian Press.

[23] Smith L C, Alderman H and D Aduayom (2006). Food Insecurity in Sub-Saharan Africa: New Estimates for Household Expenditure Survey. International Food Policy Research Institute, Washington, pp134 UNDP, 2001. Human Development Report: Somalia. United Nations Development Programme, Somalia.

[24] Von Braun, J., Webb, P., and Yohanis, Y., 1992.Famine in Ethiopia.Policy implications of copping failure at national and household levels.Research report, IFPRI, Washington, D.C.

[25] Von Braun , J., Bouis, H., Shubh, K. & Lurch, R. P., 1992. *Improving the food security of the poor Concept Policy and Programs,* s.l.: International Food Policy Research Institute.

[26] Webb,P., and Braun V. J., 1994.Famine and food security in Ethiopia.Lesson for Africa.John Wiley and sons Ltd., England.

[27] World Bank, 1986. Poverty and hunger: Issues and options in developing countries.A World Bank policy study, Washington, D.C.World

[28] USAID (2012). Infant and Young Child Nutrition Project: Maternal dietary diversity and the implications for children's diets in the context of food security. http://www.iycn.org. (Accessed 2015, January 25).

[29] Wiesmann D, Bassett L, Benson T and Hoddinott J (2008).Validation of Food Frequency and Dietary Diversity as Proxy Indicators of Household Food Security. World Food Programme, Food Security Analysis Service, International Food Policy Research Institute (IFPRI), United Nations World Food Programme, Rome, Italy.

[30] WFP. (2009). Food security and vulnerability in Addis Ababa, Ethiopia. Vulnerability Assessment and Mapping (VAM), Addis Ababa, Ethiopia.

[31] World Food Programme (2014). Zimbabwe, Results of explaining food and nutrition security analysis, vulnerability analysis monitoring and evaluation, Zimbabwe.

[32] Zezza A and Tasciotti L (2008). Does Urban Agriculture Enhance Dietary Diversity? Empirical Evidence from a Sample of Developing Countries Food and Agriculture Organization (FAO), Rome.

[33] Young, H., 1992. Food security and famine: assessment and response. Oxfam practical health guides No.7.Printed by Oxfam print unit.

[34] Abebaw Shimeles, 2003.Dimensions and determinants of food security among rural households in Dire Dawa, Eastern Ethiopia.An M. Sc. Thesis presented to the School of Graduate Studies of Alemaya University, Alemaya. 152p.

[35] Atkinson, S.J.1995. Approaches and Actors in Urban Food Security in Developing Countries. Habitat International, 19(2).

[36] Barrett, C. (2002). Food security and food assistance programs. *Handbook of Agricultural Economics, 2*, 2103–2190. Retrieved from http://www.sciencedirect.com/science/article/pii/S1574007202100272

[37] Barrett, C. B. (2010). Measuring food insecurity. *Science, 327*(5967), 825–8. doi:10.1126/science.1182768

[38] Barrett, C. B., & Carter, M. R. (2013). The economics of poverty traps and persistent poverty: Empirical and policy implications. *Journal of Development Studies, 49*(7), 976–990. doi:10.1080/00220388.2013.785527

[39] De Waal, A., 2005. *Famine that kills :Darfur Sudan,* Oxford: Oxford University press.

[40] Devereux, S. et al., 2004. "Improving the analysis of Food Insecurity" Food security Measurement Livelihood Approaches and Policy :Applications in FIVIMS.

[41] Devereux, S. & R, W., 2010. Cash transfers and high food prices :Explaining outcomes on Ethiopias Productive SafetyNet Programme. *Journal of food policy,* Volume 35, pp. 274-285.

[42] Devereux, S., R, W., M, T. & H, T., 2006. *Ethiopian Productive Safety Net (PSNP) Trends in PSNP Transfers within targeted Households.* [Online]

[43] Devereux, S.1993. Theories of Famine. Hertfordshire: Harvester Wheatsheaf.

[44] Devereux, S. 2003.Development Bank of Southern Africa. 2005. The Challenges Facing Empirical Estimation of Household Food (in) Security in South Africa. London: Routledge.

[45] De Schutter, O. (2013). Gender equality and food security: Women's empowerment as a tool against hunger.

[46] Devereux, S., & Sussex, I. (2000, October). Food insecurity in Ethiopia. In *a DFID Ethiopia Seminar, London* (Vol. 7).

[47] Devereux, S. (2001). Sen's entitlement approach: critiques and counter-critiques. *Oxford Development Studies*, *29*(3), 245-263.

[48] Devereux, S. (2002). The Malawi famine of 2002. *IDS bulletin*, *33*(4), 70-78.

[49] Devereux, S. (2009). Why does famine persist in Africa?. *Food security*, *1*(1), 25.

[50] Dewey, K. G., & Mayers, D. R. (2011). Early child growth: how do nutrition and infection interact?. *Maternal & child nutrition*, *7*(s3), 129-142.

[51] Drimie,S and Lafon, M. (Eds.) 2003. Food Security in Southern Africa: Causes and Responses from the Region. Johannesburg. Institut Francais d'Afrique.

[52] Drimie S, Faber M, Vearey J and Nunez L (2013). Dietary diversity of formal and informal residents in Johannesburg, South Africa, BMC Public Health.

[53] Ellis, F. and Freeman, H. 2005. Conceptual framework and overview of themes. In: Ellis F and Freeman H (eds.) Rural Livelihoods and Poverty Reduction Policies. London: Routledge.

[54] FAO,1998. Agriculture, food and nutrition for Africa.A resource book for teachers of agriculture. Rome, Italy.

[55] FAO, (2006). Food security. *Policy brief. Issue 4*

[56] FAO, I. WFP (2015). The State of Food Insecurity in the World 2015. Meeting the 2015 international hunger targets: taking stock of uneven progress. *Food and Agriculture Organization Publications, Rome*.

[57] FAO, A. (2008). Introduction to the Basic Concepts of Food Security. *Food Security Information for Action, Rome*.

[58] FAO, I. (2015). WFP, 2014: The state of food insecurity in the world. *FAO, Rome*.

[59] FEWS-NET. 2005. Executive Overview of Food Security Threats in Sub-Saharan Africa.. Nairobi: FEWS-NET.

[60] FEWS-NET. 2002. Mini-Manual for Understanding and Assessing Households' Risk of Food Shortage. Nairobi: FEWS-NET.

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

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

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

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

[65] FEWS NET (2011) EAST AFRICA: Past year one of the driest on record in the eastern Horn, June 14, 2011. Accessed February 22, 2014 at: http://www.fews.net/docs/Publications/FEWS per cent20NET per cent20EA_ Historical per cent20drought per cent20context_061411.pdf

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

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

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

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

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