**An assessment of household food security in urban and peri-urban areas; a case study of Bindura Municipal area, Mashonaland central, Zimbabwe**

**by**

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**A dissertation submitted in fulfilment of the requirements for the degree of**

**Master of Agriculture (Food Security),**

**in the**

**School of Agricultural, Earth and Environmental Sciences**

**College of Agriculture, Engineering and Science**

**University of KwaZulu-Natal**

**Pietermaritzburg Campus**

**July 2015**

## Dedication

To my family, you are the best. I love you all!

**Declaration**

I, **Onismo Muzah,** declare that;

1. The research reported in this thesis, except where otherwise indicated, is my original research;

2. This thesis has not been submitted for any degree or examination at any other university;

3. This thesis does not contain other people's data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other people;

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Signed _____ Date_____

As the candidate's main supervisor, I, **M. Mudhara,** agree to the submission of this thesis.

Signed _____ Date_____

**Acknowledgements**

I take pleasure in acknowledging the contribution of various persons, without whom this study would not have been accomplished.

Firstly, I thank my supervisor, Dr Maxwell Mudhara, for constant invaluable guidance and patience.

To my parents, Bernard and Hellen, and wife, Evidence Mazhawu, thank you for your support and for being there when I needed you most.

I am also deeply indebted to the WK Kellogg Foundation for funding this research and my tuition.

Above all, I wish to give thanks to the Lord Almighty, for grace without measure - Psalms 77:11.

**Abstract**

Urban household food security is gradually being recognised as a developmental challenge in sub-Saharan Africa, in general, and in Zimbabwe, in particular. The increase in the prices of food and high unemployment in Zimbabwe has made it difficult for the population, particularly for the urban poor, to meet their food requirements. This has affected the livelihoods patterns of the poor staying in urban and peri-urban areas. There are many complex reasons which make households food insecure. Poverty is mainly the driving factor due to lack of resources to purchase or procure food at household level. Poverty, combined with other socioeconomic and political problems, creates the bulk of food insecurity problems in urban and peri-urban areas. This study aimed to contribute to a better understanding of the nature and dynamics of urban and peri- urban household food security in Zimbabwe. The first objective of this study explored urban household livelihoods in Bindura Municipal area (Zimbabwe), by describing livelihood patterns, coping strategies and distinguishing between food secure and insecure households, using descriptive statistics. The second objective investigated the determinants of household food security among urban and peri-urban households. Lastly, the study evaluated the extent of urban and peri-urban household food security, by looking into their nutritional security and how this affects their welfare. Purposive sampling technique was employed to select 200 households in Bindura Municipal area. A structured questionnaire using multiple HFS measurement tools were used in this study, including Household Food Insecurity Access Scale (HFIAS), Household Dietary Diversity (HDD) and Coping strategy Index (CSI). The ordered probit regression model was used for assessing determinants of household food security, using the HFIAS as the depended variable. The results revealed that educational level, occupation, household expenditure on nonfood items, marital status and gender significantly affect household food security. The Tobit model was used to measure the extent of households' nutritional security, using HDD as an indicator of food security. The results indicate that educational level, occupation and household expenditure positively influenced household dietary diversity and sources of vegetables negatively influenced household food security. This study concluded that urban farming has the potential for increasing household food security; and that; the government in collaboration with local authorities, should develop policies that improve access to land, particularly in peri-urban areas.

**List of Acronyms**

| | |
|---|---|
| AFSUN | African Food Security Urban  Network |
| DAFF | Department of Agriculture, Forestry and Fisheries |
| ERP | Economic Recovery Programme |
| FANTA | Food and Nutrition Technical Assistance |
| FAO | Food and Agriculture Organization of the United Nations |
| FGD | Focus Group Discussion |
| HDD | Household Dietary Diversity |
| HIES | Household Income and Expenditure Surveys |
| HFIAS | Household Food Insecurity Access Scale |
| HIV/AIDS | Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome |
| KZN | KwaZulu-Natal |
| LIG | Low-input Vegetable Gardens |
| MDG | Millennium Development Goal |
| ME | Marginal Effects |
| NGOs | Non-Governmental Organisations |
| SMEs | Small and Medium Enterprises |
| UNDP | United Nations Development Programme |
| UNICEF | United Nations International Children's Emergency Fund |
| WFP | World Food Programme |
| ZIMSTAT | Zimbabwe National Statistical Agency |
| ZVAC | Zimbabwe Vulnerability Assessment Committee |

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# CHAPTER 1: INTRODUCTION

## 1.1 Background to the problem

The concept of household food security (HFS) refers to the ability of a household to assure all its members sustained access to sufficient quantity and quality of food to live active, healthy lives (Frayne *et al.*, 2010). Household food insecurity is prevalent in Zimbabwe, in urban and peri-urban areas in Africa and many developing countries. Food maybe more plentiful and more diverse in the city than the countryside, but it is far from being uniformly accessible. The present study proposes an investigation to assess the extent of HFS in Zimbabwe's urban and peri-urban areas, in particular the Bindura Municipal area. HFS accounts for the consumption levels of all members of a household's population (Sikwela, 2008). In Zimbabwe there is significant inequality between households in rural and in urban areas, in terms of food access. Most rural households produce their own food for household consumption and sell the surplus. In spells of shocks like droughts they are aided by government interventions and food aid from non-governmental organisations. To the contrary, urban and peri-urban households rely on small-scale food production, regular buying of food and livelihood diversification to construct a living. Unfortunately, access to adequate food at a household level increasingly depends on how food markets and distribution systems function, rather than only on total agro-food output (Ignowski, 2012). In trying to understand the survival of urban and peri-urban households, their resilience and coping strategies to food insecurity, a livelihoods approach is valuable. This approach seeks to improve understanding of how people use the resources at their disposal to build a livelihood. The assumption is that households survive by drawing on a range of assets (human, physical, financial, social and natural) that are available to them within the broader socio-economic and political context (Gundu, 2009).

## 1.2 Importance of the study

Zimbabwe as a country has not been spared by extreme weather patterns, rainfall variation, economic-political unrest, HIV and AIDS, which all have taken a toll on food security at household level (Kadziya & Chikosha, 2013). This study focuses on urban and peri-urban areas, which establish their household welfare using food security. Various factors contributing to HFS are discussed and investigated, so that recommendations can be made on better strategies and measures to assist societies address household food insecurity in urban and peri-urban areas. The multiplicity of factors causing and exacerbating food insecurity

requires closer collaboration among community members, government agents, development actors and policymakers, at all levels, to assist in combating poverty in urban areas. Denhere *et al*. (2011) state that in Zimbabwe several studies have been documented by FAO/WFP, Zimbabwe Vulnerability Assessment Committee (ZimVac) and Zimbabwe Food Security Outlook, concerning household food security in rural areas. Little attention has been paid to urban and peri-urban areas. The study could draw the attention of government and policymakers on how to target interventions in urban and peri-urban areas and throughout out the country. The household is recognised as the primary focus for any development strategies aimed at achieving food security, with livelihoods assets like income viewed as the ambit for food access and household management (Jonga & Chirisa, 2009). This study will concentrate on assessing HFS, taking into account issues like sources of income, sources of food and household composition. This study is of significance in understanding the impact of food prices and policy issues in relation to access, gender, food, household expenditure and levels of urban poverty. The study makes it easier for government and policymakers to formulate food security coping strategies such as livelihood diversification. It is important to inform local authorities on how they can contribute towards minimising household poverty in urban areas in developing countries. The present study investigates the proportion of food secure to food insecure participants in the Bindura Municipal area**.**

## 1.3 Problem statement

The assumption of this study is that the household is the first place to experience food insecurity. This should thus be the initial focus of government planning. Previous research by Chisango (2012) bears evidence that, despite international and government efforts towards food security, its attainment in Zimbabwe, and in Bindura in particular, is becoming elusive, especially at household level. In Zimbabwe there is high proportion of food insecure people, which is caused by unemployment, high food prices and the quality of food (Jonga & Chirisa, 2009). The study aimed to bridge the gap on the understanding of the level of the household food security and its determining factors in urban  and peri-urban areas in Zimbabwe. The study will be an origin of the interventions needed to address the level of food security in Zimbabwe's urban and peri-urban areas. To understand the HFS status in a country, it is necessary to investigate how the mechanisms of the food distribution system and resources of a household determine its access to food (Chingwende *et al.*, 2014). There is food distribution and accessibility problems that need to be addressed, ideally by expanding employment opportunities, thereby enhancing households sources of incomes. Denhere *et al*. (2014) assert

that HFS is well understood concerning issues such as social protection, sources of income, rural and urban development, changing household structures, health, access to land, water and inputs, retail markets, or education and nutritional knowledge. The multiple factors that influence access to food are not well understood and this could impact negatively on the ability to identify appropriate policies to improve food access.

## 1.4 Research objectives

Generally, the study seeks to assess household food security in the Bindura Municipal area, Mashonaland Central Province, Zimbabwe, and the factors determining it.

The specific research objectives are as follows:

- To identify different livelihood sources of urban and peri- urban households in Bindura Municipal area.
- To analyse the determinants of the household food security status in urban and peri-urban areas.
- To investigate the factors that influences the household dietary diversity levels among urban and peri-urban settings.

## 1.6 Organisation of the study

The thesis is paper-based and is organized into six chapters. Chapter 1 has outlined the problem and its setting. Chapter 2 contains a review of the relevant literature. Chapter 3 presents an analysis of household livelihoods. Chapter 4 analyses the determinants of household food security in urban and peri-urban areas. Chapter 5 illustrates the extent of household nutritional security. Finally, Chapter 6 presents the conclusions and recommendations of the study.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 Introduction

The Government of Zimbabwe has a daunting task to address household food insecurity in urban and peri-urban areas because of population growth, unemployment and a declining economy. Munodawafa (2009) asserts that the country is currently facing a 'triple threat', namely HIV/AIDS, food insecurity and diminishing capacities to deliver basic services to the people. Household food security can be defined as the accounting of the consumption levels of all members of a household population (Crush *et al.,* 2011). A household is considered food secure if it has the ability to acquire the food needed by its members to be food secure (Iram & Butt, 2004). The causes of household food insecurity may include inadequate control and quality of assets, unemployment, inadequate wages, high food prices, inadequate access to markets and other factors. The full range 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 conditions, experiences and behaviours that serve as indicators of the varying degrees of severity of the condition. Measuring food security is a complex challenge; the Household Food Insecurity Scale (HHFIS) is the most appropriate tool, as it gives a HFS condition for a period of 30 days. This literature review gives an overview of the Zimbabwean HFS situation in urban and peri-urban areas. The literature review also presents a body of information relating to issues of household income, assets endowments, HIV/AIDS, macro-economic conditions, sustainable livelihood coping strategies and household food production, as the key determinants affecting HFS.

## 2.2 Overview of the food security situation in Zimbabwe

Household food security in Zimbabwe has declined, compared with a decade ago, due to a drastic reduction in food and agricultural production following erratic rainfall, a declining industrial economy and the gross lack of key farming inputs (FAO/WFP, 2008). Food security status among the households differs due to variation in households 'available resources. The Zimbabwe Vulnerability Assessment Committee (ZIMVAC, 2013) asserts that the 2013/2014 consumption year was projected to see 2.2 million people (25 per cent of rural households) food insecure by the peak of the hunger period in March 2014. Manyure *et al.* (2013) state that, in Zimbabwe, food insecurity was only a household level concern among the poor and those without enough land to farm. However, food shortages at both national and household level have increased over the past two decades and the country has had to rely

on food aid and commercial grain imports to meet its requirements. CSO (2012) indicates that 70% of the population was living below the poverty datum line and this figure could have increased, because of a considerable increase in food prices and inflation. The plight of the poor in rural areas is exacerbated by a substantial shortfall in maize production because of erratic rains. The majority have to survive on food aid from external donors. Murisa (2010) records that poverty in urban areas is escalating because of the high rate of unemployment. Zimbabwe is classified as a low-income country with a diversified economy, whose main industrial sectors include mining and agriculture (Gundu, 2009). Although Zimbabwe was Africa's second most industrialised economy in the early 1990s, the majority of its population have always been agrarian based (Mukarumbwa & Mushunje, 2012). The decline of manufacturing and other industrial activities has contributed to an increase in the number of households dependent on agriculture for their survival (Iram & Butt, 2004).

**2.3 The extent of urban and peri-urban food insecurity in Zimbabwe**

Despite continued economic growth around the world, food insecurity remains a pressing problem in many parts of Africa. Poverty in urban areas is affected by a combination of factors, which tend to produce a wide range of vulnerabilities. The most important vulnerability involves poor urban dwellers, who are more immersed in the cash economy but earn incomes that are often erratic, unreliable and small (Kutiwa, 2010)**.** Kutiwa (2010) stressed that Zimbabwe, the former bread basket of Africa, has become a net importer of food, with grave consequences for the economy and the overall food security of the country. High food prices have drastically reduced people's purchasing power and raised the spectre of food and income disequilibrium at the household level. Most of the food in Zimbabwe's urban markets is imported, rendering the urban population more susceptible to external food shocks and rising food prices on the international market (Tawodzera *et al.*, 2010). Crush and Frayne (2010) suggested that, when a household is already spending a disproportionate amount of its income on food, inflation and price shocks will have an immediate negative impact on food security. Gandure *et al*. (2010) predicted that Zimbabwe will fall far short of achieving the Millennium Development Goal (MDG) of reducing hunger by 2015. One of the Millennium Development Goals is to reduce the number of food insecure households by 50% by 2015. Zimbabwe has already missed targeting the goals. In terms of impact, both urban and rural areas will be affected. Households, specifically those in urban areas, suffered from food insecurity due to low incomes and food shortages in the markets (Mrema & Chitiyo, 2008). The very poor, particularly those who live in informal settlements, in backyard shacks

in high-density areas, and in peri-urban areas, are the worst affected. Many people in urban Zimbabwe are living in poverty due to limited livelihood opportunities (Sigauke, 2002). Urban poverty is evidenced by the lack of ability to meet proper basic needs such as shelter, safe and clean drinking water, sanitation and food (Tawodzera, 2012). Even though Zimbabwe's rural areas remain the locus of poverty, compared to urban areas, there is evidence that, since 2000, urban households, especially those in high-density areas, proportionally became poorer due to the deteriorating macro-economic environment, characterised by hyperinflation, negative GDP growth and shrinking formal job opportunities (Moyo, 2010). According to Zimstat (2014), the total consumption poverty line (TCPL) for Zimbabwe stood at US$102.00 per person in January 2014. This means that an individual required that much to purchase both non-food and food items as at January 2014 in order not to be deemed poor. Botswana has had high and sustained rates of economic growth for the past five decades and is generally considered to be one of the best economic performers in Sub-Saharan Africa (IMF 2012). PRFT (2015), in its study in Gweru, stated that the results carried out by the National Statistics Agency (ZIMSTAT) indicate that 38% of urban households, and almost 47% of people living in urban areas in Zimbabwe, are classified as poor. Nsingo (2010), cited in (Mpofu, 2012), explained that a study by Save the Children in January 2009 estimated that 10 out of 13 million Zimbabweans, over 75% of the population, were living in 'desperate poverty'.

## 2.4 Determinants of household food security

Gebre (2012) noted that, according to the World Food Programme, the main determinants of food insecurity in the urban context are: food availability, food supplies to markets, food access, purchasing power and access to market and food utilisation, health and morbidity status. Food security is no longer seen simply as a failure of agriculture to produce sufficient food at the national level, but instead a failure of livelihoods to guarantee access to sufficient food at the household level (Abdalla, 2007). Factors used to explain the differences in levels of food security between households include income, household land holdings, employment status, household productive asset endowments and household composition (Ecker & Breisinger, 2012). Kutiwa *et al*. (2010) reasoned that economic status is a large factor in food security, but in poor countries it may not be the only determinant of food security. When a household has a consistent income it is much easier for it to be food secure. However, in countries such as Zimbabwe, only a small percentage of people are securely employed in the formal sector. Food security has to be determined by other factors such as household

composition, educational level and livelihood diversification (Iram & Butt, 2004). Access to employment opportunities help to diversify and increase the amount of income at household level. The instability in access to employment opportunities determines food insecurity of urban households (Gebre, 2012). Family size is identified as one of the important demographic factors that affect household food insecurity status. Households with large family sizes have a higher chance of being food insecure than those with smaller ones (Mudefi, 2011). Battersby (2011) explains that that the linkage between household size and household survival strategies is quite complex. For example, urban households may postpone having children or send existing household members to rural areas, thus reducing or limiting the size of the household. Alternatively, households may retain or incorporate additional members to increase income, thus increasing the household size (Battersby, 2011). Sikwela (2008), in a study in Zimbabwe, found that household size is significant for households that are food insecure, compared to food secure households. Access to credit facilities determines household food security, because it gives the household an opportunity to be involved in income-generating activities, which can increase their financial capacity and purchasing power, to escape the risk of food insecurity (Sikwela, 2008). Moreover, it helps to smooth consumption when households face a temporary food problem. Gundu (2009) noted that many reasons, such as lack of education, collateral, good harvest, nepotism and an unduly long process, were given as hindrances to access to credit.

Gebre (2012) opines that the age of a household head affects food security status, where households headed by older people have higher chances of being food insecure. This is mainly because, the older household heads are, the less likely it is for the household to be productive and the more likely such households are to depend on remittances and gifts. Older household heads, rather than having their own income and production, have a higher probability of having a large family. Education level of the household head affects HFS. Literate household heads are less likely to be food insecure than illiterate household heads (Mudefi, 2011). A possible explanation is that an educated household head largely contributes to working efficiency, competency, diversification of income, adoption of technologies and becoming visionary in creating a conducive environment to educate dependants, with the long-term target of ensuring  better living condition than illiterate ones (Senefeld & Polsky, 2007). An educated household head plays a significant role in shaping household members. Gebre (2012) stresses that being literate reduces the chances of households becoming food insecure.

**2.5 Sources of household income for urban dwellers**

Few households in developing countries derive the bulk of their income from a single source; most households avoid an extended period of dependence on only one or two sources of income (Ndlovu *et al.,* 2013). Many households in Zimbabwe derive their income from many sources, including wages, salaried labour, remittances and small enterprises, which include basket and brick making (Crush *et al.*, 2010). The contribution of each source to total income and its reliability varies greatly among households (Ersado, 2006). Factors contributing to this variation include agro-ecological conditions, wealth and income levels. In rural areas of developing countries, diversification into non-farm income sources is growing over time and now accounts for a considerable share of household income (Tawodzera, 2012). Chisango (2012) argued that off-farm labour is an important source of income for most smallholder farmers and is positively associated with higher and less variable total income. Income diversification can have a positive effect on food access, by increasing total household income and, under ideal circumstances increasing investment in agriculture (Ersado, 2006).

Tawodzera (2011) points out that, while poverty has many dimensions, the aspect that has most influence on household access to urban goods and services is income. Access to an adequate and stable income is vital for urban household food security because of the money-orientated nature of the urban environment, where nearly everything has to be bought for cash. Urban households require cash income to pay for their food, as well as for other essential services such as housing, transport and electricity (ZFSOU, 2012). The number of income sources is directly associated with the gender of the household head and the number of adult household members. In contrast to rural areas, female-headed households tend to have more income sources in urban areas (Ersado, 2006). Men and women engage in different activities to obtain income. Income derived from the sale of their labour is a key asset for the urban poor, as a result of the commoditised nature of cities, which increases dependency on cash income (Meikle *et al.*, 2001). Mbara *et al*. (2005) noted that, in the cases of Harare and Bindura, formal sector work was ranked as the most important source of income for households. Professional services constitute the highest income-earning activities, with percentages of 34% and 27% in Harare and Bindura, respectively. Crush and Frayne (2010) state that in Blantyre urban agriculture is a relatively more important source of income than in Lilongwe (25% compared with 10%), while formal employment is more important in Lilongwe. Pedzisai *et al*. (2014) revealed that urban agriculture in Zimbabwe is an important subsistence and income generating activity and is popular among the poor to complement

their meagre household incomes. Tawodzera *et al*. (2012) assert that small and medium scale enterprises (SMEs) had multiplied steadily in many towns in Zimbabwe, to provide livelihoods to millions. Crush and Frayne (2010) suggested that other sources of household income in South Africa include state grants (pensions, child grants and disability grants), informal employment, remittances, borrowing from 'loan sharks' and criminality.

**2.6 Household food production in urban and peri-urban areas**

The challenge of feeding cities lies in enhancing consumer access to food by ensuring increased local food production, processing, distribution and reversing dependence on distant production sites, thus enabling cities to become more autonomous in food production (Jongwe, 2014). More than 70% of Zimbabweans depend primarily on agriculture for their livelihoods, but they face a wide range of problems, including low productivity, limited market integration, poor soil fertility in some regions, the impact of climate change; limited irrigation systems, a lack of smallholder-oriented credit systems; and weak agricultural training and services (ZFSOU, 2012). Urban Agriculture (UA) contributes to local economic development through boosting the urban poor asset base, increasing income and alleviating poverty, thus reducing vulnerability and food insecurity (Chiweta & Mushunje, 2012). Alinovi *et al*. (2009) stated that UA is a direct and indirect occupation in cities. Crush *et al*. (2010) upholds that urban production is a source of both food and income, though the relative importance of each varied by type of household, with higher-income households selling a larger absolute volume of produce and female-headed households selling more than male-headed households. It is estimated that two hundred million urban residents the world over provide food for the market and that eight hundred million urban dwellers are actively engaged in UA (RUAF, 2009). Urban agriculturalists are composed mostly of disadvantaged groups such as orphans, women, rural immigrants without jobs and the elderly (Chazovachii *et al.,* 2013). The majority of rural dwellers in Zimbabwe depend on smallholder crop-livestock farming, based on the production of maize, other cereals and legumes, along with small and large stock, including goats and beef or dairy cattle (ZFSOU, 2012). Agriculture continues to be one of the important sources of livelihoods for the majority of households in the peri-urban and high-density areas, after petty trading, cross-border trading and self-employment (FAO/WFP, 2010). Agriculture plays an important role in the development of the Zimbabwean economic growth, households' income generation and food security (Mukarumbwa & Mushunje, 2010). Crush *et al*. (2011) point out that in the African Food Security Urban Network (AFSUN) baseline survey of poor areas in 11 cities in southern

Africa, just 22% of the households sampled said that they normally grew some of the food they consumed. Crush *et al.* (2010) disputed the AFSUN survey and emphasise that in Lusaka, with a very high concentration of poor households, food production is extremely limited, and that most households do not have access to the land to grow anything. It seemed that only residents of cities that experienced absolute food shortages, such as Harare, regularly depended on food they had grown themselves (Crush *et al.*, 2011). Urban agriculture is argued to have the potential to alleviate poverty, through subsidising food expenditure, income generation, through the sale of produce, working on urban farms and impacting prices by providing lower cost produce to the market (Battersby, 2012). Urban agriculture is often advocated as a means of addressing growing vulnerability and poverty, persistent food insecurity, declining livelihood opportunities and gender inequality in the urban economy (Crush *et al.*, 2010). Urban home vegetable gardening plays an important role in establishing sustainable and profitable livelihoods for the majority in the urban areas (Mrema & Chitiyo, 2008).

## 2.7 Sources of household food for urban dwellers

According to (Mudefi, 2011), poor households in southern African cities obtain their food from a variety of formal and informal sources. Supermarkets are more important than the informal economy in some cities and the reverse is true in others. However, it has been clear that supermarkets are the dominant sources of food for households in most cities in the world (Crush et al., 2010). Mudefi (2011) argued that supermarkets are less important as sources of food, compared from informal traders. Botswana's proximity to South Africa has meant that it is increasingly integrated into the supermarket-driven food supply chains that dominate that country's food retail sector. Southern Africa's supermarkets revolution has transformed the way in which urban residents of Botswana source their food (Crush & Frayne 2011). Economic hardship in Zimbabwe forced many households who could access land to try to supplement their food basket through household food production (Chisango, 2012). By 2008, urban agriculture had become ubiquitous throughout many towns in Zimbabwe (Crush et al, 2010). Food transfers from rural households are important and common in many towns in Zimbabwe. Food transfers proved to be important to the survival of many households in Harare and neighbouring towns (Gundu, 2009). These food transfers come from family or friends in the rural areas, other urban areas, or other countries, where Zimbabwean migrants are now domiciled (Murisa, 2010). Crush and Frayne (2011) argues that the AFSUN survey found that rural-urban food transfers are not particularly significant in Gaborone and,

certainly, nowhere near as important as in cities such as Windhoek, Harare and Lusaka. Some urban households also maintain plots in the rural areas, where they grow crops which they transfer to the city for their own consumption. FAO/WFP (2010) state that diaspora remittances play a major role in supporting household food needs and alleviating poverty in Zimbabwe. Overall, it is estimated that a large number of Zimbabweans are abroad to work and support their households.

## 2.8 Food security measurement and indicators

Measuring and defining food security is a difficult task. FAO currently defines food security as "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life". Such status is not the case for many people in sub-Saharan Africa (FAO, 2011). The most important HFS indicators are: availability of food in local areas, availability of agricultural inputs, agricultural production, market infrastructure, access to common resources, climatic factors, especially rainfall levels, agro-ecological disparities, stability of food supply and production, community social networks, presence of weather and crop forecasts, food balance sheets, pest management and local and regional conflicts (Mudefi, 2011). Current research agrees that food security has three central concepts: food availability, food access and food utilisation (Webb *et al*., 2006). There is still not a universally accepted tool of measurement. Today most measures look at household level of food security and this can be done in multiple ways. Measuring household food security can include looking at caloric intake, health measures, or food expenditure. These tend to be measured by surveys, which have multiple methods. Du Toit *et al*. (2011) noted that national food security indicators reveal that South Africa has been able to meet the food needs of its growing population over the past years. However, there are no clear statistics to ascertain that the food insecurity condition is the same at household level, especially in rural areas of South Africa. DAFF (2011) contributes to an understanding of household-level food security in different, but complementary, ways, most significantly by providing measures of the extent to which the poor spend their income on food. Alemu (2010) based his measurement of household food security on undernourishment. According to the South African Medical Research Council (SMRC), an individual is classified to be food insecure if he/she receives less than 2261 kilocalories per day. By translating this to economic terms, it represents the recommended daily consumption (SAMRC, 2010).

## 2.9 Household Food Insecurity Access Scale (HFIAS)

The Household Food Insecurity Access Scale (HFIAS) is a brief survey instrument developed by Food and Nutrition Technical Assistance (FANTA), to assess whether or not households have experienced problems with accessing food during the past 30 days (Noble, 2011). There are a number of tools which can be used, but for the present study it is the most appropriate to assess household food consumption patterns for a period of 30 days. The HFIAS measures the prevalence and degree of food insecurity from a nutritional perspective, focusing on a household's food-related experiences. When facing limited access to food, it can detect changes in the household food insecurity situation of a population, over time (Gandure *et al.*, 2010). The HFIAS was developed to reflect three apparently universal domains of the experience of inadequate household-level food access, namely anxiety about household food supply, insufficient quality, which includes variety and preferences, and insufficient quantity of food, the amount consumed and the physical consequences of insufficiency (Deitchler *et al.*, 2011). FANTA (2004) explained that the HFIAS is the most developed tool for measuring household food insecurity. It consists of a set of nine generic questions (Coates *et al.*, 2006). Question 1 addresses anxiety and uncertainty of household food supply, Q2–Q4 addresses food quality (variety and preference) and Q5–Q9 addresses insufficient food intake and its physical consequences. Q2–Q4 and Q5–Q9 are organised in order of increasing severity of the food insecurity condition (Coates *et al.,* 2006). Based on the response to the nine questions and frequency of occurrence over the past 30 days, households are assigned a score that ranges from 0 to 27 (FAO, 2008). A higher HFIAS score is indicative of poorer access to food and greater household food insecurity. Becquey *et al.* (2010) proclaims that the HFIAS still needs to be externally validated, because there are no agreed-upon gold standard indicators. Existing measures lack the ability to differentiate households at varying degrees of food insecurity in order to target and evaluate their interventions (Webb *et al.*, 2006). HFIAS was used in determining the extent of food insecurity of rural and urban households in Bangladesh and Uganda; and to examine its suitability as a predictor of poverty status (Alcara & Zeller, 2007). Other research carried out in Bangladesh has validated the household questionnaire approach as a viable and extremely useful tool for operational use in food security-related programming and evaluation. Gebreyesus *et al.* (2015) recorded that the HFIAS has been shown to measure food insecurity with an acceptable standard in a few developing countries.

## 2.10 Dietary Diversity Index

Dietary diversity has been defined as the number of individual food items or food groups consumed over a given period of time. The reference period can vary, but is most often the previous day or week (Saaka & Osman, 2013). Dietary diversity is considered an outcome measure of food security, mainly at the level of individual or household food access, but can also provide information about food availability in the community and reflect seasonal changes in dietary patterns, an aspect of the sustainability of the food supply (Kennedy, 2009). Dietary diversity instruments have recently become the preferred method for studying dietary adequacy in developing countries. Belachew *et al.* (2004) and Vakili et *al.* (2013) stated that dietary diversity (DD) and the amount of animal source foods that individuals consume are two commonly used measures for dietary quality. Healthy growth and development essentially need a balanced diet of nutrients and vitamins, which include a variety of foods from different food groups (vegetables, fruit, grains and animal source foods). The preliminary findings of the Nutrition Survey of 2014 in Zimbabwe showed that, while frequency of meals seemed adequate, dietary diversity remained a challenge, as only 26 % of children aged six to 59 months consumed four food groups (WFP, 2014). It has also been noted that, in order to cope with food insecurity, the majority of poor Zimbabweans are reducing the number of meals from three meals a day down to one, which leads to limited dietary diversity. Experience has proven that women are most affected, as they prioritise their children (EAZ, 2013). Arimond and Ruel (2004) stressed that a diverse diet, rare among poor populations in developing countries, proves especially important for infants and young children, who need essential micronutrients and energy for rapid physical and mental development. The household dietary diversity score (HDDS) is meant to reflect, in snapshot form, the economic ability of a household to access a variety of foods. Studies have shown that an increase in dietary diversity is associated with socio-economic status and household food security (FAO, 2013) Food insecurity has severe implications for nutrition, health and productivity. Mango *et al.* (2014), in Sanchez (2002), noted that members of a household that fails to obtain nutritious and preferred foods for a healthy and productive life may develop multiple chronic conditions, even obesity. Regular intake of an adequate quality and quantity diet is vital for optimal health, growth and development of adolescents. In low income countries, suboptimal dietary practices result either from limited access to food supply or from inadequate knowledge of the importance of a good quality and quantity diet (Belache *et al.*, 2013). Handina (2010) pointed out that in Zimbabwe there were changes in

the household dietary diversity caused by the introduction of the cash transfers project in the community and generated food consumption scores (FCS). In South Africa, low dietary diversity is associated with stunted growth in children and a higher probability of metabolic syndrome and cardiovascular risk factors in adults. The South African population, in general, consumes a diet with little variety and is therefore nutritionally vulnerable (Drimie *et al.,* 2013.

**2.11 Household assets endowment**

'Assets endowment' refers to households' assets, including land, labour, knowledge and capital. Household assets have a significant influence on households' livelihood decision-making (Perz, 2005). Households always use these assets to invest in their production or business, to achieve welfare benefits (Phanith & Penh, 2011). Access to food by households has been conceived as a function of entitlements, which includes a set of all alternative bundles of commodities that a person can obtain legally, by using his or her endowments (Feleke *et al.*, 2005). People may suffer inadequate food because of lack of entitlements. This implies that food insecurity should be analysed in terms of the decline or failure of food entitlements of different socio-economic groups. Ndlovu *et al*. (2013) assert that there can be household food insecurity due to a variety of variables, such as loss of endowments, loss of employment, a fall in wages, or an unfavourable shift in terms of trade of food exchange for assets. According to (Donna, 2012) physical assets can be sold to finance consumption, but they also contribute to current consumption or can be used as physical collateral for a loan or credit. Livelihood strategies are shaped by a combination of household assets available, but they are relative factors that determine the availability of these assets in urban areas, such as employment (Meikle *et al.*, 2001). Ownership of other productive assets such as farm equipment may be reasonable proxies for food security status of households as they are used for farming and hiring. Tawodzera (2011) noted that there is a positive relationship between agricultural equipment ownership and *per capita* grain production. The availability and access to assets affects the strategies of households. For example, households with an extra room may rent the extra space out for cash (Meikle *et al.*, 2001). Ownership of housing can be key in ensuring access to other resources, for example even housing in informal settlements, if registered, can be used as collateral for credit (Farrington *et al.*, 2002). Mavhura *et al*. (2015) points out that consecutive droughts have resulted in high food insecurity and depletion of household assets endowment during droughts. Maponya (2008) stated that asset ownership plays a key role in a food security context, because ownership of

assets enables households to engage in other income-generating activities, such as leasing of land, when income is insufficient.

## 2.12 Household sustainable livelihood approaches to urban poverty

A livelihood comprises the capabilities, assets (including material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with, and recover from, stresses and shocks and maintain or enhance its capabilities and assets, while not undermining the natural resource base (Scoones, 2010). Tawodzera (2011) explained that there is the realisation that poverty, as conceived by the poor themselves, is not just a question of low income, but includes other dimensions such as bad health, illiteracy and lack of social services, as well as a state of vulnerability and feeling of powerlessness, in general. Scoones (2010) pointed out that, in trying to understand urban food insecurity, a livelihoods approach is valuable. Such an approach seeks to improve understanding of how people use the resources at their disposal to construct a livelihood. Meikle *et al.* (2001) claimed that, while natural resources and common property resources such as rivers, land and forests are generally less significant assets for urban poor residents, some natural resources like land are used in urban settings for livelihoods activities. The Fast Track Land Reform Programme (FTLRP) has so far played an important part in addressing food insecurity and poverty reduction among urban poor and low-income working class groups in Zimbabwe. Farrington *et al.* (2002) points out that, natural resources are generally less used in the livelihood strategies of the urban poor, as they tend to be less available, especially in large urban centres. However, they should not be counted out, especially in peri-urban areas, where traditionally rural communities are being progressively absorbed into the urban fabric and are dependent on agricultural and non-agricultural activities. Moyo (2010) stresses that evidence from peri-urban land reform beneficiaries suggest that their livelihoods have been transformed due to their new ownership of land. They are not only directly producing food for household consumption, but some are partly producing for informal commercial purposes. In most cases, access to productive resources, including land, water, seeds, livestock and trees, contributed to yield and income increases, which, in turn, led to improved food security and nutrition levels (Nelly *et al.*, 2004). Mutangi (2013) points out that, as a result of ever-increasing poverty, some residents in Masvingo town have resorted to utilise peri-urban resources to enhance their livelihoods. Among these resources is river sand, which is now in demand for purposes of construction in urban areas. This demand, together with the persistent

recurrence of poverty, loss of employment and changes in the economy in Zimbabwe, has forced some urban people to rely on resources which are close to rural areas, for survival. A key asset for the urban and the rural poor is social capital. Meikle *et al*. (2001) explains that social capital refers to features of social organisation, such as trust, norms and networks, that can improve the efficiency of society by facilitating co-ordinating action*s*. Farrington *et al.* (2002**)** argues that strong social capital can help communities in mobilising to make demands for services and rights to the state. As well as local social relations, social capital may include the wider networks of social relations between the poor and the non-poor, including systems of patronage. However, social capital is a valuable and critical resource for poor urban households, especially during times of crisis and socio-economic change (Farrington *et al.*, 2002**)**.

**2.13 Food security interventions in Zimbabwe**

Several approaches have been implemented to address transitory food insecurity by both government and Non-Governmental Organisations (NGOs). These are the drought relief and recovery programmes (ZFSIP, 2011). Zimbabwe was once a food basket for the region. This note derives from an analysis conducted in 2009, looking back largely at the period 2000-08, which witnessed a dramatic transformation from a food surplus to a food deficit country, at the household and national levels (Pazvakavambwa, 2009). Food aid is one of the common interventions employed in Zimbabwe to ease household food security. There are countries which have received food aid for protracted periods, spanning up to 30 years, such as Ethiopia, Kenya, Uganda, Haiti and Swaziland (Jaka, 2009). Drought relief programmes have been implemented almost every other year since Zimbabwe's independence in 1980 (Belder, 2007). UHAC (2012) notes that UNICEF has reached up to two million women, men, boys and girls with critical humanitarian needs in Zimbabwe, through cluster lead agencies in education, nutrition and water, sanitation and hygiene. The Government of Zimbabwe and WFP faced with critical resource constraints to assist the targeted numbers of food insecure communities and households. This means, even those under food assistance, may need to supplement their food needs by other means (ZFSO, 2014). Hanyani-Mlambo and Mukorera (2013) explained that most NGOs and government interventions in Zimbabwe normally target rural areas, so by targeting urban communities the programmes were meeting a very important need. Sigauke (2002) said that, in certain instances, governments and the private sector, without any consultation with the intended beneficiaries, often formulate urban projects. This prompted the emergence of development approaches that focus on alleviating

the poverty of targeted urban groups. Pedzisai *et al.* (2014) stated that only NGOs seem to be helping out the urban farmers in Chinhoyi. Wilding (2004) postulated that the need for food aid was clear in the market chaos which prevailed in 2002 and, without it, there would have been considerable suffering amongst the rural population of Zimbabwe and, particularly, those farming in the communal lands. African countries should increase their investment in long-term interventions such as dietary diversification, food sufficiency and bio-fortification (Mwaniki, 2007). ZFSIP (2011) stresses that, while the food for work programmes were used for infrastructure rehabilitation and developmental purposes, only a small number of these programmes had some successes in rural and peri-urban areas. In recent years, attention has shifted towards urban areas, through encouragement from government, and NGOs are increasingly playing an important role in shelter, food security and urban development projects (Sigauke, 2002). Focusing on household food security, nutrition and the right to food in urban and peri-urban areas will help city-dwellers to attain a better livelihood. Stewart *et al.* (2013) revealed that, of the interventions that did improve households' levels of nutritional status, most used a multiple approach, focusing on nutrition education, amongst others, in combination with increased food production. Home gardening was found to be the most successful agricultural activity. This will allow municipalities to broaden their strategy towards achieving the Millennium Development Goals (Baudoin and Drescher, 2008)

## 2.14 Urban household coping strategies

Coping is the manner in which people act within the confines of existing resources and range of expectations to achieve various means (Wisner *et al.*, 2004). Resources may include land, livestock, draught animals, crops and labour. To mobilise resources, people should be entitled to command them, which can be through the exercise of rights, using the market, calling upon obligations or even through theft and violence (Ndlovu, 2010). Households in poor communities often diversify their livelihood and income-generating strategies (Battersby, 2011). The home gardening of vegetables became one of the agro-based safety nets against food shortages and nutritional needs for urban dwellers in Zimbabwe (Mrema & Chitiyo, 2008). One of the most common coping strategies in times of food insecurity in southern Africa lay in reducing food consumption (Abdall, 2007). In badly affected parts of Zimbabwe; households have sought to cope with the situation by initially eating smaller portions. As the scarcity of food supplies worsened, families intensified their efforts at coping by skipping a meal during the day (Abdall, 2008). Haese *et al.* (2011) noted that other common household strategies include short term dietary changes and reducing or rationing

consumption, as well as maternal buffering. Reducing the number of meals per day has been the main strategy adopted over the years by households in Bulilima and Mangwe Districts (Ndlovu, 2010). The reduction or skipping of some meals has a negative impact on the health of some of the most vulnerable members of the household, such as the sick, the elderly and children under five years of age due to poor diet. Battersby (2011) stresses out that urban households may postpone having children or send existing household members to rural areas to reduce expenditure, thus reducing or limiting household size. Conversely, households may retain or incorporate additional members to increase income, thus increasing household size. D'Haese *et al.* (2011) claimed that mechanisms that households employ in response to short-term food insufficiency can tell a story about that household's capacity to withstand shocks and risks that trigger food shortages. The capacity of households to withstand shocks or manage risks is dependent on the magnitude and severity of the risk, as well as on the households' assets, including social capital. Meikle *et al.* (2001) stated that many poor urban households are opportunistic, diversifying their sources of income and drawing, where possible, on a portfolio of activities such as formal waged employment, informal trading and service activities. Mudefi (2011) stated that people who live in areas with a high risk of food shortages will eventually develop a self-insurance coping strategy, to minimise risk to their household food security and livelihoods. Some of the households may resort to the sale of assets or migrating to regions where they can easily find employment, to feed the family.

**2.15 Macro-economic conditions and their effects on household food insecurity**

Over the past two or more decades, the countries of southern Africa have struggled to develop their economies and to create job opportunities and sufficient income to allow their citizens to build livelihoods that would boost their standard of living beyond the poverty line, thereby reducing their vulnerability to shocks (Abdall, 2007). Economic problems, such as poor macro-economic performance, rising external debt, generally increasing inflation and food prices, as well as inconsistent food policies, high unemployment rates and the lack of purchasing power experienced by Zimbabweans, all lead to severe food insecurity (Wilding, 2004). Dekker and Kinsey (2011) noted that, although there is very strong evidence that Zimbabwe's economic decline began in the early 1990s, during the past decade simultaneous economic and political crises have mushroomed in Zimbabwe, resulting in double digit negative growth rates. ZFSIP (2011) postulated that, in the period 2000-2008, Zimbabwe's economy has been characterised by a severe shortage of foreign exchange, high and rapid increases the inflation rates and shortage of basic commodities in the market. As a result, the

prices of basic commodities and services rose sharply. This affected low-income households (small-scale vendors, casual labourers, and low wage workers and the unemployed). However, within the context of Zimbabwe's economic crisis, the nature and scale of linkages between the urban and the rural areas should not be taken for granted (Tawodzera, 2013). This is because the scale of urban poverty, as well as the depressed economy, is likely to affect the capacity of urban dwellers to remit to rural areas. Zimbabwe's depressed economy continues to reduce employment opportunities. The majority of those employed earn relatively low wages, limiting their purchasing power for food and other basic commodities and services (ZFSO, 2009). In 2008 Zimbabwe was in crisis, with an economy depleting and a volatile political environment. Within this hyperinflationary environment, food shortages were acute and over 80 % of households in the country survived on less than US$2 per day (Tawodzera, 2014). Sibanda (2005) pointed out that gold panning was a major economic activity in Bindura town. Although it is illegal, it is estimated that a total of 5 000 people engaged in this activity during the past two decades. The economic crisis witnessed in Zimbabwe since 2000, when farm invasions by the supporters of the ruling party, and farm designations by the government, started, has contributed to a downturn in the Zimbabwean economy (Sigauke, 2002). Zimbabwe's macro-economy has largely stabilised since early 2009, when the government of Zimbabwe instituted a multi-currency, largely US dollarized, system, established the Government of National Unity (GNU) and liberalized the grain trade (USAID, 2012). This stabilisation has resulted in substantial improvements in the market environment, including price stability and increased purchasing power. Though prices went down, they remained high for most poor urban households with limited purchasing power. Sigauke (2002) stated that the economic reforms ushered in a nexus of socio-economic and political upheavals that tend to have a lasting effect on urban poverty. For example, the Economic Recovery Programmes (ERPs) led to the closure of many companies, resulting in the massive retrenchment of workers. FAO/WFP (2010) recorded that, during the crisis in Zimbabwe until early 2009, the formal sector collapsed, creating the opportunity for poor people to venture into the informal sector, mainly buying and reselling, which allowed them to cope. Over the past two or more decades, the countries of southern Africa have struggled a great deal to develop their economies and to create job opportunities and sufficient income to allow their citizens to build livelihoods that would boost their standard of living beyond the poverty line, thereby reducing their vulnerability to shocks (Abdalla, 2007). This has increased household food insecurity in the region. Another cause of Zimbabwe's problems has been the fast-track resettlement programme, which started in 2000 as an extension of the

land reform that began in 1979 (Ignowski, 2012). In contrast, Chisango (2009) stated that in 2000 the government of Zimbabwe launched the Fast Track Land Reform Programme (FTLRP), as part of its ongoing land reform and resettlement programme, which seeks to address the racially skewed land distribution pattern inherited at the country's independence in 1980. Before this programme, Zimbabwe had a thriving agriculture sector and was a net exporter of food in the region and abroad.

**2.16 The effect of HIV/AIDS on household food security**

The HIV/AIDS pandemic is a global crisis, the impacts of which will be felt for decades to come. More than 20 million people have died the whole world over, since the first case was reported in 1981(Gillesple & Kadiyala, 2005). Achieving food security in its totality continues to be a challenge not only for the developing nations, but also for the developed world. The difference lies in the magnitude of the problem in terms of its severity and proportion of the population affected (Mwaniki, 2010). ICAD (2008) revealed that HIV infection increases food insecurity vulnerability through poor health, low labour productivity, low income and increased livelihood insecurity. These factors can induce behaviour conducive to HIV infection, such as migration for work opportunities and engaging in the commercial sex trade, to earn additional income. Although it is recognised that HIV/AIDS crosses wealth groups, it is clear that the poorest households in communities are the most vulnerable or at risk (Khogali, 2003). Nkurunziza and Rakodi (2005) noted that the most explicit and widely referred to impact of HIV/AIDS on households relates to the loss of human capital, given the fact that HIV/AIDS affects the most productive population cohort. Its impact on household and community livelihoods is arguably more devastating than some other types of illness. Crush *et al*. (2006) claim that, in Zimbabwe households with chronically ill patients, adults were more likely to have their children drop out of school and more likely to resort to migration in order to cope. The relationship between urban food security and HIV and AIDS is a complex problem, mainly because both issues are multilayered and, as a result, intersect in multiple ways (Crush *et al*., 2010). Kaschula (2008) made a different suggestion, that there is a lack of empirical evidence from the South African context that demonstrates if, and how, HIV and AIDS changes household-level strategies of food acquisition and intake. At community level, because HIV/AIDS strikes the most economically active and because it is so widespread, the impact is not just across sectors, but significantly systematic (Crush *et al*., 2006). HIV/AIDS was initially considered an urban issue; transmission was at its highest in densely populated regions. Crush *et al*. (2010) states

that, with the exception of Namibia and Swaziland, HIV prevalence is higher in the major urban centres of most countries in the Southern African Development Community (SADC) than outside them. Poorer HIV/AIDS-affected households have a higher dependency ratio, with a lower number of healthy adults (Khogali, 2003). Within HIV infected households there is increased risk of food insecurity and malnutrition, as sick members are unable to work. Household income declines, expenditure on health care increases, as care-giving burdens increase, and there is less time for looking after the children (Crush *et al*., 2006). HIV/AIDS contributes significantly to household poverty. PRFT (2011), in its study in Mutare, outlined that in cases where the breadwinner of a family is unable to work because of HIV-related complications, the family finds itself with little or no income. HIV/AIDS primarily affects those aged 15 to 50 years, the bulk of the labor force. Infection rates in young African women are far higher than in young men, due mostly to biological factors such as the greater efficiency of male to female transmission, age-mixing in sexual relationships between older men and younger women and gender inequality (ICAD, 2008). ICAD (2006) concurred that, in many areas, infection rates in young women are far higher than in young men, because of the unequal power relations that prevail between men and women.

**2.17 Conclusion**

In Zimbabwe, multiple factors have contributed to urban household food security, including unemployment, HIV AIDS, climate change, and an unstable economy. The literature corroborates the fact that the extent of Zimbabwe's household food security is generally below expected levels. In urban areas, faced with the problem of an increasing population and, consequently, an inadequate supply of food items, food shortages have led to increasing prices. As the HIV/AIDS pandemic continues, it will be important to monitor the impact this is having on the food security of urban households and on the nutritional status of urban households affected by this crisis. Macro-economic conditions   had a significant impact on household food security, even though they have varied across economic groups**.** The different factors which influence food security in urban environments are complex. Urban authorities and policy-makers should recognise these determinants when designing programmes to meet the needs of the urban poor. Food security and poverty alleviation schemes should be extended to cover urban areas like urban agriculture and other relevant coping strategies. This chapter has presented some evidence based on the available literature. Succeeding empirical chapters give more evidence on household food security in urban and peri-urban areas.

However, the conclusion is that generally there is household food insecurity in Zimbabwe, particularly in urban settings.

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# CHAPTER 3: ANALYSIS OF HOUSEHOLD LIVELIHOODS IN URBAN AND PERI-URBAN SETTINGS - A CASE STUDY OF BINDURA MUNICIPAL AREA IN ZIMBABWE

## 3.1 Abstract

Diversifying household livelihood activities is essential to household food security, as it brings different sources of food, income and opportunities. Food deficit, low-income and limited socio-economic opportunities has been identified as predictors of household food insecurity in many urban settings in Zimbabwe. This paper aims at establishing the sources of food and income and their role in shaping household livelihoods in urban and peri-urban areas. A sample of 200 households was taken in Bindura Municipal area, and the data was analysed using descriptive statistics. Household food security is affected by income, age, occupation, level of education, marital status, gender and household size. The study concludes that there are limited sources of food and income in Bindura Municipal area.

**Key words**: Household, Food Security, Livelihoods, Urban, Municipal

## 3.2 Introduction

Despite continued economic growth around the world, food insecurity remains a pressing problem in many parts of Africa. Poverty in urban areas is affected by a combination of factors which tend to produce a wide range of vulnerabilities. The most important vulnerability involves poor urban dwellers who are immersed in the cash economy, but earn income that is often erratic, unreliable and small (Kutiwa *et al.,* 2010). GMPI (2011) explains that Zimbabwe's 2008 economic crisis and subsequent hyperinflation were preceded by several years of economic decline and mounting public debt and significantly contributed to the demise of household livelihoods, particularly of those living in urban areas. AEO (2012) states that since the inception of the Inclusive Government of Zimbabwe in February 2009, the country was recovering from a low economic base and real GDP growth is driven by growth in sectors such as agriculture, mining, manufacturing and transport. Few households in Zimbabwe derive the bulk of their income from a single source, as many households resort to informal businesses. Ndiweni *et al*. (2014) points out that there is controversy on the actual level of unemployment in the country, as countless Zimbabweans are making a living in the informal sector. SDSN (2012) elucidates that the World Bank measures income (or consumption) poverty with a poverty line of $1.25 per day in 2005 US$ purchasing-power-

adjusted terms. GHI (2012) records that most countries with alarming (GHI) Global Hunger Index scores are in Sub-Saharan Africa and South Asia. In 2012 Zimbabwe was ranked number 47 out of 54 countries, with 17.3 points, which was considerably low. Most urban poor receive incomes that are too low to purchase what they need for long-term survival and they spend most of their household budgets on food (Mitlin, 1999). High food prices have drastically reduced people's purchasing power and raised the question of food and income disequilibrium at the household level. Ersado (2006) stresses that different sources of income exhibit varying degrees of liquidity and vulnerability to risk; the same amount of non-farm income from a single source and multiple sources will have different implications for household risk management.

Subsistence farming, livestock management, wage employment and self-employment, using locally available resources, has become popular in Zimbabwe as a source of income generation, as well as increasing food production and availability (Scoones, 2010). In most African countries, agriculture has remained the backbone of the economy, although many other livelihood activities are being adopted due to inadequate and inconsistent rains, infertile soils and geographic areas that are prone to drought and hunger (Chazovachii *et al.*, 2013). Urban agriculture has become a livelihood source in many towns and cities in Zimbabwe. Mudzengerere (2012) noted that urban agriculture helps to increase the disposable income, as well as to reduce the cost of buying food. There is increasing recognition that street food vending plays an important socio-economic role, in terms of employment potential, providing income, particularly for women, and provision of food at affordable cost, mainly to lower income groups in cities (Chukuezi, 2010).

The aim of this paper is to identify the different household livelihood activities in urban and peri-urban settings as a way of providing food and income for the poor.

## 3.3 Research methodology
### 3.3.1 Description of the study area
The study area is located in Bindura Municipal area, which lies in Mashonaland Central Province of Zimbabwe. ZimStats (2012) records that Bindura urban area has a population of 43 675 and the rural area has 81 544 people, according to the 2012 census. Bindura is the provincial capital of Mashonaland Central Province. The municipality is made up of 12 wards, which extend into peri-urban areas that include farms and mining areas (Kadziya and

Chikosha, 2013. The study was carried in all 12 wards. Bindura town area is located in ward 3, where most of the formal economic activities, such as banking, industry, retail shops and the informal sector, are concentrated (Kadziyi and Chikosha, 2013). Bindura itself is largely a mining town, with copper, nickel and cobalt being the main minerals. Trojan Nickel Mine and Ashanti Gold Fields are the two mining companies which have operated in the area for many years.

There are a number of agribusiness firms, such as Cottco and Cargill, strategically located to collect crop output from small-scale farmers around the province. Mutandwa and Gadzirayi (2008) pointed out that the area is located in natural region 2 and is considered one of the prime agricultural zones of the country, with annual rainfall of approximately 700 mm per annum. The growth of Bindura, like other towns in Africa, is driven by the further industrialisation and urbanisation of a once mine dormitory community to a city with a commercial business district, schools, industrial areas (mostly small and medium enterprises or SMEs), police camps, prisons, hospitals and universities (Mudavanhu *et al.*, 2013). Households in Bindura Municipal area earn a living from mining companies, processing companies, NGOs, casual labour*,* buying and selling, service sector, informal SMEs and agriculture.

### 3.3.2 Data collection and sampling tools

Data collection was conducted between August and September 2014, using structured household questionnaires, Focus Group Discussion (FGD) and key informant interviews. FGD and key informant interviews were used to generate data that complemented the structured questionnaire by providing the explanations and issues behind quantitative data. One FGD was conducted with 12 participants, two from each of the six selected locations. The community group was conducted after the survey to support information on the questionnaire and other omitted household themes. Before the formal survey was conducted, the questionnaire was pre-tested using five randomly selected household heads from Chipadze and Chiwaridzo high-density suburbs. Pre-testing ensured that the questionnaire collected all the information required and it helped to improve the translation to the local language, which is Shona. Five Shona-speaking enumerators administered the questionnaire. To get an understanding of household food security and livelihood patterns in the area, key informant interviews were conducted, using three local councillors.

Four urban and two peri-urban areas namely Chipadze, Chiwaridzo, Aerodrome, Shashi Ville and Gulliver and Nyamakura, were purposively selected for the study. The reason for purposive random sampling, also known as subjective sampling, was to concentrate on locations with particular characteristics which could  better be able to assist with the relevant research and households were randomly selected for interviews. This technique was employed only to capture a true reflection of urban household economic characteristics of the population in the Municipal area, since there was evidence to suggest there is a difference in household food security between urban and peri-urban dwellers. A sample of 33 households was randomly selected from each urban location and 34 from each peri-urban location. A total of 200 respondents were therefore used for the study.

## 3.4 Data analysis methods

## 3.4.1 Descriptive statistics

Descriptive analysis of all the variables was carried out, since it is important to inform decisions on data management issues, such as coding of variables and missing values (Vyass and Kumaranayake, 2006).  Descriptive analysis involved looking at means, frequencies and standard deviations of the variables. Jongwe (2013) advised that descriptive statistics should be used to explore linkages between urban household food security and urban agriculture participation and other socio-economic variables. T-test was used to make comparisons between gender, food storage and other factors like saving money, with respect to relevant continuous variables. Chi-square $X^2$ test was used to measure the association between categorical variables. Qualitative data from the Focus Group Discussion Focus Group Discussion was analysed by explaining  the themes ,content  and concepts acquired from the topics and questions discussed as supporting information of the survey.

## 3.5 Results and discussion

**Household demographics and socio-economic characteristics** Tables 4.1 and 4.2 show the descriptive statistics of the data gathered from the study. The statistics are discussed below.

**Age**

The study revealed that, households in Bindura Municipal Area, in the six selected locations, have an average age of 40 years. According to a study conducted by AAI (2005) in Harare, the average age of the household head was 41 years, with the youngest reported as 12 years old and the oldest as 89 years old. Bashir *et al*. (2012) found that an increase in the age of the

household head decreases the chances of a household becoming food secure. According to Madzingira (1997), cited in Muruviwa (2011), due to unemployment and retrenchment, people in urban areas of Zimbabwe are unable to fully cater for themselves and so depend on help from family and relatives. In the study, the average age was good, because the head of households were comprised of the economically active group to search for different livelihoods.

**Household size**

A mean household size of five members was recorded. To disaggregate the difference between adults and children in daily calorie intake and a household's labour endowment, household size in adult equivalents were generated, using recommended conversion factors employed by NRS (1989), and cited in Wale (2004) and Chirigo (2014). The adult equivalents scale is a black box of household consumption and determines consumption shares of different groups in the household, differentiated by age and gender (White and Masset, 2003).

In the current study, a mean household size equivalent of 4.47 members was recorded (Table 3.1). This was in contrast to studies by Madungwe *et al*. (2012) in urban Bindura, who noted that the average urban household size in Chipadze and Chiwaridzo was estimated to be six people. ZimStats (2012) stipulated that the size of a household is affected by factors such as household wealth, living patterns and educational levels of household members. This was verified in the current study, as factors such as wealth, educational level and livelihood patterns determine family composition in the Bindura Municipal Area. Household heads could afford to stay with their families in cities where they work, compared to some who had to leave their families in rural areas, as they work in town. The decrease in household size in this study, compared to previous studies was maybe because people have relocated to other towns, cities or countries searching for livelihoods.

**Total household income**

A mean of US$1 069.68 total household income was recorded from the survey. The total household income was a sum of revenue from savings, salaries, pensions, remittances, micro-enterprises, buying and selling and other multiple sources. The total mean monthly income (in US$) from the survey was: farming US$114.31, buying and selling US$19.80, pension US$215, remittances US$815, salary and wages US$360.99, micro enter prices US$109.65

and income from other sources was US$19.69. Ersado (2006) stated that few households in developing countries derive the bulk of their income from a single source, such as income from farming; this created deficit in their livelihood sources.

**Land size**

Total household land size was the sum of hectares a household had. In Bindura Municipal area, land ownership was through allocation, inheritance, and rental, purchasing and borrowing. Rukuni (1999) asserts that an important recommendation of the Commission of Inquiry into the Land Tenure Systems in 1994 endorsed that Zimbabwe should maintain a multi-form land tenure regime. A mean total land size of 1.69 hectares was recorded in both urban and peri-urban areas; this was mainly because land for agriculture is limited in urban and peri-urban areas. Boateng (2002) contended that household land sizes appear to be smaller in urban and peri-urban farming systems. Plot sizes of the sampled households' cultivations were less than one hectare. Orsini *et al.* (2013) proclaims that urban agriculture, owing to the high competition for land, occurs in limited spaces. The land sizes vary depending with households; however peri-urban households had more land as compare to urban households. The land was mostly used for producing staple food crops especially maize. There was a significant variation in livelihood diversification between urban and peri –urban areas, with the former having more livelihood means and options, because of its proximity to means of production.

**Assets**

Household income was measured in the form of the value of the physical assets, both household and farm implements. In times of income and natural shocks, like droughts, people could sell their assets and buy food and other necessities. A mean value of US$3 208.93 of assets was recorded during the survey, which is considerably low for urban and peri-urban dwellers. Simatele (2012) states that there is an assumption that a large portion of people's assets, particularly the urban poor, are vulnerable to different stresses, which may be a result of internal or external processes. This means that the urban poor live with less valuable assets or no assets at all.

**Table 3.1: Characteristics of households in the Bindura Municipal area (continuous variables)**

| Variable description | Mean | Std. Deviation |
|---|---|---|
| Age (number of years) | 40.60 | 11.19 |
| Total land size (ha) | 1.69 | 2.54 |
| Total household income (US$) | 1 069.68 | 2 149.84 |
| Total value of physical assets (US$) | 3 208.93 | 4 338.23 |
| Numbers on Household members | 5.13 | 1.94 |
| Household Adult Equivalents | 4.47 | 1.71 |

*n* = 200

**Source**: Household survey (2014)


**Main occupation and source of household income**

Table 3.2 indicates that 42.5% of the household heads surveyed are employed in permanent jobs and 15.5% were employed in temporary jobs. Twenty-six point five percent of the households who were involved in self-employment, such as farming (4.0%), buying and selling (5.5%), self-employed (16.5%) and gold panning (0.5%) as their main occupations majority of them were in urban areas than in peri-urban areas. A total of 15.5% of household heads were unemployed, this includes household heads who were retired. The survey suggests that households in the area had more than one occupation to complement their earnings. Mudavanhu *et al*. (2011), in his study in Bindura District, noted that, in terms of occupation, a total of 44.2% of the male households do not regard farming as their main occupation. Most of them have casual and formal jobs, as well as their own jobs, such that they are always off the farms. Many male household heads do not regard farming as their main occupation as evidenced by more percentage (52%) of female households relies on farming as source of livelihoods. Table 3.2 shows that even though farming was the least preferred occupation, but a mean of US$391.91 per year came from crop sales alone, as most surveyed households have different sources of income to increase their net income. Off-farm income included income from petty trade and street vending, remittances, micro-enterprises and others which have a mean value of US$109.64. This means diversification of income sources increases total household income. ZVAC (2013) indicates that all Mashonaland and Midlands Provinces ranked food crop sales as the second most common income source. Remittances were ranked second in the two Matabeleland Provinces and in Masvingo Province. Some of the surveyed households could not save enough money, mainly because of

meagre salaries, large family sizes and high prices of commodities. The survey shows that households in the Bindura Municipal area spend an average of US$89.69 on food per month. This showed that some households were spending less on food than the World Bank global poverty measure of US$1.25 per day. Amount spent per day per household was calculated as given below;

Average amount spent on food/month ÷ average number of household members × number of days in a month.

**Table 3. 2: Household demographics**

| Variable description | Categories | Frequencies | % |
|---|---|---|---|
| Gender of household head | Male | 124 | 62.0 |
| | Female | 76 | 38.0 |
| Marital status of household head | Single | 21 | 10.5 |
| | Married | 151 | 75.5 |
| | Widowed | 28 | 14.0 |
| Education of household head | None formal | 9 | 4.5 |
| | Primary | 31 | 15.5 |
| | Secondary | 49 | 49.0 |
| | Tertiary | 62 | 31.0 |
| Land ownership | None | 98 | 49.0 |
| | Own land | 102 | 51.0 |
| Occupation | Self-employed | 53 | 26.5 |
| | Employed (i)permanent | 85 | 42.5 |
| | (ii)temporary | 31 | 15.5 |
| | Unemployed | 31 | 15.5 |
| Household income | <$100 | 43 | 21.5 |
| | $101>300 | 39 | 19.5 |
| | $301>500 | 38 | 19.0 |
| | >501 | 80 | 40.0 |
| Source of maize meal | Own Production | 96 | 48.0 |
| | Supermarket | 93 | 46.5 |
| | Tuck-Shop | 5 | 2.5 |
| | Barter Trade | 1 | 0.5 |
| | Rural Urban Transfer | 5 | 2.5 |
| Source of vegetables | Own production | 101 | 50.5 |
| | Supermarkets | 99 | 49.5 |

*n* = 200

**Source:** Household survey (2014)

Therefore the average spent was US$0.06 per day (per person, for a family of five), which was way too far below the expected global poverty quota. Beside incomes from other sources and occupation; households had a potential income in the form of their physical assets, which

had a mean value of US$3 208.93, as some had indicated in FGDs that they sell assets as an income-coping strategy mechanism.

**Gender and marital status**

Table 3.2 indicates that 62% of households were male-headed and 38.8% were female-headed. The survey shows that 10.5% of head of households were single, 75.5% were married and 14.0% were widowed. Married household heads have better chances of maintaining household food security, as they help each other with household necessities. The findings of this study are in line with the trend reported by ZimStats (2012), reveling that most household heads were headed by males. The cumulative effect of male-headed households is high security in asset ownership, high human capital formation and increased earning opportunities, which might render the households food secure.

**Education**

The household heads in the sample had achieved high levels of education. Table 3.2 shows that there are high illiteracy levels among the household heads in Bindura Municipal area and Zimbabwe as a whole, even though  as far as 4.5% from the survey did not attend formal education. ZVAC (2013) revealed that households with household heads with tertiary education reported the highest level of income, while those without any formal education reported the least average income. The present study finds similar results, in that highly educated heads of households were employed in high income jobs, compared to less educated head of households, who were employed in low income jobs.

**Land ownership**

A total of 49.0 % of the households do not own any land at all; 51.0% own land by different means, e.g. allocation from municipality and government land reform, rent from those who own land, borrowed from neighbors and relatives, bought from other land-owners usually from those who had migrated to other places, and inherited land from relatives. The land reform programme has a mixture of beneficiaries from the poor to the better-off in society (Matondi and Dekker, 2011). Mudavanhu *et al*. (2011), in their study in urban Bindura, specify that 5.5% inherited land and 2.5% bought it by various means. Landless households undertook farming on leased land and could not take a major decision that has to do with land, without the owner's consent.

**Household income earning scale and occupation**

Table 3.2 shows that heads of households in the survey were earning different income scales, depending on their occupation. Some were in the form of wages and salaries. A total of 21.5% of the heads of households were earning less than US$100, 19.5% were earning between US$101 and 300, 19% were earning between US$301 and 500 and only 40% were earning above US$500. Overall household monthly income earning was significantly low, compared with the Food Poverty Line (FPL) in Zimbabwe, which, for an average of five persons per household in January 2014, was US$159 (ZimStats. 2014). Occupation was divided into three categories, namely self-employed, temporary and permanent employment and unemployed. A total of 26.5% were self-employed, 42% were permanently employed, 15.5 were temporarily employed, and 15% were unemployed, which included pensioners. Unemployed people included heads of households who were educated up to tertiary level but could not secure jobs because of limited economic opportunities.

 **Source of staple food**

About 48.0 % of the households obtained their maize meal from their own production. Some obtained maize meal from supermarkets, tuck-shops, barter trade and rural urban transfers (Table 3.2). Rural urban transfer is when urban poor rely on food from rural areas for their survival. Moyo (2013) stresses that, although urban households still live in predominantly cash-driven, exchange entitlement-based economies, food transfers from rural areas give them an additional option for accessing food outside urban food market channels. The government of Zimbabwe embarked on a land reform programme to redistribute land equitably. The scope of urban and peri-urban agriculture is likely to increase, given that more agricultural land has been set aside for this form of agriculture, and that the majority of urban households are faced with the escalating costs of food (Mutandwa and Gadzirayi, 2006). Households who obtained vegetables from their own production were 50.5% and supermarkets were 49.5%, without sourcing from tuck-shops, barter trade and rural urban transfer. Besides food from their own farms, most urban households rely on other sources of livelihood, such as sales of food and cash crops, vegetable growing, casual labour, remittances and petty trade (FAO, 2010). In the study there was a significant difference in the source of vegetables and maize meal between urban and peri-urban households. Urban households relies mostly on purchasing for their food because of limited access to  land as compared to peri-urban households, who relied mostly on own production.

## Gender dynamics in Bindura municipal area

The study also examined at households in the municipal area from a gender perspective. The results showed a number of differences in household characteristics disaggregated by gender. T-tests were carried to determine whether or not the observed differences are statistically significant. The means, standard deviations and t-statistical significance levels of the variables listed across gender in Bindura Municipal area are presented in Table 3.3. Only dietary diversity was statistically significant between males and females (p<0.05). This might be because female-headed households have a higher probability of attaining a high dietary diversity, compared to male-headed households. Taruvinga *et al.* (2013) noted that female-headed households spent more on higher-quality, more expensive and protein-rich foods. Since women are involved in food preparation, food selection is expected to be influenced by women`s knowledge regarding the nutritional benefits of different foods and their power to allocate household family budgets towards high-quality foods.

**Table 3. 3: Household gender dynamics**

| Variable | Female | | Male | | T-test | Total | |
|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | S D | | Mean | SD |
| Total land size (ha) | 1.61 | 2.43 | 1.74 | 2.62 | ns | 1.69 | 2.54 |
| Age (years) | 40.71 | 10.67 | 40.53 | 11.54 | ns | 40.60 | 11.19 |
| Total household size (Adult eqvl.) | 4.91 | 2.034 | 5.27 | 1.87 | ns | 4.47 | 1.71 |
| Total Household Size (numbers) | 4.24 | 1.81 | 4.61 | 1.64 | ns | 5.13 | 1.94 |
| Dietary diversity score | 6.93 | 2.82 | 6.48 | 3.32 | ** | 6.65 | 3.12 |

**Source**: Household Survey (2014).
**Note**: **: Statistically significant at 5% confidence level.

## Gender and land ownership

Table 3.4 shows that in terms of numbers, more males than females own land by various means. This can be related to the dominance of males in Bindura Municipal area, as they constituted 62.0% of households. Although males possess more land than females, their dominance, both in numbers and on land tenure, is not statistically significant, as revealed by the chi square result in Table 3.4. In Zimbabwe, women are significantly attached to the land, where they play a key role in subsistence farming (Shumba, 2011). Chikova and Madebwe

(2006) revealed that the records at the Ministry of Lands, Agriculture and Resettlement indicated that 90% of women beneficiaries were offered A1 pieces of land, while only 10% were offered A2 plots.

**Table 3. 4: Gender and land ownership**

| Gender | Land ownership (%) | | $n$ | $X^2$ significance |
|--------|------|------|-----|--------------------|
| | Yes | No | | |
| Male | 50.0 | 50.0 | 124 | |
| Females | 47.4 | 52.6 | 76 | ns |

**Source:** Household Survey (2014).
**Note** ns: = not statistically significant

There are no significant differences in the proportion of male and female heads of households who owned land. This implies that there are no gender disparities with regards to ownership of land. Thus, female-headed households are able to access and utilise land the same way as male households, to produce food for their families. CGD had indicated that the main obstacle to improved livelihoods was that the majority of households did not own land. It was also established that the majority of households could not afford to buy, rent or borrow land from those who have access to it. It was also found that more a greater proportion of the males benefitted than females were allocated land through the government land reform programme.

**Relationship between gender and educational level**

**Table 3. 5: Relationship between gender and educational level**

| Gender | Educational level (%) | | | | $n$ | $X^2$ Significance |
|--------|-----------|---------|-----------|----------|-----|--------------------|
| | Non-formal | Primary | Secondary | Tertiary | | |
| Female | 9.2 | 10.5 | 51.3 | 28.9 | 76 | |
| Male | 1.6 | 18.5 | 47.6 | 32.3 | 124 | *** |

**Source**: Household Survey (2014).
**Note:** ***: Statistically significant at 1% confidence level.

Data with respect to the education levels of households were collected on the basis of the formal level of education attained. Education levels were placed into four groups, i.e. (i)-no

formal education attained; (ii)-primary education; (iii)-secondary education and (iv)-tertiary education. Table 3.5 indicates that a small proportion of females and males had never attended formal education, even though females had higher numbers. More males attended primary education than females as shown in Table 3.5. More male heads of households attended up to secondary level than females, as illustrated in Table 3.5. Tertiary education, also regarded as the third stage level of education, was attended by a higher percentage of males than females. Generally, the level of literacy is high in the study areas and it is, therefore, likely to decreasing households' vulnerability and improving their levels of self-sufficiency. The findings from Bindura Municipal area show a chi-square statistical significant relationship of ($p<0.04$) between gender of the head of households and their level of education. Gudhlanga *et al.* (2012) claimed that gender and education disparities in every economic sector are not peculiar to Zimbabwe, but have long been standing anomalies, worldwide. Education is thus an important survival tool in urban areas, as it affects not only employment and income, but also the ability of the household to make logical choices in crises.

**The relationship between gender and household income**

Table 3.6 shows the association between household income and gender. The study shows that there were more males (62%) than females (38%) in the study, but there was no significant difference in terms of their monthly household income. This is mainly because woman empowerment policies, which elevate women into influential jobs and other opportunities previously meant for men, have contributed significantly.

**Table 3. 6**: **Association between gender and household income**

| Gender | Household income (%) | | | | *n* | $X^2$ significance |
|--------|------|------|------|------|-----|-----|
| | <100 | 101- 300 | 301-500 | > 501 | | |
| Female | 27.6 | 17.1 | 19.7 | 35.5 | 76 | |
| Male | 17.7 | 21.0 | 18.5 | 42.7 | 124 | ns |

**Source**: Household Survey (2014).
**Note** ns: = not statistically significant

**Table 3. 7: Association between marital status and household income**

| Marital status | <100 | 101-300 | 301-500 | > 501 | $X^2$ significance |
|---|---|---|---|---|---|
| Single ($n$=49) | 28.6 | 12.2 | 20.4 | 38.8 | ns |
| Married ($n$=151) | 19.9 | 21.2 | 18.5 | 40.4 | |

The header "Household income (%)" spans the income columns.

**Source**: Household Survey (2014).
**Note** ns: = not statistically significant

Table 3.7 shows that 75.5% of the household heads are married, while 24.5% are single. This included household heads who were widowed and divorced. This result is a clear indication of a relatively large proportion of married households in the study area. Even though the result is not statistically significant, married household head are assumed to have an advantage with regard to food security, as both spouses could be working which means the possibility of an increase in household income. Usually single-headed households are female-headed households. Because of the absence of husbands, female-headed households have fewer economically active household members and are at a disadvantage relative to male-male-headed house households.

**Table 3. 8: Relationship between household income and number of meals a day**

| Household income per month | Number of Meals | | | $X^2$ significance | $n$ |
|---|---|---|---|---|---|
| | Three (%) | Two (%) | One (%) | | |
| <100 | 30.2 | 60.5 | 9.3 | | 43 |
| 101-300 | 53.8 | 35.9 | 10.3 | *** | 39 |
| 301-500 | 63.2 | 36.8 | 0 | | 38 |
| >501 | 83.5 | 16.5 | 0 | | 80 |

**Source**: Household Survey (2014).

**Note:** ***: Statistically significant at 1% confidence level.

Table 3.8 indicates the relationship between household income and number of meals a day. In households who were earning US$100 and below, a greater percentage (60.5%) ate breakfast and supper only. The study found that they ate one less meal a day than normal. Three meals a day were consumed as the household income increased from US$101 to US$501 and above. The survey found that few households were skipping one or two meals a day. This shows that as the household income increases, the number of meals a day increases. The chi-square test illustrates a significant relationship ($p < 0.01$). Most households in Zimbabwe since 2009 had increased their income, with the greatest impact being for conditional cash transfers. The average number of meals eaten per day is estimated to have risen from 1.9 to 2.6 (Gourlay, 2012). Some households reported that, even though the number of meals eaten had remained static, the quantity of food consumed at those meals had increased.

**Dynamics of urban and peri-urban household food security**

The study also looked at the association between household food security and socio-economic parameters. Chi-square tests were carried out to determine whether or not the observed differences are statistically significant. The results are presented in Table 3.9. Only household income coping strategy was not statistically significant with household food security. The survey shows a strong association between household food security ($p < 0.05$) and marital status of the head of the household. This may be because households with married people help each other to bring food and income to sustain the family, unlike single and child-headed households. A study by (Kaloi *et al.*, 2005), cited in Ndobo and Shekampu (2013), concluded that married couples were likely to be more food secure than single-headed households. The purchasing power of households is the most critical determinant for food security, through access to the means to acquire food. The educational attainment of the head of the household was important in explaining the variations in household food security and it was statistically significant at $p < 0.01$. Education has an influence on employment opportunities, especially in urban settings. Tefera and Tefera (2014) noted that education does help to improve the food security status of households.

**Table 3. 9: Food security and household parameters**

| Variables | | Food security | | | | n | p-value |
|---|---|---|---|---|---|---|---|
| | | Food secure (%) | Mildly food secure (%) | Moderately food insecure (%) | Severely food insecure (%) | | |
| Marital status | Single | 44.9 | 2 | 30.6 | 24.4 | 49 | ** |
| | Married | 52.3 | 11.3 | 15.9 | 20.5 | 151 | |
| Educational level | Non formal | 33.3 | 11.1 | 11.1 | 44.4 | 9 | |
| | Primary | 29 | 6.5 | 19.4 | 45.2 | 31 | *** |
| | Secondary | 45.9 | 9.2 | 24.5 | 20.4 | 98 | |
| | Tertiary | 71 | 9.7 | 12.9 | 6.5 | 62 | |
| Dietary diversity score (DD) | Low | 32.1 | 3.8 | 20.8 | 43.4 | 53 | |
| | Medium | 54.1 | 10.5 | 20.2 | 14.9 | 114 | *** |
| | High | 66.7 | 12.1 | 15.2 | 6.1 | 33 | |
| Occupation | Unemployed | 18.8 | 3.1 | 15.6 | 62.5 | 32 | *** |
| | Employed | 56.5 | 10.1 | 20.2 | 13.1 | 168 | |
| In come Coping strategy | Sell livestock | 61.5 | 7.7 | 15.4 | 15.4 | 13 | |
| | Sell assets | 60 | 20 | 10 | 10 | 13 | |
| | Use cash savings | 65 | 6.7 | 18.3 | 10 | 60 | ns |
| | Borrow money | 37.2 | 9.6 | 24.5 | 28.7 | 94 | |
| | Reduce spending | 56.5 | 8.7 | 8.7 | 26.1 | 23 | |
| Food storage | No | 45.6 | 2.9 | 19.4 | 32 | 103 | *** |
| | Yes | 55.7 | 15.6 | 19.8 | 9.4 | 97 | |

**Source:** Household survey (2014)**.**

**Note:** ***, ** and * indicate significance at 1%, 5% and 10% levels, respectively

**Note** ns: = Not statistically significant

The chi-square results in Table 3.9 showed an association between dietary diversity (p<0.01) and household food security. Dietary diversity can be described as a proxy measure of nutrition and can be a good indicator of overall household food security. Naser *et al.* (2014) noted that the relationship between income and household food security is a sequential relationship between food expenditure and dietary diversity, which leads to food security. Hasan-Ghomi (2015) reported that food insecurity is associated with dietary behavior,

including specific food choices and preparation methods.Occupation of the head of the household has proven to statistically influence household food security at $p<0.01$. A job opportunity has a direct possibility of producing income to buy food and other household necessities. Households with higher incomes and better economic conditions have more choices in food selection and can afford to spend a higher percentage of their income on food. According to Omonona and Adetokunbo (2007), food insecurity incidence is relatively low for those engaged in a professional occupation and highest for traders. Household food storage showed a statistical significance, with household food security at $p<0.01$. If a household has food reserved for future use it can easily avert shocks like drought, income insecurity and high food prices. Gitonga *et al*. (2013) explained that food storage, especially of grain, is essential to food security. It bridges the period between two harvests, as well as stabilising prices taking the produce off the market during the peak season and releasing it back when the grain is in short supply.

**Crops grown in Bindura Municipal area (2013 season)**

A number of crops are commonly grown in Bindura Municipal area, Table 3.10 shows the area allocated to food and cash crops during the 2012/2013 summer season. There is diversity in crops grown in the area and the crops were classified into food and cash crops. Food crops were maize, sorghum, beans, groundnuts and sweet potatoes. Cash crops were tobacco, cotton, potatoes, soya beans and sunflowers. Maize is the major staple food grown, occupying more hectares of land. Tobacco is the preferred cash crop grown to replace cotton over the past years because of cotton's decline in viability.

The study shows that households in urban and peri-urban areas have small sizes of land for agriculture, as indicated in Table 3.10. Key informants and Focus Group Discussions indicated that maize as a staple food crop in Zimbabwe in grown by nearly every household from urban and peri-urban areas. This is indicated by the high mean difference in area under maize.

**Table 3. 10: Number of hectares allocated to crops grown in the Bindura municipal area**

| Crop | Min | Max | Mean | S.D |
|---|---|---|---|---|
| Tobacco | 0 | 5.0 | 0.38 | 0.975 |
| Cotton | 0 | 4.0 | 0.5 | 0.36 |
| Potatoes | 0 | 2.0 | 0.4 | 0.221 |
| Soya beans | 0 | 3.0 | 0.16 | 0.475 |
| Sunflower | 0 | 1.0 | 0.3 | 0.171 |
| Maize | 0 | 5.0 | 0.76 | 0.952 |
| Sorghum | 0 | 1.0 | 0.01 | 0.100 |
| Beans | 0 | 3.0 | 0.14 | 0.422 |
| Sweet potatoes | 0 | 1.0 | 0.5 | 0.205 |
| Groundnuts | 0 | 1.0 | 0.07 | 0.247 |

**Relationship between occupation and household income**

The study also looked at the association between household income and the occupation of the head of the household. Table 3.11 below indicates that a chi-square test of household income and occupation show that there was statistically significant difference ($p<0.01$) between household income and the occupation of the head of the house.

**Table 3. 11**: **Relationship between occupation and household income**

| Occupation | Monthly household income | | | | $n$ | $X^2$ significance |
|---|---|---|---|---|---|---|
| | <100 (%) | 101 -300 (%) | 301 -500 (%) | > 500 (%) | | |
| Self-employed | 25.0 | 25.0 | 21.2 | 28.8 | 52 | |
| Permanent | 4.7 | 15.1 | 17.4 | 62.8 | 86 | |
| Temporary | 25.8 | 19.4 | 29.0 | 25.8 | 31 | *** |
| Unemployed | 61.3 | 19.4 | 9.7 | 9.7 | 31 | |

**Source**: Household Survey (2014).

**Note:** ***, ** and * indicate significance at 1%, 5% and 10% levels, respectively.

**Note** ns: = Not statistically significance.

Occupation was grouped into three categories, self-employment (farming, gold panning and petty trading), employed (permanent and temporary employment) and unemployed, which includes those who were retired.

Most people were formally employed in temporary or permanent jobs. The mainstream of households had multiple sources of income, due to economic hardships and poor salaries, as indicated by the Focus Group Discussion and key informants. Among those employed in permanent jobs, 62.8% were earning above US$500. This was because they were in the civil service and the private sector. About 37.2% of permanently employed heads of households were earning between US$100 and US$500, mainly because they were employed in low income jobs like the manufacturing and retail industry. About 25% of those temporarily employed were earning US$500 and above. This might be because there are very few temporary paying jobs available in the area. Seventy-four point two percent of heads of households who were temporarily employed were earning between US$100 and US$500. This might be because employers in the area prefer to employ cheap labour. Unemployment has forced some people to resort to self-employment, but it does not pay a lot of money, because from the study, about 71.2% were being paid less than US$500 and only 28.8% were receiving above US$500. The study reveals that heads of households who were unemployed were earning low incomes, because 61.3% were earning less than US$100 and 38.7% were earning between US$101 and US$500 and above. Their income was in the form of pension funds and remittances, but during the survey some households did not have a single source of income at all.

### 3.6 Conclusion

The paper has examined how urban households pursue and secure livelihoods in order to achieve household food security. The study identified the livelihood situations of the poor in small towns and the gaps and linkages between the livelihood requirements of the poor and policies at municipal level. Livelihoods are understood not only in terms of income-earning, but a much wider range of activities, such as gaining and retaining access to resources and opportunities. The findings demonstrate that household food insecurity is pervasive among low-income urban households. The results revels that gender, education level, land ownership, age, occupation, marital status and asset endowment play a role in shaping household food security. High income households spent more money on all types of foods, from a wide range of sources. Lower income households spent nearly all their income on food. Even though the demographic characteristics of the households were significantly

different between urban and peri-urban dwellers, their livelihoods patterns were quite similar. The descriptive statistics indicated that poverty is more pronounced among the poor, especially the unemployed. It must be noted; however that poverty incidence is still high in urban and peri-urban areas.

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**CHAPTER 4: AN ANALYSIS OF THE DETERMINANTS OF HOUSEHOLD FOOD SECURITY IN URBAN AND PERI-URBAN AREAS – A CASE OF BINDURA MUNICIPAL AREA IN ZIMBABWE**

**4.1 Abstract**

While Zimbabwe was perceived as Africa's bread basket a decade and a half ago, currently the country has a significant number of poor households which are particularly in urban and peri-urban settings. A number of factors determine households' food security. This paper investigates socio-economic determinants of household food security in urban and peri-urban areas of Zimbabwe. The study was conducted in six locations in Bindura Municipal area, Mashonaland Central Province, with a randomly selected sample of 200 households. Data was analysed using descriptive statistics, econometric analysis and an ordered Probit regression model. Household food security can be determined by multiple socio-economic factors in urban and peri-urban settings. This study found that gender, marital status, educational level, household expenditure, and occupation of the head of the house significantly influence household food security. This can trigger government to make alternative policies to improve households' access to adequate food in urban and peri-urban areas.

**Keywords: Determinants, household, Food security, ordered Probit model, Urban**

**4.2 Introduction**

Zimbabwe, once the food basket for the southern African region, is now a net importer of food. The proportion of people living below the Food Poverty Line (FPL) increased from 29% in 1995 to 58% in 2003. This percentage has probably increased since then (MDGSR, 2010). The poverty datum lines in Zimbabwe vary by province, as prices vary from place to place. The total consumption poverty line (TCPL) for an average household in January 2014 ranged from US$466 in Manicaland Province to US$638 in Matabeleland North Province (ZimStats, 2014).

Igwowski (2012) asserts that household food insecurity is still a challenge for people worldwide, especially those in developing countries. In particular, sub-Saharan Africa faces challenges of erratic rains, poor soils, high poverty and HIV/AIDS, all of which make it difficult to ensure access to enough food for everyone. This study will contribute to the understanding of food security in developing countries and the significance of relative socio-

economic factors on urban and peri-urban households. Tawodzera (2011) stressed that household vulnerability to food insecurity in Zimbabwe stemmed from a range of factors, including: high levels of unemployment and poverty; high dependency ratios; hyperinflation; skyrocketing food prices; and the general collapse of the formal food system. Urban agriculture continues to be one of the most important sources of livelihoods for the majority of households in peri-urban and high-density urban areas in Zimbabwe. United Nations (UN) member states, including Zimbabwe, officially adopted eight millennium development goals (MDGs), including food security, to be realised by 2015. Mutenga (2014) notes that as the 2015 deadline approaches for countries to achieve socio-economic benchmarks, Zimbabwe is in danger of missing most of the MDG targets.

According to the FAO (1996) and Coates *et al*. (2007), food security is a state in which all people, at all times, have both physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life. Household food security can be attained through a combination of social-economic factors.

The aim of this paper is to identify the social, economic, institutional and cultural factors that impact household food security in urban and peri-urban areas. It seeks to provide government and other development agencies with options on how to address it.

**4.4.1 Estimating determinants of household food security: Ordered Probit Model**

The ordered probit is suitable for modelling with an ordered categorical dependent variable. The dependent variable used in this study is made up of categories of household food security. The model is useful in determining a combination of the multiple determinants that shape household food security.

The dependent variable in this study is household food security, grouped into four ordered categories. The four generic categories were formulated, in that during a survey a household can fall into any one of the four categories depending on the household's socio-economic condition. The categories are Q1 (food secure; there were no food shortages for the past 30 days and there is food surplus), Q2 (mildly food secure: there were no food shortages for the past 30 days, but there is no food surplus), Q3 (moderately food insecure: there is food shortages for some of the 30 days) and Q4 (severely food insecure: there are food shortages for most of the 30 days). In this study, the ordered probit model was used to establish the

determinants of household food security in urban and peri-urban areas. Based on the review of the literature, the model is estimated as follows.

A. Household food security $= f$ (*gender, marital status, household size in adult equivalence, education, total land size, occupation, total household income, total value of household assets, age, household expenditure on nonfood items, source of maize meal and food stored*) …………………………….....................................................................[1]

The respective category for food security is unobserved and is denoted by the latent variable $q_i^*$. The latent equation below models how $q_i^*$ varies with personal characteristics.

$q_i^* = X_i$ ………………………………………………………………….…… [2]

Where:

☐ the latent variable $q_i^*$ measures the difference in utility derived by individual *i* from either food secure or mildly food secure or moderately food insecure or severely food insecure.

☐ (*i* = 1, 2, 3…………….n) n represents the total number of respondents. Each individual *i* belongs to one of the four groups.

☐ *X* is a vector of exogenous variables.

Taking the value of 4 if the household was severely food insecure and 1 if household was food secure, the implied probabilities are obtained as:

Pr $\{Qi = 1| X_i\} = \Phi (-X_i\beta)$,

Pr $\{Qi = 2| X_i\} = \Phi (\mu_2 -X_i\beta ) - \Phi (\mu -X_i\beta )$,

Pr $\{Qi = 3| X_i\} = \Phi (\mu_3 -X_i\beta) - \Phi (\mu_2 - X_i\beta)$,

Pr $\{Qi = 4| X_i\} = 1 - \Phi (\mu_3 - X_i\beta)$. ……………………………………………… [3]
Following Greene (2003)

Where $\mu_i$ is the unknown parameter that is estimated jointly with $\beta$. Estimation is based upon the maximum likelihood where the above probabilities enter the likelihood function. The interpretation of the $\beta$ coefficients is in terms of the underlying latent variable model in equation [4].

The probability of households found between 1-4 can be written as:

$$\Pr (Q_i = 1) = \Phi (X_i\beta_1) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [4]$$

Where $\Phi (\cdot)$ is the cumulative distribution function (cdf) of the standard normal (Verbeek, 2008). A description of the explanatory variables used in the Ordered Probit model is provided in Table 4.1.

**Table 4. 1: Description of independent variables used in the model**

| Variables | Measures | $H_0$ Sign | Rationale |
|---|---|---|---|
| Age | Years | +/- | Younger head of household has the energy to work in different jobs; older head of households can be food secure as they can get remittances and pension; the relationship can be two ways. |
| Gender | (0=female,1=male,) | + | Male-headed households tend to be food secure; they are the ones dominating in the world, so the relationship can be positive. |
| Marital status | (1=married, 0=unmarried) | +/- | Households with married spouses can be food secure, as they help each other on household necessities, married head of households dominates in the survey and therefore a positive relationship is possible. |
| Household size | Adult equivalents | +/- | Smaller household size is less people to feed, bigger household size its more people to work for the household, and the relationship can be two- sided. |
| Educational level | Years of schooling | +/- | Educated head of households are more likely to be food secure; they have potential access to opportunities. |
| Total household income | US$ | + | More income can buy more food for the household. |
| Occupation | 0=unemployed, 1= employed | + | Employed household heads are a potential of reliable flow income into the household. |
| Total value of assets | US$ | + | More assets are a potential income they can be sold to sustain consumption during shocks. |
| Maize meal source | 0=Own product 1=other sources | + | Few sources of maize meal sources means household food insecurity; in this study more sources dominated the survey, so the result might be positive. |
| Nonfood expenditure | US$ | + | High income households afford nonfood items as a sign of food security, because low income households spend most their income buying food. |
| Total land size | Hectares | + | Households with more land have more room to grow crops; can lease out the land for money. |
| Food stored | 0=No 1=yes | + | More food storage can alleviate any future shocks like droughts and high food prices. |

## 4.5 Results and discussion

### Household's demographics

The sample of 200 households was composed of a majority of male household heads (62%) than females (38%). The survey indicated that households are dominated by a middle-aged

generation, with mean averages of 41 years for both males and females. CGD with households' participants indicated that old-age people have resorted to rural areas doing subsistence farming, because life there is cheaper and more affordable. Even though the majority of surveyed households were food secure, at 50.5% food surplus and 9.0% with no food shortage and no surplus, food insecurity is still prevalent in Bindura Municipal area, as 40.5% of the households were considered as food insecure. Of the 40.5% households who were classified as food insecure, 19% faced moderate food shortages, whilst 21% had severe food shortages. This result is inconsistent with other studies in Zimbabwe. Mutsvangwa (2007) reported that less than 50% of the households had adequate grain supplies in any month during the year. Tawodzera (2010) and SADC/FANR (2003) stated that in 2003 about 63% of Harare's urban population had been classified as food insecure. Results from the Poverty Income Consumption Expenditure Survey (PICES) of 2011/12, carried out by the National Statistics Agency, (ZIMSTAT, 2013), indicate that 38% of urban households, and almost 47% of people living in urban areas in Zimbabwe, were classified as poor.

**Determinants of household food security descriptive statistics**

This section presents descriptive statistics to highlight factors which determine household food security. Bonnard (2000) and Gebre (2012) believe that household ability to achieve food security in urban area is derived from the household's human, material and institutional resource bases. The chi-square results indicate whether or not there has been an association between household food securities with different socio-economic parameters.

The survey results indicated a strong association between household food security (p<0.01) and location. It must be noted that households who dwell in urban areas have a higher chance of being food secure than those in peri-urban areas. Because of their proximity to markets, most households in urban and peri-urban areas have multiple sources of income. Treuhaft and Karpyn (2010) acknowledged that researchers found that residents who live near supermarkets, or in areas where food markets sell fresh food, have lower rates of diet-related diseases than their counterparts in neighborhoods lacking food access.

The results in Table 4.2 show a significant relationship between marital status of a household head and the alleged household food security (p<0.8). Married household heads may feel food secure if they combine their income and other services with their spouses. Hanson *et al*. (2007) support the notion that marriage and long-term partnerships provide social support and

other non-economic resources that help individuals withstand periods of economic uncertainty or stress.

There is a significant relationship between household food security and the occupation of the head of household ($p<0.01$). The results indicate that households with a head of the house who is employed are more food secure than those without. During the focus group discussion participants emphasised that formal or informal employment in Zimbabwe is a source of substantial income earnings.

The chi-square results in Table 4.2 indicate a statistically significant relationship between household food security and level of education ($p<0.05$). This suggests that household heads who have acquired different levels of formal education are likely to feel more food secure than those who do not have formal education. Mango *et al.* (2014) explains that the level of education of the household head influences the household's access to, and use of, information and builds its capacity to enhance food security. Muhoyi *et al.* (2014) concurred that it is expected that households whose heads spent more years in school are more likely to be food secure than their counterparts with little or no education. The chi-square results in Table 4.2 indicate a statistically significant relationship between household food security and level of education ($p<0.05$). This suggests that household heads who have acquired different levels of formal education are likely to feel more food secure than those who do not have formal education. Mango *et al.* (2014) explains that the level of education of the household head influences the household's access to, and use of, information and builds its capacity to enhance food security. Muhoyi *et al.* (2014) concurred that it is expected that households whose heads spent more years in school are more likely to be food secure than their counterparts with little or no education.

**Table 4. 2: Association between food security and socio-economic parameters**

| Variable | Categorical | Food secure | | Food insecure | | n | X² |
|---|---|---|---|---|---|---|---|
| | | Food secure (*n*=101) (%) | Mildly food secure(n=18) (%) | Moderately food insecure (*n*=39) (%) | Severely food insecure (*n*=42) (%) | | |
| Location | Peri-urban | 35.3 | 7.4 | 16.2 | 41.2 | 68 | *** |
| | urban | 58.3 | 9.8 | 21.2 | 10.6 | 132 | |
| Gender | Female | 46.1 | 6.6 | 25.0 | 22.4 | 76 | ns |
| | Male | 53.2 | 10.5 | 16.1 | 20.2 | 124 | |
| Marital status | Single | 44.9 | 2.0 | 30.6 | 22.4 | 49 | * |
| | Married | 52.3 | 11.3 | 15.9 | 20.5 | 151 | |
| Occupation | Unemployed | 18.8 | 3.1 | 15.6 | 62.5 | 32 | *** |
| | Employed | 56.5 | 10.1 | 20.2 | 13.1 | 168 | |
| Maize source | Own production | 43.8 | 8.3 | 24.0 | 24.0 | 96 | ns |
| | Multiple sources | 56.7 | 9.6 | 15.4 | 18.3 | 104 | |
| Vege source | Own production | 51.5 | 10.9 | 17.8 | 19.8 | 101 | ns |
| | Supermarket | 49.5 | 7.1 | 21.2 | 22.2 | 99 | |
| Income Coping strategy | Sell assets | 59.1 | 13.6 | 13.6 | 13.6 | 22 | ns |
| | Other strategies | 49.4 | 8.4 | 20.2 | 21.9 | 178 | |
| Education | Non-formal | 45.5 | 9.1 | 9.1 | 36.4 | 11 | ** |
| | Formal | 50.8 | 9.0 | 20.1 | 20.1 | 189 | |
| Food stored | No | 45.6 | 2.9 | 19.4 | 32.0 | 103 | ns |
| | Yes | 23.5 | 1.5 | 10.0 | 16.5 | 97 | |

**Note**: ***, ** and * means significant at 1%, 5%and 10% levels of significance, respectively. ns= not statistically significant. **Source:** Household Survey (2014).

Table 4.3 presents one way Anova (Analysis of Variance) test results for household food security and its determinants. The results indicate a statistically significant difference between household food security and age (p<0.06). The mean age differences imply that as the number of years of age of the head of the households increases so do the chances of their households being food secure.

Table 4.3 also indicates that there is a significant relationship (p<0.07) between household size and household food security. The mean household size difference shows that the larger the household size the greater the responsibilities, especially in a situation where many of the household members do not generate any income, but depend on the household head. This is in consonance with the findings of Maharjan and Khatri-Chhetri (2006) and Idrisa *et al.* (2008) that foods secure households have a small size and a low dependency ratio. Obamiro *et al.* (2003) and Olayemi (2012) reported that typically, large family sizes have a significant relationship, with much greater risk of poverty. The Anova test indicates a statistical difference (p<0.09) between household food security and total land size. The mean land size difference in the study shows that households with more land for urban agriculture were food secure. Maharjan and Khatri-Chhetri (2006) noted that, compared to food insecure households, food secure households have small family sizes, lower dependency ratio, higher percentages of irrigated land and more total land and livestock holdings.

Muraoka *et al.* (2014) explain that a 10% increase in operational land size increases per capita total consumption and per capita home-produced food consumption by 0.8% and 2%, respectively. The results indicate a statistically significant difference (p>0.04) between household food security and total value of household assets. Household assets are potential income, which can be sold to sustain livelihoods in urban areas. The mean household assets value difference shows that the more valuable assets a household possesses the more potential income they can have. Sugiyanto *et al.* (2012) pointed out that physical assets can be sold to finance consumption but they can also be used as physical collateral for a loan or credit. Maponya (2008) added that households can also sell some of their assets to compensate shortfalls in consumption.

**Table 4. 3: One way Anova test results for household food security determinants**

| Variables | Food secure | Mildly food secure | Moderately food insecure | Severely food insecure | F significance |
|---|---|---|---|---|---|
| | | **Mean** | | | |
| Age(years) | 41.57 | 40.28 | 38.85 | 40.02 | * |
| Household size in adult equivalents | 4.5189 | 4.2461 | 4.1874 | 4.7312 | * |
| Land size(ha) | 2.1 | 1.85 | 1.56 | 0.83 | * |
| Monthly spending on food(USD) | 109.32 | 112.78 | 74.13 | 47.02 | ns |
| Dietary diversity score | 7.61 | 7.72 | 6.49 | 4.12 | ns |
| Number of meals per day | 0.21 | 0.28 | 0.59 | 1.02 | ns |
| Total household income(USD) | 1155.13 | 531.17 | 786.87 | 1357.62 | ns |
| Value of households assets(USD) | 4343.47 | 5115.78 | 3489.82 | 2521.17 | *** |

**Note**: *** and * means significant at 1% and 10% levels of significance, respectively. ns= not statistically significant. **Source**: Household Survey (2014)

**Factors influencing household food security**

The ordered probit model was used to determine household characteristics that predict household food security in urban and peri-urban areas. Table 4.4 presents the results of the ordered probit model. The results indicate that, collectively, all estimated coefficients are statistically significant, since the LR statistic has a p-value less than 1%. The pseudo $R^2$ value is about 16%, which is moderate for cross-sectional data. The model results on Table 4.4 indicate that household characteristics such as household income, household size, land size, value of assets, food stored and age are not statistically significant determinants of household food security. The model indicates that household heads' education levels are determinants of food security (p<0.03). Table 4.4 indicates that households with formal education (primary, secondary and

tertiary) have a 9.9% chance of remaining food secure and 7.1% to be mildly food secure if a year is added onto the number of years spent in school. Households with no formal education are 9% likely to be moderately food insecure and 17.9% chance of falling into the severely food insecure category if a year is added onto the number of years spent out of school. The implication may be that the higher the education one has, the more are the chances of having formal employment which pays a good salary. This increases household income to buy food for household consumption.

Faridi and Wadood (2010) found that education is clearly linked with food security issues, with the assumption that household heads with more human capital are prone to suffer less from food insecurity. There is a general trend of decrease in food insecurity as the education level of the household is increases. Other studies have revealed the constructive influence of higher education on the decreasing chances of household food insecurity. Nyako (2013) stresses that, in order to understand the mechanisms through which individuals with higher levels of education are likely to experience lower levels of food insecurity, he examined two perspectives: the human capital approach and the capability approach. Education is an important determinant of household food security, because an educated household is more sensitive to adopt technology to maximise the output he/she generated from farm activities. This contributed directly for household food security (Muche *et al*., 2014).

The model shows that the occupation of the head of the household has a positive influence on household food security (p<0.01). If the head of the house remains employed, or another job is added to his current occupation, the household has a 30.3% chance of remaining food secure and a 6.4% chance of becoming mildly food secure. In the same household, if the head of the house lost his job or is not employed there is a 2.2% chance of moving into moderately food insecure and 34.3 % chances of dropping into the severely food insecure category. Dastgiri *et al*. (2006) and Payab *et al*. (2014) showed that the higher the job status of the head of the household, the lower the food insecurity will be in the household. Omonona *et al*. (2007) assert that the food insecurity incidence for those engaged in professional occupations is relatively low, as a result of high income associated with this category.

The results also indicate that total monthly household expenditure is an effect of household food security (p<0.01). The households which could afford to meet all their   monthly expenditure on

food, clothing, health, transport, water and electricity bills, educational fees and other household necessities had a 4.5% chance of remaining food secure and a 2.6% chance of being mildly food secure if there is an additional one US dollar added on, to meet their total monthly household expenditure. The same households might have a 3% chance of moving into moderately food insecure and 7.2% probability of dropping into severely food insecure categories if there is a dollar shortfall in their monthly total household expenditure. The observation in the present study was that there were some households who could afford to meet all their monthly expenditure, compared with some who could hardly afford a single basic expenditure on food. FAO (2005) established that household income and expenditure surveys (HIES) are a source of policy relevant measures allowing monitoring and targeting of regional or national prevalence of food insecurity. The percentage of a household's total expenditure on food gives an indication of their vulnerability to food insecurity in the future. FAO (1993) found that the proportion of the family income allocated to various basic necessities of food, housing, clothing, etc., in urban households, is determined by, among other factors, size of the income, prevailing prices of these necessities, social status and cultural norms. Malaba (2006) explains that, in economic theory, expenditure is a better measure of welfare than income, as it measures what people have actually expended for consumption and it is also easier to estimate expenditure than income. Focus group discussion in the present study admitted that they spend most of their meagre income on food because of its high price. In the study there was a difference in expenditure between urban (58%) and peri-urban (42%) households. Households in urban areas could afford to pay for a number of household necessities as compared to peri-urban households who prioritised mostly food.

The model indicates that the marital status of the head of the household is a significant determinant of household food security ($p<0.06$). The marital status variable was modelled as 1=married and 0=single. Households with married heads of the households had a 10.3% chance of remaining food secure and 4.6% probability of being mildly food secure if the head of the house remains married. The same household has a 1% percent chance of shifting into moderately food insecure and a 15% chance of falling into severely food insecure category if the head of the house becomes single.

**Table 4. 4: Ordered probit results of determinants of household food security**

| Independent variables | Coefficients | | | Marginal Effects | | | |
|---|---|---|---|---|---|---|---|
| | | | | Food secure | | Food insecure | |
| | Value | Robust St. Error | P>z | Food secure | Mildly food secure | Moderately food | Severely food insecure |
| Age | 0.001 | 0.008 | 0.928 | -0.097 | -0.045 | -0.001 | 0.001 |
| HH size in adult Equivalents | -0.049 | 0.072 | 0.482 | 0.013 | 0.008 | 0.001 | -0.019 |
| Total land size | 0.008 | 0.049 | 0.857 | -0.003 | -0.002 | -0.001 | 0.004 |
| Educational level | 0.455*** | 0.206 | 0.026 | -0.099*** | -0.071*** | -0.009* ** | 0.179*** |
| Occupation | 0.957*** | 0.3595 | 0.008 | -0.303*** | -0.064*** | 0.022*** | 0.343*** |
| HH expenditure | 0.183*** | 0.055 | 0.001 | -0.045*** | -0.026*** | -0.003 *** | 0.072*** |
| Value of HH assets (US$) | 0.001 | 0.001 | 0.319 | -5.78e-06 | -3.12e-06 | -2.31e-07 | 9.13e-06 |
| Marital status | 0.382* | 0.206 | 0.063 | -0.103* | -0.046* | 0.001* | 0.151* |
| Gender | 0.367* | 0.206879 | 0.080 | -0.097* | -0.045* | -0.001* | 0.143* |
| Food stored | 0.130 | 0 .195 | 0.509 | 0-.032 | -0.018 | -0.002 | 0.051 |
| Total HH income | 0.001 | 0.001 | 0.593 | -7.98e-06 | -4.74e-06 | -3.75e-07 | 0001 |

/cut1   1.601494   0 .6179103
/cut2   2.363213   0 .6561865
 /cut3   2.648599   0 .6655963
N =200     LR $X^2$ = ***;  Pseudo $R^2$=0.16; Log likelihood = 239.33
**Note:** *, **, ***, means the coefficient is statistically significant at 10%, 5% and 1% levels, respectively: Household Survey (2014)

Kaloi *et al*. (2005) stated that, in a study in Rhode Island, the results showed that there was a significant difference in food security status among the marital status categories. Zenda (2002), cited in Adekunle (2013), pointed out that households with married people are able to share household activities such as agricultural production, harvesting of fruit, weeding and fetching of firewood and water, while divorcees, single and widowed household heads have to do all the household activities, as they do not have the support, unless from their older children who are fit to assist with the household activities.

The model outcome shows that the gender of the household head is statistically significant determinant of household food security ($p<0.08$). The results indicate that male-headed households have a 9.7% chance of remaining food secure and a 4.5% chance of continuing to be mildly food secure if the head of the house remains a man. If the head of the house changes to a female head, there is a 1% probability of the household moving into moderately food insecure and a 14.3% chance of becoming into severely food insecure. This is because; in the present study there are more males (62%) than females (38%) as shown in Table 4.2.

The implication of the findings, in this study is that male-headed households have better access to employment, productive resources and an asset base such as credit facilities and access to land mainly because family headship and gender division of labour, as compared to their female counterpart. Hanson *et al*. (2007) stated that the male head of the household is the most significant key in the household, since he usually takes responsibility for looking after the family and utilises all available resources, including existing human capital, to survive. The result is consistent with Mallick and Rafi (2010), who noted that since males earn more than females in the same job, a household lacking male-earned income simply has a much higher probability of being poor. Socio-cultural factors can prohibit women's participation in the labour force. FAO (1999) and Muhoyi (2014) spine that lack of access to resources, such as land, inputs and support services, limit the capacity of women to contribute significantly to their families' food basket, compared to males. In this regard, male-headed households are expected to be more food secure than female-headed households.

**4.6 Conclusion**

The paper sought to explore the determinants of Zimbabwe's urban and peri-urban food security at household level. The study revealed that the socio-economic determinants of household food security in urban and per-urban are more or less the same, even though households in urban areas were at disposal of many resources to supplement their livelihoods than peri urban households. The descriptive statistics and the model estimates showed that education, gender, marital status, number of meals a day, household expenditure, occupation of the head of the household, household size, spending on food and dietary diversity play a significant role and are considered as primary determinants of household food security. Education attainment of the head of the household lowers the probability of a household being food insecure, at the same time there are high chances of a household being food insecure if the head of the household achieved low level of education. The promotion of education is therefore vital in solving the problems of food security. There is a diverse level of food security between male- and female-headed households, not only in urban areas but across a spectrum of different societies like rural, mining and farming areas, so there should be a promotion of gender equality in accessing different services which directly affect households. Marital status had proven to shape household food security though spousal contribution on income and other services. The number of meals a family consumes daily increases their dietary diversity. Household monthly expenditure, especially on food, determines the degrees of resilience of a household on food deficit challenges and there was a difference in household expenditure between urban and peri-urban households, mainly because of urban households had a wider livelihood resource base than peri-urban households. Occupation of the head of the house is the pillar to any household food security and is usually driven by level of education. The household's dependency ratio easily determines household food security in urban areas in Zimbabwe; more family members, who are too young or old to work means many people to feed and to provide for. Analysis of the determinants of food security shows a negative relationship between a household food security and a household situated in urban areas. Households living in urban and peri-urban areas are mostly engaged in informal seasonal employment. Dysfunctional state institutions, unemployment and low asset base are some of the reasons for higher food insecurity level in urban and peri-urban areas. Government policies and programmes can address these characteristics using direct and integrated approach.

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# CHAPTER 5: AN ANALYSIS OF FACTORS INFLUENCING HOUSEHOLD DIETARY DIVERSITY-A CASE STUDY OF BINDURA MUNICIPAL AREA

## 5.1 Abstract

Household food security can be defined as the concept that underpins the various notions of relative food deprivation, ranging from hunger, to malnutrition and famine. The concept is used to analyse and explain very different and complex livelihood realities at particular and local levels. High levels of food insecurity in Zimbabwe are the result of complex interlinked factors, stemming from both a man-made crisis of a political and economic nature and an extreme vulnerability to climatic shocks. This paper uses the household dietary diversity score to explore household nutritional access in urban and peri-urban areas in Zimbabwe. Increasing dietary diversity is associated with increased household probability of adequate micronutrient intake. FAO has developed a standardised tool for measuring dietary diversity. The tool can be administered at either the household or individual level. Dietary diversity can be used as a proxy measure of the nutritional quality of the diet and for the access dimension of household food security. The study was conducted in six locations in Bindura Municipal area, Mashonaland Central Province, with a randomly selected sample size of 200 households. Data was analysed using both descriptive statistics and econometric analysis, using an ordered logistic regression model to examine the extent of household food security among the households surveyed. Occupation of the head of the household, total household income, monthly spending on food, source of vegetables and number of meals a day were found to significantly influence household dietary diversity. This study provides government and its development partners with information to drive national and sub-national level prioritisation and decision-making for attaining household food security.

Keywords: Household dietary diversity, Food security

## 5.2 Introduction

Millions of people worldwide suffer from hunger and under-nutrition. A major factor contributing to this international problem is household nutrition insecurity. This condition exists when people lack sustainable physical or economic access to enough safe, nutritious and socially acceptable food for a healthy and productive life (FAO, 2009). Household food security is a

qualitative and cultural concept relating to livelihoods, as well as being a technical term relating to hunger, malnutrition, famine and chronic food shortage (James, 2008). Food security is founded on four fundamental elements: adequate food availability, adequate access to food, acceptable food stability and appropriate food utilisation. MCFSSO (2009) established that a food secure household is one that can produce, or access, sufficient amounts of nutritious food for all family members. Masiiwa (2013) stresses that severe acute malnutrition imposes a significant economic burden on households in Zimbabwe. Drimie *et al.* (2013) noted that the causes of nutrition insecurity in urban areas are exacerbated by issues related to urban living such as a greater dependence on cash income and weaker informal safety nets.

The preliminary findings of the Nutrition Survey of 2014 in Zimbabwe showed that, while the frequency of meals seemed adequate, dietary diversity remained a challenge, as only 26 percent of children six to 59 months old consumed four food groups (WFP, 2014). Arimond and Ruel (2006) assert that lack of diversity is a particularly severe problem among poor populations in the developing world, where diets are based predominantly on starchy staples and often include few or no animal products and only seasonal fruit and vegetables. Ravallion (2007) estimates that about one-quarter of the developing world's poor live in urban areas, but that poverty is becoming more urban and the poor are urbanising faster than the population as a whole. Zezza and Tasciotti (2008) agreed that urban agriculture may have a role to play in addressing urban food insecurity problems, which are bound to become increasingly important with the secular trend towards the urbanisation of poverty, and of the overall population, in developing regions. Jongwe (2013) claimed that the worsening global macro-economic situation in 2008 resulted in urban food insecurity. Households adopted different survival strategies, including the intensification of urban agriculture.

Unlike rural households, urban households almost always require cash to access social services such as health and education, and hence there is greater need for households to have secure and consistent income to meet these costs. Wiesmann (2008) reveals that the World Food Programme (WFP) has adopted a data collection tool measuring dietary diversity and food frequency, because several indicators built on this type of data have proven to be strong proxies for food intake and food security. FAO (2008) noted that the household dietary diversity score (HDDS) is meant to reflect, in a snapshot form, the economic ability of a household to consume a variety of

foods. The measurement of dietary diversity indicators has gained increasing prominence, particularly because of the close relationship of dietary diversity with household per capita consumption and daily caloric availability (Carletto *et al.,* 2013). Understanding household dietary diversity may therefore be an alternative, easy pathway to estimate household food security (Thorne-Lyman *et al.,* 2009; Vakili *et al.,* 2013; Taruvinga *et al*., 2013). Therefore the measurement of household nutritional collection can help to assess urban and peri-urban food security and increase understanding of how policy, governance, institutional and management issues need to align for improved food and nutrition security programmes in urban settings.

## 5.3 Research methodology

## 5.4 Data analysis method

The respondents were asked to recall all food items/commodities consumed in the previous 24 hours prior to the interview. A scale of twelve food groups was used in assessing the dietary diversity of the respondents (Taruvinga *et al*., 2013). The dietary diversity scores for the respondents were estimated using information collected from the 24-hour dietary recall (FAO, 2007). A single point was awarded to each of the food groups consumed over the reference period, giving a maximum sum total dietary diversity score of 12 points for each individual, in the event that his/her responses were positive to all food groups. Table 5.1 presents the categories of food groups.

**Table 5. 1: Household dietary diversity food groups**

| Food Groups |
|---|
| 1. Any bread, rice, noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat or any other locally available grain |
| 2. Any potatoes, yams, manioc, cassava or any other foods made from roots |
| 3. Any tubers |
| 4. Any vegetables |
| 5. Any fruits |
| 6. Any beef, pork, lamb, goat, rabbit, wild game, chicken, duck, other birds, liver, kidney, heart or other organ meats |
| 7. Any eggs |
| 8. Any fresh, dried fish or shellfish |
| 9. Any foods made from beans, peas, lentils or nuts |
| 10. Any cheese, yoghurt, milk or other milk products |
| 11. Any foods made with oil, fat or butter |
| 12. Any sugar coffee or tea or honey |

Table 5.2 effectively created mutually exclusive dietary diversity categories, as derived from the 12 food groups, into; low, medium and high dietary diversity groups (Taruvinga *et al*., 2013).

**Table 5. 2: Dietary diversity frequencies found in the study**

|  | Low Dietary Diversity | Medium Dietary Diversity | High Dietary Diversity |
| --- | --- | --- | --- |
| Dietary Diversity Score | 0 - 4 | 5 - 9 | 10 -12 |
| No. of respondents | 53(26.5%) | 114(57%) | 33(16.5) |

### 5.4.1 Tobit model for estimating the extent of household food security

The Tobit model was used to estimate the extend of household food security using a dietary diversity score, where a dietary diversity score is the total number of food groups a household consumed over a period of 24 hours. This model was used because dietary diversity score is lower censored at zero, since some households during the survey reported not eating anything within a period of 24 hours. On the other end of the scale, dietary diversity score is highly censored at 12, since a household can only have access to food for a maximum of 12 food groups within a period of 24 hours.

The model was specified as suggested by Gujarati and Porter (2009), as follows:

$Y_i = \beta x_i + \varepsilon_i$      if RHS>0

=0      otherwise

$Y_i$ is the total number of food groups a household can consume in 24 hours $i$; $x_i$ is a vector of household characteristics; $\beta$ is a vector of coefficients to be estimated, and $\varepsilon_i$ a residual term.

### 5.4.2 Description of variables

The variables which were used in the two models are set out in Table 5.3. The Household Diversity Score (HDDS) is used as a proxy measure of the socio-economic status of a household.

**Table 5. 3: Description of independent variables used in the model.**

| Variables | Measures | $H_{0Sig}$ | Rationale |
|---|---|---|---|
| Age | Years | + | Younger-headed households make better dietary decisions than older-headed households |
| Gender | (0=female, 1=male,) | + | Male-headed households tend to be food secure; they are the ones dominating in the world so the relationship can be positive |
| Marital status | (1=married, 0=unmarried) | + | Married spouses help each other on dietary decisions; potential of more income from married households, positive relationship is possible |
| Household size | Adult equivalents | +/- | Reduced household size, less dependency, bigger household size can bring more income |
| Educational level | Years of schooling | +/- | Educated head of households are more likely to be food secure they have potential access |
| Total household income | US$ | + | More income can buy more food for the household |
| Occupation | 0=unemployed,1=employed | + | Employed household heads are a potential for a reliable flow of income into the household |
| Total value of assets | US$ | + | Assets generate income and own production |
| Place | Location (0=Peri-urban,1=urban | + | Urban households have more income and are close to a variety of food markets |
| Nonfood expenditure | US$ | + | High income households afford expenditure of nonfood items because they spend adequately on food as compared to less income, who spent nearly all income on food |
| Vegetable sources | 0=Own product 1=other sources | - | Vegetable-based diet lead to household food insecurity |
| Maize meal source | 0=Own product 1=other sources | - | More sources of maize meal sources means household food insecurity because there is less diversity |
| Spending on food | US$ | + | More money spent on food; there is high possibility to buy all the required food groups |
| Total land size | Hectares | + | Households with more land have more room to grow crops; can lease out the land for money. |
| Food stored | 0=No 1=yes | + | More food storage can alleviate any future shocks like droughts and high food prices. |
| Number of meals | Meals per day | + | Adequate meals a day, high possibility of attaining diversity as different food is consumed |
| Income coping strategy | 0=Sellassets,1=Other strategies | + | Disposal of income coping strategies means there is proceeds available for the household |

## 5.5 Results and discussion

### Extent of household nutritional security descriptive statistics

Among the food groups included in the survey, about 68.5% of the households had consumed cereals over a period of 24 hours, 33.5% had consumed vitamin A rich vegetables, 35% had eaten white tubers and roots and 85% had fed on dark vegetables. About 58.5% had taken vitamin A rich fruits, 67.5% meat, 34% eggs, 19% fish, 40.5% legumes, 50.5% milk and milk products; 71% oils and fats and 53 % spices, sweets, caffeine and alcohol. The majority of surveyed households were food insecure, with 26.5% having low dietary diversity, 57% medium diversity and only 16.5% a high dietary diversity score, as shown in Table 5.2. The results of this study indicate that dietary diversity is low thereby increasing the risk of food insecurity in the area.  Among the food groups, namely, starches, vegetables and fruits, animal sourced foods, fats, and legumes, the study reveals that the majority of households in Bindura Municipal area can only afford mostly starch and carbohydrate foods. This result is inconsistent with other studies in Zimbabwe. For example, WFP (2014) reported that analysis of nutrition data in Zimbabwe showed that chronic malnutrition is prevalent even in high maize surplus seasons, which brings into focus micro-nutrient deficiency related to low dietary diversity, rather than food quantity.  Tawodzera (2011) expressed similar sentiments that as much as the low dietary diversity among surveyed households in Zimbabwe showed nutritional inadequacy of the food being consumed by the poor, food insecurity was also reflected by the number of months per year in which household are adequately provisioned with food. Makovere and Nyamutowa ( 2013) recorded that, before the implementation of low-input vegetable gardens (LIG) in the Mufakose high-density suburb in Harare, the average household dietary diversity score (HDDS) for urban poor households living with HIV and AIDS was 3.6, which was too low. Table 5.4 shows chi-square association between socio-economic variables and household food security.

### Association between household dietary diversity and socio-economic characteristics

Table 5.4 presents chi-square results of the association between food security and socio-economic parameters. Household characteristics, such as gender, marital status, source of maize meal, education and household income coping strategy, are not statistically significant determinants of the extent of household food security.

**Table 5. 4: Dietary diversity score and household nutritional security parameters**

| Variable | Categorical | Dietary Diversity | | | n | X² |
|---|---|---|---|---|---|---|
| | | Low % | Medium % | High % | | significanc |
| Gender | Female | 22.4 | 63.2 | 14.5 | 76 | ns |
| | Males | 29.0 | 53.2 | 17.7 | 124 | |
| Marital status | Single | 26.5 | 59.2 | 14.3 | 49 | ns |
| | Married | 26.5 | 56.3 | 17.2 | 151 | |
| Occupation | Unemployed | 65.6 | 28.1 | 6.3 | 32 | ** |
| | Employed | 19.0 | 62.5 | 18.5 | 168 | |
| Maize source | Own production | 30.2 | 57.3 | 12.5 | 96 | ns |
| | Multiple sources | 23.1 | 56.7 | 20.2 | 104 | |
| Vegetable source | Own production | 19.8 | 57.4 | 22.8 | 101 | * |
| | Multiple sources | 33.3 | 56.6 | 10.6 | 99 | |
| Coping strategy | Sell assets | 4.5 | 5.0 | 1.5 | 22 | ns |
| | Other strategies | 22.0 | 52.0 | 15.0 | 178 | |
| Number of meals a day | three meals | 12.0 | 63.2 | 24.8 | 125 | *** |
| | two meals | 50.0 | 47.3 | 2.7 | 74 | |
| | one meal | 100 | 0 | 0 | 1 | |
| Education | Non formal | 36.4 | 36.4 | 27.3 | 11 | ns |
| | Formal | 25.9 | 58.2 | 15.9 | 189 | |
| Food stored | No | 36.9 | 52.4 | 10.7 | 103 | *** |
| | Yes | 15.5 | 61.9 | 22.7 | 97 | |
| Location | Peri-urban | 54.4 | 39.7 | 5.9 | 68 | *** |
| | urban | 12.1 | 65.9 | 22.0 | 132 | |

**Note:** *** and * means significant at 1% and 10% levels of significance, respectively. ns= not statistically significant. **Source:** Household Survey (2014).

There is a significant relationship between household food security and occupation of the head of the household ($p > 0.05$). The results indicate that households with the head of the house employed are more nutritionally secure than those with unemployed heads. Employment can easily result in a substantial flow of income, which can result in household purchasing different kinds of food. Omonona *et al.* (2007) state that food insecurity incidence is relatively low for those engaged in professional occupations and highest for traders and the unemployed.

The chi-square results in Table 5.4 indicate a statistically significant relationship between household food security and source of vegetables ($p < 0.06$). This suggests that households which grow or buy different types of vegetables have a possibility to attain dietary diversity, as they contain nutrients like starch and other carbohydrates. Mrema and Chitiyo (2011) concurred that vegetable home gardening and roadside markets became one of the agro-based safety nets against food shortages and nutritional needs for urban dwellers in Zimbabwe. Focus group discussion participants delineated that most households in urban areas have back-yard gardens. Most of the gardens are diversified in that different types of vegetables are grown throughout the year. The only problem they are facing is water supply, especially in dry seasons.

Chi-square test results also indicate a statistical significance difference ($p < 0.01$) between dietary diversity and the number of meals a day in normal circumstances. The number of meals a day is a strong determinant of household dietary diversity through the way it increases or decreases the chances of households to diversify their diet. Table 5.4 indicates that low dietary diversity was a result of an insufficient number of meals a day; medium dietary diversity was a result of an average number of meals; and a high dietary diversity was a result of the required number of meals a day. This was possibly because a food secure household can afford three or more meals a day, unlike food insecure households, which can hardly afford two or a single meal a day. Manjengwa (2012) noted that poor households consume food of poor nutritional quality and sometimes eat once or twice per day, because they cannot afford three meals per day. Focus group discussion highlighted that the majority of households could now afford two or more meals a day, compared with during 2008, when they could not afford a single meal because of high food prices and hyperinflation.

The survey results indicate an association between household dietary diversity and food stored (p<0.01). Households that had food stored in the form of maize meal or grain have a high chance of being food secure, because maize meal or grain are staple foods in Zimbabwe. They can easily diversify their diet by eating the maize meal or grain with other different foods like vegetables, milk, meat and fish. Thamaga-Chitja *et al*. (2004) stated that effective storage plays an important role in stabilising the food supply at the household level, by smoothing seasonal food production. The focus group discussion with participants reveled that that food storage in the form of maize grains or maize meal after harvesting is vital for any household, because buying regularly proves to be very expensive.

The study results indicate there is a correlation between location and household dietary diversity (p<0.01). In the study, it was observed that some households in urban areas have better chances of being nutritionally secure, especially those in low-density suburbs, compared to high-density and peri-urban households, this is because they have better income opportunities which allows them to spend adequate money on quality food and nutritious food, thereby achieving household food security. Sithole *et al*. (2012) reported that an urban livelihood assessment estimated that 13% of low-income urban households in the high-density and peri-urban areas were food insecure. ZIMVAC and GFSC (2014) noted that there are more problems in the high-density than in the low-density areas, e.g., access to water to grow vegetables.

Table 5.5 presents Anova test results on the relationship between   household food security social and economic parameters and dietary diversity score. The age of the household head is a statistically significant determinant of perceived household dietary diversity (p<0.08). Households headed by older people might appear more food secure, making better dietary decisions. As the mean differences show in Table 5.5, the effect is that, as the household heads get older, they appear food secure through achieving medium diversity, which more than half of the sample size (114) accomplished. This may be because, as the household head grows older, the head earns better income and makes better household dietary decisions. A low dietary diversity score appears to have a lower mean age, as compared to medium diversity. This may be because of high cost of food, beyond the reach of youthful households, especially those unemployed. A high dietary diversity score has a low mean age, possibly because of few

younger-headed households in the area, who can earn a better income to sustain the essential diet. Participants indicated on the FGDs that, of the food groups listed, the majority of the households in Zimbabwe consume five to nine (medium dietary diversity) food groups because of the number of meals they eat a day and the food they can afford to buy and prepare.

**Table 5. 5: Anova-test results for the extent of household nutritional security**

| Variables | Low | Medium | High | Significant level |
|---|---|---|---|---|
| *n* | 53 | 114 | 33 | (Anova) |
| | | **Mean** | | |
| Age (years) | 38.92 | 42.11 | 38.09 | * |
| Household size in adult equivalence | 4.4 | 4.6 | 4.6 | ns |
| Land size(ha) | 1.28 | 1.78 | 2.03 | ns |
| Monthly spending on food(US$) | 49.36 | 99.56 | 120.33 | *** |
| Total household income(US$) | 1200.98 | 1048.38 | 932.42 | ns |
| Household expenditure on nonfood items (US$) | 3.34 | 5.82 | 6.64 | *** |
| Value of households assets(US$) | 3018.08 | 3788.07 | 5483.88 | *** |
| Hectares allocated to food crops(ha) | 0.74 | 1.15 | 1.00 | ns |
| Hectares allocated to cash crops(ha) | 0.37 | 0.77 | 0.69 | ns |

**Note:** *** and * means significant at 1% and 10% levels of significance, respectively. ns= not statistically significant. **Source**: Household Survey (2014).

Table 5.5 Anova test shows a statistical mean difference (p<0.01) between household monthly spending on food and dietary diversity. Households with high dietary diversity spend more money on food every month, compared with those with low and medium dietary diversity. This can be because high income households can afford to spend more money on any type of food they prefer, compared to the poor and middle class. According to Nsele (2014) and (Clausen and Steyn, 2005), low income results in a low dietary diversity

The tests indicate a statistically significant mean difference (p<0.01) between household dietary diversity and monthly expenditure on nonfood amenities like water, electricity, transport, rent, educational fees and clothing. Table 5.5 shows that households with low mean expenditure have low dietary diversity. Those with average mean expenditure have medium diversity and households with high expenditure have high dietary diversity. The result implies that households who can afford to pay for all basic necessities, like food, clothing, health, transport, household items, water, electricity and educational fees are nutritionally secure through the availability of income and other services. This might be because a household dietary diversity score can be determined by the availability of household income to meet expenditure, including food. Manjengwa (2012) defined the poor by the type of clothes, their size and where they are bought. Focus Group Discussions revealed that households prioritise food on their monthly expenditure list, irrespective of their household income.

Table 5.5 shows a mean significant difference (p<0.02) between the total value of assets and the three distinctive groups of dietary diversity. The record shows that households with higher dietary diversity had a higher total mean value of household assets, compared with food insecure households, which had less total mean value of assets and lower dietary diversity. This might be because households which are nutritionally secure have the capacity to achieve high dietary diversity, through converting their assets into income and buying food in times of food shortages. Ihab *et al.* (2012) stated that food availability and access is restricted due to high food prices and limited resources, which result in inadequate quantity and poor quality of diet in households.

**Tobit model results for the extent of household food security**

A Tobit model was estimated to determine the socio-economic characteristics and resource endowments that predict the influence of household dietary diversity, as presented in Table 5.6. Marginal effects (ME) measure how unit change of the average value of the independent variables affects the proportion of household dietary diversity scores. The results indicate that, collectively, all estimated coefficients are statistically significant, as reflected by the significant Chi-square value (p<0.01). The pseudo $R^2$ value is about 18%, which is low for cross-sectional data. The model correctly predicted about 74% of the cases, confirming that the model fits the data well.

A statistically significant relationship was observed between education and household food security ($p < 0.08$). This implies that, as the level of education of household heads increases, household dietary diversity intensity increases by 66.5%. This suggests that the level of formal education could impact positively on households' nutrition decisions. This agrees with the findings of Amaza *et al.* (2006), which suggest that the higher the educational level of a head of household, the more dietary diversity the household can achieve. Sarkar (2014) emphasises that household dietary diversity is significantly better in houses where the head of the household completed more than standard 10 of schooling, compared to the houses where the head of the households are uneducated or have no formal schooling. Hoddinot and Yohannes (2002), cited in Ajani (2010), outlined that higher educational attainment in households is likely to be associated with higher income and increased income is linked to more expenditure on food.

The statistical analysis reveals that household dietary diversity increased significantly with the occupation of the head of the household. The variable estimate was found to be statistically significant ($p < 0.07$). This implies that occupation determines the income earned and this might lead to improved food consumption. The empirical results show that occupation significantly improved the dietary diversity in the study, because of the availability of income. This means that household nutritional quality diversifies as income level increases. Das (2014) noted that the occupation of the household head is an important factor determining both the food and non-food consumption pattern.

The sources of vegetables negatively influence household dietary diversity. A vegetable-based diet increases the chances of a reduced dietary diversity, as many households will be only exposed to carbohydrates, because in most cases they are low income households. The result shows that increasing the availability of vegetable sources will result in less household dietary diversity by 61.3%. This is denoted by a statistically significant value ($p < 0.1$), (see Table 5.6). Most urban and peri-urban households in Zimbabwe grow vegetables in their home back-yards and in gardens along small streams and rivers. Ekesa *et al.* (2008) revealed that high consumption of vegetables could be explained by the fact that vegetables are cheaper than meat or fish, thus increasing the likelihood of being consumed over a longer period of time, such as five days a week. However, in my study neither the FGD nor the survey, had elaborated as true

or false that vegetables based diets diminishes chances of dietary diversity, but an estimate from the econometric model , reveled a negative impact.

Affording household nonfood items was positive and significantly influencing household dietary diversity ($p<0.01$). The estimates show that households that could afford to meet their monthly basic amenities and bills like rent, educational fees, water, electricity and other items are more likely to increase their dietary diversity by 1%, thereby achieving household food security. This implies that high income households who can afford to pay for other costs besides food only are food secure because of availability of extra income, compared to low income households who spend most of their money on food alone. According to (ZRCS, 2014), food expenditure was noted as a major component of household expenditures in Zimbabwe and varied from about US$50, on average, to about US$ 2 509 per household per month. Of equally high importance is expenditure on rent, electricity and water, which varied depending on locality and household income.

A significant positive influence was observed between household food security and total value of household assets ($p<0.08$). This means that household dietary diversity increases by 1% as the value of assets increases. Amaza *et al.* (2008) recognized that an asset holding is considered one of the measures of household resilience. Fausat and Naphtali (2014) observed that some assets could be sold off, if need be, to cushion the effects of adverse circumstances, such as crop failure or drought, on household food security. Rose (2008) noted that the stronger the position of a household with respect to its assets, the better it will be able to face a difficult situation in the future.

**Table 5. 6: Extent of household nutrition security (dietary diversity tool): Tobit model**

| Independent variables | Marginal Effects | | | Coefficients | | |
|---|---|---|---|---|---|---|
| | Value | Robust St. Error | P>z | Value | Robust St. Error | P>z |
| Age | -0.0156 | 0.017 | 0.341 | -0.016 | 0.017 | 0.34 |
| Gender | -0.298 | 0.432 | 0.49 | -0.299 | 0.432 | 0.489 |
| Marital status | 0.118 | 0.534 | 0.827 | 0.118 | 0.534 | 0.826 |
| HH size in adult equivalents | -0.015 | 0.1 | 0.889 | -0.015 | 0.1 | 0.889 |
| Educational level | 0.665* | 0.039 | 0.084 | 0.665* | 0.382 | 0.082 |
| Total land size | 0.062 | 0.075 | 0.412 | 0.062 | 0.075 | 0.411 |
| Occupation | 0.931* | 0.491 | 0.06 | 0.931* | 0.4905 | 0.058 |
| Monthly spend on food | 0.005 | 0.004 | 0.173 | 0.005 | 0.004 | 0.171 |
| Maize meal source | 0.603 | 0.373 | 0.106 | 0 .603 | 0.373 | 0.105 |
| Vegetable source | -0.613* | 0.367 | 0.097 | -0.613* | 0.367 | 0.095 |
| Number of meals | 0.234 | 0.325 | 0.472 | 0.234 | 0.325 | 0.471 |
| Household income coping strategy | 0.79 | 0.579 | 0.175 | 0.79 | 0.579 | 0.174 |
| Food stored | 0.148 | 0.358 | 0.679 | 0.001 | 0 .358 | 0.679 |
| Total household income | -0.001 | 0.001 | 0.564 | 0.148 | 0.001 | 0.564 |
| Total monthly spending on nonfood items | 0.868*** | 0.118 | 0 | -0.001*** | 0.118 | 0 |
| Total value of assets | 0.001* | 0.001 | 0.075 | 0.001* | 0.001 | 0.073 |

*n*=200    LR $X^2$ = *** Pseudo $R^2$=0.15    Log likelihood = -428.81    F-value 0.000

**Note:** *, *** means the coefficient is statistically significant at 10% and 1% levels respectively:

**Source:** Household Survey (2014)

The model results indicate that size, gender and age of the household head are not significant determinants of the extent of household food security. The model suggests that, as the age of the household head increases, his or her ability to make dietary decisions is likely to decrease. Gender of the household is significant, in that female-headed households are able to diversify their diets, because in most cases woman are responsible for preparing food and looking after children, all the time. Household dietary diversity also varies with the types of family and size of the households. Dietary diversity is found to be the highest in households where families have

four or fewer members, as there are fewer people to feed. In the focus group discussion participants mentioned that structure of the households directly affects household food security.

**5.6 Conclusion**

The paper has investigated the extent of urban household nutritional security in the Zimbabwean context. This chapter has indicated that the extent of household nutritional security can be analysed using dietary diversity, as this can be achieved by a combination of socio-economic factors. The results indicated a positive impact of a well-managed household diet on food security and highlighted the significance of income on household food security. Taking the dietary diversity of urban and peri-urban households from the study area, the paper suggests that a low dietary diversity was mainly composed of starchy staples, i.e. vegetables and grains, at the expense of protein sources like meat, eggs and fish. The survey revealed that households in peri-urban areas because of lack of adequate income, are less likely to diversify in their diets as compared to households in urban areas even though the margin is not high. The results indicate that households which have received the requisite dietary diversity were mainly a result of the occupation of the head of household, value of assets, education level of the head of household and monthly expenditure on the household necessities. The results also indicated that a high percentage of respondents were falling short of the required dietary diversity. The study recommends intervention by relevant stakeholders to encourage households to become involved in home gardening practices.

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# CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Recap of the research objectives and methodology

The study's general objective was to analyse household food security in urban and peri-urban areas. The study had three specific objectives. Firstly, the study sought to identify different household sources of food and income in Bindura Municipal area. Secondly, the study evaluated the determinants of household food security. Thirdly, the extent of household food security in the area was assessed. Using a purposive random sample of 200 households, data analysis involved both descriptive and econometric techniques. Descriptive analysis made use of the t-tests and $\chi^2$ tests and econometric analysis involved methods such ordered probit and logit models. Data from focus group discussion and key informant interviews were used to contextually interpret the results from the econometric models and descriptive statistics. Chapter 6 presents the main conclusions of this study. Based on the empirical results, the chapter also draws several policy recommendations. The last section of this chapter presents the remaining knowledge gaps and suggests areas of further studies in the future.

## 6.2 Conclusions

Rising food insecurity in urban areas is a great cause for concern. This needs to be dealt with through concrete and clearly defined policies and/or effective implementation strategies. There is a need to rethink current policies of urban development and current urban programming. The study determined that unequal access to food is due to the marital status of a household head, his or her age and the level of education and possession of assets, which includes land. The study concluded that household food security is influenced by prevailing socio-economic factors. On the other hand, the extent of urban household food security was exacerbated by a prolonged adverse macro-economic situation that undermined national economic recovery, to the extent that households spent a greater percent of their total income on food.

The results have indicated significant household food insecurity in Bindura Municipal area. The study has shown that a significant number of households in all the six study areas were food insecure and attained low dietary diversity during the period of the survey. Consistent with prior expectations and findings from previous studies, land size, household income activity and food storage were found to significantly positively influence household food security in the study

area. However, household size was found to negatively influence household food security, large family size has greater risk of poverty when there is limited income and resources. Households headed by married people were found to have a higher probability of becoming food insecure, compared to their counterparts headed by unmarried people. Consistent with prior expectations, educational level of the household head was found to be statistically significant in explaining the food security situation at the household level. This thesis therefore concludes by suggesting that models for understanding urban food security can begin at the household food insecurity access scale and dietary diversity as the most appropriate tools to develop a deeper understanding of the spatial and non-spatial determinants of household food insecurity.

### 6.3 Policy recommendations

Based on the empirical results the study recommends the following:

❖ Training of urban households is needed in the domains of income and food production

❖ Improving food security among urban households should be a comprehensive developmental effort involving many stakeholders along service value chains.

❖ During focus group discussion, urban and peri-urban households mentioned serious crises of land shortages in Bindura Municipal area. Thus, to eliminate the land shortage issue, the study recommends that government and local authorities intervene in assisting households to be allocated land   from the ongoing land reform programme.

❖ In the light of the findings of the study, it is recommended that efforts to improve access to credit by households and the promotion of off-household activities as alternative livelihood op

❖ tions, should be pursued by both local and central government structures in Zimbabwe to improve the household food security situation in urban districts.

❖ Policies that will make micro-credit from government and non-governmental agencies accessible to urban and peri-urban households will go a long way in addressing their resource acquisition constraints and eventually improving household food security in the country.

❖ The thesis therefore calls for the development of an explicitly urban food policy, which goes beyond urban agriculture, and responsibility for the realisation of the right to food to be partially devolved to the urban scale.

❖ From the survey and focus group discussion, households have very little knowledge on income-generating activities, such as stockvels, relevant for raising income.

❖ Income generation in urban areas and specifically, inner-cities. New forms of income generation should be researched and developed in order to ensure stable levels of income for longer periods of time.

❖ Macro-level policies related to agricultural production and the infrastructure necessary to ensure an adequate and safe supply of food to cities are warranted.

❖ Existing social programmes can be reviewed and prioritised in order to provide the most beneficial services to the urban poor.

❖ For household food production through urban agriculture, co-operation is needed between all role-players in managing the implementation of urban agricultural projects, including municipalities, local governments and city councils. Attention should be given to the question of whether Zimbabwean cities would be able to create sufficient space for urban agriculture. Selecting specific land for the use of urban agriculture is a factor to consider for policy-makers and urban planners.

❖ The sources of food in terms of where food comes from, i.e. if the food is coming from commercial markets outside the city, or from markets in the city itself, should be investigated.

## 6.4 Areas for further study

It is imperative to note that ongoing research on the issue of urban and inner city food security is needed, in order to fully understand the complex dynamics of this issue and to acquire more information on the diverse conditions and the different stakeholders regarding food and nutrition insecurity in urban centres. This would include adopting a more integrated and holistic approach to these problems. More detailed and in-depth knowledge through research will be one of the key tools to combat the ongoing struggle for survival of so many urban residents in developing countries. There could be more factors that significantly affect household food access and food security and therefore such relevant factors as technology availability, infrastructural development and many more should be taken into consideration.

**APPENDICES**

**Appendix A: Research questionnaire**

University of KwaZulu-Natal

Informed consent form: Research project information

The study will be conducted by Onismo Muzah, Student number 209511552 who is a postgraduate student (Master of Agriculture in Food Security) at the University of KwaZulu-Natal. The aim of the research project is to assess household food security in Bindura Municipal area, Mashonaland central province of Zimbabwe .This study seeks to contribute to the body of knowledge that will inform policy recommendations on urban household economic dynamics and strategies to curb urban food insecurity. A structured questionnaire will be used to gather the required data.

Declaration

The following was clearly explained to me before the study, I understand the contents of the questionnaire and the nature of the research and I have agreed to participate in this research: All information provided for the study will be treated with STRICT CONFIDENTIALITY; anonymity will be ensured where appropriate through coding and questionnaires will be destroyed afterwards; participation in the study is voluntary and participants are free to withdraw from the study at any time without any negative or undesirable consequences to themselves. Due to the nature of the study and the budget for this research, the researcher is not promising any benefits for the participation in the research.

_____ _____ _____

Name Signature Date

For any queries I can be contacted on my mobile number (0762122100) or by email 209511552@stu.ukzn.ac.za. You can also contact my supervisor Dr M. Mudhara on 033 260 5518, Email: Mudhara@ukzn.ac.za at the African Centre for Food Security and HSSREC Research Office Ms P Ximba, Tel: 031 260 3587, Email: ximbap@ukzn.ac.

**University of KwaZulu-Natal**

**African Centre for Food Security**

**Questionnaire**

The information captured in this questionnaire is strictly confidential and will be used for research purposes by staff and students at the KwaZulu-Natal only. Respondents can choose not to answer questions – answers are voluntary. The respondent should be a resident/household member in Bindura Municipal area.

Date of survey……………………………………………………………………………………

Name of enumerator………………………………………………………………………………..

Name of Respondent ……………………Location ………………..................Age ……….

**Section A: Household demographics**

1. Gender of household head

| Female (0) | Male (1) |
|---|---|
|  |  |

2. Marital status of household head

| Single (0) | Married (1) | Widow (2) |
|---|---|---|
|  |  |  |

3. Household structure

| Gender | Total | <12 | 12-17 | 18 to 35 youth | 36 to 65 adults | 65> old age |
|---|---|---|---|---|---|---|
| Male |  |  |  |  |  |  |
| Females |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |

4. What is the educational level of head of household?

| None (0) | Primary (1) | Secondary (2) | Tertiary (3) |
|---|---|---|---|
|  |  |  |  |

5. Means of Agricultural land ownership and size.

| Means of Ownership | Allocated (ha) | Inherited (ha) | Borrowed (ha) | Rental (ha) | Bought (ha) |
|---|---|---|---|---|---|
| Number of (hectares) |  |  |  |  |  |

**Section B: Household Income and Food**

6. What is the main occupation of head of household?

| Buying & selling = 0 | Farming /UA = 1 | Permanent job = 2 | Temporary job = 3 | Unemployed = 4 | Self-employed = 5 | Gold panning = 6 | Retired = 7 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

7. How much income does the household receive from the following main sources of income?

| Farming | Buying and selling | Pension | Remittances | Salary/ wages | Micro - enterprise | Others specify |
|---|---|---|---|---|---|---|
| | | | | | | |

8. What type of expenses do you pay for? Then rank your spending of your household income from most important to least important.

| Type of expense | No = 0 | Yes = 1 | Rank |
|---|---|---|---|
| Food | | | |
| Clothing | | | |
| Health | | | |
| Transport | | | |
| Household Items | | | |
| Water and electricity | | | |
| Education | | | |
| Other Items | | | |

** 1= most important……….. 8 = least important

9. Total household monthly Income, **excluding gifts, donations or money send by friend's relatives and other family members (USD).**

| <100 = 0 | 101 – 300 = 1 | 301-500 = 2 | >501 = 3 |
|---|---|---|---|
| | | | |

10. How much does your household normally spend on food per Month? USD_____
11. Do you save money?

| No (0) | Yes (1) |
|---|---|
| | |

12. If yes how much a month? USD_____

13. What is the main source of Maize meal?

| Own production=0 | Supermarkets = 1 | Tuck-shops = 2 | Barter- trade = 3 | Rural-urban transfers = 4 | Food aid = 5 | Others = 6 |
|---|---|---|---|---|---|---|
| | | | | | | |

14. What is the main source of vegetables? **Refer from variables in question 15**.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |

15. What is the regular household meal?

| Sadza = 0 | Rice = 1 | Pasta = 2 |
|-----------|----------|-----------|
|           |          |           |

16. Household Dietary Diversity Score (HDDS) .Would like to ask you about the foods and drinks you or anyone else in the household ate or drank yesterday during the day and at night in the home. Did you or anyone in the household drink or eat:

|   | Food Group | Examples | No (0) | Yes (1) |
|---|------------|----------|--------|---------|
| a | Cereals | Bread, noodles, biscuits and Cornflakes |  |  |
| b | Vitamin A Rich Vegetables And Tubers | Pumpkin, carrots, or sweet potatoes plus other locally available vitamin-A rich vegetables |  |  |
| c | White Tubers And Roots | White potatoes or foods made from roots |  |  |
| d | Dark Green Leafy Vegetables | Green/leafy vegetables (Rape, tomatoes and onions), including wild ones + locally available vitamin-A rich leaves such as Muboora. |  |  |
| e | Vitamin A Rich Fruits | Oranges, mangoes, paw-paws, other locally available vitamin A-rich fruits |  |  |
| f | Meat | Beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds or other blood based meat. |  |  |
| g | Eggs | chicken, duck, guinea hen or any other egg |  |  |
| h | Fish | Fresh or dried fish or shell fish |  |  |
| i | Legumes, Nuts And Seeds | beans, peas, lentils, nuts, seeds or foods made from these |  |  |
| j | Milk And Milk Products | milk, cheese, yogurt or other milk products |  |  |
| k | Oils And Fats | fats or butter added to food or used for cooking |  |  |
| l | Sweets | sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candies |  |  |
| m | Spices and Caffeine or Alcoholic Beverages spices | spices, coffee, tea, alcoholic beverages or local examples |  |  |

|   | No (0) | yes (1) |
|---|--------|---------|
| 17. Does food availability change with seasons |  |  |

| | | |
|---|---|---|
| 18. Is there any difference in diet between children, women and men | | |
| 19. Have there been any pests or diseases that damage your crops or vegetables | | |

20. Did you grow any crops in 2013 planting season?

| No = 0 | Yes = 1 |
|---|---|
| | |

21. If yes how many hectares was allocated to :

| Cash crops | No of hectares | Food crops | No of hectares |
|---|---|---|---|
| Tobacco | | Maize | |
| Cotton | | Sorghum | |
| Potatoes | | Beans | |
| Soya beans | | Grounds nuts | |
| Sunflower | | Sweet Potatoes | |
| Others | | Others | |

22. How much money did the household obtained from crop sales in 2013 season? USD_____

23. Do you sell livestock or Poultry? No (0).........Yes (1)............

24. If yes approximately how much the household make a year? USD_____

25. Physical Household Assets Owned

| Does this household have : | No (0) | Yes (1) |
|---|---|---|
| **Farm Implements** | | |
| Tractor | | |
| Ox-drawn plough | | |
| Cultivator | | |
| Harrow | | |
| Planter | | |
| Truck or lorry | | |
| Wheelbarrow | | |
| Scotch cart | | |
| Ridger | | |
| Ripper | | |
| **Household Assets** | | |
| Radio | | |
| Television | | |
| Table | | |
| Chairs | | |
| Sewing Machine | | |
| Bicycle | | |
| Car | | |
| Cell phone(s) | | |

| Landline | | |
|---|---|---|
| Others (specify | | |

## Section C: The Extent of Household Food Insecurity

26. In the past four weeks ………
       0 = No (skip to Q2)
       1 = Yes

1 a .How often did this happen?

1 = rarely (once or twice in the past four weeks)

2 = Sometimes (three to ten times in the past four weeks)

3 = Often (more than ten times in the past four weeks)

| Occurrence Questions | No | Yes | 1 | 2 | 3 |
|---|---|---|---|---|---|
| In the past four weeks, did you worry that your household would not have enough food? | | | | | |
| 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? | | | | | |
| 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? | | | | | |
| 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? | | | | | |
| 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? | | | | | |
| 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? | | | | | |
| 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? | | | | | |
| In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food? | | | | | |
| 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? | | | | | |

27. Number of meals a day on normal circumstances

| Breakfast ,lunch and supper only = 0 | Breakfast and supper only = 1 | Lunch and supper only = 2 | Only 1 meal a day = 3 |
|---|---|---|---|
| | | | |

28. What source of energy do you use for cooking?

| Electricity = 0 | Fire wood = 1 | Gas = 2 | Paraffin = 3 |
|---|---|---|---|

|  |  |  |  |
|---|---|---|---|
|  |  |  |  |

29. What is the Household Source of water to drink?

| Tap = 0 | Tank = 1 | Borehole = 2 | River or well = 3 |
|---|---|---|---|
|  |  |  |  |

30. What type of toilet does the household use?

| Flush toilet =0 | Blair toilet =1 | Bush system =2 |
|---|---|---|
|  |  |  |

31. What material is the household-homestead built on?

| Blocks & tiles /asbestos =0 | Burnt bricks &asbestos/ iron sheets =1 | Burnt Bricks &thatched =2 | Thatched Pole &dagga=3 | Other poorer = 4 |
|---|---|---|---|---|
|  |  |  |  |  |

32. How does your household cope/ deal with income shortage?

| Sell livestock=0 | Sell other assets=1 | Use own cash savings=2 | Borrow money from friends & relatives=3 | Reduce spending = 4 |
|---|---|---|---|---|
|  |  |  |  |  |

33. Did your household benefited from Food aid this year?

| No (0) | yes (1) |
|---|---|
|  |  |

34. If yes how many times?

| Once (0) | Twice (1) | Thrice or more (2) |
|---|---|---|
|  |  |  |

35. Can you rank the quality and safety of the food on consumption?

|  | Good (0) | Very good (1) | Poor (2) | Very poor (3) |
|---|---|---|---|---|
| Quality |  |  |  |  |
| Safety |  |  |  |  |

36. Does the household have any family members or relatives working and sending money to them?

| No (0) | Yes (1) |
|---|---|
|  |  |

37. If yes approximately how much per year? USD_____

38. Is there a time that you starve of hunger because your household could not afford any food?

| True =0 | Sometimes =1 | Never  =2 |
|---|---|---|
|  |  |  |

39. Do you have any maize and maize meal in storage?

| No (0) | Yes (1) |
|--------|---------|
|        |         |

40.    If yes how long do you think it will last?

| Less than a month (0) | Less than six months (1) | More than a year (2) |
|-----------------------|--------------------------|----------------------|
|                       |                          |                      |

41. In the past 30 days, how frequently did your household resort to using one or more of the following strategies in order to access food?

Codes: 0 = Never, 1 = Seldom (1-3days a month), 2 = Sometimes (1-2days a week), 3 = Often (3-6 days a week), 4 = Daily

|    | Coping strategies | 0 | 1 | 2 | 3 | 4 |
|----|-------------------|---|---|---|---|---|
| 1  | Skip entire days without eating |   |   |   |   |   |
| 2  | Limit portion size at times |   |   |   |   |   |
| 3  | Reduce number of meals eaten per day |   |   |   |   |   |
| 4  | Borrow food or rely on help from friends /relatives |   |   |   |   |   |
| 5  | Rely on less expensive or less preferred foods |   |   |   |   |   |
| 6  | Purchase or borrow food on credit |   |   |   |   |   |
| 7  | Gather unusual types or amounts of wild food/hunt |   |   |   |   |   |
| 8  | Send household members to eat somewhere |   |   |   |   |   |
| 9  | Send household members to beg |   |   |   |   |   |
| 10 | Reduce adult consumption so children can eat |   |   |   |   |   |
| 11 | Rely on casual labour for food |   |   |   |   |   |
| 12 | Other (specify ) |   |   |   |   |   |

**Thank you for your time**

**Appendix B: Ordered probit regression results of determinants of household food security**

```
Ordered probit regression                    Number of obs   =        198
                                             Wald chi2(11)   =      50.34
                                             Prob > chi2     =     0.0000
Log pseudolikelihood = -203.03628            Pseudo R2       =     0.1516
```

| foodsec1 | Coef. | Robust Std. Err. | z | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| Gnder_nbrz | .362203 | .206879 | 1.75 | 0.080 | -.0432723 | .7676783 |
| AGE | .0006763 | .0074794 | 0.09 | 0.928 | -.013983 | .0153357 |
| TTL_lndsize | .0087024 | .0481609 | 0.18 | 0.857 | -.0856913 | .1030961 |
| Mrd_single | .3812013 | .2052887 | 1.86 | 0.063 | -.021157 | .7835597 |
| Ttl_HHincome | .0000328 | .0000615 | 0.53 | 0.593 | -.0000876 | .0001533 |
| Ttl_vlue_HHassets | .0000229 | .000023 | 1.00 | 0.319 | -.0000221 | .0000679 |
| HHexpsiz | .1828207 | .0540914 | 3.38 | 0.001 | .0768034 | .2888379 |
| Food_storage | .1293357 | .1958844 | 0.66 | 0.509 | -.2545907 | .5132621 |
| edu2 | .4555123 | .2052621 | 2.22 | 0.026 | .0532059 | .8578187 |
| occup2 | .9562618 | .3599441 | 2.66 | 0.008 | .2507842 | 1.661739 |
| HH_Sze_udlt_eqlv | -.0499837 | .0710283 | -0.70 | 0.482 | -.1891966 | .0892292 |
| /cut1 | 1.542522 | .626498 | | | .3146085 | 2.770436 |
| /cut2 | 2.293977 | .6609464 | | | .9985461 | 3.589408 |
| /cut3 | 2.577918 | .6709208 | | | 1.262938 | 3.892899 |

# Marginal effect one

```
. mxf compute,predict (outcome(1))
unrecognized command:  mxf
r(199);

. mfx compute ,predict (outcome(1))

Marginal effects after oprobit
     y  = Pr(foodsec1==1) (predict, outcome(1))
        =  .15969835
```

| variable | dy/dx | Std. Err. | z | P>\|z\| | [ 95% C.I. ] | | X |
|---|---|---|---|---|---|---|---|
| Gnder_~z* | -.0962265 | .0601 | -1.60 | 0.109 | -.214023 | .021569 | .762626 |
| AGE | -.0001644 | .00182 | -0.09 | 0.928 | -.003732 | .003403 | 39.5859 |
| TTL_ln~e | -.0021148 | .01173 | -0.18 | 0.857 | -.025102 | .020872 | 1.85859 |
| Mrd_si~e* | -.1029225 | .06055 | -1.70 | 0.089 | -.221606 | .015761 | .79798 |
| Ttl_HH~e | -7.98e-06 | .00001 | -0.54 | 0.588 | -.000037 | .000021 | 1187.76 |
| Ttl_vl~s | -5.56e-06 | .00001 | -0.99 | 0.324 | -.000017 | 5.5e-06 | 3865.93 |
| HHexpsiz | -.0444275 | .01315 | -3.38 | 0.001 | -.070201 | -.018654 | 5.28283 |
| Food_s~e* | -.0316136 | .04853 | -0.65 | 0.515 | -.126733 | .063506 | .545455 |
| edu2* | -.0997391 | .04251 | -2.35 | 0.019 | -.183056 | -.016422 | .277778 |
| occup2* | -.3025075 | .13392 | -2.26 | 0.024 | -.564979 | -.040036 | .863636 |
| HH_Sze~v | .0121466 | .01758 | 0.69 | 0.490 | -.022308 | .046601 | 4.02975 |

(*) dy/dx is for discrete change of dummy variable from 0 to 1

# Marginal effect two

```
. mfx compute,predict (outcome (2))

Marginal effects after oprobit
      y  = Pr(foodsec1==2) (predict, outcome (2))
         =  .24382287
```

| variable   | dy/dx     | Std. Err. | z     | P>\|z\| | [   95% C.I.   ]    | X       |
|------------|-----------|-----------|-------|---------|---------------------|---------|
| Gnder_~z*  | -.0459138 | .02396    | -1.92 | 0.055   | -.092883  .001056   | .762626 |
| AGE        | -.0000975 | .00108    | -0.09 | 0.928   | -.002209  .002014   | 39.5859 |
| TTL_ln~e   | -.0012549 | .00692    | -0.18 | 0.856   | -.014824  .012315   | 1.85859 |
| Mrd_si~e*  | -.0469698 | .02297    | -2.05 | 0.041   | -.091981 -.001959   | .79798  |
| Ttl_HH~e   | -4.74e-06 | .00001    | -0.52 | 0.602   | -.000023  .000013   | 1187.76 |
| Ttl_vl~s   | -3.30e-06 | .00000    | -0.98 | 0.325   | -9.9e-06  3.3e-06   | 3865.93 |
| HHexpsiz   | -.026364  | .00973    | -2.71 | 0.007   | -.045441 -.007287   | 5.28283 |
| Food_s~e*  | -.0185057 | .02786    | -0.66 | 0.507   | -.073112  .036101   | .545455 |
| edu2*      | -.0701624 | .03373    | -2.08 | 0.038   | -.136279 -.004046   | .277778 |
| occup2*    | -.0631177 | .0239     | -2.64 | 0.008   | -.109964 -.016272   | .863636 |
| HH_Sze~v   | .007208   | .01011    | 0.71  | 0.476   | -.012606  .027022   | 4.02975 |

(*) dy/dx is for discrete change of dummy variable from 0 to 1

## Marginal effect three

```
. mfx compute,predict (outcome (3))

Marginal effects after oprobit
      y  = Pr(foodsec1==3) (predict, outcome (3))
         =  .11231179
```

| variable   | dy/dx     | Std. Err. | z     | P>\|z\| | [   95% C.I.   ]    | X       |
|------------|-----------|-----------|-------|---------|---------------------|---------|
| Gnder_~z*  | -.0002857 | .00461    | -0.06 | 0.951   | -.009313  .008742   | .762626 |
| AGE        | -7.72e-06 | .00008    | -0.09 | 0.927   | -.000173  .000157   | 39.5859 |
| TTL_ln~e   | -.0000993 | .00056    | -0.18 | 0.860   | -.001199   .001     | 1.85859 |
| Mrd_si~e*  | .0004751  | .00495    | 0.10  | 0.924   | -.009233  .010183   | .79798  |
| Ttl_HH~e   | -3.75e-07 | .00000    | -0.45 | 0.653   | -2.0e-06  1.3e-06   | 1187.76 |
| Ttl_vl~s   | -2.61e-07 | .00000    | -0.77 | 0.441   | -9.3e-07  4.0e-07   | 3865.93 |
| HHexpsiz   | -.0020859 | .00204    | -1.02 | 0.308   | -.006093  .001921   | 5.28283 |
| Food_s~e*  | -.0013888 | .00222    | -0.63 | 0.531   | -.005734  .002957   | .545455 |
| edu2*      | -.0099278 | .00791    | -1.26 | 0.209   | -.025424  .005569   | .277778 |
| occup2*    | .0228558  | .02383    | 0.96  | 0.338   | -.023854  .069566   | .863636 |
| HH_Sze~v   | .0005703  | .00091    | 0.63  | 0.530   | -.001211  .002352   | 4.02975 |

(*) dy/dx is for discrete change of dummy variable from 0 to 1

## Marginal effect four

```
. mfx compute,predict (outcome(4))

Marginal effects after oprobit
      y  = Pr(foodsec1==4) (predict, outcome(4))
         =  .48416699
```

| variable | dy/dx | Std. Err. | z | P>\|z\| | [    95% C.I.    ] | X |
|---|---|---|---|---|---|---|
| Gnder_~z* | .142426 | .07928 | 1.80 | 0.072 | -.012959  .297811 | .762626 |
| AGE | .0002696 | .00298 | 0.09 | 0.928 | -.005574  .006113 | 39.5859 |
| TTL_ln~e | .003469 | .0192 | 0.18 | 0.857 | -.034161  .041099 | 1.85859 |
| Mrd_si~e* | .1494171 | .07818 | 1.91 | 0.056 | -.003805  .30264 | .79798 |
| Ttl_HH~e | .0000131 | .00002 | 0.53 | 0.593 | -.000035  .000061 | 1187.76 |
| Ttl_vl~s | 9.13e-06 | .00001 | 1.00 | 0.318 | -8.8e-06  .000027 | 3865.93 |
| HHexpsiz | .0728774 | .02154 | 3.38 | 0.001 | .030655   .1151 | 5.28283 |
| Food_s~e* | .0515081 | .07784 | 0.66 | 0.508 | -.101054  .20407 | .545455 |
| edu2* | .1798293 | .07915 | 2.27 | 0.023 | .024693  .334966 | .277778 |
| occup2* | .3427694 | .10117 | 3.39 | 0.001 | .144482  .541057 | .863636 |
| HH_Sze~v | -.0199249 | .02831 | -0.70 | 0.482 | -.075406  .035556 | 4.02975 |

(*) dy/dx is for discrete change of dummy variable from 0 to 1

# Appendix C Tobit regression for the extent of household nutritional security

```
Tobit regression                                    Number of obs   =        200
                                                    F( 16,    184) =      18.89
                                                    Prob > F       =     0.0000
Log pseudolikelihood = -428.80175                   Pseudo R2      =     0.1518
```

|                      |           | Robust    |       |        |            |            |
| Dd_score             | Coef.     | Std. Err. | t     | P>\|t\| | [95% Conf. | Interval]  |
|---------------------:|-----------|-----------|-------|--------|------------|------------|
| AGE                  | -.0153999 | .016134   | -0.95 | 0.341  | -.0472313  | .0164314   |
| GENDER               | -.2985242 | .4311687  | -0.69 | 0.490  | -1.149195  | .552146    |
| Mar_status1          | .11722    | .5345348  | 0.22  | 0.827  | -.9373854  | 1.171825   |
| HH_Sze_udlt_eqlv     | -.0140823 | .1009002  | -0.14 | 0.889  | -.2131523  | .1849878   |
| Edu_one              | .6655015  | .3826635  | 1.74  | 0.084  | -.0894708  | 1.420474   |
| TTL_lndsize          | .0610213  | .0741544  | 0.82  | 0.412  | -.0852809  | .2073236   |
| Occupation1          | .9300617  | .4905502  | 1.90  | 0.060  | -.0377647  | 1.897888   |
| spending_food        | .0042872  | .003132   | 1.37  | 0.173  | -.001892   | .0104664   |
| Maize_ml_1           | .6039194  | .372253   | 1.62  | 0.106  | -.1305136  | 1.338352   |
| vegetabl_meal_source1| -.6138028 | .3676647  | -1.67 | 0.097  | -1.339183  | .1115778   |
| No_meals             | .2334687  | .3242177  | 0.72  | 0.472  | -.4061936  | .8731309   |
| Cping_strtgy2        | .7892114  | .5799362  | 1.36  | 0.175  | -.3549682  | 1.933391   |
| Food_stored          | .1485502  | .358738   | 0.41  | 0.679  | -.5592186  | .856319    |
| Ttl_hhincme          | -.0000487 | .0000843  | -0.58 | 0.564  | -.0002149  | .0001176   |
| Ttl_hhexpensz        | .8688616  | .1171905  | 7.41  | 0.000  | .6376518   | 1.100071   |
| Ttl_vl_hhassts       | .0000823  | .000046   | 1.79  | 0.075  | -8.32e-06  | .000173    |
| _cons                | .227015   | 1.038074  | 0.22  | 0.827  | -1.821044  | 2.275074   |
| /sigma               | 2.21431   | .1289114  |       |        | 1.959975   | 2.468644   |

```
  Obs. summary:        3  left-censored observations at Dd_score<=0
                     186      uncensored observations
                      11 right-censored observations at Dd_score>=12

. mfx

Marginal effects after tobit
      y  = Linear prediction (predict)
         =   6.6807754
```

| variable   | dy/dx     | Std. Err. | z     | P>\|z\| | [      95% C.I.   ]      | X       |
|-----------:|-----------|-----------|-------|--------|----------|----------|---------|
| AGE        | -.0153999 | .01613    | -0.95 | 0.340  | -.047022 | .016222  | 40.6    |
| GENDER*    | -.2985242 | .43117    | -0.69 | 0.489  | -1.1436  | .546551  | .62     |
| Mar_st~1*  | .11722    | .53453    | 0.22  | 0.826  | -.930449 | 1.16489  | .755    |
| HH_Sze~v   | -.0140823 | .1009     | -0.14 | 0.889  | -.211843 | .183678  | 4.4743  |
| Edu_one*   | .6655015  | .38266    | 1.74  | 0.082  | -.084505 | 1.41551  | .33     |
| TTL_ln~e   | .0610213  | .07415    | 0.82  | 0.411  | -.084319 | .206361  | 1.69    |
| Occupa~1*  | .9300617  | .49055    | 1.90  | 0.058  | -.031399 | 1.89152  | .84     |
| spendi~d   | .0042872  | .00313    | 1.37  | 0.171  | -.001851 | .010426  | 91.85   |
| Maize_~1*  | .6039194  | .37225    | 1.62  | 0.105  | -.125683 | 1.33352  | .56     |
| vegeta~1*  | -.6138028 | .36766    | -1.67 | 0.095  | -1.33441 | .106807  | .575    |
| No_meals*  | .2334687  | .32422    | 0.72  | 0.471  | -.401986 | .868924  | .535    |
| Cping_~2*  | .7892114  | .57994    | 1.36  | 0.174  | -.347443 | 1.92587  | .89     |
| Food_s~d   | .1485502  | .35874    | 0.41  | 0.679  | -.554563 | .851664  | .385    |
| Ttl_hh~e   | -.0000487 | .00008    | -0.58 | 0.564  | -.000214 | .000116  | 1069.68 |
| Ttl_hh~z   | .8688616  | .11719    | 7.41  | 0.000  | .639173  | 1.09855  | 5.3     |
| Ttl_vl~s   | .0000823  | .00005    | 1.79  | 0.073  | -7.7e-06 | .000172  | 3863.83 |

```
(*) dy/dx is for discrete change of dummy variable from 0 to 1
```

.