A Conceptual and Empirical Investigation into Measuring Aspects of Urban Food Security in 12 Southern African Cities

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A few drops of ink, in the hope of a better tomorrow.

COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Name: *Victor Thomas* Date: *9 November 2011*

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ABBREVIATIONS:

BoS	Bureau of Statistics
CAPS	Cape Area Panel Study
CCZ	Consumer Council of Zimbabwe
CBS	Central Bureau of Statistics
CFA	Comprehensive Framework for Action
CFS	Committee on World Food Security
CPI	Consumer Price Index
CSO	Central Statistical Office
CWIQ	Core Welfare Indicators Questionnaire
DC(s)	District Council(s)
DFID	Department for International Development
DHS	Demographic and Health Surveys
EA	Enumerator Area
EWS	Early Warning System
FAO	Food and Agriculture of the UN
FEWSNET	Food Early Warning System Network
FIVIMS	Food Insecurity and Vulnerability Information and Mapping System
GDP	Gross Domestic Product
GHS	General Household Survey
GIS	Geographical Information System(s)
GNP	Gross National Product
GT	Gauteng
HES	Household Expenditure Survey
HIV/AIDS	Human Immune Virus/ Acquired Immune Deficiency Syndrome
HSRC	Human Sciences Research Council

IAMS-FIVIMS	World Bank's Integrated Assessment Model
IAWG	Inter-Agency Working Group
ICP	International Comparison Programme
IDRC	International Development Research Centre
IES	Income and Expenditure Survey
IFPRI	International Food Policy Research Institute
IIED	International Institute for Environment and Development
INE	Instituto Nacional de Estatistica (National Statistical Institute)
KZN	KwaZulu-Natal
LP	Limpopo
LSHTM	London School of Hygiene and Tropical Medicine
MD(s)	Magisterial District(s)
MDG(s)	Millennium Development Goal(s)
MICS	Multiple Indicator Cluster Survey
MRC	Medical Research Council
NIBR	Norwegian Institute of Urban and Regional Studies
NPCS	National Planning Commission Secretariat
NSO	National Statistics Office
OHS	October Household Survey
PAS	Public Attitude Survey
PPP	Purchasing Power Parity
SALDRU	Southern Africa Labour and Development Research Unit
SOFI	State of Food Insecurity
SOWP	State of the World Population
Stats SA	Statistics South Africa

UCT	University of Cape Town
UKZN	University of KwaZulu-Natal
UN	United Nations
UNCHS	United Nations Centre for Human Settlements
UNFPA	United Nations Population Fund
UN-Habitat	United Nations Human Settlements Programme (formerly UNCHS)
USDA	United States Department of Agriculture
UWM	University of Wisconsin-Madison
WB	World Bank
WFS	World Food Summit
WHO	World Health Organisation

KEY DEFINITIONS:

Food Security	"Food security exists when all people at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996: Section 2, Paragraph 1)
Access Vulnerability	"*access vulnerable*" are households that spend greater than 60% of their income on food and thus could be or are vulnerable to accessing insufficient food for the household due to income.
Access Failure	"*access failure*" are households, which are failing to access food and thus have to miss meals, due to insufficient financial access. *Access Failure*: households actually failed to access food due to financial constraints.

CHAPTER ONE: INTRODUCTION

1.1 FOOD SECURITY IN SOUTHERN AFRICAN CITIES

The issue of urban food security is a critical global issue, especially in Southern Africa. It is of such a pressing nature the United Nations (UN) has made it a Millennium Development Goal (MDG). Without a focus on urban food security the UN MDGs, regional goals and national goals will not be achievable. There is an urgent need to collect evidence and monitor the food security situation at the urban scale in Southern Africa (Crush and Frayne, 2010).

In 2009 it was reported by the Food and Agriculture Organisation (FAO) of the United Nations (FAO, 2009a) "at 1020 million, for the first time in human history, more than 1 billion people are undernourished worldwide" (FAO, 2009a page 1). One in four of the global hungry are found in Sub-Saharan Africa (FAO, 2006b) and a rapidly growing number of them are found in urban areas (Haddad *et* al, 1999; Ravallion, 2001). These globally hungry individuals are described as being food insecure.

Food security was defined at The World Food Summit (WFS) in 1996 as: "Food security exists when all people at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996: Section 2, Paragraph 1).

Food security is a basic human right enshrined in international conventions[1] (UN, 1948; Maxwell and Smith, 1992; Roman, 2003; FAO, 2006c). At the WFS in 1996 a goal was set to *"Achieve food security for all and ongoing efforts to eradicate hunger in all countries, with an immediate view to reducing the number of undernourished people to half their present level no later than 2015"* (DFID, 2002: 6). More recently, food security has also been given greater profile as being an integral part of the first MDG (UN Millennium Project, 2005; UN, 2005; FAO, 2005). The FAO reports that

[1] International Declaration on Human Rights (Art 25); International Convention on Economic, Social and Cultural Rights (Art 11 + General Note 12); Convention on the Rights of the Child (Art 24.2c) (DFID, 2002:2; Roman 2003:2)

the precursor to achieving the other MDGs is to address MDG one's[2] reduction of hunger goal. Lynn Brown, chairperson of the World Bank's IAMS-FIVIMS programme says, "If we want to *eliminate extreme poverty* and reach the other MDGs, we must first mobilize resources, energy and political commitment to *make hunger history*" (FAO, 2005: back cover, emphasis added). Many others (e.g. Hopkins, 1986; Mustafa et al, 1999; Popkins, 2000) echo this call as hunger compromises an individual's ability to participate in daily life. Accordingly, the understanding of the dynamics of food security and the reduction of food insecurity is of the utmost importance (FAO, 2005).

Hunger and poverty are increasingly being experienced in urban areas. As the "locus of poverty is shifting to cities" (UN-Habitat, 2006: 48), it is increasingly important that research focuses on the urban context if the MDG's are to be achieved. This is especially true in the developing world where we have seen rapid growth in urban populations and the urbanisation of poverty (Atkinson, 1992, 1993a; Gilbert and Gugler, 1992; Naylor and Falcon, 1995; Moser, 1996; Rakodi, 1997; Haddad *et al*, 1999; Ravallion, 2001; Kessides, 2006; UNFPA, 2007). The understanding of the link between urban food insecurity and urban poverty is critical. Southern Africa in particular has the fastest urbanisation rate and slum growth rate[3] in the world (UN-Habitat, 2006). It is estimated that more than half the Southern African population will be urban by 2025 and characteristic of this urbanisation is increasing urban poverty and associated food insecurity (UNCHS, 2001; Sachs, 2002; UN-Habitat, 2006).

Urban poverty is a growing reality internationally and especially in Southern Africa (Montgomery *et al*, 2004; UN-Habitat, 2006). Southern Africa has also been identified as one of the most food insecure regions in the world (ECA-SA, 2004; UN, 2005; UN Millennium Project, 2005). This problem is highly evident in Southern African cities, as millions have made the transition to urbanise (Wratten, 1995; UN-Habitat, 2006). However, there is little meaningful analysis of data on the urban food security situation, making it impossible to meaningfully target these critical areas.

[2] MDG 1: The Eradication of Extreme Poverty and Hunger

[3] Slum growth rate: is based on statistics for the whole of Sub-Saharan Africa (not available at Southern Africa scale).

Thus data needs to be identified and analysed that can inform understanding and decision-making. The Southern African food security situation is a critical problem in the urban context, as poor households are obliged to access food through financial mechanisms which are often not available to them (UNCHS, 2001; Sachs, 2002; Roman, 2003; UN-Habitat, 2006). The core issue that this thesis addresses is thus to identify and analyse available quantitative data in order to understand the scope and scale of urban food insecurity in Southern Africa.

1.2 Description of Problem for Investigation

The understanding of what is occurring in terms of hunger and food security in Southern African urban areas is extremely limited (Haddad *et al*, 1999; Crush and Frayne, 2010). While vast amounts of research have been focused on food availability and food security in rural areas, there has been little research done on food security in the urban context (Haddad *et al*, 1999; Maxwell *et al*, 1999). No thorough quantitative analysis of Southern African urban food security has been undertaken. The inability to ascertain the nature or scope of the urban food security problem is leading to failures in the targeting and the monitoring of the MDG 1, WFS goals and any other international, regional or national goals.

Furthermore, the nature of urban food security has made it hard to identify those who are food insecure. Simple food availability (e.g. agricultural cereal production) measures are not useful in understanding urban food security, which is predominantly an issue of access, not availability.

Nowhere is the reality of hidden hunger more real than in the cities of Southern Africa (UN-Habitat, 2006; Frayne *et al*, 2009). In fact, it is arguable that the epicentre of hunger today and tomorrow, is in Southern African cities. However, little is known about how many are going hungry behind closed city doors and on the streets. How are we to fight the monster if we never look at it, or try to understand it in its urban habitat? The global focus on the MDGs has not resulted in a reduction in urban poverty in Southern Africa. This thesis begins to investigate the scale of food insecurity within Southern African cities. One of the complexities is the lack of useable data as well as interpreting this data. The lack of data and thus the

implementation of focussed strategies to solve food insecurity seem to be leading to an increase in food insecurity (FAO, 2009a).

1.3 Aims, Questions and Objectives

The aim of this research is to identify and analyse quantitative data in order to better understand urban food security dynamics in Southern Africa. To achieve this, I will attempt to answer three key research questions in this thesis: firstly, what is the best way to understand food security in an urban context? Secondly, what data and methods are available and appropriate for assessing urban food security? And thirdly, using the identified data and methods, what can be said about urban food security and its varying manifestations between different cities in Southern Africa?

The research objectives, which follow from these questions, are to identify concepts and instances under which concepts inform food security measurement in the urban context. As *The New Fontana Dictionary of Modern Thought* puts it "to possess a given concept [e.g. food security] involves being able to recognise instances under which that concept falls." (Bullock and Trombley, 1999). A further research objective is the identification of indicators for concepts, which inform food security measurement, as well as, to identify reliable data from which indicators can be derived for specific cities. A further objective is to establish a methodology based on the identified concepts and indicators to investigate urban food security. The final objective is to present and discuss statistical findings, explaining the situation as well as comparing variations between cities in Southern Africa.

1.4 Constraints and Limitations of the Investigation

One of the known limitations within the area of research is the fact that there is a limited amount of relevant data available for urban food security in Southern African cities. Where data has been collected, access to this data is limited. One of the significant obstacles I encountered was the lack of responsiveness of certain countries in supplying needed data (discussed in Chapter 5). Either this data does not exist or they were unwilling or unable to part with it (e.g. Swaziland and Zimbabwe). Another problem encountered is the varied style of data collection in different countries, which often did not allow for in-depth evaluation.

I have found the quality of data to be problematic at times, as occasionally explicit errors are present, and sampling strategies are inappropriate for city level analysis (discussed in Part 2). These weaknesses and this research will further highlight the need for better field access data. Importantly, instead of changing the question to suit the data, the preferred approach was to ask the correct question from the data rather than some "proxy". The insights from the data are essential and insightful in understanding the urban food security situation in Southern Africa. Nevertheless, the original household surveys contain a large amount of relevant data, which is useful for the analysis of Southern African urban food security.

1.5 THESIS STRUCTURE

The thesis is divided into three parts. Part One: Literature Review (Chapters 2, 3 and 4), Part Two: Methodology (Chapters 5, 6, 7 and 8) and Part Three: Results and Discussion (Chapters 9, 10, 11 and 12) with a Concluding Chapter 13.

In Chapter One, I have introduced and reviewed the current situation of research and understanding in regards to the Urban Food Security situation in Southern Africa. I have also shown the research aims, questions and objectives and reviewed the constraints and limitations surrounding receiving the statistical data and the data itself.

Part one of this thesis is the Literature review. The literature review looks at the current understanding and principles surrounding food security globally, within Southern Africa and the within South Africa. The review also shows the current literature on the rural population's current transition to the urban and concludes with what the urban is in definition and how this can effect ones research perspectives and outcomes.

Part Two of the thesis is the Methodology based on the literature review of Part One. This methodological framework is outlined over four chapters. Chapter 5 starts by explaining the systematic search and identification of available and appropriate food access data for the urban context, specifically with respect to the identified Southern Africa cities and three specific South Africa cities. Chapter 6 deals with the

methodological undertaken in preparing the South African household survey data so that meaningful investigation and creation of urban food access indicators could take place for a detailed investigation into the three cities South African Cities (Cape Town, Johannesburg and Durban). Chapter 7 deals with the creation of the various geographical scales of the three South African Cities. Finally, in Chapter 8 the prepared Southern African and South Africa data was used to derive indicators of food insecurity.

Part Three of the thesis encompasses the results and the discussion of these results together with the opportunities for further research, which this thesis raises. The discussion of the results is made up of four chapters. Firstly, Chapter 9 assesses the available Southern African datasets for food security data. Chapter 10 goes on to compare and contrast the issues of data availability in the Southern African context. Chapter 11 discusses the results of the urban food security indicators in the three South African cities. Lastly, chapter 12 compares the three South African cities to view any other contributing factors influencing poor households.

The thesis concludes in Chapter 13 by reviewing the three Parts of the thesis namely the literature review, methodology and results and discussion.

PART ONE: LITERATURE REVIEW

Part One is a review of the relevant food security literature to clarify concepts that inform the empirical research and discuss complex debates that can influence the measurement and understanding of urban food security, while highlighting the rapid transition from the rural to the urban and the related urban food insecurity in Southern Africa.

To this end in Chapter Two, I review the current food security situation globally and regionally, as well as, reviewing past and current understandings of food security as a concept. In Chapter Three, I examine the global and Southern African urban transition and review some important criticisms of current methods used to estimate food insecurity. While reviewing the transition to the urban and its characteristics, I identify key concepts pertinent to the urban food security context. Finally, in Chapter Four, I examine the urban and the complexity around its definition and scale.

One of the significant difficulties in studying urban food security is that the definitions of 'food security', 'urban' and 'poverty' are all highly contested making meaningful analysis and understanding complex. It is also the reason why particular concepts and indicators that inform urban food security measurements need to be identified, so that meaningful analysis can be undertaken.

In the literature review, I find that urban food security is fundamentally an issue of access and not an issue of food availability. In urban areas food security is fundamentally an issue of a lack of finances to access food. Additionally I find that in the literature on food security there is a historic and persistent bias to frame food security as a rural issue. I find that the literature does not adequately address food security as an urban issue. Some of the literature recognises that urban food security is a growing problem as the urbanisation of poverty occurs in the developing world. The literature makes a strong call for food security research to take place, to measure and understand the growing urban food security situation. It is additionally evident that little is known about the urban food security situation of Southern Africa. This literature review highlights both the fact that current methods of measuring food security are inadequate when considering the urban context and that household survey

data offers a more pertinent view of what is happening in the urban situation. The literature continues to show that in the urban context food security is an issue of food access rather than food availability and thus needs to be measured as such.

CHAPTER TWO: UNDERSTANDING FOOD SECURITY

This chapter examines the literature on food security: how the thinking around food security is understood, how it has developed and how it is measured in the literature and by various agencies with particular reference to the urban context.

Initially (2.1) I establish the current food security situation by looking at widely accepted statistics on global and regional food security. These statistics make it clear that food security is an extremely significant global issue and arguably the key development priority. The limited data reveals that Southern Africa as a sub-region is an epicentre of hunger. It is also clear from the literature that there is a great need and indeed multiple requests for more data and analysis in understanding the urban food security situation in Southern Africa.

Secondly, (2.2) I investigate the current and past understandings of food security and the evolution of the food security definition to todays widely accepted 1996 World Food Summit definition. However, historically the definition has had a rural bias and the initial research concepts and measurement were invariable framed for rural realities. This view remains persistent in current literature. The literature shows the need for more balanced methods of measuring of food security with the global transition from a mostly rural life to a predominantly urban existence.

Thirdly (2.3) I explore the three key conceptual divisions (availability, access and utilisation) in the food security literature and their appropriateness to measure and understand the urban context.

Fourthly (2.4) I examine critiques of these current methods of food security measurement, specifically with urban measurements in mind.

Fifthly and lastly (2.5) I review a growing trend in the literature to view the concept of urban food security as essentially a food access issue and thus review new methods to measure urban food security by making use of household surveys. The literature

indicates that household surveys are more reliable, contain food access data and allow for national and sub-national (e.g. provincial or urban) food security analysis.

2.1 THE CURRENT FOOD SECURITY SITUATION

The FAO's 2009 statistics report that for the first time 1 billion people went undernourished (FAO, 2009a). Even with global efforts to reduce hunger, the global number of undernourished has continued to increase. This makes food security a critical current global issue.

The FAO statistics offer the most readily available data and measures on the global food security situation. The FAO food security statistics are published annually in *The State of Food Insecurity (SOFI) in the World* report (e.g. FAO, 2004; FAO, 2005; FAO, 2006 etc.). Their global and regional statistics are most often those quoted by academia (e.g. Alexandratos, 1995; Clover, 2003; Smith, 2006; Crush and Frayne, 2010), institutions (e.g. Bread for the World 1997; Pinstrup-Andersen *et al*, 1997; the World Bank (numerous)) and are used with respect to monitoring progress towards the first Millennium Development Goal[4] and World Food Summit target[5] (FAO, 2004; FAO, 2005; FAO, 2006; UN Millennium Project, 2005; Sánchez, 2005). However, these statistics have several shortcomings, especially at national, sub-national and at the urban scale. These shortcomings are discussed at length in Chapter 2.4. However, the FAO statistics offer the best overall picture of what is occurring globally, regionally (e.g. Sub-Saharan Africa) and sub-regionally (e.g. Southern Africa). It is for this reason that I initially use the FAO food security statistics to outline the current Global, Sub-Saharan Africa and Southern Africa situation.

2.1.1 FOOD SECURITY GLOBALLY

In 2006, the FAO estimated in *The State of Food Insecurity in the World* report that 854 million people are food insecure, in terms of being undernourished. 820 million people (96%) were found in developing nations (FAO, 2006b). Four years later the number of undernourished had ballooned to 1.02 billion people with over a quarter of

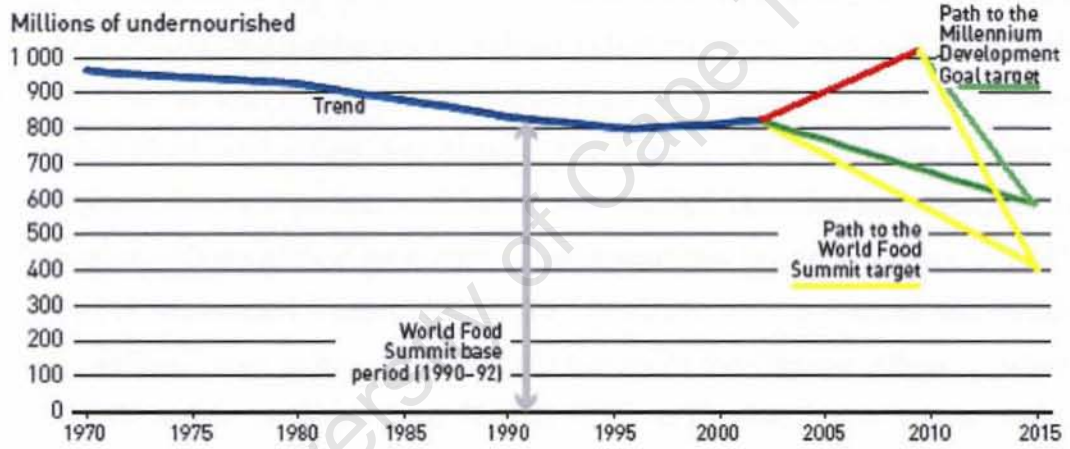
[4] Millennium Development Goal: of halving the proportion of people who suffer from hunger.

[5] World Food Summit target: of halving the number of undernourished people by half,

these people found in Sub-Saharan Africa. With hunger and poverty on the rise, new ways of understand and determining 'who' is hungry and 'why'they are hungry are needed if there is to be any hope in reducing hunger (FAO, 2009a).

In 2006, the FAO was reporting that the last decade had seen some slight progress towards the World Food Summit goal, while modest progress had been made in achieving the Millennium Development Goal (FAO, 1996). However, four years later the goals seem more elusive with the undernourished on the increase globally. The increasing trend of food insecurity since 1996 was further hurt by the 2006-2008 food crises[6] and the following economic crisis, which has added an additional 100 million people to those undernourished (FAO, 2006b, 2009b). Figure 1 below shows the initial progress and the setbacks to reaching the MDG and WFS goals.

Figure 1 Total Number of Undernourished People Globally



Source: FAO (2006b: 5), with own modifications.

From Figure 1 we can see the greatest progress in reducing overall hunger was made in the 1970s (a reduction of 37 million) and 1980s (a reduction of 100 million). Since the beginning of global targets, using 1990-1992 as the baseline period, there was a decrease of 3 million undernourished people until 2006 (Clover, 2003; FAO, 2006b) and then once again it is noted there has been an increasing trend in the globally undernourished since this period. More people (1.02 billion) are food insecure now,

[6] 2006-2008 Food Crisis: refers to the period in 2006–08 that saw the prices of most major food commodities and fuel increase to levels that were not affordable for a large portion of the world's poor. After 2008 the high prices did retreat however remain on average, 17 percent higher in real terms than two years prior (FAO state fs, 2006, 2009; Brinkman *et al*, 2009; Ruel *et al*, 2010).

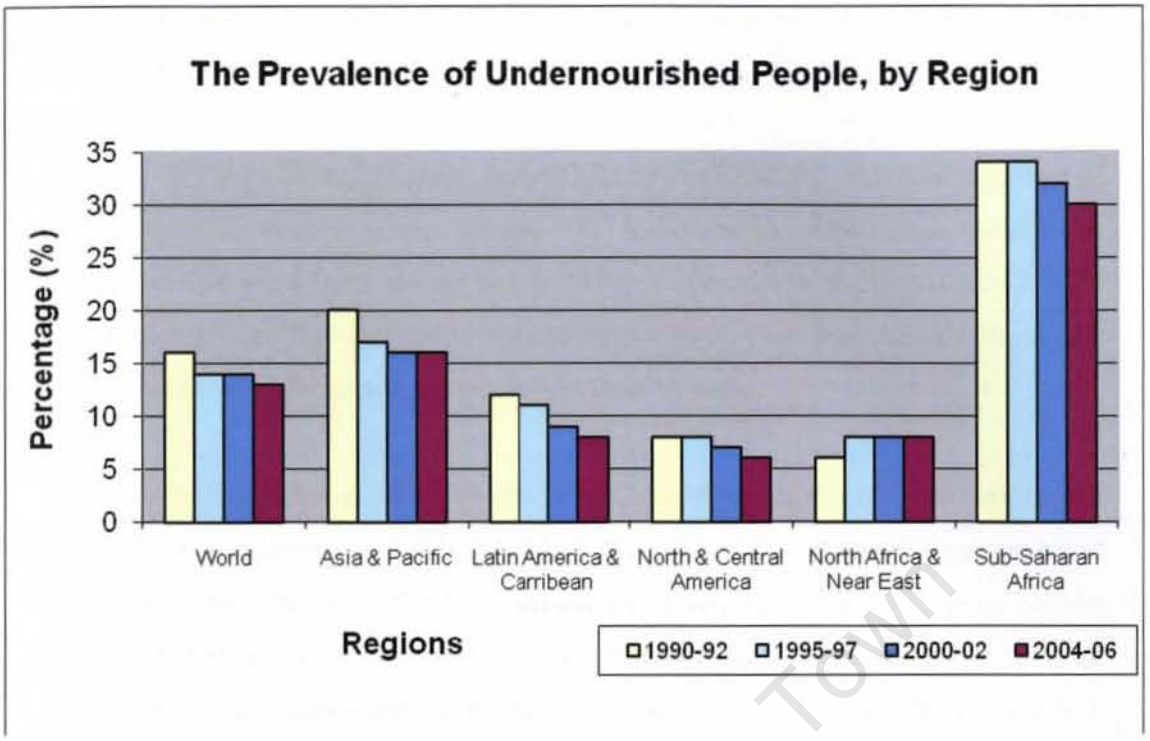
than any previous time since statistics have been kept by the FAO. The Figure 1 is a resounding call for food security to become a key global issue if the WFS goal, MDG 1 and if other MDGs are to be met (FAO, 2005, 2009a). Indeed as pointed out by Lynn Brown Chairperson at the World Bank's IAMS-FIVIMS "If we want to *eliminate extreme poverty* and reach the other MDGs, we must first mobilize resources, energy and political commitment to *make hunger history*" (FAO, 2005: back cover, emphasis added). Greater understanding is needed of 'who' the global hungry are and 'where' they are to be found and 'what' is key to reducing hunger in their context.

2.1.2 Food Security In The Sub-Saharan Africa Context

Sub-Saharan Africa has been identified as a hunger hotspot by the UK Department for International Development (DFID, 2002) and UN Millennium Project Task Force on Hunger (Sánchez, 2005). In 2006 the FAO (2006b) reported some progress had been made in reducing the number and prevalence of hungry people since 1992 in the 'Asia and the Pacific' and 'Latin American and the Caribbean'. However, areas in the 'Near East and North Africa' and 'Sub-Saharan Africa' have seen a rise in the number of hungry over the same period. Additionally Sub-Saharan Africa has been identified as the region with the highest proportion of undernourished people in the world (FAO, 2005; UN Millennium Project, 2005). The UN (2005: 4) is concerned that "Since 1990, millions more people are chronically hungry in Sub-Saharan Africa..." which led the Committee on World Food Security (CFS) to conclude, "Sub-Saharan Africa remains the most food-insecure region in the world" (CFS, 2006b: 9).

The following Figure 2 demonstrates the differences between the prevalence of undernourished people globally by region.

Figure 2 The Prevalence of Undernourished People, by Region



Source: Own compilation from data tables in FAO (2009b:48-50).

As seen from this Figure, Sub-Saharan Africa faces the largest challenge with the highest prevalence of undernourished people globally. Approximately 1 in 3 (30% in 2004-06) people in Sub-Saharan Africa are faced with food insecurity (FAO, 2009b). The Figure shows that Sub-Saharan Africa has a higher prevalence of undernourished people – significantly higher than any other region. It is followed by 'Asia and Pacific' at 16% in 2004-06 and then 'Latin America and Caribbean' and 'North Africa and Near East' at 8% in 2004-06.

Sub-Saharan Africa has the highest prevalence of undernourished people globally and has shown the least progress towards reducing the prevalence of undernourishment (Clover, 2003). Some relatively small positive gains have been made with the prevalence decreasing from 34% in 1990-92 to 30% in 2004-06 (FAO, 2009b). However, the FAO 2009 statistics show that these small gains are being eroded with Sub-Saharan African undernourishment prevalence rate being at 32% because of the 2006-08 food crisis and following global economic crisis (FAO, 2009a, 2009b; Brinkman *et al*, 2009; Ruel *et al*, 2010). Not only has the prevalence of

undernourished people increased but also so has the actual number of millions in Sub-Saharan African.

In fact, over the past three decades, Sub-Saharan Africa has had an increasing trend in the number of people going hungry. In Sub-Saharan Africa the number of undernourished grew from 169 million in 1990, to 206 million in 2002 (FAO, 2006b) and then to 269 million in 2009 (FAO, 2009b). This is a net increase of 100 million hungry people in Sub-Saharan Africa in less than 20 years.

Additionally Sub-Saharan Africa has by far the lowest per capita food consumption in the world. The average calorie intake is just above the daily minimum requirement of 2100 kcal. Sub-Saharan Africa has furthermore shown the least gains in per capita food consumption since 1969-1971 levels. When Nigeria is excluded, the FAO in 2006 projected per capita food consumption to rise by only 185 kcal by 2015 (FAO, 2006b).

It is safe to conclude that Sub-Saharan Africa is the most food insecure region in the world (CFS 2006b) based on: (1) it has seen a significant rise in the number of hungry, (2) it has the highest proportion of undernourished people in the world for 1992-2006 (FAO, 2006b), and (3) has the lowest per capita food consumption in the world.

Far from meeting any food security targets Sub-Saharan Africa is moving away from the MDG and WFS hunger reduction goals. There is thus a pressing need for research to (1) better understand why and (2) in what context the hungry find themselves, as well as (3) what the food security situation is for the growing percentage of the population transitioning to urban areas. This will enable intervention programmes to be more effective in dealing with food insecurity.

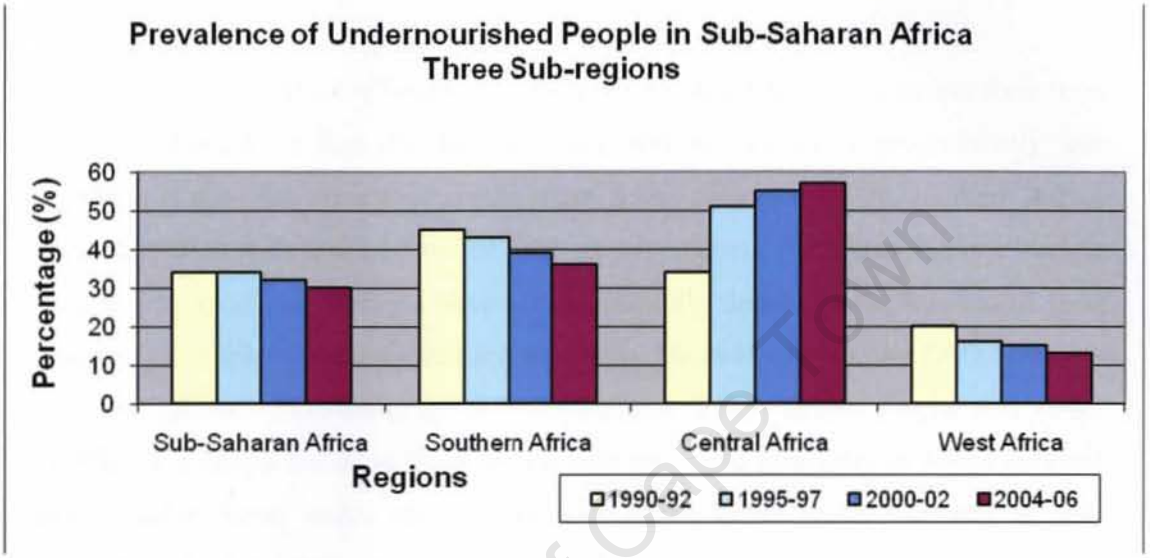
2.1.3 Food Security In The Southern African Context

A large proportion of studies investigate Sub-Saharan Africa as a whole, while other studies investigate Southern Africa as a sub-region and those studies indicate that it is one of the most food insecure sub-regions in the world (Clover, 2003; DFID, 2002;

Drimie and Mini, 2003; ECA-SA, 2004; Roman, 2003; SADC FANR, 2003; Sánchez 2005; FAO 2009b).

The Figure below demonstrates the prevalence of undernourished people in the three sub-regions (Southern Africa, Central Africa and West Africa) of Sub-Saharan Africa.

Figure 3 Prevalence of Undernourished People in Sub-Saharan Africa's Three Sub-regions



Source: Own compilation from data tables in FAO (2009b:48-50).

The Figure 3 above shows that all three sub-regions show high prevalence of undernourished people compared to other global regions (see Figure 2). Central Africa as of 2004-06, has the highest prevalence of undernourished people. West Africa has the lowest prevalence of undernourished people, but still higher than the prevalence rate in most regions in the world. While Southern Africa has shown some modest gains in reducing the prevalence of the undernourished, it moved from the highest prevalence of the undernourished by sub-region to the second highest.

Nevertheless, on average, Southern Africa still has a higher prevalence of undernourished people than Sub-Saharan Africa as a region. Globally it has the second highest prevalence rates of undernourishment. Resultantly, the Southern African food security situation should be a global priority (ECA-SA, 2004).

In the past two decades, Southern Africa has experienced a worsening food security crisis (SADC FANR, 2003; Drimie and Mini, 2003). The number of food insecure people in this region went from about 22 million people in 1979/81 (Drimie and Mini, 2003), to 34.1 million in 1990-92 and to 36 million people in 2001-03 (WFP, 2006; FAO, 2009b). Southern Africa is currently poised to miss both the MDG and the WFS food security target, unless something is more effectively done to target the food insecure and change the current situation (Clover, 2003; FAO, 2009b).

A major challenge to establishing who the poor are and what characterises their food security situation, is that the data accuracy and availability is progressively less available at national, sub-national and urban scales (Sharma, 1992). Southern Africa is no exception with limited detailed food security statistics. Perhaps this is a leading reason why food interventions have not successfully decreased the number of food insecure. It is for this reason, that among others Maxwell (1999), the FAO Statistics Division (2006d), Haddad *et al*, (1999), Sánchez (2005) Crush, Frayne and Grant (2006) have called for more detailed research into food insecurity at lower national scales, sub-national scales and in particular at the urban scale. Research at sub-national and urban scales will hopefully result in food security remedies/programmes that better target the food insecure.

Unfortunately, the data at lower levels (e.g. national levels) is not well researched in Southern Africa as seen in Table 1. The Table demonstrates an assortment of available food security measures: (1) percentages of the total population of undernourished individuals (2) percentages of the total population malnourished and (3) the chronically food insecure, by country in Southern Africa.

Table 1 Measures of Food Insecurity in Southern Africa Study Countries

	Percentage of Total Population (%)		
Southern African Study Countries	***Undernourished***	***Malnourished***	***Chronically Food Insecure***
Botswana	35	26	-
Lesotho	11	-	-
Malawi	32	34	22.4
Mozambique	46	45	35
Namibia	21	-	-
South Africa	-	-	-
Swaziland	18	19	-
Zambia	49	47	-
Zimbabwe	44	45	-
Average of Study Countries	*41*	-	-

Source: Own compilation from World Food Program (2006).

Of significant importance is the fact that we do not know the differential breakdown between undernourished, malnourished and chronically food insecure. In addition, there is an obvious lack of data for the Southern African region at country level. Again, this is an indicator of the problems of sourcing data for these countries, which contributes to poor levels of research of food security in this region. Additionally this demonstrates the importance of accurately defining definitions and the sub-categories of what is meant by undernourished, malnourished and the food insecure. Table 1 does however demonstrate that there are high percentages of undernourished, malnourished and food insecure, for example Mozambique with 46%, 45% and 35% respectively. In addition, multiple countries have declared food disasters in the last couple of years (Malawi, Zimbabwe, Zambia and Lesotho) which further contributes to the critical situation in the Southern African region.

It is evident that globally hunger is increasing and there is a significant need to understand all the issues around food security. This increase in hunger is occurring in the developing world where rapid urbanisation of the poor and food insecurity is happening. The global epicentre of food insecurity is without a doubt Sub-Saharan Africa with Southern Africa in urgent need of study and intervention. Good statistical food security data is needed at national and sub-national scales.

2.2 THE CONCEPTUAL DEVELOPMENT AND RESPONSE TO FOOD SECURITY

In order to identify and analyse the available quantitative data on urban food security, it is essential to understand what is meant by food security and how various definitions apply as a whole or in part to the urban realities. This investigation of food security definitions (and its subsequent development) demonstrates: (1) the food security definition has changed over time, (2) there are three conceptual divisions in the food security literature, (3) both historically and currently there is a bias towards rural issues, and (4) the literature indicates while food may be available it is not always accessible to individuals.

The literature reveals that over time numerous definitions of food security have existed (Maxwell, 1996; Clover, 2006)[7]. These definitions have largely been framed with the rural context in mind. The widely accepted definition for food security today comes out of the Rome Declaration at the World Food Summit (WFS) in 1996:

> "Food security exists when all people at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996: Section 2, Paragraph 1)

Consensus on the definition is a result of an evolution within food security literature and combines many of the factors, which have formed part of the historic definitions (Mustafa *et al*, 1999). The WFS definition informs us that there should be access to food for all (through their own production or through financial or other markets), stability in its supply (reducing current and future risks to its supplies and that food should meet the dietary needs of individuals nutritionally). Failure to achieve any of these conceptual divisions will result in food insecurity (Maxwell, 1996; FAO, 2006d). Food insecurity "exists when people are undernourished as a result of

[7] An expanded list of 35 different food security and insecurity definitions used between 1975-2005 is available in Appendix A. Highlighting the contested evolution and understanding of food security.

insufficient physical availability of food, limited economic and social access to adequate food and/or inadequate food utilisation" (FAO, 2006d: 4).

Early food security definitions focused only on the availability (supply side) of food security. Rising out of a concern that rural food production was not sufficient to maintain supplies causing rising food prices, the United Nations World Food Conference in 1975 defined food security as the:

> "Availability at all times of adequate world food supplies of basic food-stuffs... to sustain a steady expansion of food consumption... and to offset fluctuations in production and prices" (UN, 1975 cited in Maxwell, 1996: 156)

Thus, the focus in the 1970s was to assure the availability and price stability of basic foodstuffs at national and international levels (FAO, 2006a). These priorities are evident in early thinking and literature on food security (e.g. McIntire, 1981; Reutlinger, 1978; Siamwalla and Valdés, 1980) and persist today in reporting (e.g. FewsNet, 2010).

As a result of the UN's 1975 definition and early thinking of food security being a rural phenomenon requiring a rural solution, both monitoring of the food security situation and development programmes to mitigate food insecurity focussed on food availability and hence rural based food production. The trouble with this "supply only" definition is that it overlooks the key issues of households' ability to access food and the food's nutritional value. As pointed out by Sen (1981) and Clay (2003) even when food supplies have been sufficient, hunger often still existed in those areas as individuals did not have the resources to access (e.g. financial or ability to work for it) the food. These insights have particular reference to the urban food security situation today where food is often available in the cities but not fully accessible to the growing number of urban poor.

Sen's (1981) work in the 1980's brought to the forefront the importance of household's and an individual's ability to access food, onto the food security agenda. A large body of literature followed from the mid-eighties to early nineties around

food access (Maxwell and Smith, 1992). Smith et al (1992) reviewed nearly 200 papers written between 1985-1991 on food security concepts and definition issues, with eighty percent of these papers focused on food access. The emphasis on food access led to changes in the food security definition to include the concept of access. It was shown that even if food was available, individuals could be food insecure even when supply was abundant (Clay, 2003; Clover, 2003; Maxwell and Smith, 1992). Some of the highly significant and influential definitions with respect to food access were Reutlinger and Knapp's (1980), Siamwalla and Valdes's (1980) and the FAO's (1983) food security definitions. The FAO's definition (1983, emphasis added) perhaps best encapsulates all the changes to include the concept of food access, is:

> "ensuring that all people at all times have both physical and *economic access* to the basic food that they need"

These changes in definition reflected an expansion in thinking and understanding of food security not only in the literature but also in small ways by various institutions (e.g. The United Nations Food and Agricultural Organization and the World Bank). However, the literature and institutions still framed food security largely as a rural issue and the focus of food security monitoring is unfortunately still largely based on food availability measures.

Three years later the World Bank (1986) added to the evolution of the food security definition, by adding the idea of time and being able to have sufficient nutritional intake for an active healthy life to the food security definition i.e. not just access, but the nature of the access. Food security is:

> "access of all people at all times to enough food for an active, healthy life". (World Bank, 1986:1)

The nexus of these concepts make up the widely accepted multidimensional 1996 WFS definition that highlights and brings together all of the above definitions in some part.

It is perhaps notable that nowhere in the literature has an urban /or rural food security definition emerged. The early focus on food availability and rural framing of food security has greatly influenced responses and the evaluation to focus on these factors. Even though the expanded definition better captures the concept of food security and allows for the potential investigation into the growing urban food security situation, food insecurity is consistently portrayed as a rural phenomenon requiring rural solutions.

Maxwell (1996) argues that research; development programmes and food security monitoring continue to focus on the plight of the rural populations to the neglect of the globally rapidly urbanising populations, with the key focus skewed towards increasing production of food as a way to combat food insecurity. Part of the reasoning behind the rural framing of the food security issue has been that in the past, when assessing progress within countries it is generally the rural areas that have the highest percentage of hunger. While this is still often true UN-Habitat's (2006) *State Of The World's Cities 2006/7: The Millennium Development Goals and Urban Sustainability: 30 Years of Shaping the Habitat Agenda* points out there is a shift as a growing number of the world's poor and hungry are being found in urban areas.

While urban food security has been identified as critical, the FAO's "Twin Track" approach to tackle food security neglects the growing urban food insecurity reality and related access issues and instead reverts to basic 'availability' rhetoric (CFS, 2006b, 2007; Crush and Frayne, 2010). The "twin track" approach suggests that in order to address food security, rural livelihoods need to be strengthened by increasing food production, while the emerging reality of urban food security is not addressed. This is not to say the rural situation should not be a concern, indeed, it is currently, according to FAO estimates, where most of the hunger is located (Broca, 2002). Nevertheless, the locus of hunger along with poverty is shifting to urban areas (UN Habitat, 2006; Haddad *et al*, 1999) and thus any meaningful approach to tackling food security, now and in the future, must take into consideration the urban situation.

The "twin track" approach has two key focuses (CFS, 2006a: 3): "(1) Direct interventions and social investments to address the immediate needs of the poor and hungry with, (2) Long-term development programmes to enhance the performance of

the productivity sectors" such as agriculture and rural development. This "twin track" approach is a subsequent 2002 change to the original seven commitments by the FAO committee on World Food Security (WFS) to tackle 1996 WFS target of reducing by half the number of hungry (CFS, 2002, 2006b). The original seven broad commitments were wide ranging. The commitments recognised the wide ranging implications of the 1996 WFS definition, that food security was not going to be achieved by simply increasing food production or trade policy, but rather it includes issues of economic access and nutrition. However, after the 2002 report on negligible advancement towards the food security goals, they reactively cut the commitments back to the "twin track" approach (CFS, 2002). Instead, they have reverted to the historical rhetoric of framing food security as a rural phenomenon and to the monitoring of food production (availability), neglecting the progress in the understanding of food security as much more than a rural phenomenon (e.g.: demonstrated in the evolution of the definition) especially avoiding issues demonstrated in the research of Sen (1981), Staaz *et al* (1990) and Maxwell (1996), (2000). Their findings are that current and future growth in urban food security relates to household inability to access food due to financial constraints.

The growth in our understanding of food security to include access, nutrition and the consideration of all households, both rural and urban, as potentially food insecure opens up the door to the investigation of these aspects of food security.

2.3 THREE CONCEPTUAL DIVISIONS WITHIN FOOD SECURITY

The FAO Statistics Division deconstructs food security into three concepts "...food availability, food access and food utilisation...: *Food availability* relates to physical availability of quantities of food from own production or [from a] business, commercial imports or donors available for human consumption. *Food access* refers to the adequate income or other means to acquire food quantities needed. *Food utilization* refers to proper use, processing and storage techniques; adequate food and nutrition knowledge and practices towards a better nutrient absorption and metabolic utilization" (FAO, 2006d: 4). Generally there has been consensus around the three conceptual divisions (namely: food availability, food access and food utilisation) within the food security literature.

From the literature, it is evident that since the changes in the food security definition, our understanding of food security has matured from simply a rural and food production concept to include other concepts such as access, as highlighted by Sen (1981) and others and nutritional value. However, it would seem from the literature that our measuring and monitoring of food security has not caught up with our expanded understanding. There seems to be a tendency to revert to our historical monitoring of food security (e.g. from seven broad commitments from the 1996 food security definition to the 2002 "twin track" approach).

The consensus around the three conceptual divisions has a lot to do with the evolution of the food security definition (discussed in 2.2) which had the effect of creating separate research agendas over time. Concern around global food security in the 1970's was mainly focussed on total food supplies i.e.: "food availability". The focus shifted in the 1980's to include individual and household entitlement, vulnerability and access issues to food and then more recently ideas around the importance of food's nutritional value.

Interestingly, there is little agreement on: (1) indicators for each division, and (2) which conceptual division(s) and associated indicator(s) would be most appropriate in measuring and understanding various contexts, i.e. the urban context. Not all the conceptual[8] divisions apply equally in different contexts: for example in the urban context where nutritional food is available, food security is primarily an issue of *food access* (von Braun *et al*, 1993; UN-Habitat, 2006).

Food availability measures established in the 1970's and 1980's still remain as the predominate method of food security measurement, neglecting research on the importance of access and nutrition, both reflected in the latest food security definitions. These food security measurements neglect research showing that various areas (e.g. rural, urban) experience food security differently. The lack of consensus

[8] Concept: To possess a given concept involves, among other things, (1) Being able to recognise instances under which that concept falls, (2) Being able to engage in appropriate inferences involving that concept (Bullock and Trombley, 1999: *'Concept'*)

around the validity of the various conceptual divisions and which indicators are valid (i.e. for the urban context should food availability be used as an indicator of urban food security when there is a plentiful supply in stores but it is still possible that many are hungry) has not allowed for meaningful quantitative comparisons to be made over time, especially within the urban context.

For this reason, I will examine the literature on these three conceptual divisions within the 1996 WFS definition; firstly Food Availability, then secondly Food Utilisation and finally Food Access, investigating their indicators and appropriateness for measuring and understanding the urban context.

2.3.1 Food Availability

The World Food Crisis in 1972-74 ushered in a new era where food shortages were to be mitigated by ensuring sufficient stocks were available at all times. The 1975 World Food Conference produced a definition of food security that reflected this priority. The literature on food availability forms a large Chapter on food security, as it was the original commencement point of the discussion on food security[9]. Historically food security research had been and still is based on rural food production and availability (Staaz *et al,* 1990) as the World Food Conference discussions on food security in the mid- and late 1970s were strongly influenced by identifying the risk of shortfall in world food production, due to widespread crop failures and disasters and fluctuations in prices early in that decade (von Braun *et al*, 1993; Battisti and Naylor 2009). Thus, to ensure food security it meant avoiding brief shortfalls in the supply of food. A large body of literature grew out of this early conceptual understanding of food security (e.g. Minhas, 1976; USDA, 1977, Valdes and Konandreas, 1981, FAO, 1983). The *food availability* body of literature and early institutional learning still biases the issue of food security to being an issue about rural food availability.

Early food security literature largely framed food insecurity as a rural phenomenon with rural agriculture solutions (Maxwell, 1999). The rural framing of food security is

[9] It is important to note the first UN (1948) Universal Declaration of Human Rights, recognised the right to food as core to an adequate life. However it was in the 1970s that the food security discourse really started.

mainly due to three key reasons: (1) it is where agricultural activity is predominately found, (2) where the majority of the world's food insecure have and still are found (Ravallion, 2001; FAO, 2006b) and (3) due to "urban bias" policies (Corbridge *e* al, 2005). Thus, a large proportion of the food availability literature is focused on the rural context (UNFPA, 2007; FAO, 2003; FAO, 2005; Løvendal *et al*, 2005; Ninno *et al,* 2005; Ray, 1998; Sachs, 2005; Maxwell, 1999). According to Maxwell (1998) urban poor residents can be impacted negatively by food shortages too, due to resulting surging prices of foods in stores, quickly translating into mass food access issues as households become unable to financially afford the food, such as in the 1970's and even more recently in 2006/8 food crisis. These impacts on urban food insecurity are often overlooked due to the rural framing of food insecurity.

Food availability literature has explored how: differing trade policies, 'urban bias' and structural adjustment programmes, droughts, famines, conflicts and national food production levels have affected food availability (FAO, 2003; FAO, 2005; Løvendal *et al*, 2005; Ninno *et al,* 2005; Ray, 1998; Sachs, 2005).

In 1977, Lipton (1977) argued that rural areas suffered due to governments biases towards urban areas. As a result, planning and policies (e.g. structural adjustment policies) were influenced by this 'urban bias' thesis and a strong focus was placed on rural development and rural food production to compensate for this 'bias' (Jones and Corbridge, 2010 and discussed further in Chapter 3). Maxwell (1998) and Mitlin (2004) showed how internal policies influenced by 'urban bias' often meant the urban poor were neglected and arguably allowed for increased levels of urban poverty and vulnerability. Maxwell (1999) showed how increases in urban food prices due to 'urban bias' policies were recorded in Ghana and Uganda. Moreover, Thurlow and Wobst (2004) show that the implementation of structural adjustment programmes in Zambia had a general increase in the livelihood security of the poor in rural areas but it also showed a deterioration in lifestyle for the urban poor who had to face higher prices for food. Cornia *et al*, 1987 and Hindle, 1990 agree, finding that policies such as structural adjustment programmes have caused a general deterioration of basic living standards. Maxwell (1998: abstract) concluded "The impacts of "urban bias" policies such as structural adjustment, continued rapid growth, and an increase in

urban poverty make food insecurity in the 1990s primarily a problem of access by the urban poor".

Additionally the FAO (2004) demonstrated that climatic factors have a major impact on food supply especially in Africa. In fact the 1972-74 food crises, which catalysed the 1975 World Food Conference (Mortimore, 1989 cited in Smith and Maxwell, 1992, Battisti and Naylor 2009), was largely precipitated due to high summer temperatures in the former Soviet Union which caused shortfalls in world cereal markets and food security which led to run away food prices. Battisti and Naylor (2009) and others (e.g. Ziervogel and Ericksen, 2010) warn that with current climate change predictions further extreme weather events in the future could further affect agriculture production and hence food availability. Davies (2001), Clover (2003) and Vogel and O'Brien (2006) all report that droughts and floods result in decreases in food supply. This is especially true for Southern Africa. In 2003, Grunwald (2003, cited in Clover, 2003) reported that Southern Africa had the highest number of weather related disasters in the preceding two years and experienced nine out of ten, of the hottest years since 1860 in the past decade. All these climatic conditions negatively affect food supplies and in reality, they become the scapegoat for food insecurity in the region (e.g. 2006-08 Food Crisis). Both Sen (1981) and Clover (2003: 7) point out that while *"Weather and climate have also been a convenient scapegoat, yet an abundance of food can and does exist alongside famine even in natural hazards"*. They suggest instead of focusing on technical solutions (e.g. increasing food supplies) that the issues of access and fair distribution of food should be looked into as solutions to food insecurity.

Conflicts and their impact on food availability have likewise received wide attention in the literature (e.g. FAO, 2004; Alinovi *et al*, 2008; Jaspars and Maxwell, 2009; Maxwell *et al*. 2010). The three key impacts have been identified in the literature relating to the impact of conflicts on food availability. (1) Firstly, regional instability causes food price fluctuations (Downing, 1990; Clover, 2003). (2) Secondly, disruption of farming activities and destruction of crops and infrastructure, which are important to food reaching, markets (Downing, 1990; Davies, 1991; Clover, 2003; Devereux and Maxwell 2001 and Alinovi *et al*, 2008). (3) Thirdly Frankenberger (1992) argued conflicts can also affect neighbouring areas food supply, as refugees

move in, they turn to these areas and place strain on the normal local food supplies. (Ray, 1998; FAO, 2003; FAO, 2005; Løvendal *et al*, 2005; Ninno *et al,* 2005; Sachs, 2005).

As a result of external and internal policies, climatic variability, conflicts and other factors that cause impacts on food supply, the focus has been on mitigating these factors (e.g. removing harmful policies and increasing cereal production) and monitoring (e.g. FEWSNET). Early warning systems became a key way in the 1980s to mitigate and monitor 'food security' (i.e. short falls). This is still the case presently. The FEWSNET network[10] is one such early warning programme, reporting on rural agriculture outputs and weather scenarios in monthly briefings and alerts. The data used to monitor the food security situation is highly skewed to considering rural food production and not on how individual households experience food security or insecurity. For example, the *2010 FewsNet Food Security Outlook: Most Likely Scenario, January to June 2010* (FewsNet, 2010) reports that in January to March 2010, the Southern African countries covered in the programme (Zimbabwe, Zambia, Malawi, Mozambique) are largely "generally food secure" based on food availability measures. However, this conclusion contrasts sharply with Southern Africa being the second most food insecure region in the world (discussed in 2.1.3, where WFP (1996) reports the undernourishment in Malawi at 32%, in Mozambique at 46%, in Zambia at 49% and in Zimbabwe at 44%). It also has noteworthy differing results with households reporting a significant number of people being food insecure (e.g. results in Chapter 10). The monitoring tools and indicators used, while effective in predicting rural food agriculture forecasts, fail to capture all the concepts of food security (availability, access and utilisation), especially the reality of the food security situation of individuals and households in urban areas.

Indicators historically were developed based on rural food supplies and food security measures (Shoham and Clay, 1989; Maxwell and Smith, 2002). Today food security indicators of food supplies of nations and regions (e.g. cereal productions) are still used as key indicators of whether a nation or region is food secure, even though these

[10] FEWSNET: An early warning food security network that issues updates or alerts online (www.fews.net), referring only to supply side food issues, such as, cereal production by region and climate (drought or floods) factors.

indicators fail to indicate if food is actually accessible to the people of the region (e.g. Committee On World Food Security (1999), The FEWSNET Network, GIEWS[11]). While availability is an important part of food security, it is only a limited part of food security. One cannot call a region food insecure or secure, purely based on availability. The literature (e.g. Sen 1981) and even the 1996 food security definition (WFS, 1996) indicates food security is equally about access and nutritional utilisation. However, food availability indicators continue to be used erroneously as the key indicators of overall food security, as they are relatively easy to monitor, to compare and the data is readily accessible (Sharma, 1992).

The FAO Committee on World Food Security (CFS), which was setup to monitor and implement the 1996 World Summit Plan of Action, has now been paired down to a "twin track" approach from the original seven broad commitments (discussed in 2.2) which used seven key indicators to monitor the world food security situation (CFS, 1999; 2006a). The seven key indicators were to monitor global food security based upon, at that stage, the new wide-ranging food security definition and the seven commitments (WFS, 1996). Nevertheless, all the indicators were biased towards food availability statistics. They reveal absolutely nothing about the food security situation of individuals and households especially with regards to nutrition and access. The seven indicators for global monitoring of food security that were selected are (CFS, 1999): (1) Ratio of World Cereals Stocks to World Cereal Consumption (2) Ratio of Five Major Grain Exporters Supplies to meet Requirements (3) Closing Stocks held by percentage of Total Disappearance of Major Cereal Exporters (4) Changes in Cereal Production in China, India and CIS against the previous year's trend (5) Changes in Cereal Production in Low Income Food Deficit Countries (LIFDCs) (6) Changes in Cereal Production in LIFDCs less China and India (7) Export Price Movements for major cereals (Annual Averages). The major flaw in these indicators is that they only measure food security in terms of availability, based on early narrow food security definitions. I, based on this and on a large portion of the food security literature, argue that much of current food security data is simply rurally framed food supply measures and tells us little to nothing about the actual food security situation of individuals and households. Current indicators (such as, production plus imports

[11] GIEWS: Global Information and Early Warning System (www.fao.org/giews/ENGLISH/index.htm)

minus exports) does not allow for analysis at lower levels of the scale such as the city level. They simply tell us about food supplies and not about peoples' food security situation. Perhaps the reason we are missing the MDG and WFS target is that we are not measuring the people's actual food security situation, so we cannot identify whom the hungry are with accurate measures and how hunger is experienced, (e.g. is it an issue of poor nutritional foods or a lack of money to purchase food). Without knowing this, we cannot target the food insecure with effective programmes. Generally, household research needs far more emphasis so that the measure of food security can be analysed in terms of access and nutritional utilisation (Grant *et al,* 2007; Crush and Frayne, 2010).

In terms of urban food security, Maxwell (1998) argues that urban food security is not a problem of aggregate food supply today but rather the inability of the poor to purchase (access) food. Thus, food availability as a concept and its associated indicators does not have application in measuring urban food security.

The second conceptual division in the 1996 WFS definition of food security is the whole issue of *food utilisation*, referring to the importance of the nutritional value of food consumed.

2.3.2 Food Utilisation

What the FAO (2006d) terms *food utilisation* is a concept of food security which is well documented (e.g. Pryer and Crook, 1988; Todd, 1996; Ray, 1998; DFID, 2002; WHO, 2006a; WHO, 2006b). Sometimes the *food utilisation* 'conceptual division' is simply referred to as *food nutrition.* The FAO (2006d) suggests that *food utilisation* is additionally trying to capture the ideas of proper use, processing and storage techniques of food. Furthermore, the idea of food acceptability and food adequacy (i.e. the food is acceptable culturally and personally to the household) also find their place in the *food utilisation* conceptual division of food security. More recently there has been an emphasis which states that in order to be food secure, not only must it be available, accessible, nutritional sufficient but it must also meet one's personal food preference (FAO, 2009b).

Nutritional intake and daily consumption issues (e.g. malnourishment) are extensively covered in the literature. For example, Pryer and Crook (1988) as well as Todd (1996) compiled a review of the literature with respect to urban nutrition only and identified 51 studies at that time. The medical profession along with many international bodies (e.g. World Health Organisation and UNICEF) and other researchers (e.g. Omran, 1971; Pryer and Crook, 1988; von Braun *et al*, 1993; Garret and Ruel, 1999) have made the study of food utilisation their primary concern when studying food security (DFID, 2002; WHO, 2006a). Malnourishment is measured in three keyways: *stunting*, *underweight* and *wasting* (e.g. Omran, 1971; Pryer and Crook, 1988; von Braun *et al*, 1993).

Many (e.g. Ray, 1998; Maxwell and Smith, 1992; World Bank, 2006; Martínez and Fernández, 2008) have shown that poor nutritional intake results in low energy levels and decreased productivity. Martinez and Fernández (2008), found that malnourishment in Central America can effect GDP between 1.7% and 11.4%.

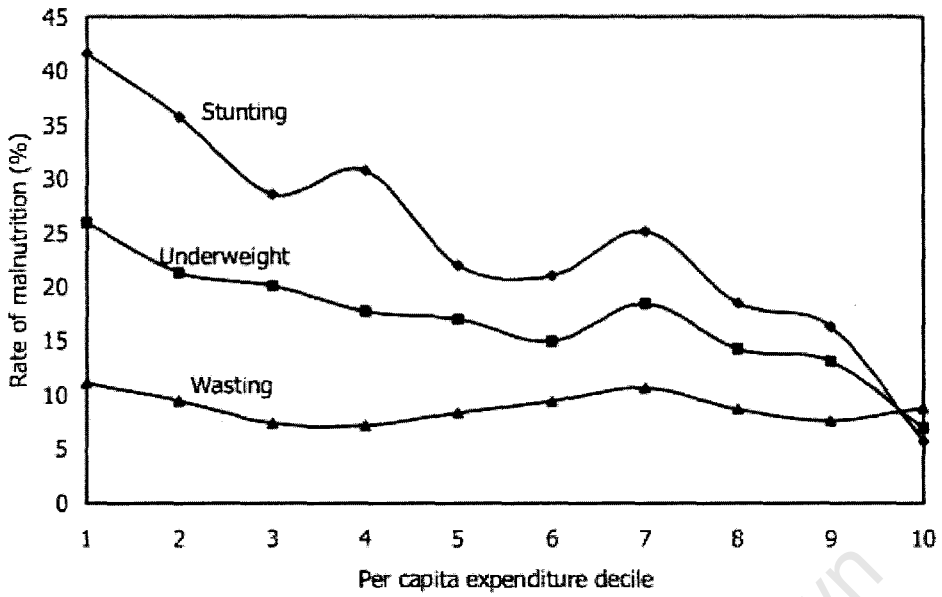
For the purpose of the study we do find that within urban contexts, good research has been done in terms of 'food utilisation'. In fact, the urban and rural differences of malnutrition have also been well documented, such as Hassain and Lunven's (1987) *Urbanization and Hunger in the Cities*; von Braun *et al* (1993) book on *Urban Food Insecurity And Malnutrition In Developing Countries: Trends, Policies And Research Implications*; Ruel *et al* (1998) extensive discussion paper on *Urban Challenges To Food And Nutrition Security: A Review Of Food Security, Health, And Caregiving In The Cities*; Garrett and Rule's (1999) key work on *Are Determinants of Rural and Urban Food Security and Nutritional Status Different? Some Insights from Mozambique* and Smith *et al* (2005) *Why Is Child Malnutrition Lower in Urban Than in Rural Areas? Evidence from 36 Developing Countries*. Three of the key focuses to come out from this research with respect to understanding urban nutrition are changing of diets, lack of food and changes in activities (Solomons and Gross, 1995).

The literature indicates changes in diet and activities occur with the transition to urban areas, as is happening in Southern Africa with negative health impacts on obesity, diabetes and chronic diseases (e.g. Popkin, 1993 *"Nutritional Patterns and Transitions"* and Popkin's significant 2000 study *"The Nutrition Transition and Its*

Health Implications in Lower-Income Countries"). Moreover, urban food utilisation studies have shown time after time that within urban areas, malnourishment is highly variable (more so than rural areas) and simple averages of malnourishment of an urban area can be misleading (Basta, 1977; Bradley *et al* 1992). Haddad *et al* (1999) and Menon *et al* (2000) both using Demographic and Health Survey (DHS) data from numerous countries from Africa, Asia and Latin America found that the variations of *stunting* (a measure of malnourishment) between the richest and poorest income quintiles in urban areas was consistently greater than in rural areas. Zere and McIntyre (2003) found that improved household income levels are associated with a dramatic drop in the probability of *stunting* of children.

Vozoris and Tarasuk (2003) point out that food security in terms of malnutrition is related to a household's income, because a household access to food increases as income increases. In 1985, the Botswana Rural Development Unit demonstrated that low household income had an effect on household's malnutrition, especially in areas where food production was not viable (Botswana Rural Development Unit, 1985). The relationship between household income and food security is supported by a study on child malnutrition in South Africa, by Zere and McIntyre (2003), where they found household income to be a key determinate in a child nutritional status. The Figure 4 below graphical demonstrates the relationship between total income (total expenditure was used as a proxy in this study) and rates of malnutrition (using *stunting*, *underweight* and *wasting* as measures of malnourishment).

Figure 4 Child Malnutrition by Per Capita Expenditure Decile in South Africa.



Source: Zere and McIntyre (2003: 5)

From Figure 4 we see *stunting* and *underweight* as a measure of malnourishment are dependent on the households' total income, whereas *wasting* seems to be independent. Zere and McIntyre (2003: 1) concluded in "...addressing problems of *stunting* and *underweight*, which are found to be responsive to improvements in household income status, requires initiatives that transcend the medical arena". Zere and McIntyre's (2003) research supports the idea that household income can be an indicator/measure of the utilisation concept within food security in South Africa and arguable a more useful measure within the urban context where food intake is primarily based on financial access.

These findings are supported by others, such as, Musrove's (1988) research on Brazil where he concludes that the chief cause of malnutrition in cities, is households with low incomes. He found additionally when poor households incomes increase they increase the diversity and quality of their diet, leading to improved nutritional intake. Various studies (e.g. Popkin, 2000; Ruel, 2003; Arimond and Ruel, 2004) found households who cannot afford high value foods tend to buy cheaper nutritionally poor foods as a substitute. von Braun *et al* (1993:20) therefore concludes, "The importance

of income as the most powerful determinant of nutrient and energy adequacy is a critical issue".

Maxwell and Smith (1992) point out while malnourishment can often reflect current or past food insecurity it can also be independent of food insecurity. This is because malnourishment can have many other causes (e.g. 'an unhealthy environment', 'inadequate maternal health', 'child care' and disease). Therefore, it is important to not always interpret the malnourishment results as a result of household food insecurity. However, equally important is that positive malnourishment results should not be interpreted that a household is totally food secure. Maxwell and Smith's (1992) observations are upheld by Garret and Ruel (1999) where they found in Mozambique that rural populations had considerably higher child malnourishment rates than in urban areas, though at the same time the rural vs. urban areas had very similar food security situations. While the food security situations were similar, the differences in malnourishment point out that the two are not always linked.

It is clear that the food utilisation concept of food security has developed somewhat independently from the whole food security debate with research and measures dating back to 1971 (e.g. Omran, 1971). Some very definite measures for monitoring malnutrition have been developed (e.g. Zere and McIntyre, 2003). Additionally we see that malnutrition is experienced in rural and urban areas and that at times malnourishment is worse in the urban environment. Findings from the literature above find malnourishment in urban areas is highly dependent on households ability to access financial mechanisms (i.e. income), which allows them to access food. Thus food access is the key determinate of utilisation in an urban area and it follows access is the key in understanding urban food security. *Food access* is the third conceptual division and is focus of the next section.

2.3.3 Food Access

The third conceptual division the WFS 1996 definition focuses on the issue of *food access*. The concept of *food access's* profile increased in the literature after the FAO changed their definition in 1983 to include *food access* as a necessary part of what it means for an individual or households to be food secure.

Sen's (1981) work on access was highly influential in the realisation that *food access* was essential for food security. Maxwell (1996) points out that while research on issue of *food access* was done by others prior to Sen's (1981) work (e.g. Joy's, 1973 and Berg's, 1973 research on nutrition pointed out the importance of access issues; Levinson, 1974 on economic analysis of malnutrition led him to the issue of *food access*; then Siamwalla and Valdes 1980 and Reutlinger and Knapp's 1980 work laid the ground for the 1983 definition on food security), but it was Sen in his 1981 work that truly established the body of knowledge around food access.

From the mid-eighties to early nineties there was a greater emphasis in the literature on, investigating household's ability to achieve *food access*, rather than only investigating food availability or utilisation (Roman, 2003; Sen, 1998). Smith *et al* (1992) reviewed nearly two hundred works over a decade ago with eighty percent of them been centred on the issue of *food access*. Some notable works from this period were: Cathie and Dick's (1987) research on *Food Security and Macroeconomic Stabilization: A Case Study of Botswana 1965-1984* and Keilman *et al* (1983) that focused on the links between access and nutrition. A number of papers reflected the changed emphasis from not only considering availability but also access as an equal part to the understanding of food security (e.g. Advisory Council on Development Co-operation, 1985; CARE, 1988; Amani *et al*, 1988; Rukuni and Bernsten, 1988; while Clay *et al* in 1988 pointed out the differences and importance of national and individual food security; African Leadership Forum, 1989; Chrisensen, 1991). Other papers highlighted the need to not only change emphasis but to shift the food security agenda significantly away from food availability to the overlooked issue of food access (e.g. Chrisholm and Tyers, 1982 focussed on the importance of entitlement; Commission of the European Communities, 1988; Corbett, 1988; Adedeji and Adbayo, 1989; while CIDA, 1989 and Bapna, 1990 framed food insecurity as solely as an issue of lack of access). At the same time, Benson *et al* (1986) and Calon (1990) demonstrate the importance of needed cash incomes to ensure food access. The sheer coverage of the literature on food access during the 1980's is astounding, yet Sen's work *'Poverty and Famines: An Essay on Entitlements and Deprivation'* stands out in making the case for food access to be a key concept in food security.

Sen's (1981) focus, at that time, was on food entitlement[12], in that people could only gain access to food, if they could grow it (production-based), buy it (trade-based), work for it (own-labour) or be given it (inheritance and transfer). Sen believed that all or some of these entitlements are necessary to meet food requirements and when these entitlements are in place, then an individual or household was considered food secure. Essentially the book pointed out that it is often the socio-economic conditions of households, which determined their food security, not the availability of food around them. Sen demonstrates that in many cases of famine, food supplies were not significantly reduced, but factors like declining incomes, rising food expenditure and unemployment led to starvation among certain groups in society (Sen, 1981). While aspects of Sen's (1981) work has received some critics (e.g. Rangasami, 1985; Bowbrick, 1986; Nolan, 1993; Fine, 1997 and Devereux, S, 2001) the need to recognise food access as an important part of food security is undisputed.

Swift (1989) offers an important addition to the issue of access and entitlement theory. Swift describes how households who are able to build up assets can draw down on them during times of need to ensure continued access to food. He advances that vital to a household's food security is their ability to build resilience and reduce their vulnerability by building up assets (investments, stores and social claims). His work has strong link to today's livelihoods (e.g. Davies, 1996; Rakodi, 1999; Ellis, 2000) and vulnerability (e.g. Moser, 1998; Periperi Publications, 1999; Chambers, 2006) literature. While this literature is not the focus of this research, it is vital to acknowledge that livelihood and vulnerability analysis are important to the ability of a household to remain food secure (Ruel *et al*, 2010).

Devereux (1988) and Sen (1981) explain that issues of access are not necessarily inconsistent with food availability, as rural food production failures can lead to decreases in income (e.g. less work for farm workers) and can lead to higher prices for rural and especially urban households who rely heavily on purchasing foods. However, what is clear is that food availability, decline or increase, is not necessarily a stipulation for declines or increases in food access.

[12] Entitlements: Sen (1984: 497) "the set of alternative commodity bundles that a person can command in a society using the totality of rights and opportunities that he or she faces".

Roman (2003:5) goes onto agree with Sen and points out the fact that "...famines have occurred even with plenty of food. Most people buy food rather than produce it; in fact very few people, including small farmers, are entirely self-sufficient in production" (Roman, 2003: 5). This view is supported by others (e.g. Maxwell, 1996 and Staaz *et al*, 1990). The fact that most people buy food, not produce it is supported by research findings. In the case of South Africa, the national Income Expenditure Survey (IES) results, report that in 2000 only 5 % of South Africans used agriculture as their primary source of food (Watkinson and Makgelta, 2002). Similarly Maxwell *et al's* (2000) noteworthy study of food security in the African city of Accra showed that only 5.8% of individuals in the study were engaged in some form of agriculture, livestock or fishing and even then, those households only got 7.5% of their total food from their own production. "Most individuals earned their living through petty trade, street food vending, small- and large-scale enterprises, wage labour, or professional services in a competitive and densely populated urban environment" (Maxwell *et al,* 2000:60). This underlines the fact that many people in rural and especially in urban areas, rely on financial mechanisms to access food, and not their own production (DFID, 2002; Staaz *et al*, 1990).

"Sen's work focused attention on the lack of access by households and individuals to food because of low incomes (entitlement) as a cause of food insecurity, and other research has shown that for most of the hungry in the world, this lack of access is chronic, not transitory" (Staaz *et al* 1990: 1311) Staaz *et al* goes on to explain that low incomes are a cause of food insecurity and most of global hunger is due to chronic access issues and not availability issues. Nowhere is this truer than in urban areas where access to food is directly related to income. This is due to the reality that within urban areas little land is available for agricultural food systems so rather households access food by purchasing from informal and formal food suppliers. Smith *et al* (2006) further argue that the greatest need currently to achieve the MDG of reducing hunger is a greater understanding and analysis of food access issues. These issues of access and income are significant for the urban context as the majority of the urban population access their food through financial mechanisms (UN-Habitat, 2006).

I argue from the literature on food security that urban food security is essentially an issue of food access (e.g. a household that has the ability to purchase sufficient food from a shop can be food secure). UN-Habitat (2006: 52, emphasis added) reports, "[b]ecause hunger experienced in cities is *directly related to income* (rather than agricultural productivity), the *urban poor* are much more *vulnerable to income-dependent hunger* than their rural counterparts". The clear correlation between hunger and income is supported by amongst others, Ravallion (1989, 1990, 1992), Maxwell (1998), Maxwell *et al* (2000), Jamal (2002), Gibson and Rozelle (2002), Vozoris and Tarasuk (2003), Zere and McIntrye (2003), FAO (2006d), UN-Habitat (2006), Smith (2006) and UNFPA (2007).

Ravallion (1989, 1990, and 1992) work shows that income is related to undernutrition and caloric intake. In his 1989 paper, he points out that studies that use calorie intake will show lower levels of income elasticity[13], than if undernutrition is used for the same population. Thus Ravallion (1990) critiques studies such as Shah (1983) and Behrman and Wolfe (1984) and shows, for example that while simplistic measures of caloric intake might only reflect an income elasticity 0.15, a more thorough methodology taking into account local nutritional needs and other variables results in the income elasticity being as high as 1.5, i.e. a 10% increase in income would result in a 15% increase in energy intake. He additionally asks the question, if calorie intake is truly unresponsive to income then how is it possible for famines to occur when there is food.

Research into urban food security and the impact of income have found that food security is heavily dependent on an individual's and a household's ability to access food through income streams. Gibson and Rozelle's (2002: 23) investigation into nutrition and income in urban areas, led them to conclude, "that policies that increase urban household incomes will also act to reduce undernutrition". Jamal's (2002:14) paper *Price and Income Effects on Urban Undernutrition* concluded, "[u]ndernourishment is a form of food poverty and occurs on account of deficiency in food intake, which may occur because of fall in income, increase in food prices or increase in non-food prices". Ruel *et* al (1999) noted that urban households depend

[13] Income elasticity: "A measure of the responsiveness of quantity demanded to a change in income" (Ragan and Lipsey 2004: 88)

on purchasing food for food security, showing that many urban households purchase 90% or more of their food. Ruel *et* al (1999: 1918) concludes "[t]he ability to earn a cash-income thus becomes an especially important determinant of urban food security". Thus, in an urban context, food access i.e. the ability of income to provide nutritional resources, is considered as the important factor in understanding urban food security, as suggested by studies by Ruel *et* al, (1999), Gibson and Rozelle, (2002) and Zere and McIntyre (2003). In an urban setting, income, is the means to provide food (through consumerism and buying power), whereas in a rural environment food it can be created/grown and stored or purchased.

Thus food security in urban areas is an issue of food access and subsequently this research project falls within the ambit of food access: as it investigates urban household's ability to access food through financial means and the amount of total finance devoted to this cause (Ruel *et al,* 1999; Maxwell, 2000; FAO, 2006d; Zere and McIntyre, 2003; UN-Habitat, 2006; UNFPA, 2007).

While income tells us about the ability of a household to access food resources, according to Zimmerman (1932), Houthakker (1957), Ravallion (1992), Tabatabai (1993), Ruel *et al* (1999), Maxwell (2000), Vozoris and Tarasuk (2003) and the FAO (2006d) the percentage of income spent on food expenditure can tell us more about the character of the household's food security. The expenditure habits of the urban poor can be largely explained by Engels Law[14]. Engels Law stating that with a given set of tastes and preferences, as income rises, the proportion of income spent on food falls, even if actual expenditure on food rises. Essentially, we can expect that the poorer a household, the higher the proportion of their total income will be spent on food (Zimmerman, 1932; Houthakker 1957; Deaton and Muellbauer, 1980; Ray, 1998; Ragan and Lipsey 2004; FAO, 2006d). Thus by investigating how much a household devotes of total income to food expenditure, it can tell us about a

[14] A note on economic laws: "A proposition in economics which is supposed to be of general validity. The empirical testing of laws of economics is often less well founded than the testing of laws in the natural sciences. For this reason, the laws of economics as proportions of general validity may be less secure." (Bullock and Trombley, 1999: 250).

household's vulnerability to food insecurity. This in many ways makes intuitive sense and has been shown to be a largely valid economic law, for example Houthakker's (1957:532) study of *An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law* of 40 surveys spanning 30 countries found that elasticity's to be similar and thus "Engel's Law to, formulated in 1857, is confirmed by all surveys.". Tabatabai (1993), Ruel *et al* (1999) and Maxwell *et al* (2000) have shown that for urban African cities these observations about food expenditure hold true in their research findings. Tabatabai (1993) found that the average household expenditure on food in Kinshasa and Bandundu Town was between 65.1 – 74.2% of total expenditure. Table 2 from Tabatabai (1993) is of the two urban areas (Kinshasa and Bandundu) and how various income groups spend their monthly incomes.

Table 2 Kinshasa and Bandundu Town: Level and Structure of Expenditure by Monthly Consumption Expenditure per Consumption Unit

	Kinshasa					Bandundu Town				
Variable	LOW30	MED30	HIGH30	TOP10*	Total*	LOW30	MED30	HIGH30	TOP10	Total
MCE per CU[b] (zaires)										
Mean[c]	790	1,525	2,913	8,224	2,385	242	440	822	2,606	711
Range	110-1,132	1,132-2,005	2,005-4,550	4,550-55,750	110-55,750	54.0-337.6	337.6-554.4	554.4-1,320	1,320-17,640	54.0-17,640
Expenditure structure (percent)										
Food	72.0	69.4	65.7	55.5	65.1	81.2	75.3	74.9	65.7	74.2
Lodging	12.4	12.8	13.7	24.9	15.8	10.0	10.7	11.0	12.0	11.1
Clothing	5.1	6.8	7.9	7.0	7.0	3.0	4.0	6.3	10.5	6.4
Other	10.5	11.0	12.7	12.2	12.1	5.2	7.0	7.8	11.8	8.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] One observation with an unlikely total expenditure figure was dropped.
[b] Monthly consumption expenditures per consumption unit.
[c] Unweighted mean of household-level data.

Source: Tabatabai (1993: 41)

Table 2 shows us that food expenditure is the greatest cost for all income[15] groups. Furthermore, it shows that in both of the urban areas surveyed (Kinshasa and Bandundu) that as income decreases that total food expenditure becomes a great proportion of total income, which is in line with what we expect from Engel's Law. In Kinshasa, the lowest 30% (LOW30) of the populations use 72% of their income on food while the top 10% (TOP10) use a lower proportion of 55.5%. In Bandundu, the same relationship is true where the LOW30 spend 81.2 % of their income on food; it

[15] Total expenditure is used here as a proxy for total income. This is a commonly done such as the FAO paper by Naiken (2002).

slowly decreases to 65.7% at the TOP10. Additionally, it is noteworthy that lodging remained a stable part of total expenditure for both urban areas (Tabatabai, 1993).

Maxwell *et al's* (2000) work on urban food security found the same relationship as Tabatabai (1993) that as incomes increased, the total percentage of income spent on food decreased, from 61.1% in the lowest quintile to 40.7% in the highest quintile. Maxwell *et al* (2000:58) found that for the urban African context, e.g. Accra "finding['s are] consistent with the Engelian relationship between income and the percentage allocated to food."

The increasing percentage of income also tells us how vulnerable an urban household might be to food access failures. For example, a household with a high percentage of expenditure between 60 – 80% (such as those, in the two African urban studies above) are more vulnerable to food access failure (not being able to purchase food to meet their daily needs). With large percentages of income devoted to food and constraining factors like having to meet rent, transportation to work etc., these households are in danger of not being able to fully access food to meet their needs, especially if there are any sudden shocks such as food price increases (Ruel *et al*, 2010; Tabatabai, 1993; Maxwell *et al,* 2000). In fact, households that have high percentages of income devoted to food might already be cutting meals (demonstrating food access failure) due to other fixed urban expenses. Table 22 in Chapter 10 investigates what percentage of households, who have greater than 60% of their income devoted to food expenditure (demonstrating food access vulnerability), experienced food *access failure.*[16] The results of the investigation found that up to 30% of homes in some urban areas, who were food access vulnerable, were additionally experiencing food access failure.

A number of studies (e.g. Zimmerman, 1932; Deaton and Muellbauer, 1980; Ravallion, 1989, 1990, 1992; Maxwell *et al*, 2000; Ravallion and Lokshin, 2006) value this simple metric (Engels law) as a way to give insight into a household's food security situation. Critics however, have correctly point out that income and food

[16] Food Access Failure: in this research it is the term used when a household has report that due to insufficient finances the household failed to access their food needs, demonstrating itself in missing meals.

expenditure are not the only factors that influence food access (Zimmerman, 1932; FAO, 2006b). Nevertheless, in the case of the urban setting it works as a good predictor of households who are vulnerable to access failure. The CFS (2000) reported that it had short listed two indicators for cross-country comparisons in order to monitor the World Food Summit follow-up on 'vulnerability and food access': (1) the "percent income spent on food" (as discussed above) (2) and secondly, Gross National Product (GNP) per capita ("GNP per capita, although highly imperfect, does provide some indication of the extent to which a country's population will be able to afford the food needed to meet minimum dietary energy requirements for a normal and healthy life" CFS, 2000: paragraph 18). The first indicator "percent income spent on food" is favoured and was suggested by an Inter-Agency Working Group (IAWG) subgroup for inclusion in the list of core indicators for future monitoring. CFS (2000) argues that the "percentage income spent on food" is widely recognised as an important determinant of food security status for many poor. Nevertheless, to date, no FAO *The State of Food Insecurity* has used this measure, instead it has continued to rely on simplistic availability measures such as undernutrition (critiqued in Chapter 2.4). It is largely felt this is because undernutrition indicators are widely accessible while income and food expenditure data has not always been globally easily accessible (Section 2.4 and Sharma, 1992). While 'percentage of income spent on food' has application in all contexts as an indicator of food access and vulnerability to food access failure, it has even greater application to the urban context where access is largely an issue of finance.

It apparent from the literature review above, that an investigation needs to be done of the percentage of income spent on food expenditure within cities in Southern Africa. This would allow for a better understanding of food access issues within the urban context. Using available household survey data, I will monitor how average income and food expenditures change over time in certain urban centres and then have a more in-depth investigation into the percentage of income spent on food for three urban centres (Cape Town, Johannesburg and Durban)[17] in South Africa.

[17] These three cities were identified based on the criteria outlined in Section 5.2.2. Additional a note on the definitions of Cape Town, Johannesburg and Durban. It was decided to use South Africa's current administrative spatial definitions for each city. The official names of these administrative areas have changed

It is reasonable to believe, as discussed in the examples from the research above, that the urban poor are vulnerable to descending into food insecurity, if an income stream is interrupted by some means (e.g. loss of job, sickness due to HIV/AIDS, purchase power decreases or/and food price increase). Thus, a greater understanding of how much income is spent on food expenditure will reveal how close the poor are to becoming food insecure. Maxwell (1998: abstract) found that "[u]nder circumstances where the urban poor spend a very large portion of their total income on food, urban poverty rapidly translates food insecurity". Furthermore, investigating whether there is an increasing average 'percentage of income spent on food' in an urban centre, can act as a forewarning of potential future food access problems for urban residences in those centres.

Of the three conceptual divisions within food security, it is clear from the literature that urban food security is primarily an issue of *food access* (Maxwell, 1996; Weber *et al*, 1998). The primary way in which food is accessed in urban areas is through financial mechanisms. Food access for the urban poor is directly related to their income. Additionally Vozoris and Tarasuk (2003) Zere and McIntyre (2003) and others also found that increased income results in improved nutrition.

2.4 Current Indicators of Food Security: Critiques and a Possible Way Forward

While the definitions, concepts and understanding of food security have progressed rapidly in the literature (as reviewed above), monitoring of this newer more comprehensive understanding of food security has lagged behind. This is due to the fact that indicators have failed to capture the newer understanding of food security as well as having some severe methodological problems (Sharma, 1992; CFS, 2000; Naiken, 2003; Smith *et al*, 2006). These indicators only monitor some concepts within the WFS 1996 Food Security definition (FAO, 1996). Most of the indicators only

over time, however it was decided that for this research the cities would be referred to as Cape Town (Officially City of Cape Town), Johannesburg (Officially City of Johannesburg) and Durban (Ethekwini) (discussed further in Chapter 7; Stats SA 2007; Demarcation Board, 2010).

measure food availability based on early definitions of food security. Therefore, while the literature and food security definition has evolved to include the three core concepts of availability, access and nutrition, the monitoring of food security has largely been stuck in measuring food availability based on food security definitions from the 1970's (Sharma, 1992 and CFS, 2000).

Indeed the FAO itself recognised the shortcomings of current efforts to measure global food security. Sharma (1992) a food security economist at the FAO notes the need to develop suitable indicators which are independent of supply, in order to identify and monitor household food access. "The need for improved reporting on *household access* to food stems from a widely recognized observation that world food security is becoming *less* a problem of *global supplies*, overall stability and global stock levels as such, and *more* a problem of *inadequate access* to food supplies for vulnerable groups within a country,....while the incidence of food insecurity at the household level is known to be severe in many low-income countries regardless of whether they have food deficits or food surpluses, the status and trends of the problem are *not routinely monitored* because of lack of suitable indicators." Sharma (1992:1 *emphasis added*). The CFS (2000) reported that structures within the FAO suggested and short-listed a few indicators that needed to be added to fully monitor global food security. To fully measure food security, they suggested adding access indicators, including 'the amount a household spent on food as a percentage of total income' and nutritional indicators. However, over ten years has now passed and we are yet to see these additions in reports such as SOFI. Furthermore, others have made a clear call (e.g. Staaz *et al* 1990; Sharma, 1992; Maxwell, 1998; Crush and Frayne, 2010) for indicators of food security to simply reflect what the definitions requires of them i.e. to measure not only one part of food security but all of what it means to be food secure.

One example of the bias in monitoring food availability is reflected in the "FAO 7 Key monitors of Food Security" (Committee on World Food Security, 1999: expanded on in chapter 2.3), which only monitors food availability and neglects the concepts of access and nutrition. Two other measures that are used extensively by FAO in their annual *The State of World Food Insecurity* reports are: (1) *Per capita food consumption* and (2) a customized indicator "prevalence of undernutrition"

(POU) or "undernourishment"[18] which according to Smith *et al* (2006) are both essentially a measure of availability. As a result, the two POU indicators neglect the concepts of access and nutrition and thus only measure true food security in part. Below I examine the literature re both indicators, first briefly the *per capita food consumption* and then in greater depth the often-quoted *undernourishment* measure and what it indicates.

2.4.1 THE "PER CAPITA FOOD CONSUMPTION" INDICATOR

A number of studies, such as the FAO (2006b) use the measure "per capita". However, it is not explained as to what is meant by it or where the data was sourced. Further investigation into *per capita food consumption* makes it apparent that it is really a food availability indicator such as *total cereals in a country* (World Health Organisation and Food and Agricultural Organisation, 2003). The WHO/FAO (2003) report a more appropriate term for this indicator would be "national average apparent food consumption" since the data comes from national Food Balance Sheets rather than from food consumption surveys" which is simply an indicator of food available in a region or country, expressed in Kcal per capita per day. It does not indicate the nutritional status or actual access to the available food, by individuals in the region or country.

2.4.2 THE UNDERNOURISHMENT INDICATOR

The FAO also admits that their food security indicator "undernourishment" is more correctly an indicator of food deficiency and therefore does not truly capture all of what food security means. This indicator is made up of three key components: (1) the average amount of food available based on food balance sheets, (2) the level of inequality of food access to the food available based on coefficients of variation from household surveys (3) and the minimum number of calories required for an average person. An in-depth technical analysis on the formula used to derive the FAO "food security" indicator is outlined by Naiken (2002), in which he highlights the basic

[18] "or the percentage of a country's population that does not consume sufficient dietary energy" (Smith *et* al, 2006: x)

methodological framework for the FAO indicator and some weaknesses. Naiken believes that undernourishment is only an indicator of food availability.

With respect to 'undernourishment' the 2004, FAO *The State of Food Insecurity* acknowledges that there are limitations in the data and in their own methodology and analysis of food security (FAO, 2004). They also however, highlight four strengths of the 'undernourishment' measure (FAO, 2004: 14): (1) it relies on similar data from different countries, (2) can be updated regularly, (3) allowing for comparison across countries and (4) over time.

The literature is full of critiques of the FAO 'undernourishment' measure as the indicator of food security (e.g. Smith, 1998a; Ferris-Morris and Smith, 1997; Svedberg 1999, 2002, 2003; Gabbert and Weikard 2001; Haddad 2001; Aduayom and Smith, 2003; Naiken, 2003; Broca 2003 Smith *et* al, 2006). Smith's (1998) paper *"Can FAO's measure of chronic undernourishment be strengthened?* Is particularly useful in identifying methodological biases' in the 'undernourishment' indicator. This view is also supported by Aduayom and Smith (2003) and Smith *et al* (2006). Smith *et al* (1998a) argued for the use of household survey data to strengthen the undernourishment measure. Naiken, the then chief FAO Statistical Analysis Service response (Naiken cited in Smith, 1998b:32) was that of agreement "The emphasis on [Household Income and Expenditure Surveys] HIES data is not only quite appropriate but also timely. The principal aim of the FAO's periodic exercises of estimating the prevalence of undernutrition has been to provide information on the broad dimensions of the hunger problem in the developing world. In fact, although the estimates have been derived on a country-by-country basis, only the global and regional aggregates have been presented. The country-level estimates have not been made public precisely because of the acknowledged limitations in the data used and/or the assumptions that had to be made." Naiken (2003) reiterated the limitation of the 'undernutrition' measure was only available at above the national level as it is based on import and export data from food balance sheets. Thus (1) it only tells us about availability and (2) is limited to regional level estimates (who's validity is questioned). Hence, there is a need to identify data that can be used for analysis at the sub-national level which tell us about a household's ability to access food.

Gabbert and Weikard's (2001) paper *"How Widespread Is Undernourishment? A Critique Of Measurement Methods And New Empirical Results"* examined methodological issues relating to undernourishment indicator, concluding that cut-off points and the estimation error of the standard method of calculating undernourishment can be large. Naiken (2003) demonstrated the impact of changes to (1) the cut-off points and (2) changes in the mean food consumption could have major impacts on estimates of undernutrition, e.g. changes of up to 35%. Smith *et al* (2006) also argued that country estimates have been shown to vary considerably with slight variation in the methodology applied. Additionally Haddad's (2001) paper on *"The Analysis of The Factors Behind Progress Towards WFS Targets"* outlined considerable weaknesses in the analysis of undernutrition (highlighted in Table 7 in Haddad 2001: 15). Haddad (2001) points out that the undernutrition indicator has some significant shortcomings in that it: (1) cannot assess food insecurity either at the national or sub-national levels, (2) is conceptually different to food insecurity (neglecting economic, social and physiological access, vulnerability and safety) (3) has methodological and data weaknesses and (4) it is not in fact the only available data and that calorie data and other household survey data such as food expenses, income and whether the household is missing meals, is also available and potentially useful. Haddad (2000) also argues for more quantitative research, especially within countries, to determine performance in meeting WFS targets and to generate consensus as to what are the priority actions for reducing food insecurity. Haddad's (2000) strong critique highlights the disconnect between the current food security definition and what is measured. It also suggests that data is available in household surveys that can be potentially more useful in investigating food security at national and sub-national levels. It is clear from the literature, that households may be a potential source of available food security information (data) and may have application at the urban scale.

Svedberg, possibly the most adamant critique of the *undernourishment* measure argues in his 1999 paper *"841 Million Undernourished?"* that undernourishment: (1) is a unreliable indicator of the scope of the undernutrition problem, (2) erroneously finds chronic undernutrition to be most prevalent in Africa, (3) points policy in the wrong direction, and (4) is not suitable for monitoring progress toward the 2015 development goals. In *"Undernutrition Overestimated"* Svedberg (2002) strongly

criticize the FAO undernutrition measure: (1) as biased, (2) substituting critical "missing" parameters (such as, calorie cut-off points) with estimates (3) that "estimates provided by FAO are much too unreliable for directing policy in any meaningful way, or for simply providing an acceptably accurate "map" of POU in various parts of the world", (Svedberg, 2002: 26) (4) for having "...overestimated POU in the world, although unevenly so, signifying that the comparability across regions (and presumably individual countries) has been compromised." (Svedberg, 2002: 26) (5) Concluding that "If the objective to reduce by half the absolute number of undernourished people in the world before the year 2015 is taken seriously, and new policies are to be initiated, the international community simply must have more detailed and reliable information on where the undernourished are, who they are, and how many there are." (Svedberg, 2002: 26-27). Svdberg (2002) issues a strong call for new approaches that can tell us more reliable detailed information about who is food insecure. Household surveys potentially can offer information that is more detailed on where the undernourished are, who they are and how they are.

David (2003) questioned the input data reliability in calculating undernourishment and expressed the need for analysis at sub-national levels (e.g. for the food security situation in urban centres) which the undernourishment indicator was unable to measure. David (2003) suggested household survey data as a possible solution as they are designed to provide sub-national (e.g. urban and/or provincial) estimates. In the same way David (2003) Broca (2003) argued the underlying data needed improving and furthermore Broca (2003) concluded household surveys should be used at the very least to cross-check the FAO undernourishment measure, and that any concerns about complex household survey sampling designs can be mitigated by new statistical software tools. While Smith *et al*, (2006: 1) questioned the continued reliance on aggregate data on availability, rather than data on individuals or households ability to access food, which is the "...most immediate cause of hunger". Deaton's (2001) findings support Smith *et al* (2006) questioning the current measure of undernourishment using only aggregate national account, finding that it is perhaps a measure of available food and not a measure of a household's ability to access food.

Certainly better approaches to measuring food security are needed. Undernutrition as an indicator has been shown to be methodologically flawed and constrained. It has

problematic underlying data, and an inability to target or identify hunger at sub-national levels (such as urban areas) and it is conceptually distant from food security (only focusing on availability). Household surveys, without a doubt, have the potential to identify needed food security data at sub-national levels like urban areas.

As my research endeavours to explore urban food security and identify relevant food access data, the literature indicates that the analysis of household surveys, potentially offer the data and information needed. The question is - how useful, available and accessible is this data for food security analysis on the urban scale. Thus, the next Chapter explores what the literature shows has been done with household survey data in terms of food security studies and what the general limitations and strengths are of household surveys in exploring urban food security in Southern Africa.

2.4.3 A Possible Way Forward Using Household Surveys

Household surveys have been suggested by many (e.g. Sharma, 1992 ; Smith *et al*, 1998a; Haddad, 2000; David, 2003; Broca, 2003; Smith *et al*, 2006) as a good potential source of data for food security measurements. Household surveys amongst other things provide: (1) a 'bottom up' approach, (2) relevant data e.g. income, food expenditure, (3) analysis of food security at sub-national levels and (4) allow for the identification of whom, where and how hunger changes over time.

It is acknowledged in the literature that there are some likely limitations to using household surveys. In the past limitations have been: (1) the infrequent collection and low quantity of surveys in many countries (Chen and Ravallion, 2004; FAO, 2004), (2) differing questionnaire designs have made comparability difficult across countries and time (Babbie and Benaquisto, 2002; Verma, 2002; FAO, 2004; Smith *et al*, 2006), (3) difficulty in accessing past and present household survey data (e.g. personal experience discussed in Chapter 5.1; Smith, 2002) (4) concerns over complex household survey's sample strategies and the impact it can have on lower levels of analysis (Broca, 2003). (5) Some household surveys tend to underestimate the poor (van der Berg *et al*, 2005; Posel and Casale, 2005).

The literature indicates that these five limitations, mentioned above, can be mitigated in some respects by new techniques and changes in household surveys. Firstly (1),

Ravallion and Chen (1997) and Smith (2003) demonstrate that since the 1980s Southern African governments have more frequently collected household surveys as their usefulness is being realized. According to the FAO Statistics Division (2006d) the growing number of household surveys are simply not analysed due to a scarcity of resources and skills. For example, Smith (2003) identified seventy-three household surveys *nationally representative household expenditure surveys undertaken in the 1990s*, Smith (2003) also cites that the "IFPRI /FAO/World Bank AFINS project" identified thirty-three useful and available household surveys datasets in twenty countries since the beginning of the 1990's to 2003 in Sub-Saharan Africa alone. My own research of South African household surveys identified eight useful household surveys; dated between 1995 – 2005, which are useful in understanding urban food security (discussed in Chapter 9). The literature firstly (1) indicates that household surveys are collected a lot more frequently now than in the past. Secondly (2), there has been a shift to creating global standards in questionnaire and survey designs to allow for comparability across surveys (Smith *et al*, 2006; UNSD, 2009). Efforts by the *UN National Household Capacity Programme*, offered standards and guidelines for data collection and analysis, as a result many countries have adopted these standards. Additionally efforts by the *World Bank's Living Standard Measurement Survey Programme* had the effect of building capacity and a growing harmony in the developing world among survey design. This has allowed surveys to be largely comparable (UNSD, 2009). I found in my own review of 97 surveys in Southern Africa that many of them are very similar in sampling and questionnaire design and occasionally totally identical, probably due to being funded by groups such as the World Bank, Macro International, UNDP etc. Furthermore, new techniques have been developed to allow for comparison of dissimilar surveys (Babbie and Benaquisto, 2002; Haddad *et al*, 1999; Ravallion, 2001). An example of this is the EU's efforts in the Datafood Networking (DAFNE) project where the EU has researched generating a Pan-European food data bank based on various household survey data. This project has similarly demonstrated that harmonization issues can be overcome with common aggregation rules and sensible secondary data use (Lagiou *et al*, 2001; Smith, 2003). Thirdly (3) the accessing of past and present household survey data has been a challenge, however von Braun and Puetz (1993) and Svedberg (2000) point out that many previous and current datasets are being made more freely available for research to be done on them (e.g. personal experience: of the nine national statistical

organizations contacted, six replied and sent the needed data, also in-depth datasets were highly accessible through data archives, such as in DataFirst[19]). Perhaps the increasing openness is a result of (1) a growing realisation of benefits received by getting free research done on data, (2) pressure from funders to be open with datasets they funded, (3) requests from institutions such as the World Bank (4) and/or the setting up of databank archives such as the University of Cape Town's Data Archive DATAFIRST that houses and actively collects a growing number of datasets (well over 100 datasets). Fifthly (5), concerns over complex sample strategies and it's difficulties in analysis, can largely be mitigated today by the use of powerful software packages, such as STATA (Broca, 2003) and new sophisticated analysis (Babbie and Benaquisto, 2002) that allow one to make inferences about population parameters at low levels of analysis (Khandker and Haughton, 2005; Thomas, 2006). Sixthly (6) and finally, issues around biases and under reporting of certain segments of society can be mitigated to some extent by applying weighting to the responses (i.e. by more heavily weighting the responses of underrepresented groups).

Using these various mitigation techniques, household surveys (e.g. government household surveys) potentially have many advantages and lots to offer into the understanding of food security. Poor proxy measurement (e.g. undernutrition) really has no bearing on household food security. Thus, we need to heed the call by researchers to start identifying household survey datasets, which should more accurately analyse the realities of food security at national and sub-national levels. It seems to me that the key to understanding food security in the urban context is through household surveys and the good analysis of their data. This can be achieved by commissioning surveys such as the AFSUN surveys (e.g. Frayne, Battersby-Lennard, Fincham and Haysom, 2009) or by attempting to identify what previous household surveys are available and relevant to the Southern African urban context.

In addition to the advantages to household surveys already listed, Smith *et al* (2006) found that data and estimates from household surveys have a reliable information base, in that the data is based on the words of people. According to Smith *et* al (2006: 71) "In this sense, it is a 'bottom up' approach to measurement..." opposed to the

[19] University of Cape Town's Data Archive DATAFIRST that houses and actively collects a growing number of datasets (well over 100 datasets)

FAO approach which relies on formulas, national food balance sheets and crop production numbers.

Another advantage of household surveys is that they allow for the creation of a strong base of reliable food security measures at national and at sub-national levels, which allows for better targeting of food development goals. Household surveys enable researchers for the first time to ask and answer questions outlined by Smith *et al* (2006:1): "Where are the world's hungry? How many people are hungry? How is hunger changing over time? What are the causes of hunger? Answering these questions is essential to "draw back the curtain" on what is occurring within countries, and within rural and urban contexts.

Household surveys also contain important variables such as incomes, subsidies, food expenditure, household expenditure, and household demographics, reporting of food failures etc... and allow for relationships between these variables to be teased out (Sharma, 1992). This allows researchers to thoroughly explore access issues and how other factors inter-relate.

Additionally, the understanding of food security garnered from household surveys will help with Smith *et al* (2006: 1) "targeting assistance, evaluating whether progress is being achieved, and developing appropriate policies and programs for helping people...It has become even more urgent as efforts are stepped up to meet the Millennium Development Goal (MDG) of halving the proportion of people who suffer from hunger by 2015."

For these reasons, I make use of household survey data to evaluate and explore urban food security in Southern Africa. Below I present some of the findings from the current literature on using household surveys, primarily to demonstrate the possibilities for analysis from these papers, which give us a new and better understanding of food security.

Smith *et al* (2006) in *"Food Insecurity in Sub-Saharan Africa: New Estimates from Household Expenditure Surveys"* explored the extent and the location of where food security occurred in twelve Sub-Saharan African countries through using household

survey data. In an effort to compare the results to FAO measures of food security, they selected a similar measure for food purchases "Food energy availability" (i.e. not just attempting to evaluate food security in the region, but furthermore compare varying methods and their results). Smith *et al*'s 2006 "Food energy availability", derived from the surveys, was based on converting food consumed, to the amount of energy consumed by a household and by individuals (Smith *et al*, 2006). This per capita measure was then compared to the FAO undernutrition indicator's results for the same area. While ingenious for comparing to the FAO's 'undernutrition' indicator, the conversion process of food expenditure to amount of energy consumed has some limitations. However, they found that household surveys where useful and reliable in measuring food insecurity of countries and within countries. They also found that the extent of food insecurity was much large than those reported by the FAO when comparing the two measures. On average, the household survey estimated the average national prevalence of food energy deficiency to be 58.5% while the FAO estimated it to be 39%, a difference of almost 20%.

Using households surveys Smith *et al* (2006) was also able to demonstrate their ability to deconstruct food security at sub-national levels and constructed the Table 3 showing "Urban-rural differences in estimates of food security and insecurity".

Table 3 Urban-rural differences in estimates of food security and insecurity

Urban–rural differences in estimates of food security and insecurity

		Food energy availability				Diet quality			
		Energy availability per capita		Percentage of people food energy deficient		Household diet diversity		Percentage of households with low diet diversity	
Country	Year	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Burundi	1998	1.539	2.674	76.2	41.3	4.4	5.9	46.0	6.5
Ethiopia	1999	1.680	1.444	74.4	89.2	4.7	5.5	40.0	15.2
Ghana	1998	2.358	2.269	50.5	53.1	5.7	6.0	7.6	8.6
Guinea	1994	2.645	2.234	40.6	54.3	5.8	6.6	9.7	3.5
Kenya	1997	2.473	3.168	46.3	30.2	5.2	5.9	28.2	12.0
Malawi	1997	1.621	1.533	73.0	76.3	4.2	5.7	53.6	16.8
Mozambique	1996	1.935	2.524	62.9	50.7	4.0	5.1	70.1	29.3
Rwanda	2000	1.824	2.159	66.5	55.4	4.3	6.3	54.1	4.9
Senegal	2001	2.065	1.827	54.3	68.5	5.6	6.3	11.0	4.3
Tanzania	2000	2.487	2.314	41.8	52.7	5.8	6.2	11.0	5.1
Uganda	1999	2.658	2.493	36.3	40.7	4.2	5.3	56.5	21.1
Zambia	1996	1.750	1.788	71.2	70.9	4.1	5.6	60.9	11.8
Mean		2.091	2.203	58.1	57.1	4.8	5.9	37.4	11.6

Note: All values are corrected for survey sampling designs.

Source: Smith *et al* (2006: 51).

The Table 3 demonstrates, using household survey data, that for Ethiopia, Ghana, Guinea Malawi, Senegal, Tanzania and Uganda a greater percentage of urban households are food energy deficient than compared to their rural counterparts. Additionally the mean percentage difference between urban and rural households, in terms of percentage of people food energy deficient was only 1%. Once again, this highlights the critical need to understand urban food security in Southern Africa and that food insecurity is not simply a rural phenomenon.

The results of studies done by Datt *et al* (2000) and Smith (2003) in Mozambique revealed significant levels of food insecurity in urban areas. Both studies investigated Mozambique using the National Household Survey on Living Conditions 1996-1997. With the survey data, they were able to analyse at the national, regional, urban, rural and at the city scale for Maputo City using techniques to compensate for sample design effects, demonstrating the power of household survey data to allow for low-level analysis of critical areas. Datt *et al* (2000) reported that 53.4% of the Mozambican population is estimated to have per capita consumption levels below the poverty line and 37.8% of the population is estimated to fall below the 60% of

poverty line. Datt *et al* (2000: 23) noted "...that none of the urban/rural differences in ultra-poverty [60% line] are statistically significant..." and "...on average, the urban ultra-poor have a slightly greater gap between their consumption levels and the ultra-poverty line, and greater inequality among the ultra-poor. Datt *et al* (2000) found that while currently poverty is still predominately found in the rural context in Mozambique, levels of poverty are high within an urban area, such as Maputo City with a headcount of 48%. Additionally Smith (2003) found that a higher percentage of urban dwellers were more food insecure than their rural counterparts in Mozambique, although a greater number of food insecure were in rural areas.

Other studies using household surveys such as de Klerk *et al* (2004) offer a comprehensive investigation into the South African rural food security situation. Although the stated focus of the paper was food security in rural areas, many urban measures were explored and the study exemplifies what can be done using household surveys. Further more the study demonstrates the uncertainty about what is occurring in South Africa's urban areas. This is revealed in assumptions such as "It can reasonably be assumed that the roughly 30% of lowest income households who reside in urban areas are almost all among the most food insecure, given their lack of access to agricultural land." (de Klerk *et al* 2004: 7) However, this statement is not backed up by any quantitative or qualitative data.

2.5 SUMMARY

With more than 1 billion people hungry today, hunger is compromising people's ability to improve their lives. The issue of inadequate access to food reduces people's capacity, choices and opportunities to secure a decent livelihood. Hunger compromises people's ability to work effectively which further undermines the dignity of the poor. Household surveys offer a way to identify, target and monitor the food insecure within a country, rural or urban context or in various urban centres (DFID, 2002; FAO, 1996, 2005; Ray, 1998; Smith *et al,* 2006, WHO, 2006a).

Southern African data on food security has not significantly utilized household surveys to effectively analyse what is happening on the ground in urban areas in terms

of food access. Household surveys seem to offer the possibility of gaining a far-reaching and thorough understanding of urban food security in Southern African cities. This is all the more pertinent when one takes into consideration that the major issue is the ability of the urban poor to access food.

It is for these reasons I choose to make use of household surveys as they offer the most viable potential to give meaningful reliable results on the realities of food security in Southern African urban areas, which will lead to a more comprehensive understanding of urban food security.

CHAPTER THREE: THE URBAN TRANSITION

Food security in an urban context is becoming significantly important as populations urbanise. It is thus vital to investigate the urban situation with regard to food security as the urban transition takes place, else the nexus of poverty will shift to the urban areas and into a situation, which is not understood or researched. If the MDG's are to be realised surely one must take into account the urban transition especially for those in food insecure situations. The following review of the literature shows the understanding of this Urban Transition which is and will be so crucial to our understanding of the Food Security Situation of Urban areas.

The 'Urban transition' describes "the passage from a predominately rural to predominantly urban society" (UNFPA, 2007: 7). As a global humanity, the urban transition thus describes the period we find ourselves in. In 2008, we 'globally' transitioned from a mostly rural existence to an urban one. Over 3.3 billion people now live in urban areas and by 2030 it will be almost 5 billion (DESA, 2008). Africa itself is entering this time of urban transition and by 2030, more Africans will live in urban areas (579 million) than rural areas (552 million). Africa's urban population is expected to increase by a stunning 367 million and its rural population by 141 million (Kessides, 2006). Southern Africa in particular has the fastest urbanisation rate and slum growth rate[20] in the world. It is estimated that more than half the Southern African population will be urban by 2025 (UNCHS, 2001).

Characteristic of this urban transition in Southern Africa, Africa and globally is an increase in urban poverty and associated food insecurity. Thus, urban areas should be key focus' to reach millennium development goals (Wratten, 1995; UNCHS, 2001; Hasan *et al*, 2005; UN-Habitat, 2006; UNFPA, 2007).

Three key trends have been identified by the UN-Habitat (2006) *State of The World's Cities Report 2006/7* that will characterize continued rapid population growth. (1)

[20] Slum growth rate: is based on statistics for the whole of Sub-Saharan Africa (not available at Southern Africa scale).

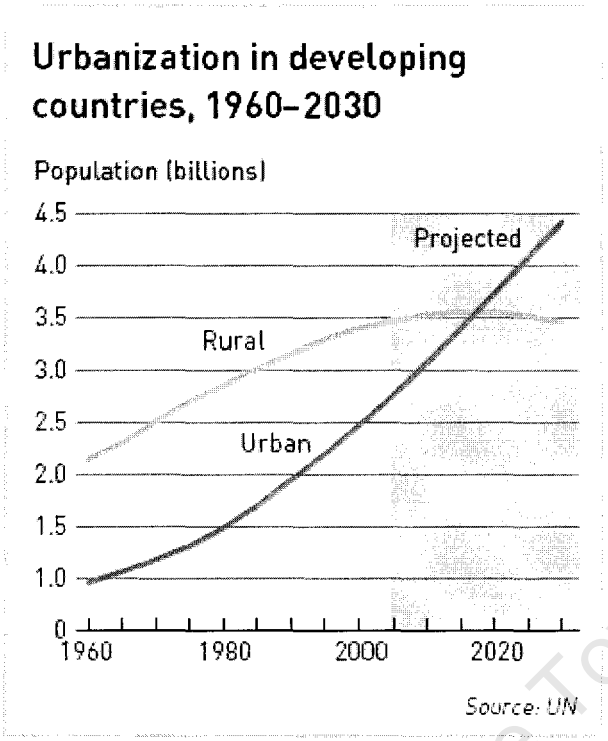
Firstly, a large amount of the rural population will move to small towns and cities, with less than 1 million inhabitants, when migrating to urban areas. (2) Secondly the world's mega-cities are going to be predominately found in the developing world. (3) Thirdly, cities in the developing world will see most of the world's urban growth in the future.

Naylor and Falcon (1995), Ravallion (2001), UNFPA (2007), Ravallion *et al* (2007) and Baker (2008) explain that this transition to the urban in developing areas will be characterised by poverty. The urban growth currently is and will continue to be associated with slum growth rates, with Sub-Saharan Africa experiencing the highest prevalence of slums (71.9% over urban dwellers) and the fastest slum growth rates (DESA, 2008). Poverty and associated food insecurity is shifting from rural areas to urban areas as the populations transitions to urban areas (Ravallion, 2001). Faced with limited incomes, high costs for services and basic needs, a growing number of urban poor find accessing food a growing challenge.

3.1 THE URBAN TRANSITION: GLOBAL REGIONAL AND LOCAL TRENDS

The globe has transitioned from a rural heritage to an urban future and now has a greater population of people living in urban areas than rural areas. While the world's urban populations has been growing rapidly in the last 100 years, the next 30 years will see an extraordinary scale of urban growth, both in number and proportion, particularly in the developing world. The urban population is expected to grow to 4.9 billion. The rural population is expected to decrease, even with a natural increase, by 28 million between 2005 and 2030 as people make the transition to the urban. Nowhere is the transition going to be more felt than in developing nations, as seen in the Figure 5 below of *Urbanisation in developing countries between 1960 – 2030* (UN-Habitat, 2006; UNFPA, 2007; DESA, 2008).

Figure 5 The Urban Transition in Developing Countries, 1960-2030



Source: FAO (2004: 18)

As seen in Figure 5 the developing world will continue to see rapid urban growth through natural growth and as people make the transition to the urban. The developing world will absorb "95 per cent of urban growth in the next two decades, and by 2030, will be home to almost 4 billion people, or 80 per cent of the world's urban population" (UN-Habitat, 2006: viii). By 2030 approximately, 60% of the developing world population will live in cities (FAO, 2004; UNFPA, 2007). This drastic population shift in the developing world should be refocusing development efforts to focus on the urban (Amis, 1995; Haddad *et* al, 1999; UN-Habitat, 2006).

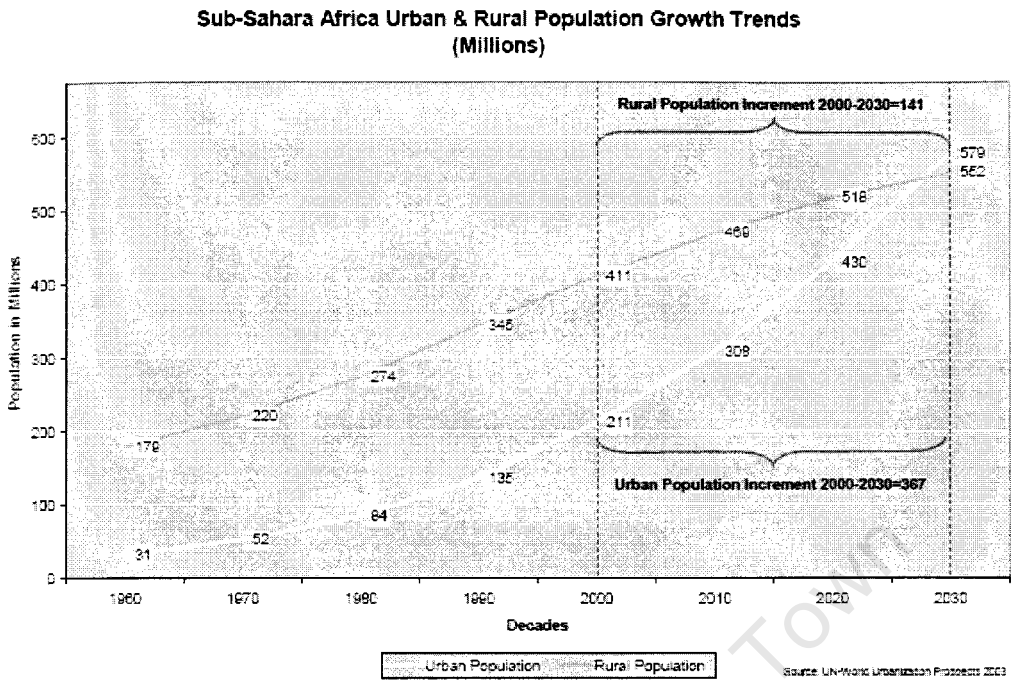
Africa and Asia are expected to have the most significant urban growth in the developing world. Both will double their urban population between 2000 and 2030. While urban growth in these developing regions present great opportunities it also presents challenges, as this urban growth will be characterised by growth in urban poverty and hunger (Maxwell, 1998; Haddad *et al*, 1999; UN-Habitat, 2006; UNFPA; 2007). For example, in the 1990's, urban areas in Asia (China) had a far higher

percentage of their population going hungry when compared to rural areas. (FAO, 2004).

The transition to the urban in Africa is particularly marked, with an urban growth rate of around 5% annually. Already one-third of Africans find themselves urbanites and by 2030, it is expected that there will be an additional 300 million urban dwellers in Africa (Kessides, 2006). High levels of hunger and poverty are expected to characterise this high urban growth rate in Africa (Maxwell, 1998; Haddad *et al*, 1999; UN-Habitat, 2006; UNFPA; 2007).

Of all the regions in Africa, Sub-Saharan Africa is expected to continue to show the highest annual urban growth rates. However Satterthwaite (2002) does advise some caution with the Sub-Saharan statistics as some of the assumptions (for 6 out of 47 countries) are based on surveys that are more than 10 years old and 3 of the 47 countries have only ever undertaken one census. There still is no doubt that Sub-Saharan urban areas are seeing rapid growth and overall the total percentage of the population in rural areas is decreasing. The following Figure 6 graphical depicts the urban transition in Sub-Saharan Africa.

Figure 6 The Urban Transition in Sub-Saharan Africa



Source: Kessides (2006: 5)

From the Figure, we see that the rural population in Sub-Saharan Africa will continue to exceed the number of individuals in urban areas until a few years before 2030, and then we will see the transition from a mostly rural to mostly urban society. It is expected that in Sub-Saharan Africa by 2030, 579 million people will live in urban areas and 552 million people in rural areas. As a sub-region of Sub-Saharan Africa, Southern Africa has highest urban growth rate in the world (UNCHS, 2001). Table 4 below shows the studies of Southern African countries urban populations, rural populations and growth rates.

Table 4 Size and Growth of Urban and Rural Populations in study Southern African Countries

	Levels of urbanisation (%)[1]			*Urban population (thousands)*[2]			*Urban Annual Growth (%)*		*Rural Population, Estimates and Projects (thousands)*			*Rural Annual Growth rate (%)*	
Countries	*2000*	*2015*	*2030*	*2000*	*2015*	*2030*	*2000-2015*	*2015-2030*	*2000*	*2015*	*2030*	*2000-2015*	*2015-2030*
Botswana	50.3	58.4	66.0	815	1148	1558	2.3	2.0	807	819	803	0.1	-0.1
Lesotho	28.0	38.9	48.7	602	1126	1848	4.2	3.3	1551	1767	1945	0.9	0.6
Malawi	24.9	44.1	54.8	2723	6901	12097	6.3	3.7	8202	8809	9987	0.5	0.8
Mozambique	40.2	51.5	60.2	7917	12989	20160	3.3	2.9	11764	12222	13348	0.3	0.6
Namibia	30.9	39.4	49.2	533	801	1228	2.7	2.9	1193	1230	1267	0.2	0.2
South Africa	50.4	56.3	64.3	20330	24431	30624	1.2	1.5	20047	18955	17020	-0.4	-0.7

Swaziland	26.4	32.7	42.3	266	481	813	4.0	3.5	742	989	1110	1.9	0.8
Zambia	39.6	45.2	54.6	3632	5794	9169	3.1	3.1	5537	7023	7635	1.6	0.6
Zimbabwe	35.3	45.9	55.2	4121	6225	8745	2.8	2.3	7548	7346	7108	-0.2	-0.2
Mean	*36.2*	*45.8*	*55.0*	*40939*	*59896*	*86242*	*3.3*	*2.8*	*57391*	*59160*	*60223*	*0.5*	*0.3*

Note: [1] *Level of urbanization*: refers to the percentage of the population residing in places classified as urban. Urban and rural settlements are defined in the national context and vary among countries (the definitions of urban are generally national definitions incorporated in the latest census).
[2] *Urban and rural population*: data refers to the mid-year population.

Source: Own compilation from UNCHS (2001)

Table 4 shows that for all Southern African countries studied, the levels of urbanisation are expected to increase significantly as we head towards 2030 (mean 36.2% to 55%). By 2030, all the studied Southern African countries will exceed or will come close to having greater than 50% of their population in urban areas, with the exception of Swaziland, which is projected to have a 42.3% of their population in urban areas. While urban growth is projected to grow, the rate of growth is expected to slow slightly, but it will remain above 2% (except in the case of South Africa, which will increase from 1.2 to 1.5%). Generally rural growth rates are expected to decrease and in some cases become negative growth. All these factors reflect the same message: that the transition to the urban is rapidly underway in Southern Africa (UNCHS, 2001). Closer to the year 2030 urban growth rates are expected to decrease marginally. Southern Africa and Sub-Saharan Africa "…is expected to sustain the highest rate of urban growth in the world for several decades, with underlying rates of natural increase playing an important role" (UNFPA, 2007:11). Crush, Frayne and Grant (2006) demonstrate that while the urban transition is occurring in Southern Africa, migration is not simply a rural "push" and urban "pull" phenomena. There is a lot of hidden complexity with individuals often moving between urban-rural and rural-urban and/or urban-urban. The studies that Crush *et al* (2006) outline (Ellis and Harris, 2004; Gagler, 2002; Potts, 2000; Anderson, 2001; Englund, 2002; Cross, 1998) all demonstrate that many individuals move between the rural – urban, urban – rural and other combinations, in a way to diversify income streams for a household and there isn't necessarily one general shift for an individual or household. However Crush *et al* (2006) agree that there is generally a transition to the urban, and a subsequent need to focus research on the urban to better understand the complexities that these new urban dwellers experience. Crush *et al* (2006) goes onto point out that the transition is largely characterised by poverty and food insecurity especially in Southern African urban areas, a fact supported by Wratten (1995), Maxwell *et al*,

(2000), Zere and McIntyre (2003), Baker (2008) and many others referenced in this literature review.

It is clear that the world is transitioning to the urban and nowhere is that more evident than in Southern Africa, which has the fastest urban growth rate in the world. In a few decades, more of Southern Africa's population will be in urban areas and hence there is a desperate need to understand what is occurring in these urban areas. The UN-Habitat (2006), UNFPA (2007) and South African Cities Network (SACN) (2006) all argue that if the MDG's are to be met, the battle ground is going to be in urban areas where currently a large number and in the future where most of the world's populations will be located. In trying to meet these development targets and the alike we need to work out how to ask simple questions from the data, such as, 'How many people are 'poor' within these urban areas?' 'How many people are currently food insecure, and is food insecurity a growing trend in our urban areas?' With this, we can then starting asking questions like, 'What allows some urban households to remain food secure, while others do not?' However, before that can happen we need to identify what data is available and accessible for Southern African urban areas and what can be said from the data that is available. Identifying the data and seeing what can be asked of the data is in part of the objective of this thesis.

3.1.1 The Urban Transition of Poverty: Global Regional and Local Trends

What can be said generally from the literature is that the rapid growth in urban areas is also accompanied by a rapid growth in urban poverty. Many of these rapidly urbanising developing regions have urban areas that are increasingly characterised by inequality, poverty and food insecurity. What Ravallion *et al* (2007) termed the 'urbanisation of poverty'. UN-Habitat (2006: 48) reports that undoubtedly "poverty is shifting to urban areas and growing in magnitude". Table 5 highlights some key estimates of global urban poverty.

Table 5 Urban Poverty Estimates 2002, using $1.08/day and $2.15/day lines (in 1993 PPP)

Region	Number of urban poor (in millions) "$1/day"	Number of urban poor (in millions) "$2/day"	Headcount Index (%) "$1/day"	Headcount Index (%) '$2/day'	Urban Share of the Poor $1.08/day	Urban Share of the Poor $2.15/day	Urban Share of the population
EAP	16	126	2.2	17.7	6.7	15.1	38.8
China	4	53	0.8	10.7	2.2	9.5	37.7
ECA	2	32	0.8	10.7	33.4	49.9	63.5
LAC	38	111	9.5	27.5	59	65.6	76.2
MNA	1	20	0.7	12.4	19.9	29.3	55.8
SAS	135	297	34.6	76.2	24.9	25.2	27.8
India	116	236	39.3	80.1	26	26	28.1
SSA	99	168	40.4	68.5	30.2	31.1	35.2
Total	291	752	13.2	34	24.6	26.4	42.3

Note: EAP, East Asia and the Pacific; ECA, Eastern Europe and Central Asia; LAC, Latin America and the Caribbean; MNA, Middle East and North Africa; SAS, South Asia; SSA, Sub-Saharan Africa.
* The headcount index represents the proportion of the urban population below the poverty line.
* The urban share of the poor represents the proportion of the urban poor of the total poor.

Source: Baker (2008: 3)

Table 5 above was originally constructed from Ravallion, Chen, Sagraula's (2007) work on *New Evidence on the Urbanization of Global Poverty* and demonstrates that the estimated number of poor below the $2/day poverty line was 752 Million (around 34% of all urban residents) and 290 Million at the $1/day poverty line. From the Table we observe the proportion of poor below the $2/day line is notable in South East Asia at 76.2 % and Sub-Saharan Africa at 68.5%.

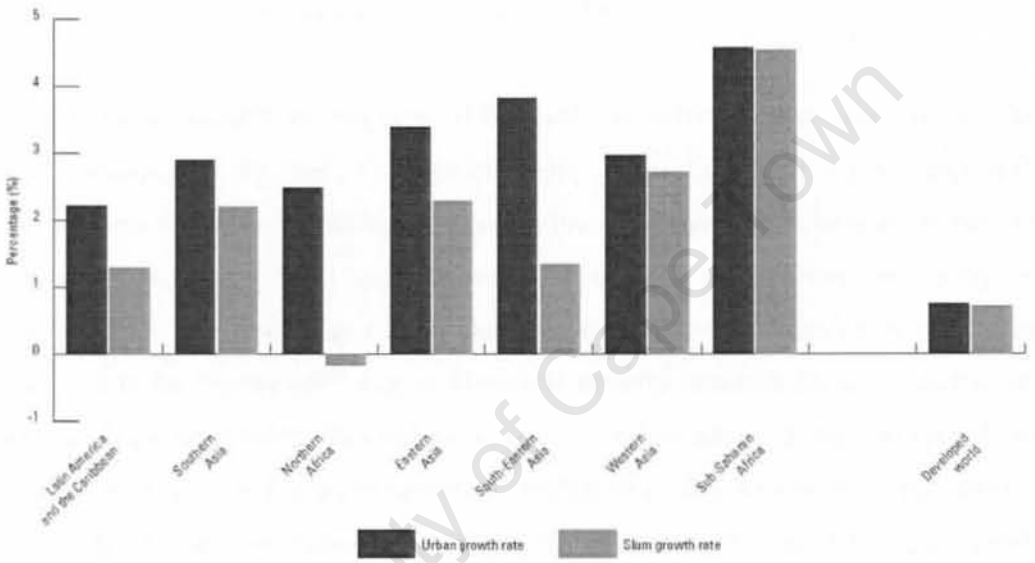
Ravallion *et al* (2007) found (1) that the poor have been urbanising quicker than the general population and (2) currently, one quarter of the world's consumption poor live in urban areas and (3) that this proportion has and is expected to rise over time. (4) That urbanisation has done little for urban poverty (5) in fact between 1993-2002 the number of "$1 a day" poor fell by 150 million in rural areas but increased by 50 million in urban areas, emphasising the urban transition into poverty. (6) Additionally they found, Sub-Saharan Africa has not seen overall falling poverty levels, as the population transitions to the urban, instead it has seen increasing urban poverty and only a small reduction in rural poverty. This makes the study of urban poverty and food security an important 21st century need, as poverty and hunger continue to shift to urban areas in the developing world and in particular Sub-Saharan Africa.

UNFPA (2007), Ravallion *et al* (2007) and Baker (2008) all indicate that the urban transition is also charaterised by a transition of poverty to urban areas particularly in the developing world. The growth in poverty and associated food insecurity is generally attributed to the urban transition, comprised of rapid natural increase, migration of rural population and reclassification of old rural areas into large urban centres (de Haan, 1997; Maxwell, 1998; Haddad *et* al, 1999). By 2035, Ravallion (2001) calculates that the majority of the poor will be found in urban areas. This underlines the critical need to understand current trends and to find tools (strategies, policies, engineering solutions, job creation etc.) to mitigate inequality, poverty and food insecurity in urban areas.

Not only is there increasing poverty in urban areas in absolute terms but also in relative terms. Work by Wratten (1995), Towsend (1993), Moser (1993, 1996), Hossain (2005) and others all demonstrate that urban households that are better off in terms of absolute poverty measures possibly could be worse off relative to their rural counterparts. Suppose an urban household has more monetary wealth than a certain rural household - it is possible they may in fact have less access to basic needs and services due to the higher costs in urban areas, thus it can be argued that relative to their rural counterparts they are relatively in more poverty. Wratten (1995: 14-15) writes for this reason "...supplementary social indicators are sometimes used to define poverty, such as life expectancy, infant mortality, nutrition, the proportion of the household budget spent on food, literacy, school enrolment rates, access to health clinics or drinking water....to contrast the welfare of rural and urban populations since they avoid the problem of rural–urban price differences". Towsend (1993) argues further when poor urban household are compared to their other urban counterparts they can be considered to be in relative poverty to those around them. These ways of measuring poverty are known as relative poverty, as opposed to using absolute poverty measures such as poverty lines. These relative approaches tend to further elevate the need for action, for research and for methods in identifying and dealing with urban poverty and hunger.

An additional indicator of the growing urban transition of poverty is the fact that global slum[21] rates are on the increase as the rural population migrate and natural growth takes place in urban areas. According to UN-Habitat (2007) food insecurity in these slums is often the same or worse than rural villages in some regions. The high percentage of urban dwellers that now live in slums (and their continued growth) is a visual indicator that poverty and food security is an urban issue. The Figure below demonstrates the annual growth rate in cities and slums.

Figure 7 The Annual Growth Rate of Cities and Slums



Source: UN-Habitat (2006: 49)

The Figure above reveals that slum growth rates are closely associated with urban growth rates, reflecting the urbanisation of poverty and food security discussed above. Slum growth rates are especially noticeable in Sub-Saharan Africa, Southern Asia and Western Asia. Slum growth rates are highest in Western Asia (2.71%) and Sub-Saharan Africa (4.53%, more than twice the world average). Sub-Saharan Africa has the highest slum and urban growth rates in the world making it an important development priority (UN-Habitat, 2006). Indeed "the locus of poverty" is shifting to urban areas in particular Southern African urban areas (Naylor and Falcon, 1995; UN-Habitat, 2006: 52).

[21]Sums as defined by UN-Habitat (2006): "a squalid and overcrowded urban area inhabited by very poor people".

Poverty in urban areas is a growing and pressing matter. This is especially true in regions like Sub-Saharan Africa, which is already associated with hunger and other development priorities. The 2007 *State of the World Population: Unleashing The Potential of Urban Growth* reports that "Hundreds of millions live in poverty in the cities of low- and middle-income nations, and their numbers are sure to swell in coming years. Over half of the urban population is below the poverty line in...Malawi, Mozambique and Zambia. Many others have 40 to 50 per cent living below the poverty line, including... Zimbabwe" (SOWP, 2007: 15). Many other nations would be included in this list if their poverty lines made allowance for the real costs of non-food necessities in urban areas." SOWP, 2007: 15

In the coming decades the majority of Sub-Saharan Africa's poor will live in urban areas. However, as Wratten's (1995) work *Conceptualizing Urban Poverty* argues the development discourse is still biased towards the rural, even with changing population dynamics. Wratten (1995) notes poverty was (and still viewed by many as) predominately understood as a rural phenomenon and urban areas cities are largely perceived to be "better off", due to historical poverty research showing deeper and more widespread poverty in rural areas than in urban areas. It was perceived that because resources were more concentrated within cities that they were being biased in some way and so the "urban bias" thesis flourished in the late 1970s and 1980s. Lipton (1977) had argued that rural areas suffered due to governments been biased towards concentrating finances and support to urban areas over rural areas. Lipton's urban bias argument along with influential economists at the World Bank (e.g. Bates, 1988 and Berg, 1981) successfully lobbied for their view. In 1981 Berg's (1981) World Bank report on *Accelerated Development in Sub-Saharan Africa* advocated the urban bias theory and proposed pro-rural approaches to compensate for the past perceived urban biases (Corbridge and Jones, 2005). As a result planning and policies were influenced by this "urban bias" thesis and a strong focus was placed on rural development to compensate for this "bias" (Baker and Pedersen, 1992; Jones and Corbridge, 2010). As discussed in Chapter 2.3.1 and by the UNCHS (2001) 'urban bias' policies such as structural adjustment served to impoverish the majority of urban households due to work force cut backs and declining wages. Today many institutions and governments are either still influenced by anti-urban bias policies and mind-sets, by actively advocating for rural bias approaches or simply stuck in this philosophy

due to the large cogs of bureaucracy and institutional inertia lagging behind the reality of growing urban poverty. It has being argued by UN-Habitat (2006) and UNFPA (2007) that the urban offers opportunities to address poverty in a new way and more effectively target the poor as urban areas concentrate poverty today and will continue to in the future. UN-Habitat (2006) and UNFPA (2007) now argue for a more pro-urban or at least an equal approach to poverty reduction efforts as the locus of poverty shifts to urban areas.

Poverty is a complex issue and its measurement is highly contested in the literature (e.g. Blakburn, 1991; Townsend, 1993; Rakodi, 1995; Wratten, 1995; Narayan *et al*, 2000). While the debate is not the focus of this research, it is important to acknowledge the complexity and history around defining poverty. Poverty is sometimes easier to 'know it' when you 'see it', however it has proven hard to define and measure. The debate about poverty and what it means has been wide ranging from challenging the use of poverty lines (e.g. Rakodi, 1995; Baulch, 1996b), to challenging absolute measures and advocating for relative ones (e.g. Blackburn, 1991; Townsend, 1993). Those who have applied these critiques more explicitly to the urban situation (e.g. Rakodi, 1995; Mitlin, 1995; Wratten, 1995) point out that the differences in costs of living between urban, rural, and even between various urban areas, often lead to an underestimation of urban poverty. This demonstrates the need to be cautious in using the same poverty measures when comparing the rural and urban. Some have critiqued the fact that measures and indicators of poverty are to aggregated and like with issues of food security, poverty indicators are needed at sub-national level e.g. for particular urban centres. This would better target the needs of people particularly in the context of the urban transition (Hulme and Shepherd, 2003). It is for these reasons that I want to identify household security data that will allow for in-depth understanding of urban food security in particular urban centres.

The World Bank which is known generally for their biases to financial and statistical measures to describe poverty concepts, commissioned an influential study *Voices of The Poor: Crying out for change* by Narayan *et al*, (2000) highlighting poverty measures are often simplistic and do not capture overall well-being (e.g. powerlessness, dignity, sense of security, respect and other issues of personal justice). The UNFPA (2007) report makes the same point about urban poverty figures, that at

times they can be imprecise and miss all the aspects (e.g. wellbeing) of what it means to be poor. The World Bank additionally offers a collection of poems in trying to describe the nature of poverty (World Bank, 2010), while Sen (1981) looks to the works of Shakespeare to give poverty words. However all three agree quantifiable indicators and measures are required to meaningfully monitor, compare and target poverty. UN-Habitat (2006) and Baker (2008) explain that this is especially true in the case of the urban poor, where limited access to income and employment affects their food security, living conditions, health and a plethora of other issues.

Some of the key issues the urban poor face, according to Amis (1995), UN-Habitat (2006) and Baker (2008), are: (1) limited access to income and employment (2) associated household food insecurity (3) inadequate and insecure living conditions, often in slums (4) poor infrastructure and services (5) vulnerability to risks such as natural disasters, environmental hazards and health risks particularly associated with living in slums (6) spatial issues that inhibit mobility and transport; and (7) inequality closely linked to problems of exclusion. The majority of goods and services within urban areas in Southern Africa are accessed through financial means, or require the trade of a good or service that has requires financial input to create (e.g. artistry, raising of chickens etc.). Therefore, the chief goal for the urban dweller is to secure some form of financial income to secure their urban livelihood. This often proves to be difficult as increasing number of people compete for limited jobs.

This complex issue of poverty is thus the first issue in the transitioning of the population to the urban areas. The second related feature of transitioning to urban life is the issue of food insecurity in the urban areas. In urban areas, the concept of food security is an issue of food access, directly related to household's ability to access income streams.

3.1.2 The Urban Transition of Food Security: Global Regional and Local Trends

Maxwell (1998) and others (e.g. Ravallion *et al*, 1997; Haddad *et al,* 1999; UN-Habitat, 2006) argue that the rapid global transition to the urban and associated

poverty swiftly translates into urban food insecurity, due to the fact that in the urban context today food security is directly related to income poverty. The FAO (2004: 22) commented that "[u]rbanisation...[is] redrawing not only the map but the profile of hunger and malnutrition in developing countries". Certainly, Haddad's *et al's* (1999) study *"Are Urban Poverty and Undernutrition Growing? Some Newly Assembled Evidence"* investigating fourteen countries has been a significant contribution. They found, by using household survey data that in the majority of countries the proportion and absolute numbers of poor and food insecure has and is increasing in urban areas.

Clover (2003) affirms that central to poverty in Sub-Saharan Africa and Southern Africa is food insecurity. Clover (2003:9) goes onto state that "Food insecurity and hunger are closely related to poverty and an inability to purchase food. Tackling hunger cannot be solved by simply producing more food— famines have occurred even with plenty of food. Most people buy food rather than produce it..." Certainly, food security in urban areas is an issue of access and the incidence of food insecurity in Southern Africa would seem to be increasing with what we know about poverty increases and the urban transition in Southern Africa.

Maxwell (1998) suggests that while urban food insecurity is on the increase in Sub-Saharan Africa due to rapid urbanisation and increasing poverty within cities, it is no longer on the political or development agenda for two main reasons; (1) Firstly cities have been seen as outposts of the rich (due to development theories, such as Lipton's 'urban bias' thesis) and the rural context seen as where the poor are located. (2) Secondly, urban food insecurity is now less visible than in the 1970s and 1980s when shortages of food supplies in city were highly visible. However today urban food security is an issue affecting the poor in the city due to a lack of access to available urban food. Thus urban food security is largely hidden in homes behind closed doors not in open empty malls. Hence urban food security has shifted largely from an issue affecting the city population as a whole to now one affecting households differently depending on income and their subsequent ability to access food.

Findings from urban food security studies discussed earlier (Chapter 2.3.3 e.g. Haddad *et al*, 1999; *Maxwell et al*, 2000; Watkinson and Makgelta, 2002; Gibson and Rozelle, 2002; Jamal, 2002; Zere and McIntyre, 2003) all conclude (1) that

conceptually urban food security is an issue of access due to lack of finances and (2) that there is a great need to focus research and development agenda's on the growing urban food insecurity crisis. For this reason, this research will identify what data is available and accessible for urban food security research for this thesis and for future research.

The urban transition presents many challenges to a household's food security. Urban households are vulnerable to failing to access food: (1) due to insufficient income, (2) shocks to income streams (jobs disappearing - decreases in income) (3) difficulties in securing stable employment (due to many Southern African countries high unemployment), (4) rapid price increases in foods, (5) high urban living costs and services (e.g. shelter, transportation to work) and the potential for living costs to increase or (6) inability to purchase in large quantities and thus pay increased food costs over time (Downing, 1990; Wratten, 1995; Corbridge and Jones, 2005; Ruel *et al*, 2010). All of these factors make some poor households in urban areas vulnerable to failing to access food. Downing (1990) suggests that households who are even vulnerable to food insecurity are by definition, food insecure.

The challenge of securing food access is shown to be worse, by Wratten (1995) and Moser *et al* (1993) in findings which reveal that in many urban areas there has been a major decrease in urban per capita incomes. It is argued by some (e.g. Baker and Pedersen, 1992; Maxwell, 1998; Corbridge and Jones, 2005) that the decreases in urban per capita income is due to the detrimental rural bias policy focus, put in place due to perceived urban bias. While being pro-rural poor these policies seem to be negatively influencing the urban Southern African households' ability to secure access to food, as access to food is directly linked to income in urban areas (UN-Habitat, 2006). These decreases in income are demonstrated in African data where there has been a "real decline in urban wages since the early 1970s, with a halving of real income levels in many cases and a general deterioration in urban employment security and benefits such as employer housing" (Wratten, 1995: 19).

Moreover, for urban households, Mitlin (2004) and others, demonstrate that food prices and the cost of living (*Housing* – UNCHS 1993, 1996; *Transport* – Kombe, 2002; *Services* – UN-Habitat 2003; Etemadi 2000) are considerably higher than rural

areas. As a result, poverty lines and the alike often underestimate the levels of poverty within cities. In the four developing country studies, that Milton (2004) reviews (Deaton and Tarozzi, 2000; World Bank Poverty Reduction and Economic Management Sector Unit, East Asia and Pacific Region 2001; Glewwe and McKay in Jonsson and Satterthwaite 2000; Kironde, 1995): prices vary from 15 – 98.2% more than their relative rural areas.

With many poor urban households spending a large proportion of there income on food and other fixed urban life costs (as discussed in Chapter 2.2), these households are vulnerable to failing to be able to afford sufficient food if there are any shocks to their finances (e.g. increasing food or other costs or loss of incomes). Thus identifying data that can tell us if an urban household is vulnerable to outright food access failure would seem to be valuable in measuring and understanding food insecurity in urban areas. Furthermore, if it could be measured where households actually failed to access food because of insufficient money, this would be another great indicator of urban food insecurity.

Research studies (e.g. Tabatabai, 1993; Lesotho Stats HBC, 2003; UN-Habitat, 2006) have shown that low-income urban households devote large proportions (60 to 80%) of their total incomes to purchase food, resulting in poverty been evident as urban food insecurity. However, it would seem from the literature review that there is minimal food security information for Southern Africa cities.

It is evident that one can no longer assume that those who leave the rural context are better off in the urban environment; potentially the reverse will be true for them, where they will find growing poverty and food insecurity. Agencies, philanthropists and governments whose approach is to concentrate on the rural in hoping it will result in a reduction in poverty, food security, slum decreases, maternal health, universal education, combating HIV/AIDS and child health, need to consider focusing attention on urban areas where most of the developing world will soon be located. We are rapidly approaching 2015 when the MDG's are meant to be achieved, but in reality, hunger has increased and poverty is increasing (FAO, 2009a). UN-Habitat (2006:49) notes that current approaches have had "the result that both national and international

interventions during past 2 decades have had the net effect of increasing overall poverty, exclusion and inequality in cities".

The growth in urban poverty and hunger is generally attributed to two key reasons: firstly the rapid urban population growth rates outstrip many urban economies growth rates (Maxwell 1998) and secondly that the migration of the poor from rural areas (de Haan, 1997; FAO, 2004).

However it is evident from research (e.g. Naylor and Falcon, 1995; de Haan, 1997; Haddad *et al*, 1999; UNCHS, 1996; FAO, 2004; UNFPA, 2007) that urban food insecurity is dependent on access and is on the increase and there is a need for more research to establish base line information. Wratten suggests quantitative measures and qualitative measures are needed. Crush and Frayne (2010) and Haddad *et al*, 1999 support the need for more quantitative from research on household surveys to shed more light and understanding of food security and poverty in urban areas.

The FAO (2006d) proclaims the majority of the world's developing population will be found in urban settings. Therefore, the understanding and measurement of urban food security are key to understanding and achieving the food security MDGs and targets and will require a focus on cities in the developing world, where an increasingly large percentage of the world's poor will live. Unfortunately, to date there has been very little analysis of what has been done on the urban situation (SOWP, 2007).

3.2 SUMMARY

In this chapter, I have demonstrated from the literature that Southern African's are transitioning to urban areas and are predominantly and increasingly becoming urbanized. This urban transition is characterized by poverty and hunger, as the poor transition to urban areas but struggle or fail to access food. UN-Habitat (2006) and Ravallion *et al* (2007) report that poverty is shifting to urban areas as the poor are urbanising quicker than the general population. Nowhere is this urban transition occurring more quickly than in Southern Africa, with the highest slums and urban growth rates in the world it is clearly visible that the situation in Southern African is dire. The locus of poverty and associated food insecurity is shifting from the rural areas to urban areas in Southern Africa (UN-Habitat, 2006; Frayne *et al*, 2009). Poor

households with limited income and costs services and basic needs means that a growing number of the urban poor find accessing food a growing challenge.

CHAPTER FOUR: WHAT IS THE 'URBAN'?

4.1 INTRODUCTION

Urban? The notion 'urban' from a food security point of view is highly contested and as a consequence, has a major impact on the understanding of food security in urban areas and on city characteristics in general. Although on the surface, the concept of 'urban' seems simple it is actually highly complex. The varying definitions of what urban is and what it is not, has far-reaching implications for our understanding of the urban situation, including the nature and scale of food insecurity. Both Davis (1959) and more recently Satterthwaite (2005) demonstrate the implications for studies using various definitions of the 'urban'.

Various disciplines, governments and agencies each have their own defining characteristics of what makes an area 'urban', thus making it difficult to make meaningful comparisons and generalisations. As poverty and hunger shift to the urban environment, techniques are required to measure and compare these issues and characteristics in the 'urban'. Critical to that discussion is what to define as the urban.

A key factor when considering the urban, is defining who and what is to be measured, especially as increasing amounts of research focuses on urban food security and poverty. In part, this thesis hopes to investigate the impacts that the various definitions of the 'urban' have on measuring and understanding urban food security.

4.2 WHAT IS THE URBAN?

In Rugg's (1972) view, one of the reasons why there is difficulty in defining what is the urban or city boundaries is because they do not exist in nature; they are human concepts. Wratten (1995:20) writes, "If "poverty" is hard to define, then "urban" is just as difficult. There are no common criteria for deciding whether a settlement is a town or a rural village. The yardsticks include inconsistent population thresholds (settlements with over 1,000 people qualify as towns in Canada, but the lower limit is

2,000 in Kenya, 10,000 in Jordan, and 50,000 in Japan); the density of residential building; the type and level of public services provided; the proportion of the population engaged in non-agricultural work; and officially designated localities." Comparing urban areas thus becomes very challenging because of the various methods of defining the 'urban'.

4.3 THE IMPORTANCE OF ACCURATELY DEFINING THE URBAN

The implications of varying definitions of what constitutes the 'urban' can make research, discussion and comparisons troublesome. Without robust definitions, even the population of areas is at odds (Satterthwaite, 2005).

Satterthwaite's (2005) report is highly valuable in pointing out the population implications of the different 'scale definitions' as applied to major urban areas. The adapted Table 6 from Satterthwaite's (2005) indicates how the population of urban areas can change with the differing definitions of the urban areas based on varying scales.

Table 6 Examples of How the Populations of Urban Areas Change with Different Boundaries

City or Metropolitan Area	*Date*	*Population*	*Area (km^2)*	*Notes*
Beijing (China)	1990	2,336,544	87	Four inner-city districts, including the historic old city
		c 5,400,000	158	"*Core City*"
		6,325,722	1,369	Inner-city and inner-suburban districts
		10,819,407	16,808	Inner-city and inner- and outer-suburban districts and 8 counties
Dhaka (Bangladesh)	1991	c4,000,000	363	Dhaka Metropolitan Area (Dhaka City Corporation and Dhaka Cantonment)
		6,400,000	780	Dhaka Statistical Metropolitan Area
		<8,000,000	1,530	Rajdhani Unnayan Kartripakhya (RAJUK) – the jurisdiction of Dhaka's planning authority
Mexico City (Mexico)	1990	1,935,708	139	The Central City
		8,261,951	1,489	The Federal District
		14,991,281	4,636	Mexico City Metropolitan Area
		c. 18,000,000		Mexico City Megalopis
Tokyo (Japan)	1990	8,164,000	598	The Central City (23 wards)
		11,856,000	2,162	Tokyo prefecture (Tokyo-to)
		31,559,000	13,508	Greater Tokyo Metropolitan Area (including Yokohama)
		39,158,000	36,834	National Capital Region

Toronto (Canada)	1991	620,000	97	City of Toronto
		2,200,000	630	Metropolitan Toronto
		3,893,000	5,583	Census Metropolitan Area
		4,100,000	7,061	Greater Toronto Area
		4,840,000	7,5550	Toronto CMSA equivalent
London (UK)	1991	4,230	3	The original "city" of London
		2,343,133	321	Inner London
		6,393,568	1,579	Greater London (32 boroughs and the city of London)
		12,530,000	-	London "Metropolitan Region"

Note: Detailed explanations and notes on Table variables are available in Satterthwaite (2005).

Source: Adapted from Satterthwaite (2005).

As can be seen from the Table 6 above the varying urban definitions give drastically different understandings of the city. For example, if one considers 'Mexico City' as defined as 'The Central City', then it has a population of 1 935 708 people. However, if one were to consider Mexico City as being the 'Mexico City Metropolitan Area' then the demographics and understanding of the city is altogether different with a population of 14 991 281 people or even at a larger defined scale of the 'Mexico City Megalopis' level with a population of 18 000 000 people. The changes in definition of the urban results in a significant change on the population size as well as population characteristics such as variations in mortality rates, health and incomes as areas are included or excluded from the defined 'urban' area. Stephens *et al* (1997) showed that significant variations in health, mortality and overall environmental conditions occurred as certain districts were included or excluded from the urban area. Thus demonstrating how changes in definition (scale) can affect how an urban area is understood.

There are three major impacts of using different definitions of an urban area (e.g. a city). (1) Firstly, comparisons are made difficult over time if the definition (in terms of scale) is changing (Haddad *et al*, 1999). (2) Secondly, comparisons are made difficult and precarious between different city areas, if their definitions are not consistent with each other (e.g. if one is only considering the core while another considers the core and other outer areas). (3) Thirdly and importantly different definitions not only change population numbers but also change our understanding of the urban area and its characteristics. If one researcher only analysed 'The Central City' of 'Mexico City', they might conclude that the city is largely rich and that food insecurity is not highly prevalent. However if they were to analyse 'Mexico City' at the 'Mexico City Metropolitan Area' scale, the picture maybe significantly different,

as diverse population groups and food systems are captured. Therefore changing the various definitions of the urban does have major impacts for the characteristics and interpretation of an urban area. This is due to the fact; the scale at which the urban is determined to an extent captures the kind of lived experience of residence in that area. In terms of the types of formal, informal or non-market sources of food and the types of livelihood assets that households are able to draw down on. All vital components in determining and understanding urban food security at a given urban 'scale'.

4.4 Different Ways to Define the Urban

It is thus clear that how one defines the urban will significantly impact the results. The implications of not having a single definition have been highlighted in the literature since 1945 (e.g. United Nations, 1945; Davis, 1958; Davis, 1959; Gibbs and Rugg, 1972) to the present (Montgomery *et al*, 2004; Satterthwaite, 2005). The United Nations was the first organisation to start collecting urban and rural statistics from various countries (United Nations, 1949). Montgomery, Stren, Cohen and Reed's (2004) noteworthy book, *Cities Transformed* looked extensively at the issues of defining the 'urban' and its importance, especially as researchers started to answer the call to investigate the urban. Montgomery *et al* (2004) explains that the UN has based their global urban population numbers on the varying countries own definitions of what they consider 'urban', i.e. they base the urban populations numbers on each countries own reporting of what they consider the urban. The UN has always been candid about the shortcomings that this creates when trying to understand the global urban situation. This issue of inconsistencies in urban definitions has prompted many over the years to discuss the implications and possible ways forward (e.g. most notable two researchers Davis and Satterthwaite: Davis, 1959, 1969; Gibbs and Davis, 1958 and more recently Satterthwaite, 2002, 2005). Davis (1959) investigated the idea of trying to create some standardised definition of the 'urban' - most notable 'The Metropolitan area'. Satterthwaite (2005) has continued to 'ring the warning bell' about the research implications of differing definitions (that change the scale) of specific cities.

Globally governments have adopted various definitions of the urban. Many are based on the assumption that urban areas are areas that grant a different way of life

according to UNSD (2010). Southern African countries are no exception to the mosaic of definitions for the urban. The following Table reflects the various definitions of what study countries consider 'urban'.

Table 7 A Table of Urban Definitions for Study Countries

Country	*Definition of 'Urban'*
Botswana	Agglomeration of 5 000 or more inhabitants where 75 per cent of the economic activity is non-agricultural.
Lesotho	District headquarters and other settlements with rapid population growth and with facilities that tend to encourage people to engage in non-agricultural economic activities.
Malawi	All townships, town planning areas, and all district centres.
Mozambique	*Conselho* of Maputo and Beira.
Namibia	The district headquarters and other settlements of rapid population growth with facilities that encourage people to engage in non-agricultural activities.
South Africa	Places with some form of local authority.
Swaziland	Localities proclaimed as urban.
Zambia	Localities of 5 000 or more inhabitants, the majority of whom all depend on non-agricultural activities.
Zimbabwe	Designated urban areas, as well as places with at least 2,500 inhabitants, whose population resides in a compact settlement pattern and where more than 50 per cent of the employed persons are engaged in non-agricultural occupations.

Source: Own Compilation, Montgomery *et al* (2004) and United Nations Statistics Division (2009, 2010).

Table 7 demonstrates that there are no two identical definitions of what is urban. The closest two definitions are Botswana's and Zambia's. Some definitions of the urban focus on the population's size (e.g. Botswana), while others focus on the type of economic activity in that area (e.g. Lesotho) and others are defined as areas that have some form of local authority (e.g. South Africa) or simple assigned the designation urban (e.g. Swaziland) or some combination of these defining attributes (e.g. Zimbabwe). The above clearly illustrates the resulting challenges when wanting to compare various urban areas.

Various disciplines have also had differing emphasis on the urban definition. Generally, Social Scientists (Wratten, 1995) have focussed on urban–rural divide as a continuum rather than as a rigid dichotomy. Others like Hugo *et al* (2001) focussed on defining the urban by spatial extent, density and proximity to services such as transportation and communication options. In China, Economists consider vast tracts

of countryside as included in the catchment area of cities, basing what is considered the urban on economic factors, in order to provide reservoirs and hydroelectric power supplies for urban dwellers (Wratten, 1995).

In order to address the complications of numerous definitions when comparing urban areas, Pacione, a leading urban geographer, suggests various 'scales of analysis' are needed when exploring the the urban (Pacione, 2009). Pacione (2009) acknowledges the complexity (population size, economic base, administrative criteria, functional definitions) of defining the urban. He suggests that various scales of an urban area (e.g. a city) need to be considered "not just one catch all definition". He suggests five main levels of analysis: (1) Neighbourhood, (2) The City, (3) The [City] Region, (4) The National System of Cities, (5) The World System of Cites. The UN (1952), Davies (1959), Montgomery et al (2004) and UN-Habitat (2004) support Pacione's approach of having a continuum of various scales in the literature.

While Pacione suggested the above five levels of analysis, the UN-Habitat (2004) and Montgomery *et al* (2004) suggest three key urban scales: (1) the core of the city, (2) the city and (3) the agglomeration scale is favoured as a future key way to investigate the city. Montgomery *et al* (2004) argue for defining cities more as agglomerations i.e. city-regions as they recognise indistinctness around urban administrative boundaries. Davis (1959) also suggested trying to create some standardised definition of the 'urban', most notably 'The Metropolitan area'. The UN-Habitat programme has opted for analysing cities as 'Agglomerations' as the best way to define key urban areas. Using the literature review as a departure point I will attempt to create three scales of the city for each city investigated, this can be seen in Chapter 7.

4.5 SUMMARY

Accurately defining the 'urban' is extremely complex which leads to multiple inconsistencies in analysing food security data as there are so many drastically differing understandings of the urban context. Until the urban definition is standardised and then measures and indicators are developed which research those measures and indicators in a consistent way, we will not have a clear understanding of urban food security. It is currently impossible to accurately say what the true urban

food insecurity status is globally as there is no commonality in research due to the differences in how one defines the urban. This leads to varying and precarious data which has subjective analysis due to the multiple indicators used in seeking to analyse what urban is. Hence one is left with an unreliable picture of what the real local, regional and global situation is in terms of urban food security. As I have reviewed the views and definitions of what 'urban' is and the scales associated with the differing viewpoints I have concluded that an agglomeration approach seems to be the most appropriate for a comprehensive analysis of the city.

PART TWO: METHODOLOGY

In Part One: Literature Review, I have summarised all the pertinent literature relating to the current food security situation, the conceptual development of food security over time, current and possible future food security measurement, the urban transition and highlighted the importance of how we define the 'urban'. The significant outcome of this literature review found that urban food security is a major, growing challenge in Southern Africa urban areas and that urban food security is all about access to food. Furthermore, the literature reviewed highlights that at the end of the day, urban food access is directly linked to a household's ability to purchase food (i.e. income in the urban context) and that the way we define what the urban is, has major implications on our understanding of food security in a particular city.

I found in the literature that the current methodologies of calculating food security are inappropriate when considering urban food security, as they simplistically only measure national or regional food availability and are invariably rurally framed. Hence, they fail to measure households actual food security situations and in particular fail to measure the urban food insecure. The literature reviewed pointed to household surveys as a key source of urban food security data at the household level. In particular, many household surveys do contain relevant food access variables, such as 'percentage of household income spent on food' and 'when households skip meals', and have 'urban identifiers' (sometimes for specific urban areas or general urban areas) that tell us about actual household's food security situation. However, the potential of household surveys for assessing food security has largely not been realised, although a few key exceptions are mentioned. There is a clear call in the literature for the "bottom-up" strengthening of the information that household surveys do provide when it comes to food security in general and urban food security in particular.

The literature pointed to two potential food access measures at the urban scale, that I have termed "*access vulnerable*" and "*access failure*". (1) The *access vulnerable* measure identifies households that spend greater than 60% of their income on food and thus could be or are vulnerable to accessing insufficient food for the household.

The usefulness and validity of this measure was demonstrated in the literature review on Engels law, findings in urban African cities and suggested as a future indicator of food access by the FAO. Since a high percentage of total income is spent on food expenditure, households are at risk of food insecurity due to shock increases in food prices or other urban goods and services. The other measure suggested by the literature is (2) *access failure* which is when a survey contains information on households failing to access food and thus having to miss meals, due to insufficient financial access.

In Part Two, based on the literature review of Part One, I develop a methodological framework to (1) identify relevant household surveys, (2) determine the *access vulnerability* of households in Southern African cities and (3) look in greater depth at three South African Cities using a detailed household survey dataset, (4) ask questions of the data such as the percentage of households who failed to access food (*access failure*) at (5) various scales of the cities.

This framework is outlined over four chapters. Chapter 5 starts by explaining the systematic search and identification of available and appropriate food access data for the urban context, specifically with respect to the identified Southern Africa cities and three specific South Africa cities. This resulted in 97 surveys being identified for urban food security research in Southern Africa, of which 36 surveys were directly useful for this thesis, thus meeting the objective of identifying reliable data from which household food security statistics can be derived for urban areas.

Chapter 6 deals with the methodology undertaken in preparing the South African household survey data so that meaningful investigation and creation of urban food access indicators could take place for a detailed investigation into the three cities South African Cities (Cape Town, Johannesburg and Durban). The chapter involves the merging of the dataset, testing and selection of the best income, food expenditure and equivalency scales for the study.

Chapter 7 deals with the creation of the various geographical scales of the three South African Cities. For each city, the household identifier data and Geographical Information Systems (GIS) were used to scale the data to three urban scales (the *Core*

City, the *Inclusive City* and the *Agglomeration City*) so that specific urban areas could be identified and investigated.

Finally, in Chapter 8 the prepared Southern African and South Africa data was used to derive indicators of food insecurity. In the case of Southern Africa, the data was used to calculate how *access vulnerable* households were in the study cities. Then with reference to the three South African cities, two key indicators of food access were created: (1) once again the percentage of homes that were food *access vulnerable* was calculated for the three scales of each city. Secondly (2) Food *access failure* was calculated for each of the three scales for each city, indicating the percentage of urban households who reported as being unable to access food due to financial constraints and hence went hungry. Furthermore, the prepared South African dataset was used to create a poverty line, which could identify urban households (for each of the three cities) below and above the line, along with whether they went hungry or not and other household characteristics that might have determined their food security status.

Chapter 5, 6 and 7 thus establish a methodology based on the identified concepts and indicators, in Part One, to investigate urban food security.

CHAPTER FIVE: THE IDENTIFICATION OF AVAILABLE HOUSEHOLD SURVEYS IN SOUTHERN AFRICA: CONTAINING RELEVANT URBAN FOOD SECURITY INFORMATION

It is evident from the literature review that conceptually the issue of urban food security is an issue of food access. The following methodological chapter establishes a methodology based on this identified concept and indicators thereof, to garner a meaningful exploration into urban food security in Southern Africa.

Chapter 5 outlines the procedures used to search and collate available and appropriate food access data for the study countries. Chapter 5 is essential in achieving the aim of this research and develops methods for future research. Additionally the chapter helps in achieving the research aim by answering the research question as to what data and methods are available and appropriate for assessing urban food security. It also meets two research objectives: (1) the identification of reliable data from which indicators can be derived for specific cities, and (2) the establishment of a methodology, based on the identified concepts and indicators, to investigate urban food security. In Chapter 5.1 all available and appropriate food access data for the Southern African is identified and then in Chapter 5.2 the list is whittled down to those surveys that are relevant to the better understanding urban food security for the twelve study cities.

5.1 THE SEARCH AND COLLATION OF RELEVANT AND AVAILABLE SOUTHERN AFRICAN HOUSEHOLD SURVEYS

This chapter starts with an in-depth search to identify available and reliable household survey food security data. It was necessary to identify useful data for this research in order to meet research objectives and for future research. The methodology outlines the search process (5.1.1) undertaken for possible available and relevant datasets which contain information on urban food security. (5.1.2) The results of the search

and selection of relevant datasets is available in the form of a Table in the results chapter (Table 17).

5.1.1 The Search For Available Southern African Household Surveys Containing Relevant Urban Food Security Information.

The search took place in the following manner: Initially an extensive internet and library search was undertaken to identify what quantitative food security data was available for Southern Africa. The primary aim was to identify quantitative data at the city level. However, national and sub-national data from which city level data could possibly be derived or approximated was also included in the review. This was done in order to answer the research question and meet the research objectives concerning what data is available for assessing urban food security.

The search for relevant data[22], comprised of a search of: large scale search engine (such as, www.gooogle.com), large institutions (such as, the World Bank), non-government organisations, consumer awareness groups, national government agencies and various universities departments and research units (such as, the DataFirst Resource Unit at the University of Cape Town, South Africa) datasets.

The 'large institutions' databases searched included the World Bank's (WB); Living Standards Measurement Study (LSMS)[23] (discussed in detail in Appendix C), WB Nutrition and Population Statistic Database[24], WB Development Data and Stats[25], WB Africa Statistics[26], WB Africa Poverty Monitoring - Survey Navigator[27], WB Africa Household Survey Databank[28], WB PovcalNet Database[29]. The United Nations Human Settlements Programme (also referred to as UN-Habitat) was contacted for

[22] Where direct online website links were available to the 'relevant data' they are provided as footnotes in this Chapter or where direct links are not available they are referenced in the reference chapter.
[23] Reviewed at: http://www.worldbank.org/lsms/
[24] Reviewed at: http://devdata.worldbank.org/hnpstats/
[25] Reviewed at: http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/
[26] Reviewed at: http://www4.worldbank.org/afr/stats/default.cfm
[27] Reviewed at: http://www4.worldbank.org/afr/poverty/databank/survnav/default.cfm
[28] Reviewed at: http://www4.worldbank.org/afr/poverty/databank/default.cfm
[29] Reviewed at: http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp

any applicable data that had been collected on urban centres (Mukung, 2006). After the first email contact was made with Mukung the UN-Habitat UrbanInfo Database Administrator on 08/09/2006, four emails were exchanged and I received a CD with the latest version of their UrbanInfo dataset (Global Urban Observatory, 2006; Mukung, 2006). The UrbanInfo CD only contained a few out dated statistics on national malnourishment to which they allocate a city's name. Thus, this is not a truly urban statistic, but surreptitiously they added the national statistic to a particular city, other data such as national urban access to education, housing, were included on the CD. However, specific city level data was not available (discussed further in Appendix C). The United Nations World Health Organisation (WHO) Nutrition in Africa[30] data was also reviewed, however it only relied on a relatively small amount of survey data not relevant to urban food security. The United Nations World Food Programme (WFP) database[31] was examined as was the United Nations Food and Agricultural Organisations (FAO) FAOSTAT[32] database and Food Security Statistics[33] and the FAO Statistical Yearbook 2004[34] however, no relevant data was identified. All of these 'large institutions' database and those listed in Appendix C contained no specific urban food access indicators and rather most of the (limited) food security statistics available in these databases were based on rurally framed food availability measures. This finding is in agreement with the literature (e.g. Sharma, 1992; Maxwell, 1996; Crush and Frayne, 2010) that much of the large institutional data available is rurally framed food availability measures.

Non-Governmental Organisations (NGO) and non-United Nation Food Agencies were contacted and where databases were available, they were reviewed for available urban food security data. The NGO Consumer Council of Zimbabwe (CCZ)[35] proved to be a good source of urban food security related-data for Zimbabwe (Masarirambi, 2007). After continued attempts in contacting Zimbabwe Statistics office failed (Machirovi, 2006), Masarirambi (2007) from the CCZ provided me with 19 documents containing

[30] Reviewed at: http://afro.who.int/nut/index.html
[31] Reviewed at: http://www.countrystat.org/wfp/en
[32] Reviewed at: http://faostat.fao.org/default.aspx
[33] Reviewed at: http://www.fao.org/faostat/foodsecurity/index_en.htm
[34] Reviewed at: http://www.fao.org/statistics/yearbook/
[35] A full listing of my communication with the CCZ and other Governmental Statistical Organisations is provided below in Table 8.

monthly food basket prices from June 2005- June 2007. International Food Policy Research Institute (IFPRI) website[36] was also surveyed for relevant Southern African food security data. A number of IFPRI datasets were requested, recovered and reviewed. For example, The *Malawi Financial Markets and Household Food Security 1995 Data* (INFRI, 2006a) and then INFPRI Social Accounting Matrix (SAM) data for multiply countries was requested and reviewed: Malawi 1998, Mozambique 94-95, Zambia 1995, South Africa 1993,1998,1999 and Zimbabwe 1991 (INFRI, 2006b, 2006c, 2006e, 2006f) while the *Malawi Financial Markets and Household Food Security 1995* and SAM studies are notable, demonstrated the powerful use of national household surveys and the fact that some are accessible, but none of the associated data had particular usefulness or relevance to urban food security. However the *South Africa: KwaZulu-Natal Income Dynamics Study (KIDS) 2004* dataset provided online by INFRI (2006d) did contain some food access data (Table 20) for urban areas in Kwazulu-Natal South Africa.

National government statistical agencies were a valuable source of food security data. A significant amount of useful data is potentially available from these agencies directly through their website documentation or direct email. While a large amount of data is being collected by these agencies, not all of it is accessible. I found this especially true when requesting full data sets. Of the nine Government agencies contacted, I received some sort of reply from six (Botswana, Lesotho, Mozambique, Namibia, South Africa and Zambia) and received no reply, despite repeated attempts, from the agencies of Malawi, Swaziland and Zimbabwe (A detailed table, Table 8, of interactions with the various agencies can be found below: Katale and Majelantle, 2006; Tsietsi, Thobei and Mokati, 2006; Chola, Kaputu, Kakungu and Nsemukila, 2006; Machirovi, 2006; Quita, 2006; NSO and Rethman, 2007; Zacarias, Chiponde and Loureiro, 2007; Alberts, Verhoef and Mokgokolo, 2007; Tshabalala and Hlophe, 2007 and Masarirambi, 2007).

When contacting each government statistical agency, a generic but individual email was initially sent (addressed to the Director of the agency and 'To Whom It May Concern'), introducing the Author, thanking them for their role and complimenting

[36] Reviewed at: http://www.ifpri.org/

them specifically on available information from their websites. I introduced the study and requested full survey data sets that would be relevant to the study. Additionally I requested at very least "income" and "food expenditure" from the surveys at citywide level (see Chapter 10 for results of various cities, which I gathered from the replies).

I was able to access a full dataset for South Africa. No other agency provided me with a full dataset, although food access information from various household surveys was provided. Not giving full datasets may be an indicator that these agencies still desire to control their information. In the following Table is a detailed list of interactions with the various agencies by country.

Table 8 A Table of Communication with Various Government and Non-government Agency

Country - Agency	*Initial Request Sent (D/M/YR)*	*Initial Response Received (D/M/YR)*	#	*Contact Name(s): In order of Contact*	*Notes on Communication, with Personal Communication References used in Italics*
Botswana – CSO	18/10/06	18/10/06	11	Anna Majelantle, James Katale	Majelantle responded on 18/10/06, and said Katale would respond further, emailed Katale on 26/10/06, 22/11/06 and 11/12/06 with no response, asked Majelantle to get Katale to contact me, Majelantle replied 13/12/06 cc'ing me and asking Katale to get me the information. On 14/12/06 Katale sent me 1993/94 and 2002/3 HIES data. I request clarification on the data sent 18/12/06, received response from Katale 19/12/06, and asked Katale on 1/8/07 for further clarification (no reply). *(Katale and Majelantle, 2006)*
Lesotho – BoS	30/11/06	12/12/06	24	Matsotang Tsietsi, Mr Thobei, K Molato, Khahliso Mokati	Tsietsi (initially no response), on the 22/11/06 emailed Tseitsi again, 01/12/06 received from Tseitsi, forwarding the information request to the BoS population division, 11/12/06 asked Tseitsi about progress, 18/12/06 Tseitsi sent request onto BoS economics division, 18/12/06 emailed Tseitsi to mention had not heard anything, 19/12/06 Tseitsi, explained she knew the data was available in house and would follow up as she had discussed it with a person in the relevant department, 8/1/07, emailed to say hadn't heard anything yet, 11/11/07 Tseitsi, replied to apologise and again cc'd me on a request for the data, 8/3/07 I emailed to say still heard nothing, 12/3/07 Tseitsi replied she would get a copy of the HBS 02/03 to me soon, 4/5/07 four emails were exchanged about the HBS (some information was received). 27/8/07 got an email from Tseitsi, another four emails followed and Tseitsi put me in contact with Mokati and Molato, 28/8/07 received an email from Mokati and Molato about some new information now on website for me to access. Mokati was also to reply to me with additional information but never did. *(Tsietsi, Thobei and Mokati, 2006)*
Malawi – NSO	22/11/06	5/4/07	7	Manager of Blantyre Office, Charles Rethman	I received no responses from first two emails. Then on the 07/9/06, the Integrated House Survey 1998 and associated reports were made available online. On 28/9/06, the Integrated House Survey 04/5 and associated reports were made available online. Then on the 26/1/07 I contacted Rethman from the Malawi Vulnerability Assessment Committee as an additional source of Blantyre income and food expenditure data as per Drimie's suggestion *(Drimie and Ziervogel, 2006)*, he replied unfortunately his unit only has rural data, but in the future they would be collecting urban variables, additionally he said both HIS were funded by the World Bank and contained some urban data, but was unsure about the quality. *(NSO and Rethman, 2007)*
Mozambique – INE	01/8/06	15/1/07	9	João Dias Loureiro, Maria Alice Chiponde, Maria de Fátima Zacarias	After a few email Zacarias was assigned to help me, she was incredibly helpful on 1/15/07 she sent a spreadsheet with the relevant years and requested income and expenditure variables. She additionally mentioned, "Unfortunately, as the National Institute of Statistics was created in 1996, it was very difficult to get information for the time before. We tried but unsuccessfully. Available information is from 1996 ahead" *(Zacarias, Chiponde and Loureiro, 2007)*
Namibia – CBS	23/10/06	24/10/06	8	Sapalov Quita	Quita was extremely helpful over 7 emails and 1 fax he provided detailed Windhoek 1993/94 data and Khomas region in 04/05. He also mentioned, "in 1993/94 there was a special request from the

					Municipality of Windhoek to collect data specifically for the city, which was not the case in 03/04. However, you can use the urban data for Khomas region as a proxy for Windhoek." *(Quita, 2006)*
South Africa – StatSA	23/4/07	30/4/07	8	Piet Alberts, Helen Verhoef, Joss Mokgokolo	Most of the South African data I got directly from DataFirst at UCT. However, GIS files I requested from StatSA and after 3 responses and discussion between Alberts, Verhoef and myself, Mokgokolo (after a few more emails) made the GIS files available temporally for me online on 5/5/07. Verhoef pointed out that the MDs have not changed since 1996 till 2007, however the DCs from 1996 differs from 2001, although some may have the same names they are not the same area *(Alberts, Verhoef and Mokgokolo, 2007)*.
Swaziland – CSO	26/1/06	28/1/07	4	Colin Tshabalala, Isabela Hlophe	On the 28/1/06 Tshabalala, a contact from Drimie *(Drimie and Ziervogel, 2006)*, from the Swaziland Vulnerability Assessment Committee sent me a report on vulnerability and mentioning that areas were divided up by "Administrative Regions. I've therefore attached the report which may be of very little help if you are looking for Towns/ Cities analysis." I replied, thanked him, and asked for contact at statistics office as website had been down for over 6months (I had repeatedly emailed the webmaster pointing out the down website and asking for contact information – but received no reply). Then on 4/5/07 contacted Isabela Hlophe from the CSO, via a contact address on a UN document, however I never received a reply. *(Tshabalala and Hlophe, 2007)*
Zambia – CSO	31/10/06	4/12/06	13	Buleti Nsemukila, Lumbwe Chola, Petronella Kaputu, Frank Kakungu	My first emails to Buleti and the CSO general email received no responses. However, serendipity I met an exchange student (Chola) while in Norway who worked in the school breaks for the Zambia CSO office. He sent me the 2004 LCMS survey report on 3/11/06. Additionally Chola gave me the details of a CSO co-worker (Kaputu) who he recommended. On 4/12/06, I phoned Kaputu and explained the research and followed up by email. On 12/5/06, Kaputu responded positively and promised to send the data soon. On 8/1/07 I wrote a reminder, on the 10/1/07 she replied that Kakungu (he got cc'd) had been assigned to send me the information. On 15/1/07, I wrote to Kakungu, making the request again and received no response. On 8/3/07, I wrote to both Kakungu and Kaputu and the 8/5/07 to Kaputu and Chola and received no responses. I contacted Chola on the 8/4/08 about data, after a few emails, Chola on 17/8/08 provided the Priority Survey 1991 report, Priority Survey 1993 report and the Living Conditions Monitoring Survey Report 1996. *(Chola, Kaputu, Kakungu and Nsemukila, 2006)*
Zimbabwe – CSO	31/10/06	No reply	6	L. M. Machirovi	Made 6 requests with no reply, the final one being on 6/8/08. *(Machirovi, 2006)*
Zimbabwe – CCZ	30/11/06	12/11/06	9	Trust Masarirambi	Received no reply initial reply, Masarirambi responded to a second email on 11/12/06 on same day and said that he will send more information soon, 1/8/06 sent a reminder, replied same day and said will respond soon. 1/30/06 sent me individual monthly food basket documents. *(Masarirambi, 2007)*
Note	# : Total number of communications, including unsuccessful communications.				

Source: Own compilation of personal communications Katale and Majelantle (2006), Tsietsi, Thobei and Mokati (2006), Chola, Kaputu, Kakungu and Nsemukila (2006), Machirovi (2006), Quita (2006), NSO and Rethman (2007), Zacarias, Chiponde and Loureiro (2007), Alberts, Verhoef and Mokgokolo (2007); Tshabalala and Hlophe (2007) and Masarirambi (2007).

In Table 8, we see multiple requests were made and often to the same agency (e.g. Zambia) or reminders had to be sent for promised data (e.g. Lesotho was a good example of this where promised data was requested numerous times, over 9 months). This resulted in a total of 90 direct communications with the agencies listed in the Table.

As noted in Table 8, the countries that were particularly helpful were South Africa (Alberts, Verhoef and Mokgokolo, 2007), Namibia (Quita, 2006), Mozambique (Zacarias, Chiponde and Loureiro, 2007) and the CCZ in Zimbabwe (Masarirambi, 2007). In the case of the Malawian (NSO and Rethman, 2007), Swaziland (Tshabalala and Hlophe, 2007) and Zimbabwean (Masarirambi, 2007) government statistical agencies, no reply was ever received despite multiple requests. Zambia on the other hand promised numerous time to send data, however if it was not for the serendipitous meeting of Mr Chola (as explained in Table 8; Chola, Kaputu, Kakungu and Nsemukila, 2006) I believe in the end I would have received very little data from the Zambian CSO.

Additionally data archives proved to be a good and growing source of survey datasets. Some of the data archives searched were the University of Cape Town's (UCT) DataFirst data archive[37], University of Michigan's Interuniversity Consortium for Political and Social Research Data archive[38], the South African National Research Foundation's South African Data Archive (SADA)[39] and International Survey Network Database[40]. These data archives now offer many of the same household surveys and often not just statistical reports but the actual survey data, metadata reports, questionnaires and other associated data. Personally, UCT DataFirst archive was the most valuable source of Southern African household surveys and were helpful in providing the datasets required.

[37] Reviewed at: http://www.datafirst.uct.ac.za/
[38] Reviewed at: http://www.icpsr.umich.edu/icpsrweb/ICPSR/
[39] Reviewed at: http://sada.nrf.ac.za/
[40] Reviewed at: http://www.internationalsurveynetwork.com/nada/

Additional data sources and databases were found and investigated about Southern Africa and are listed in Appendix B. A number of other potential sources of food security data were identified and a short review of each can be found in Appendix C.

5.1.2 The Creation of Tables of Available and Reliable Datasets for Urban Food Security research in Southern Africa

The extensive search of the internet, library and various databases (as listed above) helped identify a number of potential sources of food security data for Southern Africa. The results of the search for available and reliable datasets with Urban Food Security can be seen in a Table 17 in Chapter 9. In ensuring that the datasets were not only available and reliable, but also useful, datasets were only included into the Table if the following four criteria were met:

1. The survey was done at the household level.
2. The survey data was collected between 1980 and 2010 (1980 was selected for reasons discussed in Section 2.4.3, such as: many agencies and governments only started collecting data mid/end of 1980 and better quality data is available from the 1980s on with the development of international guidelines (Ravallion and Chen, 1997; Smith, 2003; Chen and Ravallion, 2004; Zacarias, Chiponde and Loureiro, 2007).
3. Some form of an urban identifier and/or place identifier was available, so that urban scale analysis is possible.
4. The survey data additionally contained food security information (e.g. income, food expenditure, skipping meals, nutrition measures, as suggested in Part 1 and discussed in Food and Agriculture Organization: Statistics Division, 2006d).

Each survey was checked to see they met these four basic criteria before it was added into Table 17. This was achieved by reviewing each individual survey's documentation (often 3 or more documents, such as the survey report, metadata report, questionnaire and other associated documentation) or by examining the dataset itself, resulting in over 300 documents and/or datasets being reviewed.

The result of the search using the four criteria above is a table of information on available and reliable food security data for Southern Africa. This results in Table 17 in Chapter 9 is valuable as it is unique, and is possibly the first table of its kind, that is relevant to urban food security in Southern Africa. 97 useful surveys were identified for urban food security research in Southern Africa. Additionally for each survey in the table, various important characteristics were recorded, such as: country, year, the type of survey, name of survey, collection agency, household sample size, applicability to the urban scale and specific food security measures available in the datasets.

5.2 The Identification and Collation of Relevant and Available Household Surveys

The next methodological step was the identification and collation of the appropriate and reliable food security data, from which indicators could be derived for the specific study cities. This was done in two parts; firstly, (5.2.1) was the identification of appropriate and reliable data for study cities in Southern Africa and secondly (5.2.2) was the selection of survey data that is appropriate for further in-depth study of the three South African study cities: Cape Town, Johannesburg and Durban.

5.2.1 The Identification and Collation of Available and Appropriate Southern African Survey Datasets

The identification and collation of available and appropriate Southern African Survey Datasets for this study was done in order to help answer the research question and objectives, in part, concerning what data is appropriate for accessing urban food security in Southern Africa. The survey datasets were selected, from the Ttable created in Chapter 5.1, and collated into a new table, based on the following two criteria:

1. The surveys needed to contain urban identities for study cities.
2. The surveys needed to contain data that could be used to determine food *access vulnerable* and/or food *access failure* i.e. containing total

income/expenditure and food expenditure and/or indication that the family went hungry due to no access to food and/or other relevant data.

Chapter 9 shows the results of the collection, identification and collation of the relevant and appropriate data as per criteria above. The final collection of the necessary data from the identified surveys for the twelve study cities was done largely via email correspondence (discussed in 5.1) with the relevant Southern African statistics agencies.

5.2.2 The Identification and Collation of Available and Appropriate South African Survey Datasets

The second step of the identification and collation process was to identify household survey datasets that were useful for doing in-depth urban food security analysis of the three South African study cities (Cape Town, Johannesburg and Durban). The further analysis of the three cities allows the research to better meet the research objectives. The reasons for these three South African cities being selected for further studies were predominantly for the following four reasons:

1. They have the longest consecutive time line on food security data of all the study cities in Southern Africa.
2. Their datasets have large enough sample sizes at the urban scale.
3. Their cities are identifiable by using location identifiers made available in the data.
4. Their data contains multiple variables that can be used for a better understanding individual and household urban food security especially with regard to food access.

Only three Surveys qualified for use, based on the four reasons above. The three long-term survey studies that were identified for use in the study of the South African cities above were: The October Household Surveys (OHS), The Income and Expenditure Surveys (IES) and The General Household Surveys (GHS) Central Statistical Service (1996a, 1996b, 1997a, 1997b, 1997c) and Stats SA (2000a, 2000b, 2002, 2003a, 2003b, 2003c, 2005a, 2006a, 2006b, 2007, 2008a).

While these surveys meet the criteria they suffer the same general structural and data critiques of all household surveys. Household surveys have been known to underestimate the income level among the poor and the rich (Atkinson and Mickelwright, 1983; Deaton, 1997; Posel and Casale, 2005 and StatsSA, 2008b). In addition, many household surveys suffer from small sample sizes only allowing data to be evaluated at one level of scale.

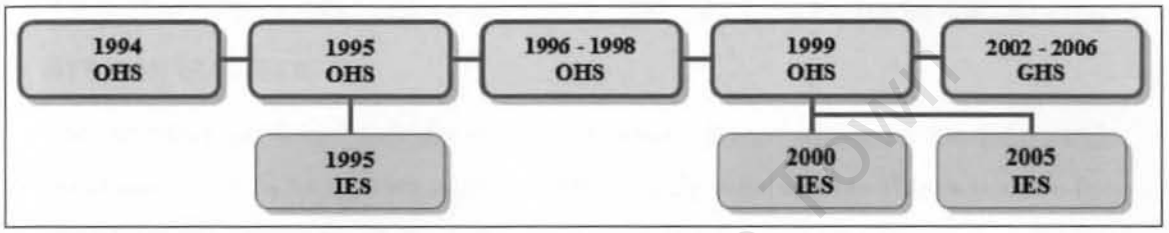
The literature specifically indicates there are some known issues with these three households survey sets (IES, OHS, and GHS). These issues need to be considered when working with these household surveys. This is especially true when using any of the Income and Expenditure Surveys. van der Berg *et al* (2005) and Stats SA (2008b) points out that the Income and Expenditure Survey datasets (especially the 1995 and 2000 IES) are particularly problematic when trying to compare income's across years. Hoogeveen and Özler (2004) identify under-sampling of whites as an issue and over-sampling with the 2000 IES as another issue. Vermaak (2005) and Stats SA (2008b) both point out big gaps between National Accounts and IES 2000 household income results. Simkins (2004) additionally questions IES 2000 ability to properly capture property income, which was acknowledged as a weakness by Stats SA (2008b), along with biases in under-reporting of earnings, failure to capture some income items, failures in households to report all expenditure and the major issue that IES, due to all the improvements, does not allow for the IES to currently be used as a continuous survey, hence not measuring change explicitly.

The October Household Survey and the General Household survey suffer less specific criticism. In fact, van der Berg *et al* (2005) suggests that over time the OHS has got better at capturing informal sector employment. Meth and Dias (2004) demonstrate that the 1999 OHS is robust when wanting to examine household income and various expenditure categories. However Vermaak (2005) does point out though that the separate total monthly household expenditure question is poorly framed and consequently poorly captured in the 1999 OHS dataset and should be used with caution, corroborating a personal observation of mine in Chapter 6. The General Household Survey is highly similar to the October Household Survey as it essentially replaced the OHS after 1999. Thus, it suffers similar criticisms as the OHS does. The

GHS has however shown to be a good source of grant data (van der Berg *et al*, 2005) which van der Berg *et al* (2005) deems as important in understanding the reduction in poverty.

Generally, however the OHS, IES and GHS are considered robust surveys that contain a wide variety of variables, allowing for potential insights into urban food security. The three long-term survey studies are additionally 'linked' as demonstrated below in Figure 8.

Figure 8 Connections between Selected South African Surveys over time



Source: Own compilation from research Central Statistical Service (1996a, 1996b, 1997a, 1997b, 1997c) and Stats SA (2000a, 2000b, 2002, 2003a, 2003b, 2003c, 2005a, 2006a, 2006b, 2007, 2008a)

Figure 8 above demonstrates how the OHS, IES and GHS are loosely linked together. In terms of structure, the sample population is the same population group (although over the years increases and decreases in the sample have occurred due to finance constraints) from the 1994 OHS to the 1999 OHS (Stats SA, 1999a; Stats SA. 1999b; Stats SA, 2000b). Additionally 1995 OHS and 2000 IES used the same sample population as the 1995 and 1999 OHS, thus loosely linking the four and hence the 2005 IES is indirectly linked to the 1999 OHS, because the 2000 IES is linked to the 2005 IES, (Stats SA, 2000b; Stats SA, 2008a). Additionally the 2002 GHS made use of the same master sample as the 1999 OHS (Stats SA, 2000b; Stats SA, 2003a).

In terms of survey structure the questionnaire design of the 2002 GHS - 2006 GHS surveys are based on the 1999 OHS. Thus the 1999 OHS acts as 'the key link' bringing together the OHS, GHS and IES. Caution will still need to be potential applied when doing direct comparisons across surveys due minor changes between surveys and thus a careful analysis of survey data is needed. However the underlying sample population and survey structure similarities between the 1999 OHS with other

OHSs, GHSs and IESs all for many insightful comparisons, not least for when it comes to urban food security.

Having established that the population groups and that the survey questionnaire designs were interlinked, the next part of the methodology was to investigate where similarities in the questionnaire design and other data characteristics existed across the various surveys from 1994 to 2006, in order to determine if comparisons and trends could be identified over time, through the various surveys.

5.2.3 The Process for the Creation of Comparison of South African Surveys

The investigation found that the surveys[41] contain similar relevant information and structures (or the exact same) making them broadly comparable. This was done by collating and examining all the OHS, IES and GHS surveys into a reference Table. The collation and examination was essential to further investigate available food security data and the quality of the data.

The creation of a reference table involved a spreadsheet of similar survey questions relevant to urban food security as well as household and individual characteristics. Each survey's documentation (questionnaires, metadata and statistical releases) and datasets (variables, measures and indicators) were processed and added into the spreadsheet.

Each survey instrument was carefully examined for food related questions and relevant household characteristics. The selected questions were matched up with information from the metadata documents, where available. These questions were also individually checked against the actual datasets using STATA. The data was then added to the spreadsheet.

Following this, the surveys and data were checked for similarities across surveys. Any question structure variations (i.e. slight changes in the way questions were phrased)

[41] Income and Expenditure Survey 1995 and 2000; October Household Survey 1996 to 1999; General Household Survey 2004 and 2005

were noted as well as where the method varied for how answers were recorded, when the same questions were being asked and were recorded in the data files. Extensive appraisal of data sets was done to confirm recorded data and questions matched up correctly for each survey. Question numbers and variable names were also noted in the spreadsheet for later reference. Any useful information for individuals and households was also noted. (Central Statistical Service, 1996a, 1996b, 1997a, 1997b, 1997c ;Stats SA, 1998a, 1998b, 1999a, 1999b, 1999c, 1999d, 2000a, 2000b, 2002, 2003a, 2003b, 2003c, 2004a, 2004b, 2005a, 2005b, 2005c, 2006a, 2006b).

In particular, the process examined:

1. Similarities in question structure across the surveys, time periods and it was noted where variations of the questions were present.
2. The format in which data (answers) to the same questions across surveys were recorded in the dataset, e.g. differing formats might mean that although the question was the same, one could not compare the two, unless you were able to transform the stored data in some way.
3. Checking if recorded data and questions match up correctly for each survey.
4. Question numbers and variable names were also noted for later reference. Additional useful information for individuals and households was noted.

The process of creating the reference Table 9 of variables across the surveys (Appendix C) created a (1) useful table of what food security data exits for the South Africa cities over time. Furthermore, it provided an (2) initial examination of the data quality, in terms of issues such as: structural problems, errors in recording and subtle changes in questions that could affect outcomes. Additionally the process had the effect of: (3) simplifying the survey datasets by creating a reference table (4) presenting the relevant information concisely and (5) examining changes in the data storage over time of variables. It also (6) identified pre-processing that will be needed to correct problems. Finally, (7) it highlighted which survey would be the most suitable in giving the best possible initial exploration of urban food security.

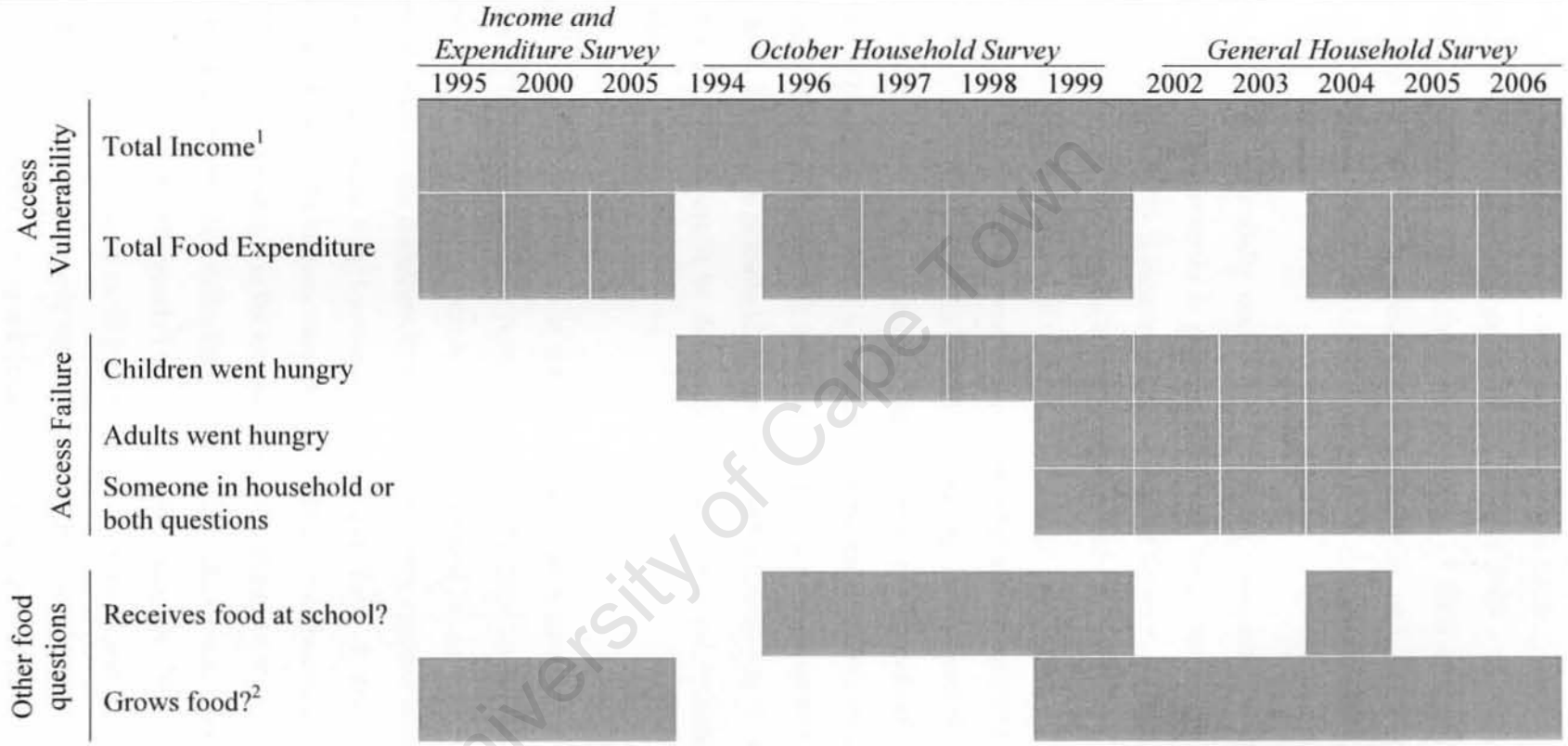
5.2.4 Results and Selection of The Key Survey

The result of this extensive review and appraisal process is a concise, easy to use tool for identifying where various sources of data can be found and where similar or the same question exists over time.

All the food data and relevant household information has been recorded in such a way that any piece of data: (1) can be traced back to the original question in the survey, (2) the exact location of the data can be determined, (3) how the data is stored and (4) if other surveys contained the same question in any other year.

The following Table 9 is summary of the final spreadsheet reference table available in full in Appendix D.

Table 9 A Table of South African Surveys with Relevant Urban Food Security Variables



Notes: **1** : or Total Expenditure
2: 'Why' was additionally asked in the 1999 OHS.

Source: Own Compilation from research Central Statistical Service (1996a, 1996b, 1997a, 1997b, 1997c) and Stats SA (2000a, 2000b, 2002, 2003a, 2003b, 2003c, 2005a, 2006a, 2006b, 2007, 2008a)

From Table 9 it is visually evident that many of the South African household surveys (IES, OHS and GHS) have relevant urban food security data. *Access vulnerability* data is available for most years: 1995 – 2000 and 2004 – 2005. *Access failure* data is available from 1994 – 2006 (with the exception of 2000 and 2001) but is not always available for the whole household i.e. sometimes only available if children went hungry.

The IES's are potentially useful for calculating a household's *Access Vulnerability* and tell us if a household is growing their own food, but are not able to tell us if a household is actually failing to eat due to lack of finance or other factors. The OHS's can tell us about a household's *access vulnerability* and whether a child receives food at school (with the exception of 1994). Then from 1996 onwards, the OHS's gives us one indicator ("Children went hungry") of whether a household is in a situation of *access failure*. From the 1999 OHS it can be determined if any anyone in the household is failing to access food and whether the household is growing food. In terms of the GHS, the Table 9 shows household *access vulnerability* can be calculated from the 2004 GHS onwards and *access failure* can be calculated from the first GHS in 2002. Whether a household grows food can be determined for all GHS's, but only in the 2002 GHS can it be determined if children in the household receive food at school.

Furthermore, Table 9 helps in the identification of a survey that will best allow for meaningful analysis and for future research to be built upon. The table identifies the 1999 October Household Survey and 2004 General Household Survey as containing data for each of the questions in the table. The 1999 October Household Survey also contains the reason *Why* household's grow food. Table 9, also shows that the 1999 October Household Survey was the last OHS, nevertheless as reviewed above in 2.2.2, it is known that it is the key survey that is linked to the 1995, 2000 Income and Expenditure Survey and is the base around which the General Household Surveys and sampling frame are designed (Udjo *et al*, 2000; Stats SA. 2003a). The 1999 October Household Survey captures all the food related measures and questions and has one of the largest household sample sizes and acts as the linchpin between the three different survey series (OHS, IES and GHS) (Udjo *et al*, 2000). Thus, 1999 OHS is the key survey for analysis of urban food security across these surveys.

It was decided to use the 1999 October Household Survey to test and analyse various data and methodological issues around urban food security for the three South African cities. The 1999 OHS was selected for the reason mentioned above and the reasons listed below:

1. The IES and GHS use the same master sample of people as the 1999 OHS uses.
2. As a survey, it has one of the largest sample sizes of all the OHS, GHS and IES, which potentially means large sample sizes when doing a city level analysis.
3. The survey instrument (questionnaire) has the most common features – i.e. had new questions and question structures that the relatively new GHS had but the OHS also included all the original OHS questions.
4. Finally, it is the key link between all the survey series.

The 1999 OHS is the most comprehensive survey, linking all the surveys together while providing an extensive, well-established dataset for urban food security analysis. For these reasons, the 1999 OHS has been used as the keystone survey for further urban food security analysis.

Thus to sum up Chapter 5; the Methodological search, identification and collation of available household surveys containing reliable urban food security information, demonstrating that it is possible to identify and compile messy datasets. The search identified many institutions are not collecting meaningful data for urban food security as they still rely on antiquated food availability measures to make general guess-estimates of overall food security. The literature and definitional changes to food security (see Chapter 2 e.g. Sharma, 1992) points out the shortcomings and problem of simple food availability measures and the conceptual shortsightedness of missing the whole food security issue of access and the urban. This lack of measuring urban food security is especially concerning as the literature in Part 1 indicates that the locus of poverty and food insecurity is shifting to urban areas, in particular in regions such as Southern Africa. Drawing from the literature, government statistical agencies household surveys were considered a good potentially source of urban food security

statistics. The search for these types of household surveys, found 97 household surveys for the study countries capturing both urban identifiers and potential food security measures. The finding of these 97 applicable surveys clearly contradicts assertions by some (e.g. Chen and Ravallion, 2004; Sharma, 1992) that suggest not enough household surveys exist to analyse issues such as urban food security.

Additionally, the search process identified a number of South Africa surveys that are loosely linked (IES, OHS and GHS) and thus allow for potential analysis of urban food security over time. The 1999 OHS was selected as the survey for further urban food security analysis, as it was identified as the key link between the three long-term surveys. It is also a well-established dataset and contained pertinent urban food security data useful for gaining a better in-depth understanding of urban food security in Cape Town, Johannesburg and Durban. Thus this chapter begins to answer the research question as to what data and methods are available and appropriate for assessing urban food security and the two research objectives: (1) the identification of reliable data from which indicators can be derived for specific cities, and (2) the establishment of a methodology, based on the identified concepts and indicators, to investigate urban food security.

CHAPTER SIX: THE PREPARATION OF A SOUTH AFRICAN HOUSEHOLD SURVEY: VARIABLES FOR IN-DEPTH ANALYSIS OF URBAN FOOD SECURITY

Chapter 6 continues to review which methods are available and appropriate for accessing urban food security data and establishing a methodology based on identified concepts (food access) and indicators from literature to investigate urban food security. This was achieved by preparing the South African 1999 October Household Survey (OHS) dataset variables, in order to identify concepts and indicators that could be investigated and to determine urban individual and household food *access vulnerability* and food *access failure*.

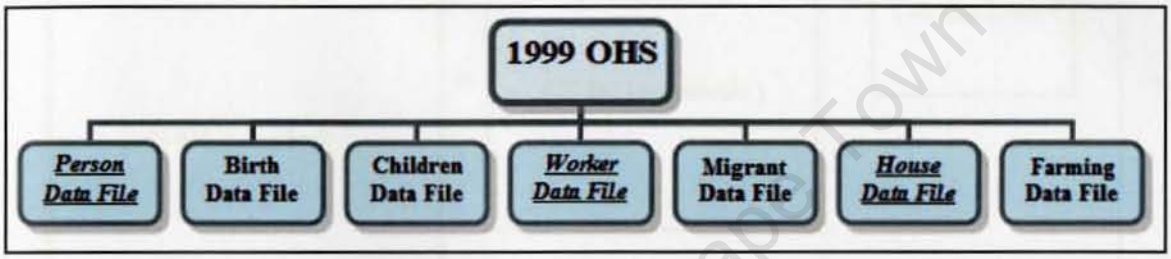
In this chapter, the 1999 OHS survey dataset was prepared so that an in-depth urban food security analysis could be undertaken for Cape Town, Johannesburg and Durban. To prepare the 1999 OHS dataset for analysis a merging (6.1) of various data files to create one 1999 OHS database for analysis was done. Following this (6.2) various methods of deriving total income were created, and extensive testing occurred to establish the most appropriate method to determine household income (the selected method would be used calculating household vulnerability to access failure). This was followed by the testing of expenditure (6.3), food expenditure (6.4) and the creation and selection of the most appropriate equivalency scales (6.5).

Once the above methodology for the 1999 OHS dataset and measures/ indicators/ variables was identified and correctly setup, the dataset was used for defining various cities scales and deriving the associated data (Chapter 7) and food security indicators (Chapter 8), this allowed for meaningful investigation into urban food security (Part 3). As a companion to Chapter 6, 7 and 8 various data files and STATA files are available in the accompanying CD to this thesis.

6.1 THE MERGING OF THE 1999 OCTOBER HOUSEHOLD SURVEY DATASET

The following Chapter outlines the methodology used in the merging of various portions of the 1999 October Household Survey to form the South African 1999 October Household Survey (OHS) dataset. Different variables from the same surveys are often stored in different data files (see Figure 9 below). For example, the 1999 OHS is made up of seven separate data files (Stats SA, 1999c). The seven data files are presented below in Figure 9.

Figure 9 The Various Data Files Structure of the 1999 OHS



Source: Own, based on the information in Stats SA (1999c)

The data required to access the appropriate urban food security data, associated indicators and household variations comes from three of the 1999 OHS data files, namely the *Person Data File*, *Worker Data File* and the *House Data File*. Thus, the merging of these three data files was needed so that an appropriate comparison and analysis could take place.

6.1.1 Methodology Used To Merge Relevant 1999 OHS Data Files

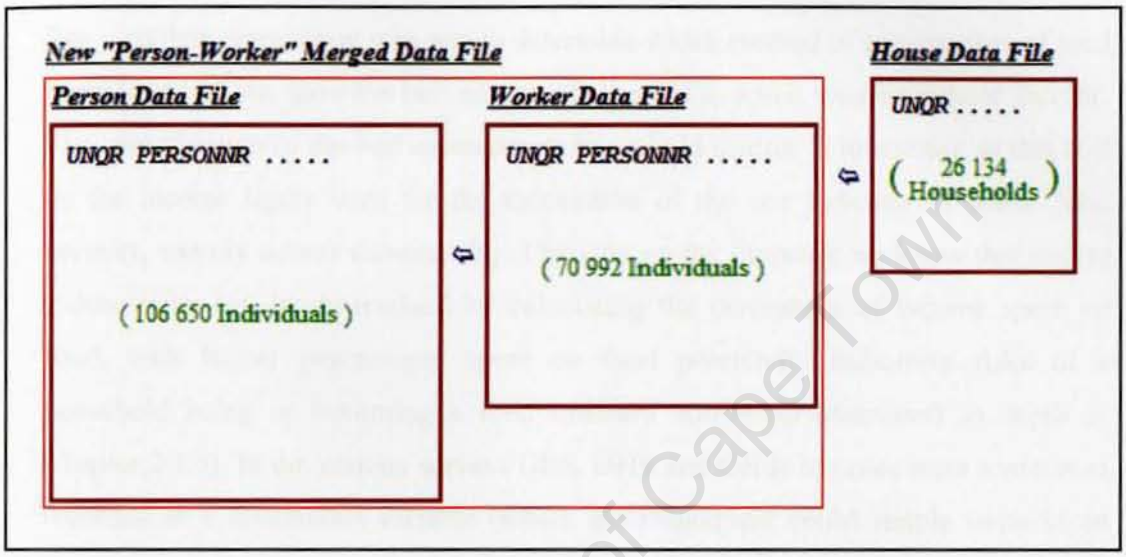
The method in which the files are merged is imperative, as an incorrect process could have resulted in the loss of data and/or the mismatch of the data.

Each of the three data files (*Person Data File*, *Worker Data File* and the *House Data File)* has recorded identifiers, which were used to merge the three files. The three data files have Unique Number (*UNQR*) identifiers which is a household level identifier (i.e. each individual for which data was recorded has a household level identifier, a Unique Number), while the *Person* and *Worker* data files contain an extra Personal

Number (*PERSONNR*), when combined with the Unique Number it was used as an individual level identifier. (Stats SA, 1999c)

Initially the Unique Numbers and Personal Numbers were appended together and converted from strings to integers, in the *Person* and *Worker* data files. The following Figure 10 demonstrates the use of identifiers and the merge process.

Figure 10 The Creation of the 1999 OHS Data File



Source: Own.

Then as seen in Figure 10 the *Worker* data file was merged with the *Person* data file to create a new data file *Person-Worker* merged data file. This is represented in Figure 10 by a blue arrow from the *Worker* data file to the *Person* data file. The reason the merge occurs in this direction is to ensure that the data integrity is maintained. The *Person* data file contains all the individuals (106 650) who were surveyed, while the *Worker* data file only contains individuals who have a job of some kind (70 992 individuals). By merging the *Worker* data file to the *Person* data file there was no loss of data. If the merge had been done in the other direction, there would have been a loss of approximately 30 000 individuals from the final dataset, which would have had huge implications for later data analysis.

The *House* data file was then merged by using the Unique Number only to corresponding Unique Numbers in the new *Person-Worker* merged data file. It was

only necessary to merge by the Unique Number as the variables in the *House* data file are all at the household level, as seen in Figure 10 Once a number of data quality error checks were done, the new *Person-Worker-House* data file was saved and then used for all further analysis.

6.2 Construction and Testing of Various Income Methods: to determine the most appropriate method

The next data preparation step was to determine which method of construction of total household income, gave the best approximation of the actual total household income. The identification of the best approximate household income is important, as this will be the income figure used for the calculation of the one indicator of urban food security, namely *access vulnerability*. Drawing on the literature we know that *access vulnerability* can be determined by calculating the percentage of income spent on food, with higher percentages spent on food potentially indicating risks of a household being or becoming a food insecure household (discussed in depth in Chapter 2.3.3). In the various surveys (IES, OHS and GHS) incomes were sometimes recorded as a continuous variable (where the respondent could simple write in an exact amount) and/or as categorical variables (where the respondent could select an income bracket they fitted into). Simultaneously some surveys recorded income data at the household level while other only at the individual level. An investigation into the income data was done to establish which variables and methods were the best to construct total household income.

The 1999 OHS survey includes all the methods listed above for recording income and thus provides a perfect opportunity to investigate differences in income measurements (Individual categorical income, Individual continuous incomes and household income) and their potential impact on food security measures such as *access vulnerability* from the data. The identification of the best method resulting in the least quality issues is not only valuable in analysis of the 1999 OHS, but is important to know for any further exploration and/or linking of other the other identified IES, OHS and GHS's.

The 1999 OHS is the only survey of the OHS, GHS and IES's to have all the identified income related questions. This allows for comparisons and selection of a method based on comparisons that no other identified survey could do. In the 1999 OHS income data was recorded for all employed and self-employed individuals in a household as actual continuous income and/or as categorical income. Thus, the various income variables were tested and compared in order to determine the closest approximation[42] to total household income.

First income methods at an individual level were created and tested. This was done at an individual level first to ensure any errors at this level were not simply scaled up at the household level, as a result of taking the sum of individual's incomes in a household. Secondly, income methods at the household level were created and tested because this was the primary level of analysis for this research, as hunger is often shared at this level. Testing at this level is also essential in ensuring the best income method was selected.

The outcome of the testing of the various methods resulted in the household Mean Categorical Point (MCP) method being selected. The household MCP was selected as the best method to approximate the total household income and exhibit the best attributes for use in analysing of the data. Its selection was based on the methodology laid out below.

The testing was done on the following methods of analysis: "actual continuous income", "categorical mid-point incomes", "mean categorical incomes" and the "continuous else mean categorical point incomes" method. The testing of the various income alternatives compared various statistical measures and the implications thereof. At the first stage of the testing, the individual level incomes were compared. The second stage looked at the construction of household level income. This was done

[42] Approximation, as incomes such as child grants, were not explicitly recorded by the household survey, this is an acknowledge weakness in using this household survey, as van der Berg (2005) points out that grants are an important part of household income for many South African households. Note from here on in the thesis, approximation or approximate, will not be mentioned each time when referring to a derived total household income.

in order to select the best method to determine total household income. The selected income was used when calculating *access vulnerability* of household.

However before comparisons can be done, the construction of: (6.2.1) "continuous income," (6.2.2) "categorical mid-point incomes", (6.2.3) "mean categorical incomes" and the (6.2.4) "continuous else mean categorical point incomes" must occur. The methods used to construct each of these income types are explained below.

6.2.1 Construction of Continuous Income Variables

The following subsection explains the creation of the continuous income variable. The 1999 OHS asked for income in question 3.20 as per the following Figure 11.

Figure 11 Continuous Income Question in OHS 1999

3.20 What is .....'s total salary/pay at the main job? *Including, overtime, allowances and bonus, before any tax or deductions*
Give amount in figures, without any text

Is this
1 = per week
2 = per month
3 = annually

☐ 1
☐ 2
☐ 3

If refusal or don't know, then show the categories. Make sure the respondent points at the ***correct income column*** *(weekly, monthly, annually) on the* ***show card*** *and mark the applicable code.*

WEEKLY	MONTHLY	ANNUALLY	
01 = NONE	01 = NONE	01 = NONE	☐ 01
02 = R1 - R46	02 = R1 - R200	02 = R1 - R2 400	☐ 02
03 = R47 - R115	03 = R201 - R500	03 = R2 401 - R6 000	☐ 03
04 = R116 - R231	04 = R501 - R1 000	04 = R6 001 - R12 000	☐ 04
05 = R232 - R346	05 = R1 001 - R1 500	05 = R12 001 - R18 000	☐ 05
06 = R347 = R577	06 = R1 501 = R2 500	06 = R18 001 - R30 000	☐ 06
07 = R578 - R808	07 = R2 501 - R3 500	07 = R30 001 - R42 000	☐ 07
08 = R809 - R1 039	08 = R3 501 - R4 500	08 = R42 001 - R54 000	☐ 08
09 = R1 040 - R1 386	09 = R4 501 - R6 000	09 = R54 001 - R72 000	☐ 09
10 = R1 387 - R1 848	10 = R6 001 - R8 000	10 = R72 001 - R96 000	☐ 10
11 = R1 849 - R2 540	11 = R8 001 - R11 000	11 = R96 001 - R132 000	☐ 11
12 = R2 541 - R3 695	12 = R11 001 - R16 000	12 = R132 001 - R192 000	☐ 12
13 = R3 696 - R6 923	13 = R16 001 - R30 000	13 = R192 001 - R360 000	☐ 13
14 = R6 929 OR MORE	14 = R30 001 OR MORE	14 = R360 001 OR MORE	☐ 14
15 = DON'T KNOW	15 = DON'T KNOW	15 = DON'T KNOW	☐ 15

Source: From Stat SA (1999d: 20).

In question 3.20 and 3.26 (which was laid out in exactly the same format as question 3.20), employed and self-employed individuals respectively were both asked for their actual continuous income (see Figure 11, red box). The individual had to specify the time category for which they accumulate the income: i.e. weekly, monthly or annually (see Figure 11, green box). If the individual refused to answer the question, individuals were asked to identify which income category, they belonged to (see Figure 11, yellow box).

In order to make all recorded continuous amounts comparable and useful for analysis, all actual income answers were converted to monthly amounts. A monthly amount was chosen for two reasons: (1) monthly income is a standard measure of income; (2) the majority of actual recorded amounts were already monthly figures (73.11%), while 25.03% were weekly and 1.86% annual figures[43] .

The actual continuous employed and self-employed incomes were converted to numeric values, from strings, in order for later calculations to be conducted. Actual income for employed and self-employed individuals, which was recorded as a weekly amount, was multiplied by 4.34[44] weeks and then saved as a new variable *Con* (new continuous monthly income variable). If the amount was recorded as a monthly amount, the amount was simply saved as is to *Con*. If the recorded amount was an annual amount, this value was divided by 12, as there are 12 months in a year, and saved to *Con*. Through this method, all recorded continuous amounts were recalculated to monthly incomes. The result was a new variable *Con* with all the monthly reported continuous incomes of employed and self-employed individuals.

6.2.2 Construction of Categorical Mid-Point (CMP)

The next income method to be constructed was the Categorical Mid-Point (CMP) method. The CMP method has been shown by Posel and Casale (2005), Bosch (2006)

[43] Income per Month 21546 of 24749 (73.11%); Income per week 6194 of 24749 (25.03%); Annually 684 of 24749 (1.86%) (from Merged DataSet)

[44] 4.34 weeks was selected as there 52 weeks in a year and 12 months in a year, thus there is an average of 52/12 = 4.34 weeks in a month.

and others to be a reliable method for approximating incomes when categorical incomes are collected. The method simply makes use of the mid-points (i.e. medians of a category) of an income category to represent an individual's income. For example, if an individual selected a category for R2501 – R3500, then the midpoint of R2999.5 would be assigned to that individual, so that comparative calculations can be done. This method is used by many organisations, including the South African Reserve Bank, when studying household surveys (Bosch, 2006). The reason for this method being selected is that it is simple to implement, commonly used in South African research (e.g. Meth and Dias, 2004; Vermaak, 2005; Bosch, 2006) and has been found by Posel and Casale (2005) to yield unbiased results.

Thus mid-points where created to give a numerical value to the categories selected by individuals in the survey. This was done so that multiple individual's incomes in a household could be summed to determine total household income and comparative calculations could be undertaken. The key weakness of this approach is that the actual individual amounts could actually lie closer to the upper or lower limit of the categories and there would be no way to tell. The adequacy of this method for analysis of urban food security is what was tested next.

The method used to calculate Mid-point incomes is given by the formula in Table 10.

Table 10 A Table Demonstrating The Method of Calculating Mid-points and Values Assigned

Mid-point Calculation for each Category	***Values***
e.g. (previousUpper+((TopCat-BotCat)/2))	
01 = 0	0
02 = ((200-1)/2)	99.5
03 = (200+((500-201)/2))	349.5
04 = (500+((1000-501)/2))	749.5
05 = (1000+((1500-1001)/2))	1249.5
06 = (1500+((2500-1501)/2))	1999.5
07 = (2500+((3500-2501)/2))	2999.5
08 = (3500+((4500-3501)/2))	3999.5
09 = (4500+((6000-4501)/2))	5249.5
10 = (6000+((8000-6001)/2))	6999.5
11 = (8000+((11000-8001)/2))	9499.5

12 = (11000+((16000-11001)/2))	13499.5
13 = (16000+((30000-16001)/2))	22999.5
14 = 30000+	50000
15 = .	.

Note: The Categories of the left (01-15) correspond to those in Figure 11 above.

Source: Own Compilation and Analysis based on what was asked in Q3.20 (Stat SA, 1999d :20).

Table 10 demonstrates the method of calculating mid-points and values assigned. The mid-point values were assigned, based on categories employed and self-employed individuals had selected as seen in the Table 10. For instance in Table 10 if category 04, R501-1000, was selected by an individual in the survey they were assigned R749.50 as this is the median point in the category. This data was saved as a new variable *IncMid* to each relevant individual in the 1999 OHS.

6.2.3 Construction of Mean Categorical Points (MCP)

The mean categorical points (MCP) method is similar to the categorical mid-point method. The difference is that the points are not based on the median value of a category (selected to reflect an individual income) but rather the mean of incomes within that category. The mean of the select categorical income bracket is based on the continuous income (see Chapter 6.2.1) data supplied by 56.7%[45] of the total responses.

Table 11 shows the calculated MCP values based on the mean of the continuous report income and gives a comparison on the differences of the MCP and CMP values.

[45] 56.7% is based on 13218 individuals responses with continuous income reported, of a total 23314 categorical responses.

Table 11 A Comparison of Mean Categorical Points and Categorical Mid-Point Values

A Comparison of Mean Categorical Points (MCP) and Categorical Mid-Point (CMP) Values						
Categories	*CMP Values*	*MCP Values*	*Sample Size*[1]	*Reported in each category*	*Response Rate*[2]	*Difference Between MCP and CMP*
01	0	0	0	120	0.00	0
02	99.5	131.693	1344	2026	66.34	32.193
03	349.5	364.0489	3154	4377	72.06	14.5489
04	749.5	751.718	2886	4237	68.11	2.218
05	1249.5	1291.889	1905	3242	58.76	42.389
06	1999.5	1974.931	1917	3605	53.18	-24.569
07	2999.5	3055.73	771	1861	41.43	56.23
08	3999.5	4080.293	396	1190	33.28	80.793
09	5249.5	5347.538	387	1125	34.40	98.038
10	6999.5	7112.237	192	628	30.57	112.737
11	9499.5	9498.356	116	386	30.05	-1.144
12	13499.5	13499.52	78	308	25.32	0.02
13	22999.5	21997.34	72	209	34.45	-1002.16
14	50000	199978.1[4]	84	174	48.28	149978.1
15	.	.	0	13	0.00	.

Notes:

1 The Categories of the left (01-15) correspond to those in Figure 11 above.

2 Number of continuous observations, within category range.

3 Sample Size divided by reported in each category, all multiplied by 100.

4 This value does not make sense, indicating problems with the data. For this and other reasons discussed below category 14 was generally ignored when making comparison, unless other wise stated.

Source: Own Compilation and Analysis

The differences in the CMP and MCP method are show in Table 11. The table shows that each mean point has been based upon the continuous incomes within the same categorical range. For example from Table 11 for category 04, R501-1000 the CMP method assigned R749.50 as the value for the individual while the MCP method takes the average of all continuous income data reported between R501-1000 (2886 observation) and calculates the mean, R751.718, of those actual values and assigns that value to individuals who selected the category 04.

The MCP method of using the mean calculated points gives a more specific picture of individual's incomes between the bracketed categories. It is vital that all the means are statistically sound, i.e. have a large enough sample to make meaningful calculations of each mean. The lowest number of observations was for category 14, with 84 of 174 possible observations (close to representing 50% of the total cases).

For the following three reasons I am not apprehensive about the lower sample size of category 14: (1) although the observations for the category are on the lower side of what I would like, 84 observations are still a good amount of values to calculate a mean (Babbie and Benaquisto, 2002). (2) Without using any values to calculate a mean, there is no basis on which to select a value as there is no upper limit for category 14 (i.e. as the category is for respondents for earning R30 001 or more). Using the mean of the 84 observation gives this category some reference point. (3)Finally, this category of income earners is not the focus of this research and therefore this assigned value will have no effect on identifying the food *access vulnerable* households, hence is unimportant in the case of this research.

From the Table 11 it is noted that in comparing CMP with MCP there is not much deviation from CMP values. However, the deviation will make a difference when individual incomes are summed to create a total household level income.

As mentioned above the method used to calculate the MCP in STATA involved: (1) calculating the means of the continuous incomes that fell into each individual category. This mean value was then used as the mean categorical point, as seen in Table 11. (2) Each categorical mean was then checked to determine whether there were a sufficient number of observations. (3) The mean values were then assigned to self-employed and employed individuals in the same manner as was done for the CMP method, creating a new variable called *RecodeIncMid.*

6.2.4 Construction of Continuous else Mean Categorical Points (C else MCP)

The final method I constructed used continuous income data where other available data was not available. The MCP data was assigned to the individual. This method is potentially statistically dubious (discussed below), however it still made sense to test it as it may have some possible applications.

The methodology followed stated that when actual income was reported for an individual, it was assigned to a new variable, if no actual income was reported then the MCP was assigned to the new variable, thus creating a variable that had

continuous data where available or the MCP value. The idea behind this method comes from the structure of the income question, discussed and represented in Figure 11. The potentially statistically dubious part of using this method was the making use of continuous income twice; once for calculating the means of the MCP and then using the actual amounts again.

6.2.5 Testing and Comparison of Income Methods at Individual Level

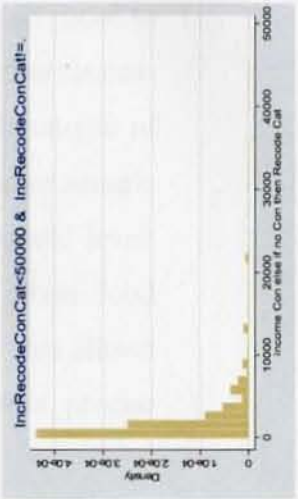
The various income types that were created above (in Chapter 6.2.1 – 6.2.4), were compared to each other, initially at the individual level and then constructed at the household level. The various income types were tested at an individual and household level to identify different data quality issues, i.e. errors could be more easily identified when looking at an individual level rather than a household level as once figures are summed at the household level it is often hard to see where the errors occurred.

The following Table 12 compares some basic statistics describing and comparing the distribution of the different income methods.

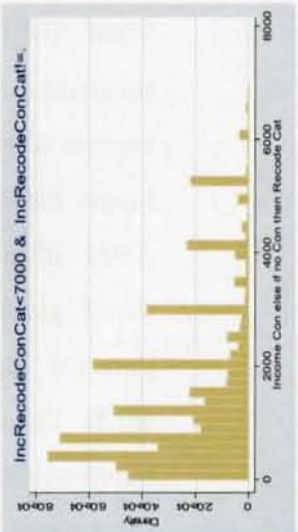
Table 12 A Table of Summary Statistics for the Various Constructed Individual Level Incomes

SUMMARY OF INDIVIDUAL LEVEL INCOME COMPARISON – Using 1999 OHS								
Income Types	Continuous (C)		Categorical Mid-Points (CMP)		Mean Categorical Points (MCP)		C else MCP	
Obs.	13302	[13238][1]	23296	[23122]	23296	[23122]	23300	[23146]
Mean	2833.49	[1635.732]	2487.91	[2130.367]	3623.345	[2145.716]	3617.076	[2170.934]
Std dev.	28190.31	[2794.184]	5124.075	[3055.742]	17294.67	[3003.541]	24668.94	[3200.502]
(Min, Max)	(0.25,1520302)	[0.25,45591.7]	(0,50000)	[0,22999.5]	(0,199978.1)	[0,21997.34]	(0,1520302)	[0,45591.7]
Skewness	37.66065	[6.803607]	6.698967	[3.888252]	10.94243	[3.681181]	33.96309	[4.433121]

Graph of "x<50000 and x!=."



Graph of "x<7000 and x!=."



OTES **1**: The values in square brackets "[ ]" indicate where value's only below R50 000 were used. This is because the categorical selection only allowed individuals to select up to "R16 001- R30 000" or "R30 000 or More" (StatSA, 1999d: 20). Both CMP and MCP values above were selected for the last category choice "R30 000 or More", as an arbitrarily high value. Thus, the values in brackets are values that exclude these arbitrary high values. For comparison reasons the values in brackets were compared. Hence, in the discussion below, the bracketed values are used unless otherwise specified.

Source: Own Calculations from the OHS 1999 Dataset.

The Table is useful in demonstrating various statistics and potential problems with the method used to calculate individual income, which is to be used to calculate food access vulnerability. From Table 12 it was observed that when including all observations, the continuous income has far fewer observations (13302) compared to the CMP with 23296, MCP with 23296 and C else MCP with 23300 observations. Therefore using continuous income would result in a significantly smaller sample of individual observations. However, the other methods allow for a much larger sample size of individuals for investigation of income at an individual and household level. The larger sample size is particularly important when investigating urban food security. The more households (larger sample size) within a given urban area allows STATA (the specific method is discussed in section 7.3) to make more precise inferences about the urban population.

When investigating the mean of values below R50 000, we see that the CMP, MCP and C else MCP method have similar means. It is however observed that continuous income exhibited a lower mean. This was probably a result of high-income earners preferring to indicate their income in categories (high-income earners often report their income this way) (Atkinson and Mickelwright, 1983; Juster and Smith, 1997; Posel and Casale, 2005). Posel and Casale (2005: 23) while investigating South African household surveys found that "those reporting in [categorical income] brackets are found to be concentrated in the tails, and especially the upper tail, of the income distribution." Thus using continuous income as the income of choice could result in a loss of data around the tails i.e. low income and high-income earners not reporting continuous income.

When examining the standard deviation's[46] it is noticed that the continuous values have a smaller standard deviation around the mean then CMP and MCP method. The CMP and the MCP methods show evidence of similar standard deviation, while the minimum and maximum standard deviation does not tell us much in terms of comparisons and selecting a preferred income level in this case. It is interesting to note that C else MCP and C act very similarly to each other in Table 12, as does CMP and MCP.

The skewness is a great measure that tells us how data is structured. We see that the continuous income method has a skewness of 6.8 while CMP 3.9, MCP 3.7 and 4.4 C else MCP. This indicates that the data is skewed positively. However, more importantly is the ability to use skewness as a measure of how similar the data types are structured in comparison to each other. What was noticed is that the structure of the income data is similar in both the results of the CMP and MCP methods, while the continuous income is more skewed to higher incomes. This can be an indication of missing or non-reporting of low incomes as discussed by Atkinson and Mickelwright (1983) to generally be the case, and therefore showing a higher reporting of more middle to high incomes. The C else MCP method reflects a mixture of MCP's and the continuous incomes.

Two different graphs were created to view the distribution of variables and income. The first graph looked at the distribution of all variables below R50 000 (R50 000 was selected due to reasons discussed in the note in Table 12). The second graph looked at the distribution of income below R7000. R7000 was selected for the second group as testing of the various income types showed that 90-95% of monthly income data was found below R7000, therefore the graphing of the various income types in this range allows for a closer look at comparisons of the distribution of the various income types. This method of graphing the distributions is suggested by Babbie and Benaquisto (2002) when cleaning data, in order to easily identify potential issues in the data.

[46] Standard Deviation: a statistical measure of dispersion around the mean.

Both graph types show a more random distribution of Continuous income as well as the clustering of income, for CMP and MCP, around the central median or mean values. The graphs additionally show the mix in the distribution that is created by the C else MCP method, where random distribution of continuous income is interrupted by MCP clusters of incomes.

It would seem that no particular constructed individual income method is highly dissimilar compared to the rest. However, it does seem that "CON" has two key weakness: (1) it has a smaller sample size than the other methods and (2) under reporting low and high-income individuals. Thus will not be useful for urban food security analysis, as large sample sizes and low-income families reporting their situation is essential in understanding food security at an urban scale. Noting these observations before summing up the various individual incomes methods to create household incomes is important in the analysis of the final decision (6.2.7) on which of the constructed income's will be used when calculating the vulnerability of a household to failing to access food in an urban setting.

6.2.6 Testing and Comparison of Income Methods at the Household Level

A benefit of using the 1999 OHS is that it additionally recorded the total household income, unlike the other identified surveys (Stats SA, 1999: 38; Figure 12). Figure 12 shows the actual question on total household income in the 1999 OHS:

Figure 12 1999 OHS Question 6.3.6 on Total Household Income

6.36 What was the total household income in the last month, including wage, salaries, government grants, private pensions and all other sources of income?
Show prompt card

☐ 01	R 0 - R 399
☐ 02	R 400 - R 799
☐ 03	R 800 - R 1 199
☐ 04	R 1 200 - R 1 799
☐ 05	R 1 800 - R 2 499
☐ 06	R 2 500 - R 4 999
☐ 07	R 5 000 - R 9 999
☐ 08	R 10 000 OR MORE
☐ 09	DON'T KNOW
☐ 10	REFUSE

Source: Stats SA (1999: 38).

In Figure 12, three major quality weaknesses are observed in the way the total household income question was asked and how it recorded data:

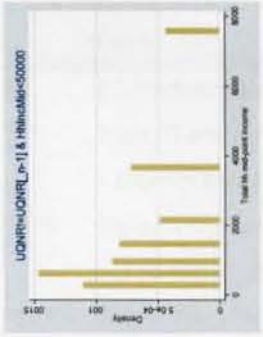
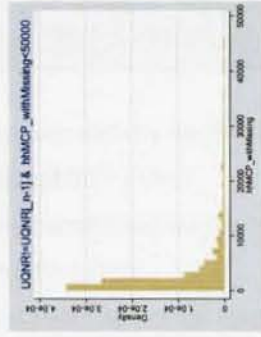
1. As seen in Figure 12, household income was recorded as a categorical variable and as there is not another source of household income, the approximation of values was based on mid-points.
2. Categories seem random and different to the income report brackets in the same survey seen in Figure 11, category: Question 3.20 and 3.26.
3. It is seen in Figure 12 that the upper limit of the categorical income is only R9 999. Thus only household incomes below R10 000 could be meaningfully reported for this question. This seems strange to only allow households to report household income up to R10000 when individuals in the same households are asked to specify their monthly income up to R30 000 a month (in question 3.20 and 3.2.6). Common sense would have made more categories and a larger Rand value for total household income, at the very least match the individual level income categories or to surpass it. (Stats SA, 1999)

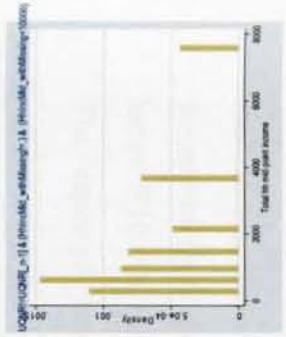
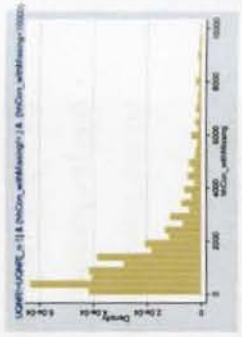
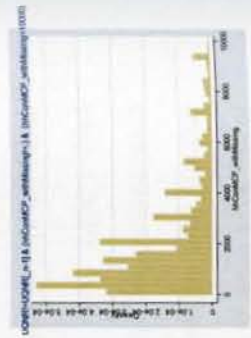
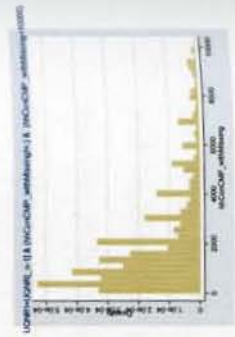
However having the total household income is a valuable metric for comparing the constructed household incomes where households which have a total constructed household income less than R10 000 were created. The report, bracketed household income, acts as a rough guide in selecting which method is reliable and closely approximates total household income.

The reported household income from Question 6.3.6 (Stat SA, 1999: 38) was therefore placed in Table 13 below along with the newly constructed household incomes as a comparative reference. The newly constructed household income values are simply the sum of all the constructed incomes from the individuals within each household.

Table 13 A Table of Summary Statistics Comparing the Various Constructed Household Level Incomes and the Reported Household Income

SUMMARY OF HH LEVEL INCOME COMPARISON – Using 1999 OHS

{} means <10 000	*Reported HH Total Income MP*	*Hh Continuous (hhC)*	*Hh Categorical Mid-Points (hhCMP)*	*Hh Mean Categorical Points (hhMCP)*	*hhC else hhMCP*	*hhC else hhCMP*
Obs.	{22913} 23962 [22913] [1]	{9348} 9753 [9689]	{15256} 16466 [16304]	{15297}16466 [16466]	{15279} 16469 [16322]	{15314} 16469 [16322]
Mean	{1726.748} 3840.037 [1726.748]	{1665.85} 3863.961[##] [2191.738]	{2107.094} 3519.88 [2987.383]	{2106.925} 5126.287 [3009.369]	{2084.842} 5117.364 [3032.67]	{2087.931} 4287.866 [3022.456]
Std dev.	{1951.157} 10059.51[1951.157]	{1723.288} 33419.93 [3525.37]	{2146.271} 7097.12 [4441.558]	{2117.035} 22553 [4391.944]	{2099.359} 30539.5 [4527.782]	{2113.208} 26264.98 [4558.227]
(Min, Max)	{199.5, 7498.5} (199.5, 50000[%]) [199.5,7498.5]	{0.25,9900} (0.25, 1521604) [0.25,46000]	{0,9999} (0,1500000) [0,47998.5]	{0,9923.573} (0, 599934.3) [0,45969.61]	{0,9998.356} (0, 1521604) [0,46000]	{0,9999.5} (0, 1521604) [0,47998.5]
Skewness	{1.897543} 4.211749 [1.897543]	{2.010606} 31.65042 [5.065859]	{1.651507} 6.383175 [3.712154]	{1.631881} 11.08323 [3.571184]	{1.626021} 26.96947 [3.703027]	{1.638518} 38.63532 [3.796051]
Graph of "x<50000 and x!=."						

Graph of "x<10 000 and x!=."						
Correlate to Tot hh Mid-Point Income *** (<10000%)	1	0.7789	0.8097	0.8127	0.8183	0.8150
Correlate to Total hh Expenditure ****(<10000 %)	1	0.5928	0.6380	0.6416	0.6422	0.6394
	Actual HH Total Income MP	*Hh Continuous (C)*	*Hh Categorical Mid-Points (hhCMP)*	*Hh Mean Categorical Points (hhMCP)*	*hhC else hhMCP*	*hhC else hhCMP*

Notes:

$ [ ] = where values are smaller than 50000

*** Note "Total hh Income" is a Categorical variable and Mid-Points where used, thus correlations maybe effected negatively by this"

- if (*x* <50000 | HhIncMid<50000)and(*x* <50000 and HhIncMid<50000) and (HhIncMid!=.| *x*!=.)

***$ Note "Total hh Income" is a Categorical variable and Mid-Points where used, thus correlations maybe effected negatively by this"

- if (*x* <7000 | HhIncMid<7000)and(*x* <7000 and HhIncMid<7000) and (HhIncMid!=.| *x*!=.)

**** Note "Total hh Expenditure" is a Categorical variable and Mid-Points where used, thus correlations maybe effected negatively by this"

- if (*x*<50000 | ExpMid<50000)and(*x*<50000 and ExpMid<50000) and (ExpMid!=.| *x*!=.)

summ hhCon_withMissing if UQNR!=UQNR[_n-1] , detail

% 10000 and more is actual max catgorical, see Question

Source: 1 Own Calculations from 1999 OHS Dataset.

Similarly, to Table 12, Table 13 above is useful in demonstrating various statistics and highlighting potential problems with the method used to calculate household income, to be used to calculate food *access vulnerability*. From the Table 13 it can be seen that 23962 households completed the actual Household total income question discussed above. Using the constructed household continuous (hhC) method, 9753 household were constructed. Using the category answers to construct household total income (hhCMP and hhMCP), 16466 household incomes were constructed. Using the continuous else categorical to construct household income (hhC else MCP and hhC else CMP) three more households (16469) could be constructed by using the categorical methods. The number of households constructed using the hhC method was substantially less than the other methods. The less households (smaller sample size) within a given urban area means less precise inferences about the urban population can be made, using resampling STATA techniques. However, there was little difference between household categorical methods and continuous else categorical methods. Additionally there was a large difference between the answers to the direct question about household total income and the methods using categorical data. This is in all probability partially a result of under reporting of actual incomes as discussed above and observed by many (Atkinson and Mickelwright, 1983; Juster and Smith, 1997; Posel and Casale, 2005). It may also be the result of income data not always capturing all the income streams into a household. However, it is important to remember that other surveys do not always question the actual total household income directly and the categories are too low and arbitrary as discussed in 6.2.6. Therefore the best method has to be selected from hhC, hhCMP, hhMCP, hhC else MCP, hhC else CMP, so it can be applied to other surveys.

As we know the household income reported (as seen above) to a maximum of R10 000 per household it makes sense to compare the various constructed income methods for where they have household constructed income methods for households below R10 000 and compare these to the known reported household income as a measuring tool. In other words we should expect that a correctly constructed total household income method should have similar results to the known household income, when below R10 000 (when below R10 000 – statistics represented in curly brackets {}). The 'reported' household income has a mean of 1726.75 and the hhC household

income a mean of 1665.85. In comparison to other household income type's means the reported and hhC method are somewhat lower. The two solely categorical based (hhCMP and hhMCP) both have values around R2107 while the two mixed methods (C else CMP and C else MCP) report a marginally lower means of R2086. The mixed methods means are shifted lower than the categorical due to the lower mean of the continuous method. It is possible that the difference between the continuous and categorical methods means is due to the higher income earners not reporting. Other statistics such as STD, DRV and skewness, help further in identifying the best method of household income to be used for food access measurement.

When comparing hhC income's mean and standard deviation (when values are smaller than R50 000) to other constructed methods of the similar sort, it is observed that hhC has a lower mean standard deviation. This is because continuous income survey questions often under report high incomes and as a result "without high end incomes" being reported, the hhC methods mean standard deviation is lower (Posel and Casale, 2005)

The Skewness indicates that all methods fall between 1.63 and 1.9 (Reported = **1.9** , hhCon= 2.01 , hhCMP=1.65, hhMCP=1.63 , 'hhC else CMP'= 1.64, 'hhC else MCP'= 1.63). The Graphs also demonstrate that there are similarities in distribution. Clustering is evident in the pure categorical methods and mixed methods.

The Table above demonstrates that hhMCP has the highest similarity for categorical methods to the reported household reported total income MP in terms of mean, STD OEV, minimum, maximum and skewness. The C else hhMCP has the highest correlations in the mixed methods. C else hhMCP falls prey to some dubious statistical issues discussed in 6.2.4 and hence it is important to be cautious of these reported statistics.

The tables of comparisons of constructed income methods highlight the importance of considering which income variables to select, when constructing a household income. The selection of the household income measure can impact our understanding of urban food security. Whatever is calculated as the total household income is what is used to divide food expenditure by, thus having an important impact on the resulting

understanding of a household's *access vulnerability*. Thus, there is a need to make sure the best possible method for constructing household income is identified.

6.2.7 Data Quality and Selection of Household Income Discussion

From the testing and various methods of construction of income, the following observations can be made for each method.

The *hhReported MP* income greatest strength is that it includes all sources of income at a household level. However three key weaknesses rule this method out of for calculating food *access vulnerability*: (1) the question is only asked in this survey thus not allowing for future comparisons to other surveys in the family of relevant surveys, (2) the income is recorded in a seemly arbitrary bracket system and (3) the household total income upper limit of R10 000 excludes many households. It is useful though as a rough guide in selecting an appropriate income method for the 1999 OHS.

The *hhCons* greatest strength is that it relies on actual values. This is highly useful for good data manipulation (such as calculating inflation etc.). Additionally the continuous values for individuals are useful for setting the means for the MCP method. The major weakness are (1) it under-estimates the tails, which are extremely important in a study identifying poverty and hunger, (2) and the small sample size is limiting, especially at an urban level. The method remains useful for national scale issues, particularly when looking at middle-income earners.

The *hhCMP* allows for a larger sample size and captures individuals who are not willing to report actual incomes, perhaps as Posel and Casale (2005) suggests, due to being respondents who are in the lower or upper tails. The weaknesses are (1) in the design of the arbitrary placement of mean bracket points. Even though some researchers make use of the method, it fails to reflect the distribution of incomes within the brackets, (2) the values are not truly continuous which potentially can skew the measuring and understanding of urban food security, even if only by a small margin.

hhC else CMP allows for a more continuous distribution by combining the power of the continuous and categorical methods. However, the statistical uncertainty it relies upon, makes using this method potentially dangerous to a true understanding of urban food security. It has the potential problem of mixing the boundaries, as well as, the statistically unsound practice of mixing two different types of quantitative data i.e. categorical and continuous. This method should be used cautiously.

hhC else MCP methods strengths are the same as those for *hhC else CMP*. It does however have an addition. When incomes are not reported, the mean of the brackets distribution is assigned to it. The weaknesses are the same as *hhC else CMP*, the statistical dubious nature of the method and problems of mixing boundaries.

I found *hhMCP* as overall the best method for comparison across this survey. Its strengths are all listed above for the *hhCMP* method. Additionally, rather than assigning a non-arbitrary value to the value chosen to represent a category, it assigns a value based upon the mean of the reported continuous income between the categorical income brackets. Its weakness is that the values are not truly continuous.

6.3 Construction and Testing of Total Household Expenditure and Food Expenditure

The next step was transforming total household and food expenditure from categorical data to single value mid-points. This was done in the same way as calculating the CMP method of income, except the midpoints were different, due to a different "bracket scale" being used (see Figure 13).

Figure 13 Total Households Expenditure

6.31 **What was the total household expenditure in the last month?**
Include everything that the household and its members spent money on, including food, clothing, transport, rent and rates, alcohol and tobacco, school fees, entertainment and any other expenses.

☐ 01	R 0 - R 399
☐ 02	R 400 - R 799
☐ 03	R 800 - R 1 199
☐ 04	R 1 200 - R 1 799
☐ 05	R 1 800 - R 2 499
☐ 06	R 2 500 - R 4 999
☐ 07	R 5 000 - R 9 999
☐ 08	R 10 000 OR MORE
☐ 09	DON'T KNOW
☐ 10	REFUSE

Source: OHS 1999: Question 6.31. (Stat SA, 1999:48)

The CMP method has been shown by Posel and Casale (2005), Bosch (2006) and others to be a reliable method for approximating incomes when categorical incomes are collected. In the case of total expenditure and food expenditure, a new variable was created for each of them in the dataset *ExpMid* and *FoodExpMid* respectively. For example, if a household selected a category for R400 – R799, then the midpoint of R598.5 would be assigned to that household, so that comparative calculations can be done.

Vermaak (2005) points out that the separate total monthly household expenditure question in the 1999 OHS is poorly framed and consequently poorly captures total expenditure thus artificially inflating *access vulnerability.* As the categories do not align with question 3.20 of the survey (Figure 11) and only go up to R10000- while the individuals in the household can report up to R30000- each.

6.4 Construction and Selection of Equivalency Scales

The testing of which equivalency scales best suits the data is essential for determining a meaningful measure of household welfare. Equivalency scales are used widely to compare household's welfare. In theory, these scales allow comparisons (equivalent) between households (Bellù and Liberati, 2005a; Nelson, 1993). For example, while

the household of two adults may receive a total received income of R12 000, the household of two adults and two children may also receive a total income of R12 000. While the household incomes may be the same, the household with two members is obviously much better off. Household equivalence scales endeavour to make household comparable by measuring the relative income needs of households with different household structures (size and socio-demographic characteristics).

One of the data preparation steps was to create equivalency scales for later use when comparing households who were above or below the poverty line and suffered from food insecurity or were food secure. It is hoped that the equivalency scales will shed more light on the interaction between poverty and food security (discussed in chapter 8).

When comparing households it is suggested by Bellù and Liberati (2005a) that it is naive to believe that one can simply compare one household to the next (for example comparing total income), because if one peels away the mystical household layer, one finds households are all made up of different sizes and socio-demographic characteristics. So one may ask - how much does a household of five needs to be just as well off as a household of two or even one? This is an essential question when comparing households to give equivalent footing to households of different structures.

While there are notable proponents of equivalency scales (e.g. Nelson, 1993; Deaton and Muellbauer, 1980; Bellù and Liberati, 2005a, 2005b, 2005c), there are also those who argue against their use (e.g. Sen, 1981 and Khandker and Haughton, 2005). The most notable criticisms in the literature are the fact that the equivalency scales are largely arbitrarily selected. There are also two major schools of thought on how they should be constructed: subjective and objective methods (Bellù and Liberati; 2005a; 2005b; 2005c). I believe the OECD scales offer additional insights into households and perhaps tell us more about the interaction between poverty levels and food insecurity, especially in the case of Cape Town, Johannesburg and Durban.

A subjective method that is well accepted as a standard measure is the parametric OECD scales (Bellù and Liberati, 2005b). The OECD scales were selected to be the most applicable methods to apply to the data for this research on urban food security.

The reason for this is that they are: simple, relatively easy to implement, yield good results, accepted by many as a standard method and the results satisfy the basic criteria and needs of this research (Vos and Zuidi, 1997; Förster, 2005; Bellù and Liberati, 2005b). While this certainly narrows down the type of method to be employed, there are currently three versions of the OECD scale (Förster, 2005; de Vos and Zaidi, 1997). There is the 'old OECD scale'[47], 'OECD modified scale' and the 'Square root Scale' (Förster, 2005; Bellù and Liberati, 2005b). Each OECD method has different impacts on the data; therefore, I tested each OECD method to determine the best method for urban household comparisons using the 1999 OHS.

The general OECD scale is given by this formula:

$$ye = y/(1 + \delta(a - 1) + \theta c)^{\sigma}$$

Where: ye adjusted household income
y original household income
a is the number of adults,
c the number of children,
θ some factor of an adult (equivalent adult) and
σ is the assumed economies of scale within a household ($0 \leq \sigma \leq 1$).

Where δ is equal to 1 or is less than 1. This is set depending on available information of the impact of increasing adult members to a household and how well-being is affected (Bellù and Liberati, 2005b; Burniaux *et al*, 1998). It is then used to take into consideration the difference between the first adult and adding an additional adult to a household.

6.4.1 Method Used To Determine The Optimal OECD Scale

In order to select the preferred OECD method for this research, some simply testing was undertaken of three OECD scales. This was done to identify the quality of the

[47] Also known as the Oxford scale or simply the OECD equivalence scale (Förster, 2005)

various methods results and which method makes the most sense in the South African context.

The original OECD scale (also known as Oxford scale or Old OECD scale) first suggested in OECD (1982) uses the formula above and "assigns a value of 1 to the first household member, of 0.7 (δ) to each additional adult and of 0.5 (c) to each child" and 0.73 (σ) is the assumed economy of scale (Förster, 2005:1). By using the same example already used and applying the original OECD scale for the 2 adult household with an income of R12 000, one would have an equivalency scale adjustment income of R8 144.17 (given by, $ye = y/ (1 + \delta(a - 1) + \theta c)^{\sigma} = 12000/(1+0.7(2-1)+0.5(0)^{0.73})$. In the same fashion, the two adults and two children earning of R12 000 total household income adjustment equivalent scale income is R5 811.47.

A modified OECD scale was first adopted by Statistical Office of the European Union (EUROSTAT) in the 1990s. This scale, first proposed by Haagenars *et al.* (1994), assigns a value of 1 to the household head, 0.5 (δ) to each additional adult member and of 0.3 (c) to each child and 0.53 (σ) is the assumed economical scale. Using the same example of the two household both earning R12 000, the household of two adults, when applying the modified OECD scale values has an adjusted income of R9 679.50. In the case of the two adult and two children household income adjusted by the modified OECD scale is R8 098.51 (Förster, 2005; Bellù and Liberati, 2005b).

More recently, OECD publications have made use of the Square Root OECD scale when "comparing income inequality and poverty across countries use a scale which divides household income by the square root of household size." (Förster, 2005:1). This method is given by the equation $ye = y/ \sqrt{n}$, where n is the total number of household members. Again, using the same example, the two adults household would have a Square Root OECD adjusted income of R8 485.28 (given by, $ye = 12\ 000/\sqrt{2}$) and similarly, an adjusted income of R6 000 for the two adult and two children household.

In each case, once an equivalence scale is identified and a scale is created it acts as "an index converting nominal incomes of heterogeneous households in comparable

measures of well-being. This index can be interpreted as the differential cost of having a given household size and composition with respect to a benchmark household type." (Bellù and Liberati, 2005b:2).

6.4.2 METHOD AND RESULTS

In order to calculate the OECD scales for the household in the 1999 OHS dataset the age variable needed to be converted from a string to a number. Using the STATA, *real* command strings were converted to values.

The next step was to create age divisions (i.e. classify individuals as a child or an adult) for the OECD formula. In the case of South Africa, a number of ages could be used to divide the population into children and adults. For example, if we were to base being an adult on whether one can receive a child grant or not, then under the age of 14 is eligible and considered a child (South African Social Security Agency, 2007), or if it is the working age 15 (Stats SA, 2005), or if we are to use an individual's legal age in South Africa, 18 would the dividing age. However, due to constraints within the dataset it was only possible to use the age 16 as the divider between adults and children. Nevertheless 16 years works as a good point as in terms of (1) food consumption - a 16 year old arguable consumes similar amounts as many adults (2) and is close to other South African child adult ages (e.g. between the working age, 15, and legal age to vote, 18 etc…)

Using STATA then, where the age variable was greater than 16 years, a new adult variable was assigned a 1 (true) and 0 where false. Another new variable *"Younger than 16"* was created and set to 1 where the age was small or equal to 16 years old. Using the new variable and the STATA *sum* command was used to create a third variable, *"Number of Child"* that was a count of the number of children one has in the household.

In the final Chapter, I create the three types of OECD scales using the income and age variable created [details can be found in accompanying CD and the detailed equations for each scale can be seen below].

The original OECD scale given by :

LAMBDA_Old_OECD=(1+((0.7)((NoOfAdults_16)-1))+((0.5)*(NoOfChildren_16)))^(0.73)*
where *ye = y/LAMBDA_Old_OESD*

replace LAMBDA_New_OECD=(1+((0.5)((NoOfAdults_16)-1))+((0.3)*(NoOfChildren_16)))^(0.53)*
where *ye =y/LAMBA_NEW_OECD*

replace LAMBDA_SQUARE_OECD=sqrt(NoMembersInHH)
where *ye = y/LAMBA.SQUARE.OECD*

*where ye = y/LAMBA_*

In order to determine the most appropriate scale for the 1999 OHS, the three scales were tested for varying household income and family composition in the following Table 14.

Table 14 The Testing of Three OECD Equivalency Scales: for Selecting the Best Method when using the 1999 OHS

	Equivalency Scale									
Household Size	**Household Income**		**Square root Scale**		**OECD-modified**		**Old OECD Scale**		**Per-capita Income**	
	***Scale*[1]**	***Actual*[2]**	***Scale***	***Actual***	***Scale***	***Actual***	***Scale***	***Actual***	***'Scale'***	***Actual***
1 Adult	*1*	3055.73	*1*	3055.73	*1*	3055.73	*1*	3055.73	*1*	3055.73
2 Adults	*1*	1291.889	*1.4*	913.5035	*1.5*	861.2593	*1.7*	759.9347	*2*	645.9445
2 Adults, 1 Children	*1*	3055.73	*1.7*	1764.227	*1.8*	1697.628	*2.2*	1388.968	*3*	1018.577
2 Adults, 2 Children	*1*	4080.293	*2.0*	2040.146	*2.1*	1942.997	*2.7*	1511.22	*4*	1020.073
2 Adults, 3 Children	*1*	1974.931	*2.2*	883.216	*2.4*	822.8879	*3.2*	617.166	*5*	394.9862
2 Adults, 8 Children	*1*	1974.931	*2.8*	698.2436	*3.3*	598.4639	*4.7*	420.1981	*10*	197.49
Elasticity	0		0.50		1		1		1	

Note: 1. Scale is the derived value from the final calculated scale, for which if you divide the actual household income by it you get the applicable equivalence amount. 2 An actual example using hhMCP incomes, from the 1999 OHS data carried.

From Table 14 we see the 'old OECD' has a higher scale value compared to the square root and OECD modified scales as actual household size increases. The literature (e.g. OECD, 1982; de Vos and Zaid, 1997) suggests that the old OECD over estimates the needs of large households compared to small households.

The square root method also forms well, however the preferred option is the modified OECD as it acts as a good middle road to both approaches. The OECD modified method was selected to be used as a household variable when comparing and contrasting issues between poverty and urban food security. With the creation and identification of all the most relevant methods and variables, the next step is to determine how to calculate these methods and variables at the urban scale.

In summary the methodology, which I have discussed and developed to this stage, allows for the identification and compilation of messy data. This allows for the analysis of specific variables and helps establish categories for the analysis of urban food security that were drawn from the literature.

There are specific problems that emerge from any dataset and in the South African example, the particular problems that were noted are an under-estimation of the poor and rich, also some surveys do not contain all the variables necessary for an in-depth exploration of urban food access.

CHAPTER SEVEN: THE ISSUE OF SCALE: THE CASE OF THREE SOUTH AFRICAN CITIES

It is evident in the literature in Part 1 that the urbanisation of poverty and hunger is occurring rapidly. While at the same time, the majority of Southern Africa's population is transiting to urban areas (de Haan, 1997; Maxwell 1998; FAO, 2004). Southern Africa has being identified as an epicentre of this "urbanisation of poverty" and the associated urban food security trend (Ravallion, 2001; Kessides, 2006; UNFPA, 2007). The lack of adequate research and understanding of these growing trends and their impact on urban areas is appalling. Thus, the literature (e.g. Wratten, 1995; Haddad *et al*, 1999; Crush and Frayne , 2010) calls for more research at the city level of quantitative measures, using household surveys, to better understand urban food security and poverty.

In this Chapter, I have taken the South African household survey, prepared in Chapter 6 and re-calculated the data at the city level so that the measures drawn from the literature can be applied at this lower level. From this, one can improve the understanding of urban food security in South Africa and Southern Africa. This methodology will hopefully prove useful in exploring other cities in Southern Africa in the future.

In the first part of this chapter (7.1), there is the identification of the household data that belonged to the three South African cities: Cape Town, Johannesburg and Durban. As the data was not applied in terms of the cities and their identified households, this had to be determined through using the original GIS Magisterial Districts (MD) provided by Stats SA (Alberts, Verhoef and Mokgokolo, 2007) and deriving each households MD from the dataset (Welsh, 2007). Chapter 7.2 outlines the methodology used for creating the various geographical scales of each city and how the relevant household data was matched to the various scales. The 1999 OHS is a stratified cluster survey, an important factor when dealing with the interpretation of results at the various urban scales. In section 7.3, the data was rescaled, so that

meaningful analysis of urban food security could be undertaken. In identifying the various cities' areas and rescaling the data, this chapter accomplished some of the main research aims and objectives: deriving specific city level data so urban food security investigations could be undertaken.

7.1 THE IDENTIFICATION OF SCALES FOR THE SOUTH AFRICAN CASES

Defining what is 'urban' is very important and a highly contested issue, as was highlighted in the literature review in Chapter 4. The literature review points out that differing definitions of the cities' geographical scale has major potential impacts on the understanding of urban food security. Satterthwaite (1995, 1997) and Montgomery *et al* (2004) show that the use by various cities' of differing geographical scales, results in different interpretations of social and political factors. In order to better understand how scale impacts our understanding of urban food security in Cape Town, Johannesburg and Durban, I decided to create three scales for each city. These scales allow one to explore to what extent the differing geographical scales change the interpretation of the city, as various lived household experiences are included and excluded, and specifically how it affects our understanding of urban food security.

A key challenge in measuring and understanding the data at the city level is that the survey's spatial units do not match the administrative boundaries of the cities. This is due to the cities' administrative boundaries having changed over time in spatial extent, however, the data has been recorded using differing spatial units. I have found that this has often been the case in my personal review of IES, OHS and GHS, with the exception of the 2004 and 2005 GHS. Thus, this chapter looks at the methodology in aligning data that has changing and contested spatial definitions of the urban. This is done so that urban food security statistics can be determined at the city level and the impacts of scale can be observed with our changing understanding of a particular city.

It was decided to use South Africa's current administrative spatial boundaries for each city as a starting point for creating the various scales of the city (Demarcation Board, 2010: Maps provided in the Chapter below, administrative boundaries are presented in red outlines). The official names of these administrative areas have changed over

time, however it was decided that for this research the cities would be referred to as Cape Town (Currently officially: City of Cape Town), Johannesburg (Currently officially: City of Johannesburg) and Durban (Currently officially: Ethekwini) (Stats SA 2007). There are two key reasons for using the Demarcation Boards (2010) current administrative boundaries as a starting point, other than the clear call for city level data (e.g. Haddad et al, 1999; Crush and Frayne, 2010):

1. In South Africa, there is a growing urban emphasis in policy documents at both national and provincial level and thus a need for research to inform policy at this level. Additionally Municipal City level policy is formulated and implemented at this scale (Local Government: Municipal Demarcation Act 27, 1998 and African Centre for Cities, 2010).
2. The provision of services and promotion of social and economic development is administered at this scale (Local Government: Municipal Demarcation Act 27, 1998: *Part 2 - Demarcation Objectives*).

However before the administrative boundaries can be used, two methodological challenges still remain; (1) Magisterial Districts (MDs) and District Councils (DCs) sampling units change over time in terms of spatial extent and by name, for the OHS, IES and GHS's (Alberts, Verhoef and Mokgokolo, 2007). Thus, it was necessary to obtain the MD list of names and their associated spatial GIS files (not provided with the surveys). (2) The MDs and DCs do not neatly 'fit' into the current administrative geographic boundaries of the cities (e.g. see Table 15 of maps below). It was therefore decided to use the current spatial definitions for each city as the base to create three alternative city geographical scales, guided by the structure of the 1990 OHS sampling units and the current administrative boundaries.

Three urban geographical scales for data assessment were created, for each city, namely the *Core City*, the *Inclusive City* and the *Agglomeration City* (these are explained in more detail in section 7.2).

1. The first definitional scale uses only MDs and their associated data, which is within the current spatial administrative boundary of the city. This scale was named the *Core City*. For example, the definition of the Cape Town *Core City* is where the entirety of the MD's and their associated data (i.e. households) falls within the current administrative boundaries of the city.

2. The second scale includes MDs, but only when more than fifty percent of their spatial area fell within the current spatial administrative boundary of the city. This scale was named the *Inclusive City*. For example the definition of the Cape Town *Inclusive City*, is where MD's and their associated data (i.e. households) fall totally within the correct administrative boundaries and where the MD has more than 50% of its spatial area in the city administrative boundary, then that whole MD and associated data was included.
3. The third city scale created, *Agglomeration City,* was based on when the MDs have any spatial quantity within the current spatial administrative boundary of the city and then all the associated data (i.e. households) within those MDs were included to make up the third scale. For example the definition of the Cape Town *Agglomeration City* considers any MD and associated data as part of the city as long as part of the MD falls within the current administrative boundary.

The various scales were useful for investigating urban food security not simply at one level, but rather at multiple scales. This also allows us to observe the implications of changing the scale definition. The relevant Province in which a city found itself was used as a proxy and control. This was done as a reference point, to check there was not something dubiously "off" with the various city scales of a particular city (discussed further in section 7.3). Creating validity checks is considered good practice when working with such large datasets. For example, we would expect that the *Agglomeration City* scale should not be very different to the Provincial Proxy for the Western Cape, as the largest portion of the Western Cape population live within the *Agglomeration City* limits. In the cases where the data looked very different, this may be an indicator that something is wrong with the way the data was compiled or analysed. All three of these scales of the cities (Cape Town, Johannesburg and Durban) and the provincial proxy/control are present geographically below in Table 15.

Table 15 A Table of Various Geographical Scales of South African Cities

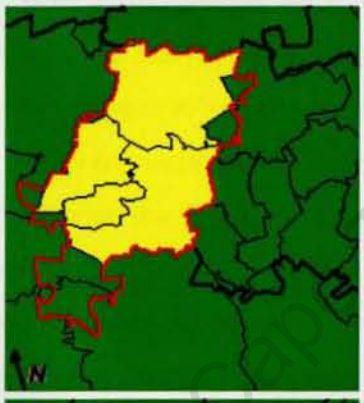
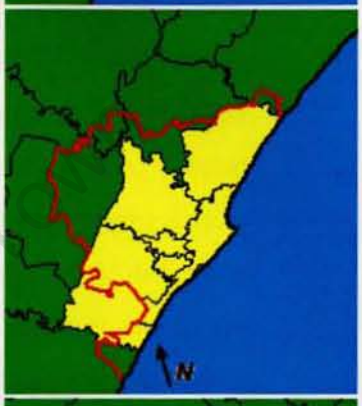
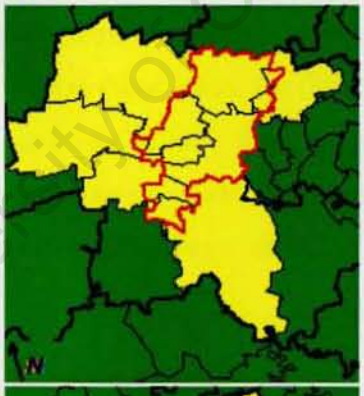
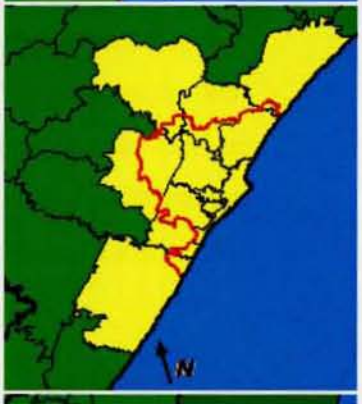
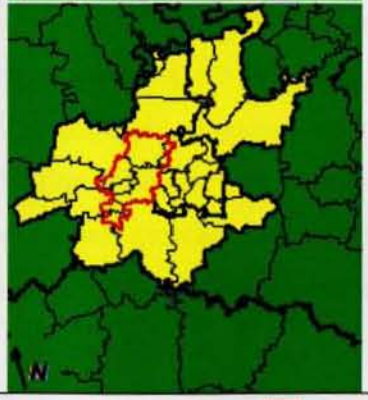
Urban Scales	Cape Town	Johannesburg	Durban
"Core City"			
"Inclusive City"			
"Agglomeration City"			
"Provincial Proxy"			
Note:	Selected MDs; Non-selected MDs; City Boundries; Ocean		

Table 15 shows the spatial extent of each city's scale definition, produced by the methodology. The table demonstrates the new scales' spatial boundaries in comparison with the current administrative city boundaries. In each map: the red lines indicate the current administrative city boundaries, the areas are the selected MDs that make up the new city scale, the green areas indicate non-selected MDs, while the blue simply indicates ocean. Further discussion on the data for each definition can be found in 7.2 and 7.3.

As pointed out in the literature and emphasized here in Table 15 the *Agglomeration City* scale considers all of the city, whereas the *Core City* definition misses certain parts of the city. Thus as Satterthwaite (1995, 1997, 2005) has demonstrated this has an impact on population sizes and representation. Additionally the created *Agglomeration City* scale fits well with what the literature suggests in Chapter 4 (e.g. UN, 1952; Davies, 1959; Montegomery *et al,* 2004) as a good geographic definition when considering the city (UN-Habitat, 2004). In terms of food security, the larger *Agglomeration City* takes into consideration more of the urban fringe and peri-urban areas, thus including differing food systems (such as, accessing non-market foods) and lived experiences of the households in these areas, the *Core City* does not do this. Furthermore, policy and services such as school food programmes etc. can be included or excluded with the various changes in scale. All these factors underline the importance of developing a methodology to create differing city scales in older household surveys.

Section 7.2 outlines the methodology used to create the three different urban scales (*Core City, Inclusive City* and *Agglomeration City*) using ArcView3.3 and the subsequent matching of the GIS MDs identifying numbers with the MDs identifying numbers in the 1999 OHS dataset. Section 7.3 then explores and discusses the impacts on data quality and reliability of these newly created scales. Section 7.3 also looks at what methodology and techniques were used to mitigate improbable interpretations of the results.

7.2 Method Used To Create Scales Of Analysis For Three South African Cases

According to the literature, the urban scale of analysis will impact the profile of urban poverty and perhaps affect our understanding of urban food security. Thus, this effect should be noted when considering the three constructed scales (*Core City, Inclusive City* and *Agglomeration City*) for each city.

In order to construct the three urban scales of each city a Graphical Information System (GIS) software package, ArcView3.3 was utilised. The first step (1) was to add a map of South Africa to a blank session of ArcView3.3. The shapefiles (containing spatial and additional text information about the shape) were acquired from a set of GIS data points and shapefiles for South Africa called "SA Explorer 3" available on the University of Cape Town's Science Server (2007) and from the Demarcation Board (2010).

The second step (2) was to acquire the correct MD shapefiles for the 1999 OHS dataset and then to overlay them onto the South African Map. Unfortunately, these are not easily accessible and have changed between the IES and OHS surveys. It was essential to get the correct MD Shapefiles that would match the 1999 OHS data. An official request for the MD Shapefiles for the 1999 OHS was made to Statistics South Africa on the April 23 2007. After three responses and discussion between Piet Alberts, Helen Verhoef and myself; Joas Mokgokolo made the file temporally available for me online on May 5 2007. Helen Verhoef pointed out "that the MDs have not changed since 1996 till 2007, however the DCs from 1996 differs from 2001, although some may have the same names they are not the same area" (Alberts, Verhoef and Mokgokolo, 2007). The MD Shapefiles were imported into ArcView 3.3 and overlaid onto the South African Map.

The third step (3) was to overlay the current city administrative boundaries (as per Demarcation Board and the admin Shapefiles already in the South Africa Explore 3 data files) on to the GIS map of South Africa. The three cities' (Cape Town, Johannesburg and Durban) administrative boundary shapefiles were overlaid over the MD shapefiles. The resulting overlay made it visually possible to see where MD were

within the various cities administrative boundaries - completely or partially - or outside these boundaries (as seen in Table 15.)

Using a method available in ArcView 3.3 called, *Select By Theme,* the three city scales (one set for each city) could be created. The method has various options that enable you to identify whether a MD lies completely within city administrative boundaries - using the *Are Completely Within* option - or if the MD lies within the city boundary as well as outside of it – using the *Intersection* option. A note of caution when using this method: while the MD and city administrative boundaries are near perfect in term of placement by ArcView 3.3, sometimes they could be 1% off, (due to poor construction of the shapefile or incorrectly geo-referenced) thus resulting in inaccurate results. For example, the city boundary might be 1 metre too large at one point, meaning that when running a *Select By Theme* option it could have the effect of including a MD that is in fact not within the city's boundaries. This might mean including households that are part of that incorrectly selected MD. Thus, there is a need to examine the selected MD to ensure that they are in fact reflecting what would be expected for the given query.

Additionally, to avoid any mistakes I used a manual method to ensure I had defined the cities and their associated data correctly. The identification and creation of the three city scales was achieved by using the selection tool on the individual MD, that could be seen to all lie within the city, thus creating the *City Core Scale*, or selecting all of those who have any spatial quantity within the city boundaries, thus creating the *Agglomeration City Scale*. In creating the *Inclusive City scale*, which includes a MD where only more than fifty percent of their area falls within the current city spatial limits, most of the cases could be done visually. However, a check to ensure that fifty percent or more is within the city boundary the following needs to be done:

1. MD shapefiles that lie over the border of the city boundary are divided into two separate shapefiles, by using the city administrative boundary shapefiles.
2. If the new MD shapefile outside the city boundary is smaller than the one new MD shapefile inside the city boundary, then the MD in its original form can be added into creating the *Inclusive City.*

Once each of the MD shapefiles for each city scale was selected, those MD shapefiles were queried for their unique MD number. The number was contained in the shapefile and was matched to the dataset, which contains the MD number. Statistics South Africa does not explicitly release the MD numbers in the initial dataset. Nevertheless, with assistance from Welch (2007) at the UCT DataFirst Unit I was able to derive the MD from the unique numbers for each individual household. Thus as seen in Table 15, the spatial identification of the relevant MD shapefiles of each city scale tell us what the unique MD numbers were. This was then used in the dataset to create the same spatial scale definitions within the data.

Chapter 8 outlines the method used to match the MDs numbers identified spatially (above) and create various city scale variables for data, which have matching MDs. The matching process used can be simply illustrated by looking at the case of the Cape Town at the *Core City* scale. The *Core City* scale MDs identified through using ArcView3.3, the MDs codes were: 101, 102, 103, 104, 105, 106, 107, 110, and 111. Using STATA, a new variable for Cape Town *Core City* scale was created, where any individual households in the 1999 OHS dataset that contained one of these MD codes, was set to 1 (true) else, it was set to 0 (false).

This simple methodology was used for all the nine city scales; creating a new city scale variable for each individual household, and setting it to true where the MDs matched the particular city scale, or else it was set to false. The result was nine variables in the data set, which identified the nine created city scales.

The overall results of this methodology was that the *Core City* scales contain only the applicable city data, however these scale's suffer due to the smaller sample sizes and do not cover all areas in the administrative boundaries. The *Inclusive City* scales contain parts of the city the *Core City* scale misses. The *Agglomeration City* Scale has the largest sample size and is in line with the way the *World Urbanisation Prospects* (2008) is now defining urban areas as agglomerations and what has been suggested by UN (1952), Davies (1959) and Montgomery *et al* (2004). However, it could contain non-urban individuals. These various city scales allow for the investigation and comparison of food security data at multiple urban scales.

7.3 Method Used To Reduce Implications Of Scaling The Data

The following Section examines issues pertaining to the scaling of data and outlines the methodology used for the various city scales scaling of data, so that meaningful statistics can be garnered about urban food security. One cannot simply use the data at lower scales without considering the design effects created when dealing with complex survey designs.

Additionally, it should be noted that when one is trying to rescale data at lower levels than the original design, there are implications for data quality or accuracy (i.e. not all the design effects can be mitigated). However, these impacts should not stop one for attempting to investigate issues at lower levels, especially when questions around urban food security need answering. Rather there should be an acute awareness of the potential impacts of the rescaling and efforts to reduce these impacts should be assessed. Furthermore, the interpretation of these results needs to consider these effects.

Sturgis's (2004) recent discussion on "Analysing Complex Survey Data: Clustering, Stratification and Weights" found that survey analysis (even in academia and publications) routinely ignores these issues of complex survey design resulting in biased estimates. He argues that the correct use of appropriate software can mitigate such issues, however most researchers use software that is incapable of correctly analysing complex surveys. Sturgis's (2004) discussion points out that most statistical packages (like SPSS and SAS) do not take into consideration complex survey design but rather simply assume a simple random sample, this subsequently leads to large standard errors. By taking into consideration clustering, stratification and weights when doing analysis at lower scales, as was done for this research, much of the design effects and standard errors can be reduced; resulting in a truer picture of reality. However it does have the negative effect of increasing the range (confidence intervals) of results (in other words, as the sample size decreases, the confidence interval is increased). The statistical software STATA 8.0 which is able to take into account complex survey designs (e.g. clustering, stratification, weightings) was used for this research's statistical analysis. Through using the STATA 8.0 *svyset* and *subpop* commands the analysis was able to take into account the complex survey design of the 1999 OHS when using data at lower scales (Khandker and Haughton,

2005 and Thomas, 2006). STATA additionally takes into consideration Taylor series approximation when calculating standard error estimated.

Khandker and Haughton (2005) and Sturgis (2004) also argue that weights are highly important, even when data has been scaled, as the results closer reflect reality when weights are taken into consideration. When rescaling data with weights, they do reduce precision, but they also reduce bias, therefore their use is essential (Sturgis, 2004).

Therefore, it was decided that for this research, that taking into consideration the complex survey design (clustering, stratification and weights) was key - even if it meant sacrificing on some precision. The methodology and reasoning by Montgomery *et al* (2004) supports this approach when considering data at lower scales (such as urban areas). In fact Montgomery *et al's* (2004) noteworthy, work *Cities Transformed: Demographic Change and its Implications in the Developing World* used identified city cluster(s) from DHS's to represent a whole city. Due to the uncertainty in this approach, taking into consideration large confidence intervals was key to lending this method greater legitimacy. The result of careful consideration of the data quality ensured that meaningful analysis of urban food security could be made for the various cities and their scales. In the case of the city scales in this research, I am certain of having samples that are more representative.

Using STATA's powerful *svyset* and *subpop* commands, the effects of weights, clustering and stratification were taken into account. The *svyset command* allows one to provide for the actual structure of the complex survey, in that it allows for the designation of the variables that make up the survey design. Once the *svyset* structure had been set, the *subpop* command (a sub command of *svy*) then allowed for a subpopulation in the data to be identified (such as the various city scales); for STATA to take into consideration the survey design and calculate estimates and standard errors for the subpopulation in this research at the 95% confidence interval for the subpopulations (each of the nine city scales) (Khandker and Haughton, 2005). As mentioned previously, the above methodology has the negative effect of increasing the confidence intervals. However, I believe along with Montgomery *et al* (2004: 489) that the "...ranges that appeared to be narrow enough to be informative, yet broad

enough to mitigate the effects of matching and other errors". This therefore allows for meaningful analysis of urban food security at the three city levels namely Cape Town, Johannesburg, Durban and their various scales. Morris et al (1999) did this in a similar fashion by taking the Second Côte d'Ivoire Living Standard Survey and calculating *access vulnerability* for those sampling units that were located geographically in Abidjan. However, he only considered one geographical scale for Abidjan, and did try to determine if there were any signs of geographical clustering between sample units.

Box 1 The Box Below Demonstrates The *Svyset* Settings Using An Example From The Research

```
. svyset [pweight=WEIGHT], strata(PROV) psu (PSUNR) clear(all)
pweight is WEIGHT
strata is PROV
psu is PSUNR
```

Source: Own, using the 1999 OHS and the Statistical Software STATA (StataCorp, 2005).

The survey was designed with a sampling procedure where it was explicitly stratified by province and within each province (Stats SA, 2000b). *Svyset* is thus set above with the following conditions: *pweight* (sampling weights) was set to WEIGHT, strata set to PROV (for province) and *psu* to PSUNR for the 1999 OHS survey structure. Then with the *svyset* setup the *subpop* command, as demonstrated above in Box 1 can be used to make queries at sub population (i.e. the constructed Cape Town *Agglomeration Scale*) levels, as per *The World Bank STATA Introduction to Poverty Analysis Manuel* (Khandker and Haughton, 2005).

Box 2 The Box Demonstrates How Subpopulations Can Be Queried: In This Case The Cape Town Agglomeration Scale

```
. svytab AbovePovertyLine FoodFailureAccured,
subpop(CapeTown_Agglomeration,srssubpop)ci deff deft

Note: 8 strata omitted because they contain no subpopulation members

pweight:  WEIGHT                          Number of obs      =     11000
Strata:   PROV                            Number of strata   =         1
PSU:      PSUNR                           Number of PSUs     =       334
```

```
                                        Population size    = 4159729.8
Subpop.:  CapeTown_Agg ...              Subpop. no. of obs =      7538
                                        Subpop. size       = 3090966.8
```

Source: Own, using the 1999 OHS and the Statistical Software STATA (StataCorp, 2005)

The above *subpop* command allows the observations to be calculated at the Cape Town *Agglomeration Scale*, while taking into consideration the complex survey design and calculation standard deviation at a 95% confidence interval. From the Box above, one can see 7538 individuals can be sampled representing a sub population size of 3.09 million. This demonstrates that tools such as STATA allow for rescaling the data at lower levels of aggregation (i.e. urban settlements); allowing more to be asked of the datasets. However, caution is stilled required; one needs to make sure sample sizes are not too small and standard deviations as a result are not so large that they do not allow for meaningful analysis of results. Additionally any resulting results with large standard deviations still gives an honest expression of what the likely statistics are, but also the amount of error that might be involved. It was decided this was a more prudent method and allowed uncertainty to be truthfully expressed, while still allowing for a good first examination of the urban food security situation in South Africa, comparisons between cities, and still allowed comparisons even when there were overlapping intervals between various city scales.

Additionally on top of all these methodological techniques to mitigate design effects, a control at the provincial level was used as a point of comparison. As discussed above, the survey was stratified for analysis at the provincial level, e.g. the Western Cape, where 74% of the population live in Cape Town. This acts as a good control for verifying calculations especially at the *Agglomeration City* scale and ensures that the results of the various scales are not dubiously off. We would expect the provincial proxy/control to be similar, but not the same, to the city scales, and particularly similar to the *Agglomeration City*. Simply put the Provincial controls add an additional validity check.

As mentioned earlier, while the new scale city definitions are for meaningful investigation of urban food security, caution is required when more in-depth analysis

of the subpopulation scale (i.e. Cape Town *Agglomeration City*) is undertaken. For example: in-depth interpretation (see section 8.4) of the results requires greater caution, as sample sizes decrease as certain households are eliminated due to certain characteristics (e.g. not below the poverty line, not hungry). Therefore this sort of analysis was only done at the *Agglomeration City* Scale where there is an increased sample size compared to other scales. What is important in rescaling the data to lower levels is to continue to ask the correct questions of the data and not simply allow the data to determine the questions. For example asking this thesis' research question and more specific questions as to who and why a certain household is below the poverty line and which households who were above the poverty line were going hungry within a particular city. This I believe pushes future research to ensure that the correct questions are asked and for pressure to mount for more household surveys to be done at the urban scale with an increased sample size so more can be investigated.

With the data prepared, and data scaled to various city scales, the final step in the methodology was to: (8.1) calculating for *access vulnerability*, (8.2) *access failure*, (8.3) the creation of a poverty line and (8.4) developing a method to unravel how components of MDG1 interact with the poverty line and food security.

CHAPTER EIGHT: THE CREATION OF URBAN FOOD SECURITY INDICATORS

Identifying and creating indicators for food access in urban areas is a key objective of this research. The methodology used to derive the indicators from the data is discussed below. Three indicators are explained and created; food vulnerability indicators, a food failure indicator and the use of a poverty line as an indicator of those in poverty. This Chapter meets a key objective of this research in establishing a methodology, based on the identified concepts and indicators, in order to investigate urban food security in Southern Africa.

8.1 CONSTRUCTION OF FOOD ACCESS VULNERABILITY INDICATORS: SOUTHERN AFRICAN CITIES AND SOUTH AFRICAN CITIES

Food Access Vulnerability occurs when a high percentage of total income is spent on food expenditure, thus leaving the households at risk to shocks in prices of foods or other goods. It has also been shown that the nutritional status of the food content normally is lower when households spend high percentage of money on food. It is evident from research (e.g. Naylor and Falcon, 1995; de Haan, 1997; Haddad *et al*, 1999; UNCHS, 1996; FAO, 2004; UNFPA, 2007) that urban food insecurity is dependent on access and that it is on the increase.

As identified in the literature review, food security in urban areas is an issue of food access and is directly related to income. According to Maxwell *et al's* (2000) a household's *access vulnerability* can be determined by observing the percentage of total income spent on food, giving us an indicator of how vulnerable a household is to having issues accessing food (i.e. urban food insecurity). This idea, as discussed in the literature, has its root observations in food expenditure by Engel (1932). In the literature review, we see that the FAO (e.g. Sharma, 1992; CFS, 2006a) argues for using this *access vulnerability* indicator in the future when monitoring urban food security, with reference to food access.

This technique is particularly useful in the urban context where food availability does not have a major impact on household food security. Food insecurity in the urban context is rather exhibited by an inability to access food due to income dependence. This technique of viewing the percentage of income spent on food as an indicator of *access vulnerability* was also used to calculate the food vulnerability of the nine Southern African cities and the three South African cities at the varying definition scales. In the case of the Southern African cities, the *Agglomeration City* level data was requested from their various national statistical agencies based on the data (discussed in Chapter 6). Where city data was made available, a graph was created for each city containing the mean income and food expenditure from the various survey years. e.g. Lusaka 1991, 1993, 1996, 1998, 2004. Then on the same graphs, the percentage of income spent on food (*access vulnerability*) was graphed onto a secondary axis. Where specific city levels (e.g. Blantyre for 1996/97) were not given, a proxy was used (where this was done it was noted on each individual graph). On occasions when the mean income was not available, then the mean expenditure was used (e.g. for Manzini). The results can be found in Chapter 10, where for example we can see that on average households in Lusaka were spending 60% of income on food in 1991 however, by 2004 it was up to 65.3%, indicating households having an increased food *access vulnerability* and sensitivity to any hardships which could potentially result in food access *failure*. The rest of this methodological discussion now focuses on the South African cities in the 1999 OHS.

Total household income is used as the measure of total household welfare in favour of total expenditure for the 1999 OHS. This is due to two key data quality reasons: (1) household expenditure in the 1999 OHS has large category boundaries, for which an arbitrary mean has to be selected and (2) the highest household expenditure upper bracket was for R10 000 or more, often much lower than many household incomes, a specific shortcoming in the 1999 OHS survey questionnaire. Some have argued (e.g. Khandker and Haughton, 2005) that total expenditure, can be a better measure of total household welfare; as income tends to be underestimated. However, Chen and Ravallion (2004) finding's support the idea of using reported household income as the measure of welfare. In their research, they found no statistically significant difference between using income instead of total expenditure. Additionally due to the two key data quality issues with total expenditure (additionally noted in the literature by

Vermaak, 2005) and the minimal differences between using income, instead of total expenditure, income was used as the primary source of household welfare. Household expenditure was used (as calculated in 6.3) in some situations for comparison reasons. Downing (1990) suggests that households who are vulnerable to food insecurity are by definition food insecure.

Method

The following equation was used to determine *food access vulnerability*:

$$\text{food expenditure as a percentage of total income}_h = \frac{\text{food expenditure}_h}{\text{total income}_h} \times 100$$

where:

h refers to a particular household

Total household food expenditure divided by total household income multiplied by 100 to give, *food expenditure as a percentage of total income*, is referred to by the FAO (2006d) as the *food ratio*.

Where the food ratio is greater than 50%, this would indicate a household is spending more than 50% of their income on food, therefore these households have limited means to satisfy other needs, especially in an urban context where services and meeting household needs are largely financially dependent, as reviewed in the literature (Chapter 2.3.3). The Central Bureau of Statistics (2006) and others in Part 1 suggest that households with low incomes use most of their income on food. Two standard indicators of poverty are commonly used with respect to the food ratio (Central Bureau of Statistics, 2006; Khandker and Haughton, 2005):

1. The first indicator is where a household is using more than 60% of income on food – they are considered poor and vulnerable to failing to access food, hence access vulnerable.
2. The other indicator is where a household is using more than 80% of income on food – they are considered severely poor and vulnerable to failing to access food, hence, severe access vulnerability.

Some (e.g. Ruel *et al*, 1999) have suggested that looking at households that spend more than 60% of income on food, while others (e.g. Lipton, 1983) have suggested where 80% of their income is spent on food that they are vulnerable to food access issues. This was discussed further in the literature review in Chapter 2 and 3.

Using the food ratio equation, food *access vulnerability* indicators were created:
The first indicator is where *food expenditure as a percentage of total income* for a household was greater or equal to 60%, a variable was created, for each household and was set to 1 (standard notation for true) or if less than 60% of income was spent on food it was set to 0 (false).

Another indicator is where *food expenditure as a percentage of total income* was greater or equal to 60% (*access vulnerable*) and the another for where *food expenditure as a percentage of total income* was greater or equal to 80% (*severely access vulnerable*) .

In the same way when *food expenditure as a percentage of total income* for a household was greater or equal to 80% (*severely access vulnerable*) a variable was created, for each household and was set to 1 (standard notation for true) or if it less than 80% of income was spent on food it was set to 0 (false).

These four newly created indicators could then be used in assessing a household's food *access vulnerability* (urban food insecurity) and allowing for comparisons between households.

By comparing the number and percentage of households that are access vulnerable for a particular subpopulation (i.e. created city scale), one can calculate the percentage and number of household individuals who are access vulnerable at each of the city scales. This was calculated for all four *access vulnerable* indicators for all nine city scales, three provinces (acting as a control) and nationally for comparative purposes.

8.2 Construction of Food Access Failure Indicator

A food *access failure* indicator was also created as another measure of urban food security (i.e. of urban food access). This is because food security in the urban context is conceptually an issue of food access or *access failure. Access failure* occurs when at least one member of the household went hungry due to financial constraints and is a good indicator of food access (i.e. urban food insecurity). The *access failure* indicator was created using questions 6.3 and 6.35 in the 1999 OHS (Stat SA, 1999d), seen below in Figure 14.

Figure 14 Food Access Failure Questions In The 1999 OHS

If the household includes persons under 7 years of age

6.34 In the past year, was there ever a time when children under 7 years of age went hungry because there was not enough money to buy food?

☐ 1	Yes
☐ 2	No

For all households

6.35 In the past year, was there ever a time when (other) members of the household went hungry because there was not enough money to buy food?

☐ 1	Yes
☐ 2	No

Source: From Stat SA (1999d: 34 & 35).

Figure 14 shows the two questions from the 1999 OHS, which were relevant in creating the *access failure* indicator. The household *access failure* indicator was created by making a composite variable to the two answers to the questions, seen Figure 14.

Method and Results

The *access failure* indicator was created in STATA by creating a new variable for each household in the 1999 OHS dataset. If the household reported YES for question 6.34 (given in Figure 14 above) or for question 6.35 then the new variable was assigned a value of 1 (true) or else a value of 0 was assigned. Assigning a value of 1 indicated that *access failure* had occurred (i.e. the household had gone hungry due to not having enough money to buy food). Therefore, where the value of 0 was assigned

this indicated that *access failure* did not occur in the household. The food *access failure* measure is thus a good indicator of exactly which households were experiencing food insecurity.

In order to determine how many and who was experiencing *access failure* within the cities of Cape Town, Johannesburg, Durban (and at the various city scales discussed in 7.1), the number and percentage of households and individuals that reported access failure for a particular subpopulation (i.e. created city scale) was calculated. This was done for each of the nine city scales, three provinces and nationally for comparison. The results of these calculations are presented in Table 23 *"Food Access Failure in 3 South African Cities: demonstrating the importance of scale"* in Section 11.2.

8.3 USE OF A POVERTY LINE AS AN INDICATOR

Finally in order to further understand urban food security and how it relates to poverty, a poverty line was created so characteristics of those who did and did not experienced *access failure* above and below a poverty line could be compared.

A study by Morris *et al* (1999) indicated that geographic targeting at lower levels within the city, i.e. the neighbourhood level, could start to get problematic especially when trying to identify the poor and undernourished. For example, major data issues start to arise such as: under coverage of many individuals in areas, splitting of poor populations between neighbourhoods might mean that on the whole areas appear to be doing financial okay (clusters of poor households do not necessarily follow selected neighbourhood lines) and if the household survey was not meant for neighbourhood analysis then the risk of under or over sampling of certain household types within the neighbourhood would result in biased results. Consequently, I argue that a better approach is to rather investigate and come to understand characteristics of the poor and food insecure in a city as a whole. This will produce better methods (policy) which can be used to target individuals. Methods such as investigating the relationship between hunger and poverty by using a poverty line do afford us this opportunity.

Poverty lines have known difficulties, however they are an accepted and useful method for separating households in a way that allows for an examination of those who are poor in a given area (Bhalla, 2002; Reddy, 2004; Reddy and Pogge, 2002a, 2002b; Sala-i-Martin, 2002; Mitlin and Satterthwaite, 2002; Chen and Ravallion, 2001; Ravallion's, 2002; Pogge, 2007). Additionally, it is evident that there is no perfect poverty line measure as Leibrundt *et al* (2006) points out when referring to South Africa. In Table 16, a few of the numerous suggested South African poverty lines are presented.

Table 16 A Table of Various Proposed Poverty Lines for South Africa.

Various Proposed Poverty Lines	*Year 2000 Rands (per capita)*
MRB SA food poverty line	211
Hoogeveen and Ozler (2004)	322
The Urban Household Subsistence Level	286
Poverty line set at per capita expenditure of the 40th percentile of Households	346
Simkins (2004)	800
Van de Berg and Louw (2004)	250
Bhorat (2004)	281

Source: Compiled from van der Berg *et al* (2005), Hoogeveen and Ozler (2004) and Leibrundt et al (2006).

In the table above, we see seven suggested poverty lines for South Africa ranging widely from R211 – R800. In examining different options for a poverty line, the following factors guided the final choice:

1) A poverty line that best helps the discussion and investigation into urban food security (a personal judgement).
2) A well understood poverty line.
3) One that is not highly contested (a well-accepted and recognised method).
4) Useful for comparison across urban areas in Southern Africa.
5) Contributes to evaluating key goals accepted by the majority of nations (such as the MDGs).

After some consideration, it was decided the most suitable poverty line for this research was to use the Millennium Development Goal One standard, poverty line of $1[48] a day (UN Millennium Project, 2005) calculated to be R305.58.

There are a number of immediate advantages of using the Millennium Development Goal One standard poverty line:

1. It is an internationally recognised poverty line, often referred to as the *international poverty line*.
2. It is the poverty line currently used to monitor globally MDG One's first target: to halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day (UN Millennium Project, 2005).
3. MDG One is made up of two targets; it aims to eradicate extreme poverty and hunger. As both targets are part of the same MDG, it would make logical sense to use the selected measure for poverty, $1 a day (comparing those above and below the $1 a day poverty line) for those who have experienced *access failure* (hunger) and for those who did not. This has the potential to give insights into characteristics that contribute to those above the poverty line going hungry and why some who are below the poverty line did not go hungry. This allows us to tear away the veil between the nexus of hunger and poverty.
4. The poverty line allows for comparability across countries and various urban areas, by converting the line at purchasing power parity (PPP) to the local currency for a certain year and then using the country official consumer price index (CPI) to adjust the amount to the survey year.

There are however a number of other possibilities that were evaluated and many have great merits. However, for the reasons listed above and for comparison, now and in the future, the international poverty line was used.

A valid criticism to using this method is the fact that it has been shown that real costs in urban areas are higher. In other words, one might not be in poverty in a rural area however with the same amount per month in an urban area one might be (Ravallion

[48] Based on 1993 PPP prices it was actually $1.08

and Bidani, 1994). Datt *et al* (2000) showed that the cost of living was higher in urban areas by 1.2 – 1.5 times.

Additionally, Bhalla (2002) and Sala-i-Martin (2002) both conclude that the $1 a day line overestimates those who are in poverty. While others such as Reddy (2004) and Reddy and Pogge (2002a, 2002b) in their passionately written debate with Chen and Ravallion (2001) and Ravallion's (2002), Reddy and Pogge (2002a, 2002b) conclude that the $1 a day poverty line results in the underestimation of poverty and also points out weaknesses in using an international standard. Mitlin and Satterthwaite (2002) describe the limitations of the $1 a day poverty line, especially with reference to urban poverty. Mitlin and Satterthwaite (2002) make three interesting points on its limitations, with respect to urban dwellers: (1) Certain basic goods and services are priced higher in urban areas (2) Certain goods (i.e. water and accommodation) that might be free in rural areas have prices attached to them in urban areas. (3) Thirdly, rural dwellers are not faced with the costs of health problems associated with urban areas. These three points are well founded and are supported by others (e.g. Datt *et al*, 2000). It however should be noted that there are certain items that maybe equally or more expensive in rural areas, due to savings experienced on certain goods and services in urban areas because of economies of scale. For example, in rural areas access to certain food items, transportation costs and time used (non-income generating) to cover lengthier distances, increase costs. However costs are generally greater in urban areas due to a large proportion of needs which have been monetised including food. It is true as Pogge T (2007) indicates even the World Bank concedes that the $1 a day poverty line is not perfect and could do with refinement.

Nevertheless, despite its recognised weaknesses, the $1 a day poverty line, is the current standard, used for the MDG and international comparisons. It is widely used and accepted as the standard. It offers a way to investigate and compare extreme (perhaps by implication more extreme than rural areas) poverty in urban areas and to investigate who below that line is going hungry and why as well as who is not below that line and some of the reasons why they may not be below that line. For these reasons, I chose to use the $1 a day poverty line in my research, acknowledging its weaknesses but recognising its adequacy.

Method for Calculating Selecting Poverty Line

The methodology used to calculate the 1999 MDG Poverty line was based on the procedure Sillers (2007) in *Calculating PPP Conversion Factors and "$1-a-day" Poverty Lines* and Chen and Ravallion (2004) all used. Sillers (2007) explained how to calculate the value of the $1 a day measure of extreme poverty, in terms of local currency using the 1993 PPPs by the 1993 International Comparison Program (ICP) and using the local CPI to achieve the correct value of the prices on survey.

The methodology employed to gain this information and to set it up to create indicators was as follows: (1) I initially got the PPP exchange rate (1.6721) for the country in question from the World Bank (2008). (2) Secondly, I identified the South African CPI for 1993 (61.2). (3) I identified the countries' CPI for the month, which was required (100). (4) Actual values were then placed into the formula below.

$$_{current}PPP = {}_{1993}PPP \times \left(\frac{CPI_{current}}{CPI_{1993}} \right)$$

(5) The conversion was then made from 2000 to 1999 Rand prices (x0.949) and (6) the calculated value (305.578 per capita) was then used to create a poverty line variable for analysis.

The poverty line variable was used to separate households into the categories of those who fall above and below the poverty line. This allowed for informed assessment of the various variables in comparison to the poverty line.

Due to sample sizes and sampling design effects (discussed in 4.5), caution is required when analysing the datasets for poverty line and food security calculations. The need for caution is because of potentially low sample sizes at the lower levels of analysis. For example, as the 1999 OHS dataset has already been resampled and now divided into smaller parts by *food failure* or not as well as by above or below the poverty line. Characteristics of the various quadrants were then investigated (e.g. characteristics of

Cape Town households who are below the poverty line and experiencing *food failure*), the resulting lower sample sizes means caution needs to be applied when interrupting results. However, it did demonstrate that asking the right questions of the data could (1) demonstrate what can be said about urban food security and (2) it gives us an initial look into the interaction between poverty and food security in Southern African urban areas.

In summary, this chapter established a methodology based on the identified concepts and indicators to establish food *access vulnerability* and food *access failure* indicators in order to investigate urban food security. The value of using the international poverty line was also established. The calculations gained from this exercise demonstrated the potential insight into urban food security that can be garnered with good data.

PART THREE: RESULTS AND DISCUSSION

Part One of this thesis reviewed the literature related to food security in Southern Africa and South Africa. It also reviewed the literature on urbanisation and urban scale. Part Two of this thesis involved setting up the methodological framework for the research, which included the methodology around the creation of appropriate indicators to be used for the investigation and researched in the literature review.

Thus, Part One and Part Two address the majority of the research questions and objectives, thereby answering two of the three research questions, namely: (1) what is the best way to understand food security in an urban context? In addition (2) what data and methods are available and appropriate for assessing urban food security? Four of the five research objectives have also been answered thus far: (1) Identify concepts and instances under which concepts inform food security measurement in the urban context. Secondly (2) to identify indicators for concepts which inform food security measurement. Thirdly, (3) to identify reliable data from which indicators can be derived for specific cities and fourthly (4) to establish a methodology based on the identified concepts and indicators to investigate urban food security.

Part Three of the thesis encompasses the results and the discussion of these results, as well as a demonstration of the opportunities for further research. Thus, Part Three answers the final research question: Using the identified data and methods, what can be said about urban food security and its varying manifestations between different cities in Southern Africa? It also demonstrates the final research objective: to present and discuss statistical findings, explaining the situation as well as comparing variations between cities in Southern Africa.

The discussion of the results is over four chapters. Chapter 9 assesses the available Southern African datasets for food security data. Chapter 10 goes on to compare and contrast the issues of data availability in the Southern African context. Chapter 11 discusses the results of the urban food security indicators in the three South African cities. Lastly, Chapter 12 briefly compares the three South African cities' to view any other contributing factors influencing poor households. Much of Part 3 is a demonstration of the power of the identified indicators for future use.

CHAPTER NINE: ASSESSING THE AVAILABLE SOUTHERN AFRICAN DATASETS FOR FOOD SECURITY DATA

In this chapter, the research question concerning the identification of what food security data is available and appropriate at the urban scale in Southern Africa is addressed.

This chapter demonstrates the results of an extensive in-depth study of what data is *available and appropriate* for assessing urban food security in Southern Africa. It identifies at what scale the urban data is available. It also investigates what types of food security data exist. As identified in the literature review two types of data can tell us what the food security situation is within an urban setting: (1) *access vulnerability* data which is data that can indicate the vulnerability to being or becoming food insecure due to already large expenditures of income on food; and (2) *access failure* data which is data that captures where households have reported that they have gone hungry due to being unable to afford available food within their urban area.

An objective of this research is to identify available and relevant data for food security analysis. Table 17 meets this objective, by revealing what datasets are available for countries in Southern Africa, the type and year of the survey, along with the specific food security measures that can be derived and their applicability to the urban scale. These tabulated results are an important first step in being able to identify and measure urban food security in Southern Africa. In itself, it is a small accomplishment in identifying available and relevant data for urban food security research in Southern Africa. It demonstrates that a vast amount of datasets exist, these have great potential for food security investigation and analysis of past trends at the national scale and sub-national scales.

The second table, Table 18 in this Chapter identifies specific available and appropriate datasets to this study that contain useful data for food access measurement

Table 17 : Table of Available Datasets for Sout hern Africa Containing Food Security Data

Country	*Year*	*Survey Type*	*Name of survey*	*Collection agency*	*Household Sample Size*	*Applicable at Urban Scale and details*[1]	*Food Security Measures*
Botswana	1985/86	Government HES	Household income & expenditure survey	CSO	unknown	Yes	Access Vulnerability
Botswana	1993/94	Government HES	Household Income and Expenditure Survey	CSO	3608	Yes	Access Vulnerability
Botswana	1999	National PAS	Afrobarometer Botswana	Numerous Partners[2]	1200	Yes	Access Failure
Botswana	2002/03	Government HES	Household income & expenditure survey	CSO	6 290	Yes & specific urban areas	Access Vulnerability
Botswana	2003	National PAS	Afrobarometer Botswana	Numerous Partners	1200	Yes	Access Failure
Botswana	2005	National PAS	Afrobarometer Botswana Round 3	Numerous Partners	1200	Yes	Access Failure
Lesotho	1993	Government HES	Household Survey	Bureau of Statistics	1700	Yes[3]	Access Vulnerability
Lesotho	1994/95	Government HES	Household Budget Survey	Bureau of Statistics	5100	Yes	Access Vulnerability
Lesotho	1995	Government HES	unknown	Bureau of Statistics	11770	Yes	Access Vulnerability
Lesotho	1995	Government HES	National Household Expenditure and Consumption Survey	Bureau of Statistics	4 850	Yes & urban area within Maseru district	Access Vulnerability
Lesotho	2000	MICS	End Decade Multiple Indicator Cluster Survey	Bureau of Statistics	7 470	Yes & district of Maseru	Nutritional Status
Lesotho	2000	National PAS	Afrobarometer Lesotho Round 1	Numerous Partners	1 177	Yes	Access Failure
Lesotho	2002	CWIQ	Core Welfare Indicators Questionnaire Survey	Bureau of Statistics	5 200	Yes	Access Failure
Lesotho	2002/03	Government HES	Household Budget Survey	Bureau of Statistics	6 882	Yes & urban area within Maseru district	Access Vulnerability
Lesotho	2003	National PAS	Afrobarometer Lesotho Round 2	Numerous Partners	1 200	Yes	Access Failure
Lesotho	2004	DHS	Lesotho DHS	Ministry of Health and Social Welfare, Bureau of Statistics & ORC Macro	8 592	Yes	Nutritional Status
Lesotho	2005	National PAS	Afrobarometer Lesotho Round 3	Numerous Partners	1 161	Yes	Access Failure
Malawi	1992	DHS	Malawi Demographic and Health Survey 1992	National Statistical Office	5 323	Yes & possibly city[4]	Nutritional Status

Table 17 : Table of Available Datasets for Sout hern Africa Containing Food Security Data

Country	*Year*	*Survey Type*	*Name of survey*	*Collection agency*	*Household Sample Size*	*Applicable at Urban Scale and details*[1]	*Food Security Measures*
Botswana	1985/86	Government HES	Household income & expenditure survey	CSO	unknown	Yes	Access Vulnerability
Botswana	1993/94	Government HES	Household Income and Expenditure Survey	CSO	3608	Yes	Access Vulnerability
Botswana	1999	National PAS	Afrobarometer Botswana	Numerous Partners[2]	1200	Yes	Access Failure
Botswana	2002/03	Government HES	Household income & expenditure survey	CSO	6 290	Yes & specific urban areas	Access Vulnerability
Botswana	2003	National PAS	Afrobarometer Botswana	Numerous Partners	1200	Yes	Access Failure
Botswana	2005	National PAS	Afrobarometer Botswana Round 3	Numerous Partners	1200	Yes	Access Failure
Lesotho	1993	Government HES	Household Survey	Bureau of Statistics	1700	Yes[3]	Access Vulnerability
Lesotho	1994/95	Government HES	Household Budget Survey	Bureau of Statistics	5100	Yes	Access Vulnerability
Lesotho	1995	Government HES	unknown	Bureau of Statistics	11770	Yes	Access Vulnerability
Lesotho	1995	Government HES	National Household Expenditure and Consumption Survey	Bureau of Statistics	4 850	Yes & urban area within Maseru district	Access Vulnerability
Lesotho	2000	MICS	End Decade Multiple Indicator Cluster Survey	Bureau of Statistics	7 470	Yes & district of Maseru	Nutritional Status
Lesotho	2000	National PAS	Afrobarometer Lesotho Round 1	Numerous Partners	1 177	Yes	Access Failure
Lesotho	2002	CWIQ	Core Welfare Indicators Questionnaire Survey	Bureau of Statistics	5 200	Yes	Access Failure
Lesotho	2002/03	Government HES	Household Budget Survey	Bureau of Statistics	6 882	Yes & urban area within Maseru district	Access Vulnerability
Lesotho	2003	National PAS	Afrobarometer Lesotho Round 2	Numerous Partners	1 200	Yes	Access Failure
Lesotho	2004	DHS	Lesotho DHS	Ministry of Health and Social Welfare, Bureau of Statistics & ORC Macro	8 592	Yes	Nutritional Status
Lesotho	2005	National PAS	Afrobarometer Lesotho Round 3	Numerous Partners	1 161	Yes	Access Failure
Malawi	1992	DHS	Malawi Demographic and Health Survey 1992	National Statistical Office	5 323	Yes & possibly city[4]	Nutritional Status
Malawi	1995	MICS	Multiple Indicator Cluster Survey	unknown	unknown	Yes	Nutritional Status
Malawi	1996	DHS	Malawi Knowledge, Attitudes and Practices in Health Survey	NSO and Macro International	2 798	Yes	Nutritional Status
Malawi	1997/98	Government HES	Integrated Household Survey 1997/98	NSO	10 698	Yes	Access Vulnerability
Malawi	1999	National PAS	Afrobarometer Malawi Round 1	Numerous Partners	1 208	Yes	Access Failure
Malawi	2000	DHS	Malawi Demographic and Health Survey	NSO and ORC Macro	14 213	Yes	Nutritional Status
Malawi	2002	CWIQ	Malawi Core Welfare Indicators Questionnaire Survey	NSO	9 819	Yes & specific urban areas	Access Failure
Malawi	2003	National PAS	Afrobarometer Malawi Round 2	Numerous Partners	1 200	Yes	Access Failure
Malawi	2004	DHS	Malawi Demographic and Health Survey	NSO and ORC Macro	15 091	Yes	Nutritional Status
Malawi	2004-05	Government HES	Malawi Second Integrated Household Survey	NSO	11 280	Yes	Access Vulnerability, Access Failure
Malawi	2005	National PAS	Afrobarometer Malawi Round 3	Numerous Partners	1 200	Yes	Access Failure
Mozambique	1996	Government HES	National household survey	INE	8 274	Yes & Maputo City given	Access Vulnerability
Mozambique	1997	DHS	Mozambique Demographic And Health Survey	Instituto Nacional de Estatistica & Ministerio de Saude	9 282	Yes & Maputo city given	Nutritional Status
Mozambique	2002	National PAS	Afrobarometer Mozambique Round 2	Numerous Partners	1 400	Yes	Access Failure
Mozambique	2002/3	Government HES	Household Budget Surveys	INE	unknown	Yes & Maputo City given	Access Vulnerability[5]
Mozambique	2003	DHS	Mozambique Demographic and Health Survey 2003	INE, Ministry of Health	12 315	Yes & Maputo city given	Nutritional Status
Mozambique	2005	National PAS	Afrobarometer Mozambique Round 3	Numerous Partners	1 198	Yes	Access Failure
Namibia	1992	DHS	Namibia Demographic And Health Survey	Ministry of Health and Social Services and Macro International	4 101	Yes	Nutritional Status
Namibia	1993/94	Government HES	Household income & expenditure survey	CBS	4 750	Yes	Access Vulnerability
Namibia	1999	National PAS	Afrobarometer Namibia Round 1	Numerous Partners	1 183	Yes	Access Failure
Namibia	2000	DHS	Namibia Demographic And Health Survey	Ministry of Health and Social Services	6 392	Yes	Nutritional Status
Namibia	2003	National PAS	Afrobarometer Namibia Round 2	Numerous Partners	1 200	Yes	Access Failure
Namibia	2004/05	Government HES	Household income & expenditure survey	CBS	10 920	Yes	Access Vulnerability
Namibia	2006	National PAS	Afrobarometer Namibia Round 3	Numerous Partners	1 200	Yes	Access Failure
Namibia	2006	DHS	Namibia Standard Demographic And Health Survey	Ministry of Health and Social Services	9 200	Yes	Nutritional Status[6]
South Africa	1987	DHS	Demographic And Health Survey	Human Sciences Research Council	14 048	Yes	Nutritional Status
South Africa	1993	GHS	South Africa Integrated Household Survey[7]	Southern Africa Labour Development Research Unit	9 000	Yes & specific urban areas[8]	Access Vulnerability, Nutritional Status
South Africa	1994	GHS	October Household Survey	Stats SA	30 300	Yes	Access Failure
South Africa	1995	Government HES	Income and Expenditure Survey	Stats SA	30 000	Yes	Access Vulnerability

South Africa (KZN)	1996	GHS	KwaZulu-Natal Development Indicators Household Survey	HSRC	6 500	Yes & specific urban areas	Access Vulnerability
South Africa	1996	GHS	October Household Survey	Stats SA	16 000	Yes	Access Vulnerability, Access Failure
South Africa	1997	GHS	October Household Survey	Stats SA	30 000	Yes	Access Vulnerability, Access Failure
South Africa	1998	GHS	October Household Survey	Stats SA	20 000	Yes	Access Vulnerability, Access Failure
South Africa (GT, KZN & LP)	1998	Infrastructure Delivery Survey	Infrastructure delivery in South Africa	National Economic Development and Labour Council	2 600	Yes	Access Failure
South Africa (KZN)	1998	HES	Kwazulu-Natal Income Dynamics Study	University of Natal University of Wisconsin, IFRI	1 393	Yes	Access Vulnerability, Nutritional Status
South Africa	1998	DHS	South Africa Demographic and Health Survey	Department of Health, MRC South Africa & MEASURE DHS	12 247	Yes	Nutritional Status
South Africa	1999	GHS	October Household Survey	Stats SA	30 000	Yes	Access Vulnerability, Access Failure
South Africa	1999	Migration Survey	Internal migration in South Africa: 1999	University of Pretoria	2 400	Yes & specific urban areas	Nutritional Status , Food Availability Change
South Africa (Langeberg)	1999	GHS	South African Integrated Family Survey: Langeberg	SALDRU	294	Yes & specific urban areas	Access Failure, Access Vulnerability & Nutritional Status
South Africa	2000	Government HES	Income and Expenditure Survey 2000	Stats SA	30 000	Yes	Access Vulnerability
South Africa	2000	National PAS	Afrobarometer South Africa Round 1	Numerous Partners	2 200	Yes	Access Failure
South Africa	2002	National PAS	Afrobarometer South Africa Round 2	Numerous Partners	2 400	Yes	Access Failure
South Africa	2002	GHS	General Household Survey	Stats SA	26 287	Yes	Access Failure
South Africa	2003	GHS	General Household Survey	Stats SA	26 398[9]	Yes	Access Failure
South Africa	2003	DHS	South Africa Demographic and Health Survey	Department of Health, MRC, OrcMacro	7 756	Yes	Nutritional Status
South Africa (KZN)	2004	HES	KwaZulu-Natal Income Dynamics Study	IFPRI, UKZN,UWM, LSHTM, NIBR	867	Yes	Access Vulnerability, Nutritional Status[10]
South Africa	2004	GHS	General Household Survey	Stats SA	26 345[11]	Yes	Access Failure, Access Vulnerability
South Africa (Cape Town)	2005	GHS	General Household Survey	Stats SA	28 128[12]	Yes & specific urban areas	Access Failure, Access Vulnerability
South Africa (Cape Town)	2005	Panel Study of Young Adults and Households	Cape Area Panel Study Wave 3	University of Cape Town and University of Michigan	4 930[13]	Cape Town Metro	Access Vulnerability
South Africa	2005/06	Government HES	Income and Expenditure 2005/06	Stats SA	24 000	Yes	Access Vulnerability
South Africa (Cape Town)	2006	Panel Study of Young Adults and Households	Cape Area Panel Study Wave 4	University of Cape Town and University of Michigan	5 256	Cape Town Metro	Access Vulnerability
South Africa	2006	GHS	General Household Survey	Stats SA	28 024[14]	Yes & specific areas	Access Vulnerability, Access Failure
South Africa	2006	National PAS	Afrobarometer South Africa Round 3	Numerous Partners	2 400	Yes	Access Vulnerability, Access Failure
Swaziland	1995	Government HES	Swaziland Household Income and Expenditure Survey	CSO	6 350	Yes	Access Vulnerability
Swaziland	2000	Government HES	Swaziland Household Income and Expenditure Survey	CSO	3 180	Yes	Access Vulnerability
Swaziland	2000	MICS	Multiple Indicator Cluster Survey	CSO	4 190	Yes	Nutritional Status
Swaziland	2006	DHS	Swaziland Demographic and Health Survey 2006-07	CSO	5 500	Yes	Nutrition Status
Zambia	1991	Government HES	Priority Survey I: Social Dimensions Of Adjustment	CSO	10 000	Yes	Access Vulnerability
Zambia	1992	DHS	Zambia Demographic and Health Survey	CSO, University of Zambia & Macro International Inc	6 209	Yes	Nutritional Status
Zambia	1993	Government HES	Priority Survey II: Social Dimensions Of Adjustment	CSO	10 000	Yes	Access Vulnerability
Zambia	1993/94	Government HES	Household Budget Survey	CSO	unknown	Yes	unknown
Zambia	1996	DHS	Zambia Demographic and Health Survey	Central Statistical Office, Ministry of Health & Macro International	7 286	Yes	Nutritional Status
Zambia	1996	GHS	Zambia Living Conditions Monitoring Survey – I	CSO	11 763	Yes	Access Vulnerability
Zambia	1998	GHS	Living Conditions Monitoring Survey II (Priority Survey)	CSO & WB	16 710	Yes	Access Vulnerability
Zambia	1999	National PAS	Afrobarometer Zambia Round 1	Numerous Partners	1 198	Yes	Access Failure
Zambia	2001/02	DHS	Zambia Demographic and Health Survey	Central Statistical Office, Central Board of Health & ORC Macro	8 050	Yes	Nutritional Status
Zambia	2002	GHS	Living Conditions Monitoring Survey III	CSO	19 600	Yes	Access Vulnerability, Access Failure
Zambia	2003	National PAS	Afrobarometer Zambia Round 2	Numerous Partners	1 200	Yes	Access Failure
Zambia	2004	GHS	Living Conditions Monitoring Survey IV	CSO	20 000	Yes	Access Vulnerability, Access Failure, Nutritional Status
Zambia	2005	National PAS	Afrobarometer Zambia Round 3	Numerous Partners	1 200	Yes	Access Failure
Zambia	2007	DHS	Zambia Standard Demographic and Health Survey	CSO	7 164	Yes	Nutritional Status[15]
Zimbabwe	1988	DHS	Zimbabwe Demographic and Health Survey	CSO & Macro International	4 107	Yes & a specific urban area	Nutritional Status
Zimbabwe	1994	DHS	Zimbabwe Demographic and	CSO & Macro	5 984	Yes & specific	Nutritional Status

Zambia	1998	GHS	Living Conditions Monitoring Survey II (Priority Survey)	CSO & WB	16 710	Yes	Access Vulnerability
Zambia	1999	National PAS	Afrobarometer Zambia Round 1	Numerous Partners	1 198	Yes	Access Failure
Zambia	2001/02	DHS	Zambia Demographic and Health Survey	Central Statistical Office, Central Board of Health & ORC Macro	8 050	Yes	Nutritional Status
Zambia	2002	GHS	Living Conditions Monitoring Survey III	CSO	19 600	Yes	Access Vulnerability, Access Failure
Zambia	2003	National PAS	Afrobarometer Zambia Round 2	Numerous Partners	1 200	Yes	Access Failure
Zambia	2004	GHS	Living Conditions Monitoring Survey IV	CSO	20 000	Yes	Access Vulnerability, Access Failure, Nutritional Status
Zambia	2005	National PAS	Afrobarometer Zambia Round 3	Numerous Partners	1 200	Yes	Access Failure
Zambia	2007	DHS	Zambia Standard Demographic and Health Survey	CSO	7 164	Yes	Nutritional Status[15]
Zimbabwe	1988	DHS	Zimbabwe Demographic and Health Survey	CSO & Macro International	4 107	Yes & a specific urban area	Nutritional Status
Zimbabwe	1994	DHS	Zimbabwe Demographic and Health Survey	CSO & Macro International	5 984	Yes & specific areas	Nutritional Status
Zimbabwe	1995	Government HES	unknown	CSO	unknown	Assumed Yes[16]	Access Vulnerability
Zimbabwe	1999	DHS	Zimbabwe Demographic and Health Survey	CSO & Macro International	6 369	Yes & specific urban areas	Nutritional Status
Zimbabwe	1999	National PAS	Afrobarometer Zimbabwe Round 1	Numerous Partners	1 200	Yes	Access Failure
Zimbabwe	2004	National PAS	Afrobarometer Zimbabwe Round 2	Numerous Partners	1 200	Yes	Access Failure
Zimbabwe	2005	National PAS	Afrobarometer Zimbabwe Round 3	Numerous Partners	1 048	Yes	Access Failure
Zimbabwe	2005/06	DHS	Zimbabwe Demographic and Health Survey	CSO & Measure DHS	10 800	Yes & specific urban areas	Nutritional Status

Notes:

Acronyms And Classification Of Types Of Surveys:
PAS: Public Attitude Survey, **DHS**: Demographic And Health Survey; were undertaken with a government agency and technical support from Macro International, also referred to ORC Macro and Measure DHS at different periods of time, **HES**: Household Expenditure Survey - Classified As Such If Income Or Expenditure Measurement Was The Core Of The Survey, **GHS**: General Household Survey - Classifies As Such If Mix Of Indicators Were Collected At The Household Level Often Including Some Income And Expenditure Measures (e.g. Living Standards Measurement Study's, Integrated Household Surveys And Omnibus Surveys), **MICS**: Multiple Indicator Cluster Survey, **CWIQ**: Core Welfare Indicators Questionnaire.

Other Notes:
1: Contains Urban Identifier(s) or Stratified at Urban Scale.
2: A number of partners were involved in the collection and compilation of the datasets (Afrobarometer, 2010).
3: Assumed based on sample strategies in 1994/5 Government HES and beyond.
4: If the same method is used as Montgomery et al (2004) utilized, by over sampling of Blantyre.
5: Private email from INE (Zacarias, Chiponde and Loureiro, 2007).
6: The final survey report was not available at time of the studies completion. However urban and rural identifiers are assumed based on the layout and stratification of previous Measure DHS's (Measure DHS, 2006b).
7: Additionally referred to as: Project For Statistics On Living Standards And Development (University of Natal et al, 1993).
8: Specific 'Metro's' can be identified when using the provincial variable. Though analysis at the Metro level must take into account small sample size issues with this particular survey.
9: Based on cases in dataset (not available in official report, they only reports approx. 30 000) (Stats SA, 2003b).
10: The 2004 questionnaire is based on the original 1993 questionnaire (International Food Policy Research Institute, 2006d).
11: Based on 83.9% response rate from the expected 31 400 (Stats SA, 2005a: ii).
12: Based on 87.5% response rate from the expected 32 146 (Stats SA, 2006a).
13: According to Lam, Seekings and Sparks (2006) 2005 is based on 93.8% of the original household sample size. However this Figure is not provided in any of the documentation reviewed. Thus the assumption the 93.8% is based on the 2002 sample of 5256. Further for wave 4, no documentation is available on sample sizes, thus the original sample size is used as a proxy.
14: Based on 86% response rate from the expected 32 566 (Stats SA, 2007).
15: The final survey report was not available at time of the studies completion, urban, rural and nutritional status is assumed based on the layout and stratification of previous Measure DHS's (Measure DHS 2007).
16: Based on the type of information collected in Household Expenditure Survey's.

Source: Own Compilation and Own Research from Africa *et al.* (2007), Afrobarometer (2010), Bauer and Beard (2004), Bureau of Statistics (2006), Carter (2007a, 2007b, 2007c, 2007d, 2007e, 2007f), Cape Area Panel Study (2002, 2003, 2004, 2005, 2006, 2007), Central Bureau of Statistics (2006), Central Statistical Office, University of Zambia and Macro International Inc (1993), Central Statistical Service (1996a, 1996b, 1997a, 1997b, 1997c), Department of Health, Medical Research Council, and ORC Macro (2007), Department of Sociology: University of Pretoria (1999), Elemo (2007a, 2007b), Human Sciences Research Council (1987, 1996a, 1996b), International Food Policy Research Institute (2006d), Instituto Nacional de Estatistica and Ministerio de Saude (1998), International Household Survey Network (1993, 1995, 1996, 1998, 2000a, 2000b, 2002a, 2002b, 2005, 2006), Katale and Majelantle (2006), Lam, Seekings and Sparks (2006), Lesotho Bureau of Statistics (2000, 2003), Malawi National Statistics Office and Macro International Inc (1994, 1997), Malawi National Statistical Office (2003, 2005), Malawi National Statistics Office and ORC Macro (2001, 2005), Mattes (2008), Measure DHS (2007), MEASURE DHS (2006a, 2006b), Ministry of Health and Social Services (2003), Ministry of Health and Social Welfare, Bureau of Statistics and ORC Macro (2005), Namibia Ministry of Health and Social Services and Macro International Inc (1993), National Economic Development and Labour Council (1998), National Research Foundation (2001), ORC Macro (2006), Smith, Aldermann and Aduayom (2006), South Africa Department of Health, MRC South Africa and MEASURE DHS (2001), South Africa Labour Development Research Unit (1994a, 1994b), South African Labour and Development Research Unit (2000, 2001), Stats SA (2000a, 2000b, 2002, 2003a, 2003b, 2003c, 2005a, 2006a, 2006b, 2007, 2008a), Tsietsi, Thobei and Mokati (2006), University of Natal *et al.* (1993), Zacarias, Chiponde and Loureiro (2007), Zambia Central Statistical Office, Central Board of Health and ORC Macro (2003), Zambia Central Statistical Office, Ministry of Health and Macro International Inc (1997), Zambia CSO (1991), Zimbabwe Central Statistical Office and Macro International Inc (1995), Zimbabwe Central Statistical Office and Macro Systems Inc. (1989), Zimbabwe Central Statistical Office and MEASURE DHS (2000, 2006).

at the urban scale. Once again, it also identifies datasets that can be used for investigating past food access trends at the urban scale.

Thus, Chapter 9 successfully identifies and presents reliable datasets from which indicators can be derived for urban food security measurement.

9.1 AVAILABLE DATASETS FOR FOOD SECURITY MEASUREMENT IN SOUTHERN AFRICA

The following Table 17 demonstrates what datasets and data are available for the investigation and measurement of food security in Southern Africa. In doing so, this table achieves the objective of identifying available and relevant data for food security analysis. Shown below are datasets that contain relevant food security data at national and sub-national scales. After extensive research into hundreds of survey questionnaires, metadata files and household survey reports the table demonstrates the sheer volume of datasets containing food security data and applicability to urban areas. The table identifies the country, year, type of survey, name of survey, collection agency, household sample size, applicability to the urban scale and the specific food security measures available in the datasets. Table 17 is thus a key future resource demonstrating what data is available with respect to urban food security in Southern Africa.

Table 17 A Table of Available Datasets for Southern Africa Containing Food Security Data

Country	*Year*	*Survey Type*	*Name of survey*	*Collection agency*	*Household Sample Size*	*Applicable at Urban Scale and details*[1]	*Food Security Measures*
Botswana	1985/86	Government HES	Household income & expenditure survey	CSO	unknown	Yes	Access Vulnerability
Botswana	1993/94	Government HES	Household Income and Expenditure Survey	CSO	3608	Yes	Access Vulnerability
Botswana	1999	National PAS	Afrobarometer Botswana	Numerous Partners[2]	1200	Yes	Access Failure
Botswana	2002/03	Government HES	Household income & expenditure survey	CSO	6 290	Yes & specific urban areas	Access Vulnerability
Botswana	2003	National PAS	Afrobarometer Botswana	Numerous Partners	1200	Yes	Access Failure
Botswana	2005	National PAS	Afrobarometer Botswana Round 3	Numerous Partners	1200	Yes	Access Failure
Lesotho	1993	Government HES	Household Survey	Bureau of Statistics	1700	Yes[3]	Access Vulnerability
Lesotho	1994/95	Government HES	Household Budget Survey	Bureau of Statistics	5100	Yes	Access Vulnerability
Lesotho	1995	Government HES	Unknown	Bureau of Statistics	11770	Yes	Access Vulnerability
Lesotho	1995	Government HES	National Household Expenditure and Consumption Survey	Bureau of Statistics	4 850	Yes & urban area within Maseru district	Access Vulnerability
Lesotho	2000	MICS	End Decade Multiple Indicator Cluster Survey	Bureau of Statistics	7 470	Yes & district of Maseru	Nutritional Status
Lesotho	2000	National PAS	Afrobarometer Lesotho Round 1	Numerous Partners	1 177	Yes	Access Failure
Lesotho	2002	CWIQ	Core Welfare Indicators Questionnaire Survey	Bureau of Statistics	5 200	Yes	Access Failure
Lesotho	2002/03	Government HES	Household Budget Survey	Bureau of Statistics	6 882	Yes & urban area within Maseru district	Access Vulnerability
Lesotho	2003	National PAS	Afrobarometer Lesotho Round 2	Numerous Partners	1 200	Yes	Access Failure

Table 17 demonstrates the findings of a thorough search and collation of available household surveys in Southern Africa that have relevance to urban food security. It demonstrates that a large amount of appropriate datasets do exist. A total of 97 surveys were identified over a twenty year period (between 1985/86 – 2005/06) that contain food security data and urban identifiers. Table 17 reveals that the greatest number of household surveys were conducted in South Africa (29), followed by Zambia (14), Lesotho (11), Malawi (11), Namibia (8), Zimbabwe (8), Botswana (6), Mozambique (6) and Swaziland with (4) household surveys.

The findings in Table 17 indicate the prevalence of three types of food security measures, food access failure, food access vulnerability and nutritional status. This data can be used to determine whether urban household's experienced *access failure*, this can be found in 40 surveys. In 42 surveys, data is found that can be used to determine urban household food *access vulnerability,* while 28 surveys contain data on individual's (often limited to children) *nutritional status* within a household. Only two surveys contain all three measures, the 1999 South African Integrated Family Survey for Langeberg and the 2004 Zambian Living Conditions Monitoring Survey IV. Some surveys contain two of the measures, such as the South African 1999 October Household Survey containing both Access Failure and Access Vulnerability data.

The majority of surveys do not identify specific cities, instead reference urban areas more generally. The surveys with larger sample sizes have the potential to be more versatile, providing valuable information at both the national and sub-national levels. While national surveys with small sample sizes generally limits the interpretation to national generalizations (e.g. national generalizations of urban areas).

The above surveys represented on Table 17 are useful for certain urban analysis, yet most are not applicable for the current research objectives on account of the sample size, lack of access to datasets and issues relating to identification of specific urban areas. The following Table 18 presents household surveys that do not exhibit these shortcomings.

9.2 Household Survey Datasets That Are Available and Appropriate For Food Security Measurement In Southern African Urban Areas

This table identifies surveys that contain appropriate data for food access measurement in the target study urban areas. The identified datasets can be investigated to show past food access trends at the urban scale in Southern Africa.

Table 18 Available and Appropriate Southern African Countries Household Surveys Containing Food Access Data useful at the Urban Scale

Country	*Year*	*Name of Survey*	*Collection Agency*	*Sample Size (households)*	*Applicable at Urban Scale*[1]
Botswana	1985/86	Household Income & Expenditure Survey	Central Statistical Office (CSO)	Unknown[2]	Yes
Botswana	1993/94	Household Income & Expenditure Survey	CSO	3608	Yes
Botswana	2002/03	Household Income & Expenditure Survey	CSO	6053	Yes
Lesotho	1993	Household Survey	Bureau of Statistics (BoS)	1700	Yes
Lesotho	1994/5	Household Budget Survey	BoS	5100	Yes
Lesotho	1995	National Household Expenditure and Consumption Survey	BoS	4850	Yes
Lesotho	2002/03	Household Budget Survey	BoS	6882	Yes
Malawi	1997/98	1st Integrated Household Surveys	National Statistics Office (NSO)	10 698	Yes
Malawi	2004/05	2nd Integrated Household Surveys	NSO	11 280	Yes
Mozambique	1996	National Household Survey	Instituto Nacional de Estatistica (INE)	8 274	Yes
Mozambique	2002/3	Household Budget Survey	INE	Unknown[2]	Yes
Namibia	1993/94	Household Income & Expenditure Survey	CBS	4750	Yes
Namibia	2004/05	Household Income & Expenditure Survey	CBS	10920	Yes
South Africa	1993	South Africa Integrated household Survey	SALDRU	9000	Yes
South Africa	1994	October Household Survey	Stats SA	30 300	Yes
South Africa	1995	Income and expenditure survey	Stats SA	30 000[3]	Yes
South Africa	1996	October Household Survey	Stats SA	16000	Yes
South Africa	1997	October Household Survey	Stats SA	30000	Yes
South Africa	1998	October Household Survey	Stats SA	20000	Yes
South Africa	1999	October Household Survey	Stats SA	30 000	Yes
South Africa	2000	Income and Expenditure Survey	Stats SA	30 000	Yes

9.2 Household Survey Datasets That Are Available and Appropriate For Food Security Measurement In Southern African Urban Areas

This table identifies surveys that contain appropriate data for food access measurement in the target study urban areas. The identified datasets can be investigated to show past food access trends at the urban scale in Southern Africa.

Table 18 Available and Appropriate Southern African Countries Household Surveys Containing Food Access Data useful at the Urban Scale

Country	*Year*	*Name of Survey*	*Collection Agency*	*Sample Size (households)*	*Applicable at Urban Scale*[1]
Botswana	1985/86	Household Income & Expenditure Survey	Central Statistical Office (CSO)	Unknown[2]	Yes
Botswana	1993/94	Household Income & Expenditure Survey	CSO	3608	Yes
Botswana	2002/03	Household Income & Expenditure Survey	CSO	6053	Yes
Lesotho	1993	Household Survey	Bureau of Statistics (BoS)	1700	Yes
Lesotho	1994/5	Household Budget Survey	BoS	5100	Yes
Lesotho	1995	National Household Expenditure and Consumption Survey	BoS	4850	Yes
Lesotho	2002/03	Household Budget Survey	BoS	6882	Yes
Malawi	1997/98	1st Integrated Household Surveys	National Statistics Office (NSO)	10 698	Yes
Malawi	2004/05	2nd Integrated Household Surveys	NSO	11 280	Yes
Mozambique	1996	National Household Survey	Instituto Nacional de Estatistica (INE)	8 274	Yes
Mozambique	2002/3	Household Budget Survey	INE	Unknown[2]	Yes
Namibia	1993/94	Household Income & Expenditure Survey	CBS	4750	Yes
Namibia	2004/05	Household Income & Expenditure Survey	CBS	10920	Yes
South Africa	1993	South Africa Integrated household Survey	SALDRU	9000	Yes
South Africa	1994	October Household Survey	Stats SA	30 300	Yes
South Africa	1995	Income and expenditure survey	Stats SA	30 000[3]	Yes
South Africa	1996	October Household Survey	Stats SA	16000	Yes
South Africa	1997	October Household Survey	Stats SA	30000	Yes
South Africa	1998	October Household Survey	Stats SA	20000	Yes
South Africa	1999	October Household Survey	Stats SA	30 000	Yes
South Africa	2000	Income and Expenditure Survey	Stats SA	30 000	Yes

South Africa	2002	General Household Survey	Stats SA	26 287	Yes
South Africa	2003	General Household Survey	Stats SA	26 398[4]	Yes
South Africa	2004	General Household Survey	Stats SA	26 345[5]	Yes
South Africa	2005	General Household Survey[6]	Stats SA	28 128	Yes
South Africa	2005/06	Income and Expenditure Survey	Stats SA	24 000	Yes
South Africa	2006	General Household Survey	Stats SA	28 024[7]	Yes
Swaziland	1995	Swaziland Household Income and Expenditure Survey	CSO	6 350	Yes
Swaziland	2000	Swaziland Household Income and Expenditure Survey	CSO	3 180	Yes
Zambia	1991	Priority Survey I: Social Dimensions Of Adjustment	CSO	10 000	Yes
Zambia	1993	Priority Survey II: Social Dimensions Of Adjustment	CSO	10 000	Yes
Zambia	1993/94	Household Budget Survey	CSO	Unknown[2]	Yes
Zambia	1996	Living Conditions Monitoring Survey I	CSO	11 763	Yes
Zambia	1998	Living Conditions Monitoring Survey II (Priority Survey)	CSO & WB	16 710	Yes
Zambia	2002	Living Conditions Monitoring Survey III	CSO	19600	Yes
Zambia	2004	Living Conditions Monitoring Survey IV	CSO	20 000	Yes
Zimbabwe	1995	Household Expenditure Survey	CSO	Unknown[2]	Yes
Notes:	**1**: Contains Urban Identifier(s) or Stratified at Urban Scale. **2**: Unknown: unable to determine exact sample size from reviewed documentation and no responsive communication despite many attempts from the relevant collection agency. **3**: National Research Foundation, 2001: 52: "October Household Survey (OHS) and the Income and Expenditure Survey (IES) were run concurrently during October 1995. Information for the IES was obtained, as far as possible, from the same 30 000 households that were visited for the 1995 OHS" **4**: Based on cases in dataset (not official report only reports approximately 30 000) (Stats SA, 2003b) **5**: Based on 83.9% response rate from the expected 31 400 (Stats SA, 2005a: ii) **6**: From 2005 City of Cape Town, Ethekwini (Durban), Ekurhuleni (East Rand), City of Johannesburg, Nelson Mandela Metropolitan Area (Port Elizabeth), Tshwane (Pretoria) are provided as variables (Stats SA, 2007a). **7**: Based on 86% response rate from the expected 32 566 (Stats SA, 2007a).				

Source Own Compilation from Alberts, Verhoef and Mokgokolo (2007), Central Bureau of Statistics (2006), Central Statistical Service (1996a, 1996b, 1997a, 1997b, 1997c), Chola, Kaputu, Kakungu and Nsemukila (2006), Katale and Majelantle (2006), Lesotho Bureau of Statistics (2000, 2003), Machirovi (2006), Malawi National Statistical Office (2003, 2005), National Research Foundation (2001), South Africa Labour Development Research Unit (1994a, 1994b), Stats SA (2000a, 2000b, 2002, 2003a, 2003b, 2003c, 2005a, 2006a, 2006b, 2007, 2008a), Tshabalala and Hlophe (2007), Tsietsi, Thobei and Mokati (2006), NSO and Rethman (2007), Quita (2006), Zacarias, Chiponde and Loureiro (2007), Zambia CSO (1991).

Table 18, identifies 36 surveys relating to urban food security measurement in Southern Africa that have large areas of sample size, accessible and specific urban. The greatest number of surveys were once again conducted in South Africa (14), followed by Lesotho (4),

Botswana (3), Zambia (7), Malawi (2), Namibia (2), Swaziland (2), Mozambique (2) and Zimbabwe (1).

The following Table 19 identifies South African urban data to be used for more in-depth study and analysis.

9.3 Available and Appropriate South African Data

The purpose of Table 19 is to show what data is available and appropriate for greater in-depth study into urban food security in South Africa. It also demonstrates the large amount of appropriate household surveys in the South African context. The analysis of this could potentially allow for insights into the general nature of urban food security in Southern Africa.

Table 19 South African Nationally Representative Household Surveys Containing Food Access Data and Measures, Useful At the Urban Scale

Year	*Name of Survey*	*Collection Agency*	*Sample Size (households)*	*Access Vulnerability*[1]	*Access Failure*[1]
1994	October Household Survey	Stats SA	30 300		
1995	Income and Expenditure Survey	Stats SA	30 000[2]		
1996	October Household Survey	Stats SA	16000		
1997	October Household Survey	Stats SA	30000		
1998	October Household Survey	Stats SA	20000		
1999	October Household Survey	Stats SA	30 000		
2000	Income and Expenditure Survey	Stats SA	30 000		
2002	General Household Survey	Stats SA	26 287		
2003	General Household Survey	Stats SA	26 398[3]		
2004	General Household Survey	Stats SA	26 345[4]		
2005	General Household Survey[5]	Stats SA	28 128[6]		
2005/06	Income and Expenditure Survey	Stats SA	24 000		
2006	General Household Survey	Stats SA	28 024[7]		
Notes:	**1**: Food *Access Vulnerability* and/or food *Access Failure* can be calculated from variables available in survey. **2**: National Research Foundation, 2001: 52: "October Household Survey (OHS) and the Income and Expenditure Survey (IES) were run concurrently during October 1995. Information for the IES was obtained, as far as possible, from the same 30 000 households that were visited for the 1995 OHS".				

3: Based on cases in dataset (not official report only reports approximately 30 000) (Stats SA, 2003b)
4: Based on 83.9% response rate from the expected 31 400 (Stats SA, 2005a: ii)
5: From 2005 City of Cape Town, Ethekwini (Durban), Ekurhuleni (East Rand), City of Johannesburg, Nelson Mandela Metropolitan Area (Port Elizabeth), Tshwane (Pretoria) are provided as variables (Stats SA, 2007a).
6: Based on 87.5% response rate from the expected 32 146 (Stats SA, 2006a)
7: Based on 86% response rate from the expected 32 566 (Stats SA, 2007a).

Source Own Compilation from Alberts, Verhoef and Mokgokolo (2007), Central Statistical Service (1996a, 1996b, 1997a, 1997b, 1997c), National Research Foundation (2001), Stats SA (2000a, 2000b, 2002, 2003a, 2003b, 2003c, 2005a, 2006a, 2006b, 2007, 2008a)

Table 19 demonstrates that South Africa has had a good history of collecting appropriate food security data and large national sample sizes, since the early 1990's. The table indicates 13 household surveys; 10 of which contain *access vulnerability* data and 10 of which contain *access failure* data, which is useful at the urban scale. Seven surveys reported both food access measures. All the surveys contained household sample sizes of 20 000 or more, except the 1996 October Household Survey which contained a household survey size of 16000. The five surveys with the largest household sample sizes were the 1994 October Household Survey with 30 300 households, followed by the other four (OHS 1995, 1997, 1999 and IES 2000) all with 30 000 households. The 1999 OHS and 2000 IES have the same sample size due to the same population sample been used (Stats SA, 2000a).

9.4 THE THREE SELECTED SOUTH AFRICAN CITIES

The following Table 20 shows the three selected South African cities and how or what city scale identifiers can be used from various surveys. The identification of these identifiers is essential to identifying which households and their data are within a specific urban area, such as a city[49].

[49] **City:** The spatial definition of each city has changed over time - this is largely due to the fact the term 'city' is an administrative term for a specific urban space. Thus where the city can be identified over time in varying surveys it is always prudent for the researcher to explore what is meant by city in each particular survey (See further discussion in Chapter 4 in Part 1).

Table 20 A Table Demonstrating The Three Selected South African Cities And How Or What City Scale Identifiers Can Be Identified From Various Surveys.

City	*Year*	*Survey Name*	*Comment on city identifier*
Cape Town	1993	South Africa Integrated Household Survey	Using the provincial and metropolitan variables, Cape Town data can be identified [1]
	1995	Income and Expenditure Survey	Enumeration Area and District Council given therefore can reconstruct city using GIS survey shapefiles.[1,2]
	1996	October Household Survey	Magisterial District Code given, therefore can reconstruct city using GIS survey shapefiles of Magisterial District. [1,2]
	1997	October Household Survey	Magisterial District Code given, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1998	October Household Survey	Derive Magisterial District Code from Unique Number, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1999	Internal Migration in South Africa	Cape Metro one of four secondary explicit strata formed within the stratum.
	1999	October Household Survey	Derive Magisterial District Code from Unique Number, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	2000	Income and Expenditure Survey	Possible to derive from Unique Number location variables, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	2004	General Household Survey	Possible to derive Magisterial District code from Unique Number, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	2005	General Household Survey	District Code given and Magisterial District Code can be derived from Unique Number, which can be used to reconstruct city using GIS survey shapefiles. [1,2]
	2005	Panel Study of Young Adults and Households	At city level already
	2006	Panel Study of Young Adults and Households	At city level already
Durban	1993	South Africa Integrated Household Survey	Using the provincial and Metropolitan variables, Durban data can be identified[1]
	1995	Income and Expenditure Survey	Enumeration Area and District Council given, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1996	KwaZulu-Natal Development Indicators Household Survey	Metro variables are given that can be used to identify Durban.
	1996	October Household Survey	Magisterial District Code given, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1997	October Household Survey	Magisterial District Code given, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1998	October Household Survey	Derive Magisterial District Code from Unique Number, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1998	Infrastructure Delivery in South Africa	Metro areas are identifiable within provinces, although sampled by population group (race) and area (urban rural). Care should be taken due to sample size.
	1999	October Household Survey	Derive Magisterial District Code from Unique Number, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1999	Internal Migration in South Africa	Durban Metro one of four secondary explicit strata formed within the stratum.
	2000	Income and Expenditure Survey	Possible to derive from Unique Number location variables, therefore can reconstruct city

			using GIS survey shapefiles. [1,2]
	2004	General Household Survey	Possible to derive Magisterial District code from Unique Number, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	2004	KwaZulu-Natal Income Dynamics Study	Possible to derive or use urban as proxy, however note the low sample size makes interpretation risky.
	2005	General Household Survey	District Code given and Magisterial District Code derived from Unique Number, which can be used to reconstruct city using GIS survey shapefiles. [1,2]
Johannesburg	1993	South Africa Integrated Household Survey	Using the provincial and Metropolitan variables, Johannesburg data can be identified[1]
	1995	Income and Expenditure Survey	Enumeration Area and District Council given therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1996	October Household Survey	Magisterial District Code given, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1997	October Household Survey	Magisterial District Code given, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1998	October Household Survey	Derive Magisterial District Code from Unique Number, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	1998	Infrastructure Delivery in South Africa	Metro areas are identifiable within provinces, although sampled by population group (race) and area (urban rural). Care should be taken due to sample size.**
	1999	October Household Survey	Derive Magisterial District Code from Unique Number, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	2000	Income and Expenditure Survey	Possible to derive from Unique Number location variables, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	2004	General Household Survey	Possible to derive Magisterial District code from Unique Number, therefore can reconstruct city using GIS survey shapefiles. [1,2]
	2005	General Household Survey	District Code given and Magisterial District Code derived from Unique Number, which can be used to reconstruct city using GIS survey shapefiles. [1,2]

Notes

1) Issues of sample stratification at provincial area and sample sizes can be a potential issue in interpretation at lower scales. Where complex sample designs, such as clustering, are used, statistical software developed to take the complex sample design into account in its calculations of the standard errors should be used. In this research the statistical software STATA was selected to deal with these issues.

2) Shapefiles have frequently changed over time, thus confirmation with Stat SA which shapefiles were used in which survey. Shapefiles will also need to be requested from Stats SA. This was the case for this research.

Source: Own Compilation from Alberts, Verhoef and Mokgokolo (2007), Cape Area Panel Study (2002, 2003, 2004, 2005, 2006, 2007), Central Statistical Service (1996a, 1996b, 1997a, 1997b, 1997c), Human Sciences Research Council (1996b), International Food Policy Research Institute (2006d), National Economic Development and Labour Council (1998), National Research Foundation (2001), South Africa Labour Development Research Unit (1994a, 1994b, 2000, 2001), Stats SA (2000a, 2000b, 2002, 2003a, 2003b, 2003c, 2005a, 2006a, 2006b, 2008a).

Table 20 shows that 35 surveys contain location identifiers (derivable or available) which can be used to construct cities at various urban scales and be used to identify households and their data within these urban areas. Table 20 identifies surveys with food security information, both relevant for further analysis, but not for this research as the characteristics of the surveys are not consistent with needs of this thesis, as well as the fact that some of the sample sizes are not sufficient. The table shows that 12 surveys (with food security data) can be used to identify Cape Town, 13 surveys in Durban and 10 for Johannesburg.

This chapter clearly demonstrates that far from there being a dearth of food security data over the last 20years, there is in fact an abundance. Ninety-seven Southern African household surveys were identified, between 1985-2006, which collected potentially useful urban food security data. Of the 97 surveys, 40 contained Access Failure data, 42 contained Access Vulnerability data and 28 the nutritional statuses of individuals. Thirty-six surveys were identified to be directly useful to this research and 13 of those were South African surveys with datasets containing food access data and data variables useful identifying specific cities.

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CHAPTER 10: COMPARING URBAN FOOD SECURITY IN SOUTHERN AFRICA CITIES: ISSUES OF DATA AVAILABILITY

The issue of urban food security is a critical issue in Southern Africa. It is of such a pressing nature that the United Nations (UN) has made it a Millennium Development Goal (MDG). Without a focus on urban food security, the UN MDGs, regional goals and national goals will not be achievable in Southern Africa. The literature has for some time (e.g. Haddad *et al*, 1999) been calling and continues (e.g. Crush and Frayne, 2010) to make an urgent call for more research into urban food security in Southern Africa to help identify conceptual issues and methods to enhance the understanding of urban food security.

This chapter answers this call in part by, firstly, identifying measures of food access, namely *food vulnerability* as a straightforward and comparable 'food access measure' for use at regional, nationally and at specific city levels, using identified Southern African household surveys in Chapter 9. Secondly, by beginning to present findings of urban food security for cross-country comparisons, showing that urban food security in Southern African cities is a significant and growing problem.

I argue for a greater use of the food security data identified in national household surveys and additionally for an effort to start comparing these results at regional, national and sub-national levels, which could look towards the potential of a PAN-Southern African databank of food access measures to accompany and give greater validity to the FAO's food availability indicators. This would create a clearer picture of food security in its totality.

Furthermore, this chapter notes that Southern African surveys and datasets allow one to comment on five issues when considering and comparing urban food security: (1) the potential for measuring food access regionally across and between urban areas, (2) trends within the various Southern Africa survey instruments and implications for measurement and comparison, (3) the overall levels of urban food security in Southern African (4) what food

access trends are evident for Southern Africa, (5) and finally what gaps and shortcomings are evident in the Southern African urban food security data.

Of the three conceptual divisions within food security, it is clear from the literature that urban food security is primarily an issue of food access (Maxwell, 1996; Weber *et al*, 1998; Crush and Frayne, 2010). However, to this point, food security statistics collected by the FAO (e.g. 2009b) have largely missed measuring urban food security and issues around food access. Instead, they have favoured historical outdated rurally framed food availability measures to monitor food security. This is despite the fact that the thinking and indeed the definition of food security itself has long since evolved (reviewed in full Chapter 2.2) from just being an issue of availability, to include food access and the nutritional value of food. However, short-sighted food availability statistics such as "undernourishment" (discussed in Chapter 2.4 as being methodologically problematic, only available at regional levels, neglectful of aspects of food security and not suitable for the monitoring of progress towards the 2015 MDG) continue to be utilised to measure food security (Gabbert and Weikard's, 2001; Haddad, 2001; Svedberg, 2002; Naiken, 2003). This is significantly limiting as Southern Africa, an epicentre of food insecurity will in the coming two decades be predominately urban and these availability measures will fail to capture household's food security situation for the majority of households in Southern Africa.

There is thus a need to investigate the measuring of food access regionally and the identification of trends and points of comparison across surveys in Southern Africa, as well as comparing some initial findings of overall trends of urban food security. From the initial findings from Southern African cities, we see the need and the opportunity to start collecting the same sort of food access measures at a regional level. This highlights the potential for past and current household survey data to be used to increase the Southern African understanding of urban food security. The collection of food access data and calculations for Southern Africa has the potential to be done in a way to create a Southern African Databank of comparable food security statistics, similar to the European Union (EU) creation of a the Datafood Networking (DAFNE) project. The EU has collated a Pan-European food data bank based on various household survey data. I argue from my findings and comparisons that urban food *access vulnerability* measures could already start to be collected and calculated to

determine regional, national and sub-national (e.g. urban areas) statistics on food access which has particular reference at the urban scale.

The first two sections examine (1) the potential for measuring food access regionally across and between urban areas and (2) secondly the trends within the survey instruments and implications for measurement and comparison. This needs to be looked at through the lens of the three main issues (1) Overall levels of urban food security in Southern Africa, (2) Trends in the Southern African data and finally (3) Gaps and Shortcomings in the Southern African data.

10.1 The Potential For Measuring Food Access Regionally Across And Between Urban Areas

Unmistakably urban food security is conceptually an issue of food access (e.g. Ruel *et al,* 1999; Maxwell, 2000; FAO, 2006d; Zere and McIntyre, 2003; UN-Habitat, 2006; UNFPA, 2007). The literature overwhelmingly reveals that in the urban context food access is directly related to the financial situation of a household (e.g. Ravallion, 1992; Maxwell *et al*, 2000; Jamal, 2002; FAO, 2006d; UN-Habitat, 2006; Smith, 2006 and UNFPA, 2007). Household's with sufficient income are less vulnerable to food insecurity (e.g. Ragan and Lipsey 2004; FAO, 2006d) as they are able to financially access the food they need and have additionally shown to have improved their nutritional intake (e.g. Popkin, 2000; Ruel, 2003; Zere and McIntyre, 2003).

I believe a strong case can be made for wide spread collection and co-ordination of household survey data, both past (to help develop a solid baseline) and present, in order to collect food access data, so that one can truelly start capturing food security and in particular urban food security in its 'definitional fullness'. Initially, the addition of a food access indicator such as *access vulnerability* alongside the FAO's standard "undernourishment" indicator (notwithstanding major issues with this indicator identified in Chapter 2.4.2, beyond the failure to capture access) will be a good start to the better capturing all of the food security definitions (i.e. access, utilisation and availability). This will allow for a truer understanding of food security in general and an initial broad understanding of urban food security (Smith *et al*, 2006). Failure to measure food security in its fullness is leading to failures (e.g. outlined in

Chapter 2.1) in the targeting and the monitoring of the MDG 1, WFS goals and any other international, regional or national goals.

While measuring food access is essential, there are some challenges. There are two key indicators of urban food access identified in the literature: (1) measuring the percentage of income spent on food by a household, referred to in this study as a measure of *access vulnerability* and the other indicator (2) is when household surveys record whether anyone in a household has had to skip meals due to financial constraints, referred to as *access failure*. Both measures effectively assess aspects of urban food insecurity. However, *access failure* was found not to be commonly recorded in Southern African household surveys (less than half of the 97 surveys identified contained *access failure* data), whereas the variables needed to calculate *access vulnerability* was recorded more often. *Access failure* is thus less useful when comparing urban food access across Southern African cities; however, *access vulnerability* is more widely available in household surveys, as they often collect household income and food expenditure.

Access vulnerability in the context of in-depth household survey data, tells us about an individual household's vulnerability to food insecurity (demonstrating the power and importance of detailed datasets). However, in the context of where 'average city/urban' income and food expenditure data is the only available data for a particular area (e.g. urban areas in general or a specific urban area), then the average city/urban *access vulnerability* is good for: (1) identifying trends of the average situation of households within that area, whether they are increasingly vulnerable to *access failure* over time, and (2) directly comparing regionally, country wide, sub-national and additionally over time (as *access vulnerability* is a percentage and no conversion of currencies is required). Additionally, the average city/urban access *vulnerability* is useful because (1) data for the measure is readily available, (2) it is a simple measure to calculate, (3) where income is not available total expenditure can be used, (4) as the population in the region transitions from rural to urban, it is a simple indicator that can be used to monitor urban food security, and (5) it is useful in monitoring high level goals such as the MDGs.

It has been suggested by Chen and Ravallion (2004) and FAO (2004) that two of the reasons why food access data has not been measured is that there is a lack of applicable data and that the process of collating and calculating food access might be too complex. The findings of this thesis' research stand in stark contrast to both these assertions. Firstly, contrary to the suggestions of some (e.g. Chen and Ravallion, 2004; FAO, 2004) this research demonstrates that ample household food security data exists in Southern Africa household surveys. An extensive review of household surveys identified 97 surveys that captured both urban identifiers and potential food security measures in the study countries and 36 of these surveys had applicability to the 12 specific cities of study (Chapter 9). Secondly, while a number of access measures were identified in the literature (e.g. *access vulnerability, access failure,* dispersion ratios, coefficient of variation), some measures are less complicated than others are when it comes to calculations (FAO Statistics Division, 2006d). Simple indicators such as *access vulnerability* have the potential to be used widely to monitor food access, as affirmed by many (e.g. Zimmerman 1932; Ogaki, 1992; Smith, 2003; Smith *et al*, 2006). Empirical studies found indicators of *access vulnerability* are useful when trying to understand urban food security (e.g. Tabatabai, 1993; Ruel *et al*, 1999; Maxwell *et al*, 2000). Furthermore, food security economists at the FAO, Sharma (1992) and the CFS (2000) indicate *access vulnerability* has high potential as an indicator of food access. Straightforward indicators have thus been identified and have strong support in the literature. However, a decade has passed and still food access is not measure by the CFS or FAO in any of their publications. Southern African household surveys offer a way to identify, target and monitor the food insecure within the region, at national levels, in urban context and even for specific urban centres as demonstrated in this chapter. I thus suggest future work should be done towards a database of food access datasets for Southern Africa.

10.2 Trends within the Survey Instruments: Implications for Measurement and Comparison

Southern African household surveys and the resultant data, which was collected often, have similar designs and thus more use should be made of these advantages. These advantages are particular useful for high-level regional and national comparisons to be made of urban food

security. This too, would make it easier for the creation of a Pan-Southern African food security databank.

In my review of Southern African household's surveys, the 97 surveys I identified had some key similarities. All were households' survey reports containing food security statistics. Additionally many contained similarities with respect to (1) data (income, food expenditure, food failure), (2) sampling strategies, (3) survey questionnaire design, which were occasionally totally identical (due to funding partners, such as the World Bank, Macro International etc.) (4) or had similar structures due to a shift to creating global standards in questionnaire and survey designs to allow for comparability across surveys (UNSTATS, 2009; Smith *et al*, 2006). The data, sample and questionnaire parallels within the various surveys, lay the foundation for comparisons and measurement.

These similarities are partially due to efforts by the *UN National Household Capacity Programme*, where standards and guidelines were offered for data collection and analysis and as a result many countries have adopted these standards. Additionally efforts by the *World Bank's Living Standard Measurement Survey Programme*, had the effect of building capacity and a growing harmony in the developing world among survey design. This has allowed for surveys to be largely comparable (UNSTATS, 2009) and for greater comparisons across countries.

However, some surveys are not directly comparable and might not be useful to add to any high-level food security database. Other surveys might be comparable when using statistical techniques to mitigate survey design and the like, allowing for comparison of dissimilar surveys (Babbie and Benaquisto, 2002; Haddad *et al*, 1999; Ravallion, 2001). In the EU DAFNE example, the EU research generated a Pan-European food data bank based on various household survey data. Different type of surveys were used and harmonisation issues were overcome with common aggregation rules and sensible secondary data use (Lagiou *et al*, 2001; Smith, 2003).

With many similarities in Southern African survey design and the need for food access statistics at the urban scale and generally in Southern African, we should be making more use of these opportunities to compare and monitor regional trends.

10.3 Overall Levels of Urban Food Security in Southern Africa

As observed in the accompanying graphs (in attached fold out), the available data indicates households in cities are spending on average 65% of income on food expenditure, indicating high overall *access vulnerability*. The data additionally reveals high-levels of *access vulnerability* variability between cities. These insights are highly useful in understanding and comparing urban food security in Southern Africa and lend positive pressure to a call for the establishment of a database of food access datasets for Southern Africa.

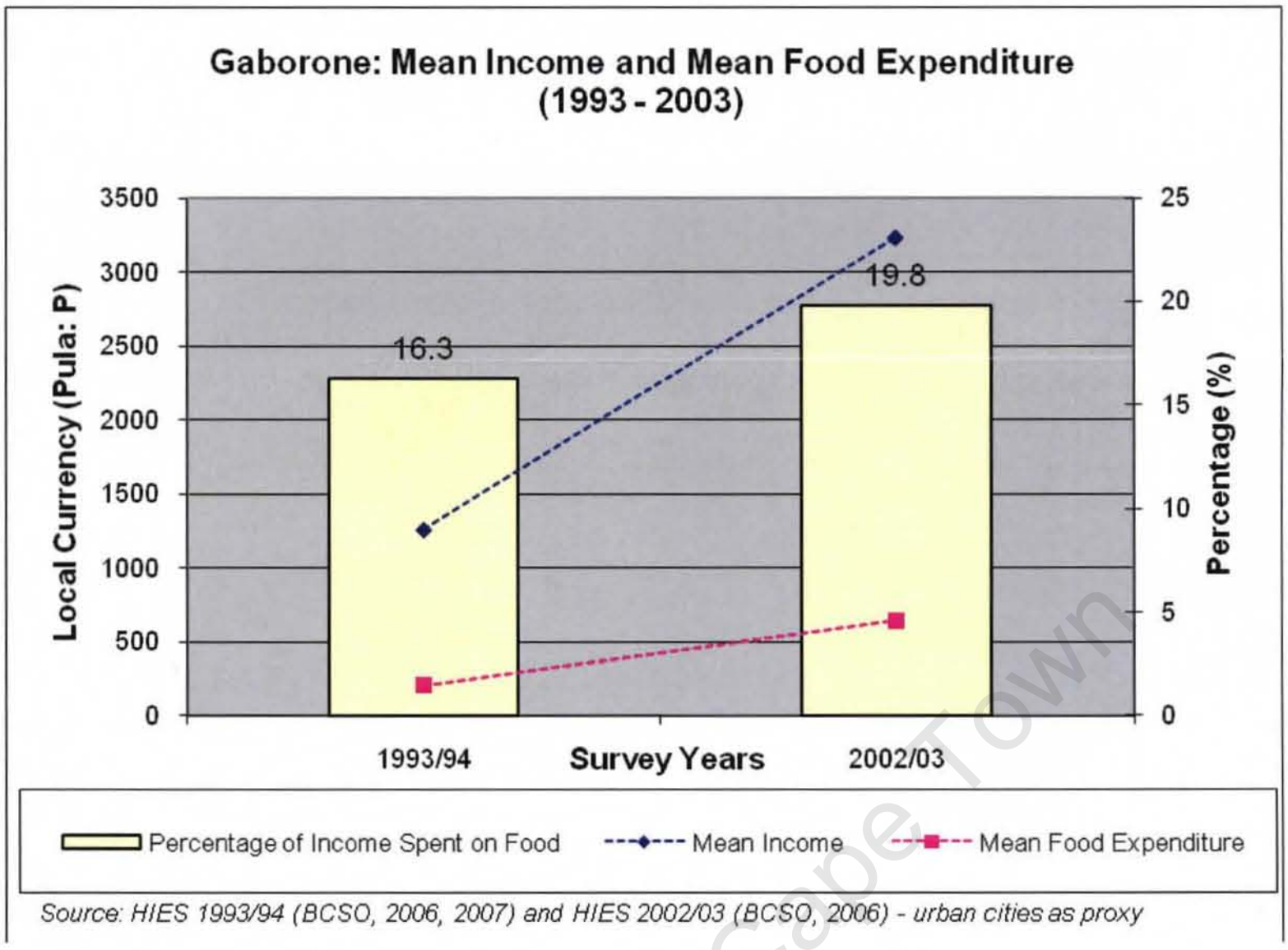
Using the data collected from various agencies (discussed in Chapter 5), one notices that in Lusaka (65.3%), Harare and Bulawayo (55.84%), households on average are spending a high percentage of income on food expenditure. This could indicate that a number of poorer households in the city are cutting out certain other basic needs to access food through financial mechanisms. This not only means their current situation in tenuous but that any increases in food prices or other expenditures may result in the household experiencing food failures if they are not doing so already. However, we notice that for Gaborone (19.8%) and Manzini (18.39%) that on average households spend a considerably lower percentage of income on food than households in Lusaka. In the other cities, the inhabitants percentage food expenditure is somewhere between these five cities.

Another important insight into urban food security comes from data provided from Namibia on Windhoek (see Graphs 5 and 6). Firstly, we see the percentage of expenditure spent on food increases from 17.5% to 32.6% during 1993/94 to 2004 (nearly doubling). However, secondly and more interestingly in Graph 6 for 1993/94 (showing three parts of the Windhoek Municipality) the results change when you view areas separately or together. Notice the differences in the right bar in Graph 6 represents the total average for the three areas combined. This graph is firstly, useful in demonstrating how various parts when separated or combined, give differing scales of an urban area and thus can impact measuring

and understanding of an area, when for example evaluating access vulnerability. The graph shows the lowest mean expenditures (indicating a poorer part of greater Windhoek) are in Katutura at N$19211 with a food expenditure of N$5052.49. Khomasdal has on average higher expenditures at N$34846 and food expenditure of N$6725.28. The inner city core "Windhoek City" has the highest mean expenditures at N$65171 and food expenditure of N$8798.09. The overall urban average for Windhoek Municipality is an expenditure of N$37882 and food expenditure of N$6629.35. The graph illustrates not only the importance of investigating an urban area at one geographical scale, but rather at various scales. Furthermore, it underlines that at the very least; city level data is important and should not be simply neglected. Secondly, one also notes from the graph that where total expenditures are less, (indicating a poorer area) households spend higher percentages on food expenditure, in Katutura 26.3%, Khomasdal 19.3% and Windhoek City 13.5% bringing the average to 17.5%. The importance of scale and what is being measured is explored further in Chapter 11.

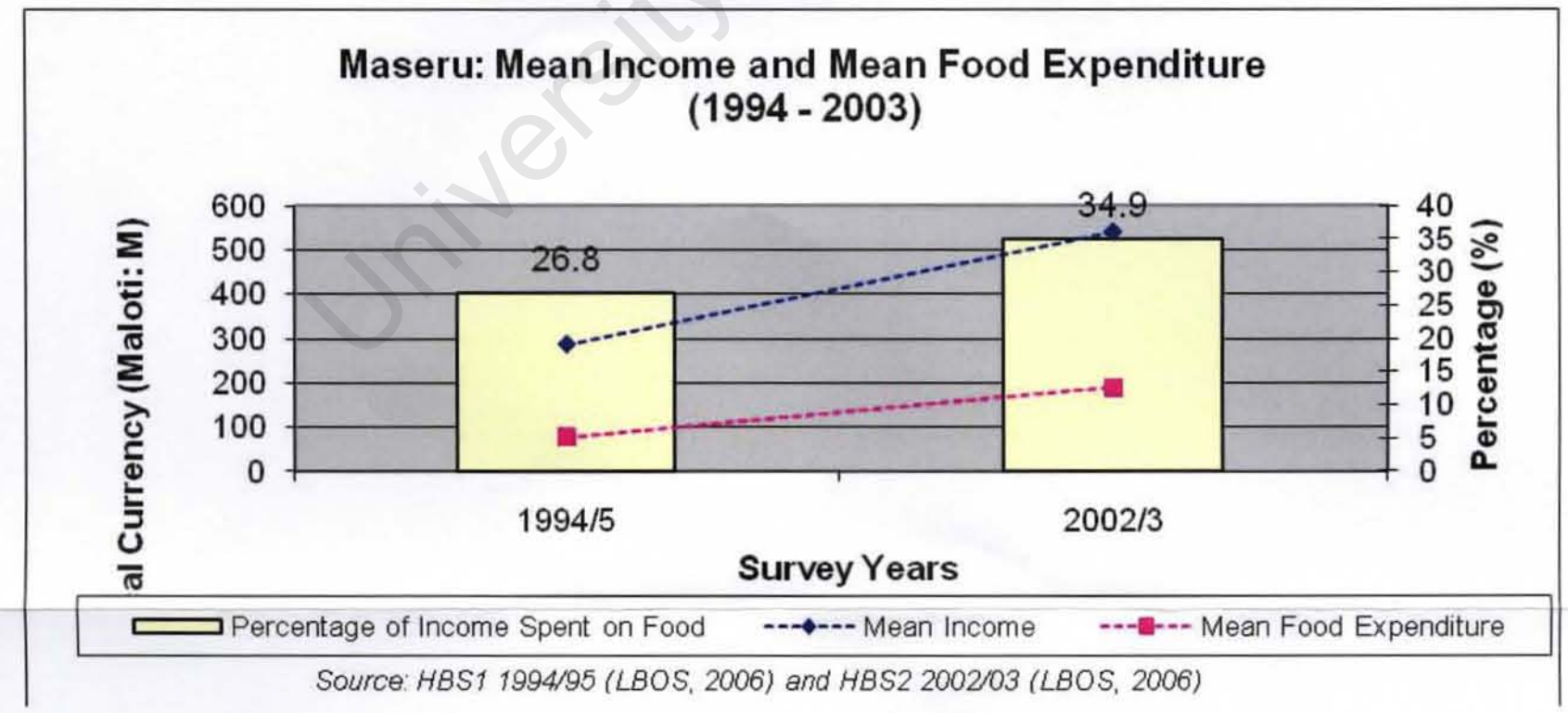
The graphs of the Southern Africa data are readily available to make some high level observations about urban areas in general and some urban centre's specifically.

Graph 1 Botswana, Gaborone: Mean Income and Mean Expenditure (1993- 2003)



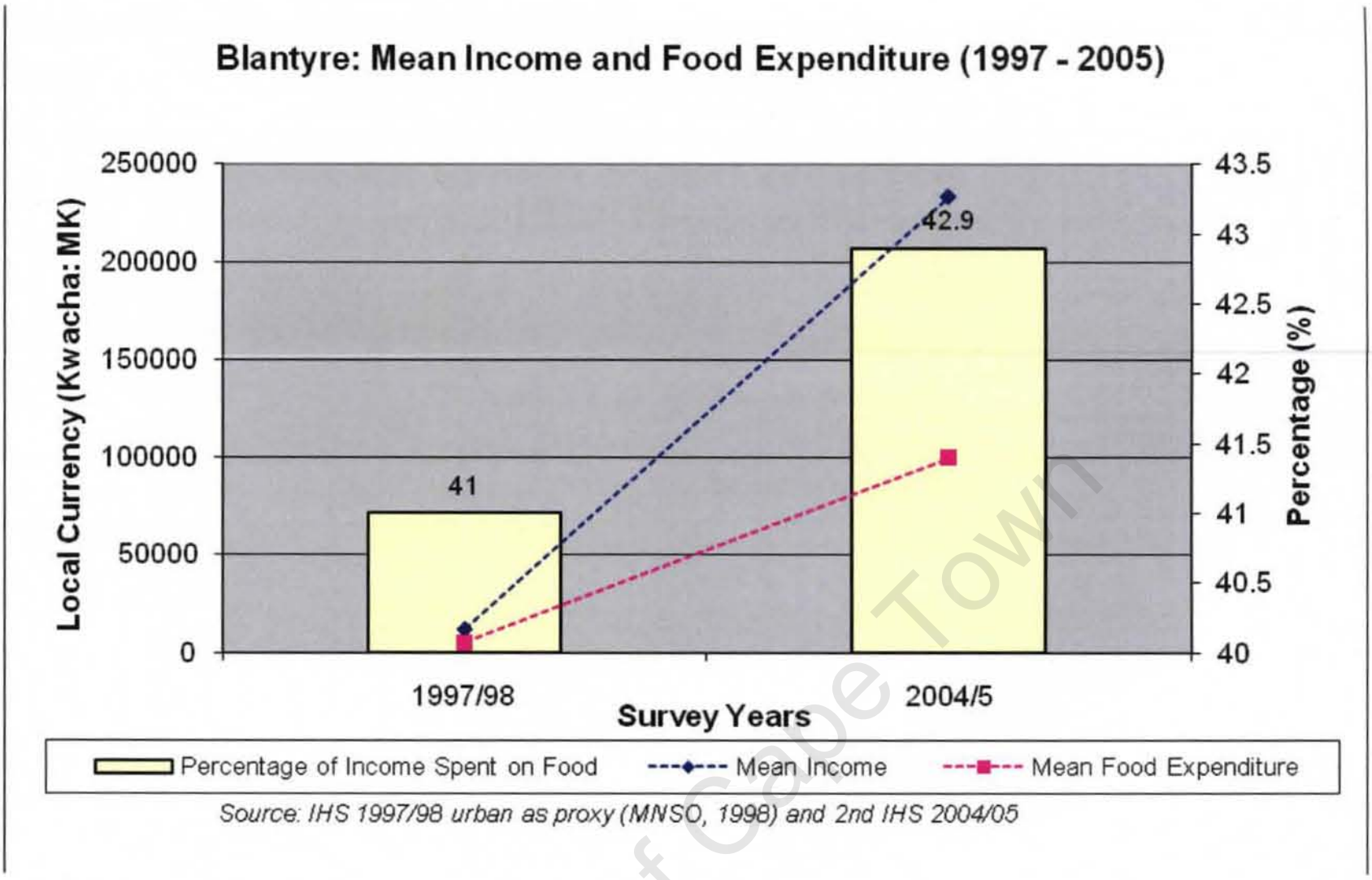
Source: HIES 1993/94 (BCSO, 2006, 2007) and HIES 2002/03 (BCSO, 2006) - urban cities as proxy

Graph 2 Lesotho, Maseru: Mean Income and Mean Food Expenditure (1994- 2003)



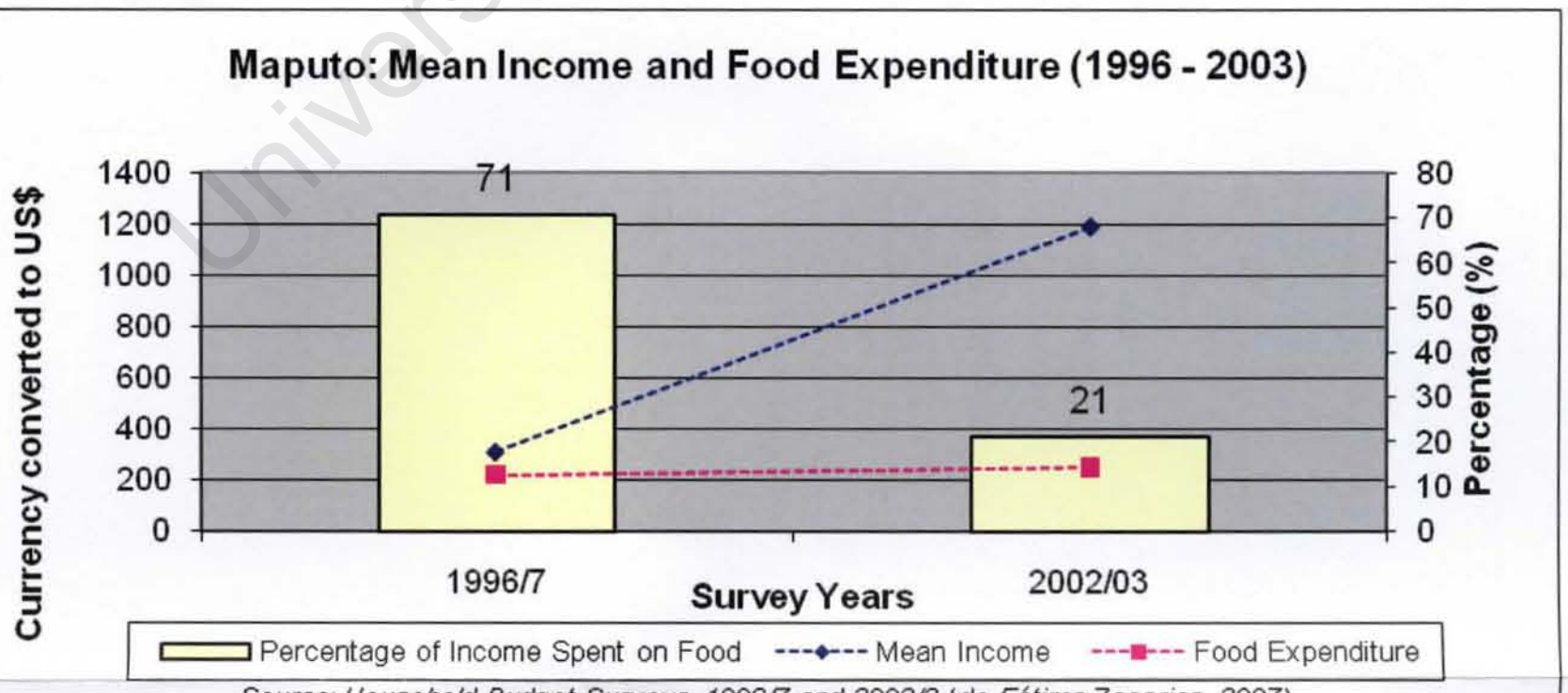
Source: HBS1 1994/95 (LBOS, 2006) and HBS2 2002/03 (LBOS, 2006)

Graph 3 Malawi, Blantyre: Mean Income and Food Expenditure (1997 - 2005)



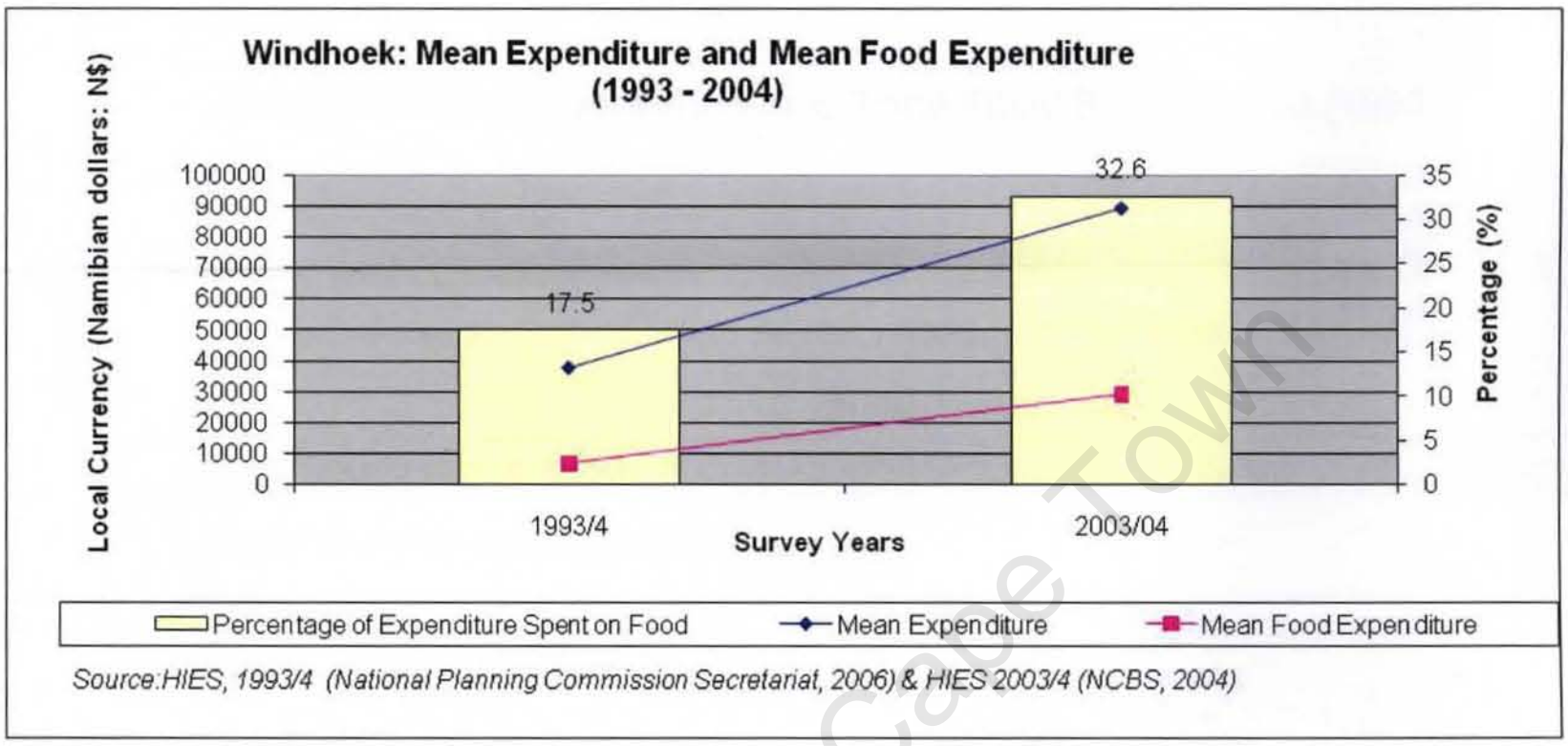
Source: IHS 1997/98 urban as proxy (MNSO, 1998) and 2nd IHS 2004/05

Graph 4 Mozambique, Maputo: Mean Income and Food Expenditure (1996 - 2003)



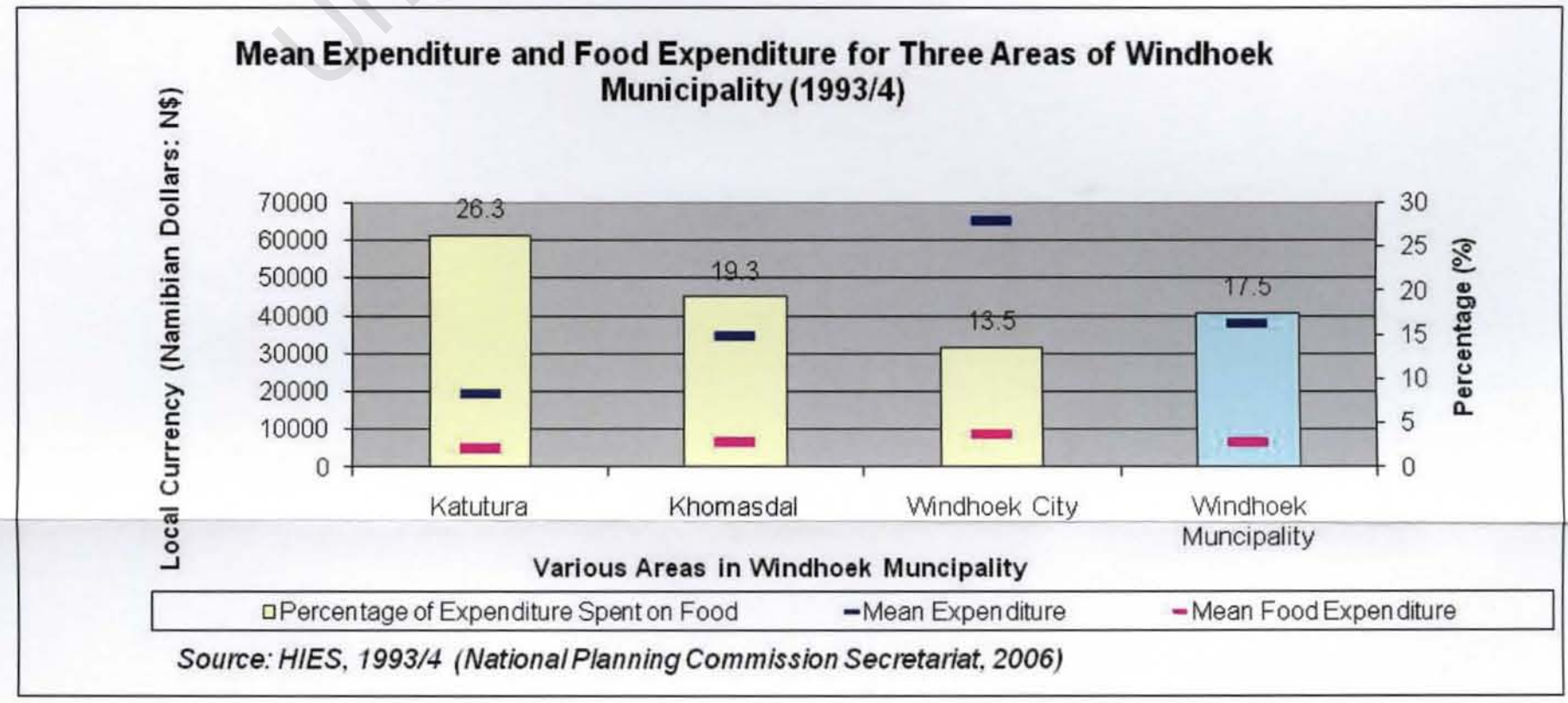
Source: Household Budget Surveys, 1996/7 and 2002/3 (de Fátima Zacarias, 2007)

Graph 5 Namibia, Windhoek: Mean Expenditure and Mean Food Expenditure (1993-2004)



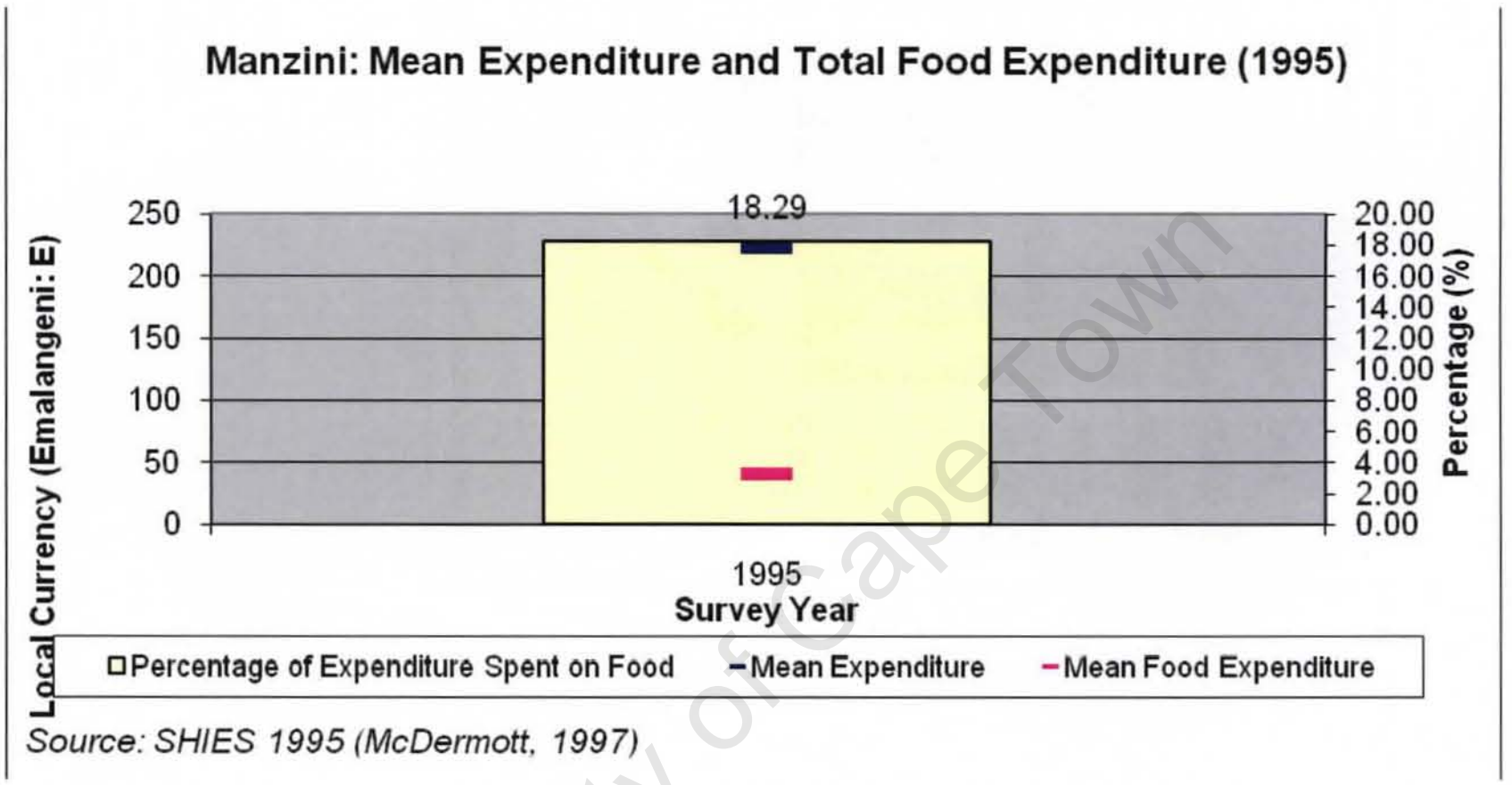
Source:HIES, 1993/4 (National Planning Commission Secretariat, 2006) & HIES 2003/4 (NCBS, 2004)

Graph 6 Namibia, Mean Expenditure and Food Expenditure for Three Areas of Windhoek Municipality (1993/4)



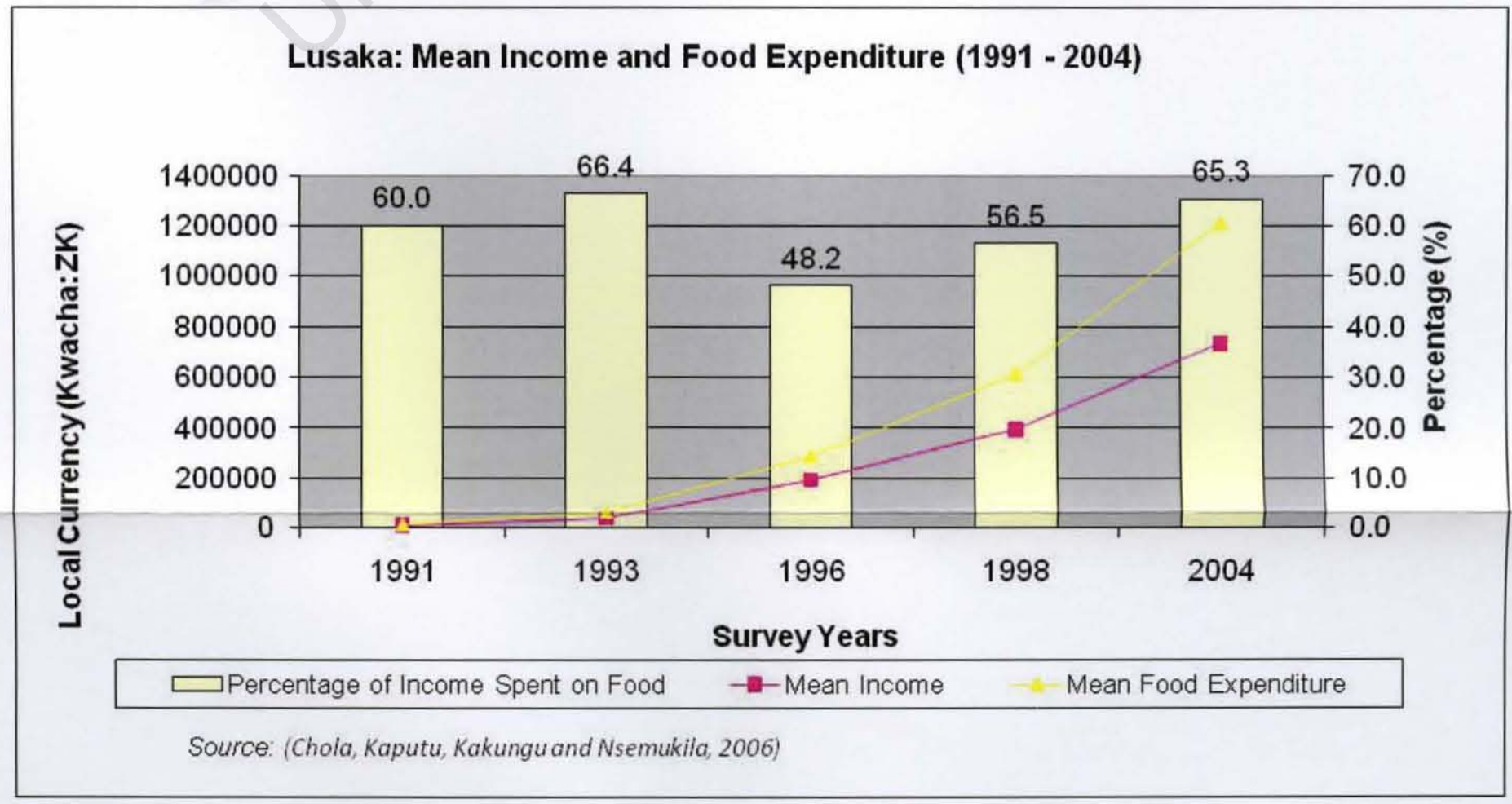
Source: HIES, 1993/4 (National Planning Commission Secretariat, 2006)

Graph 7 Swaziland, Manzini: Mean Expenditure and Total Food Expenditure (1995)



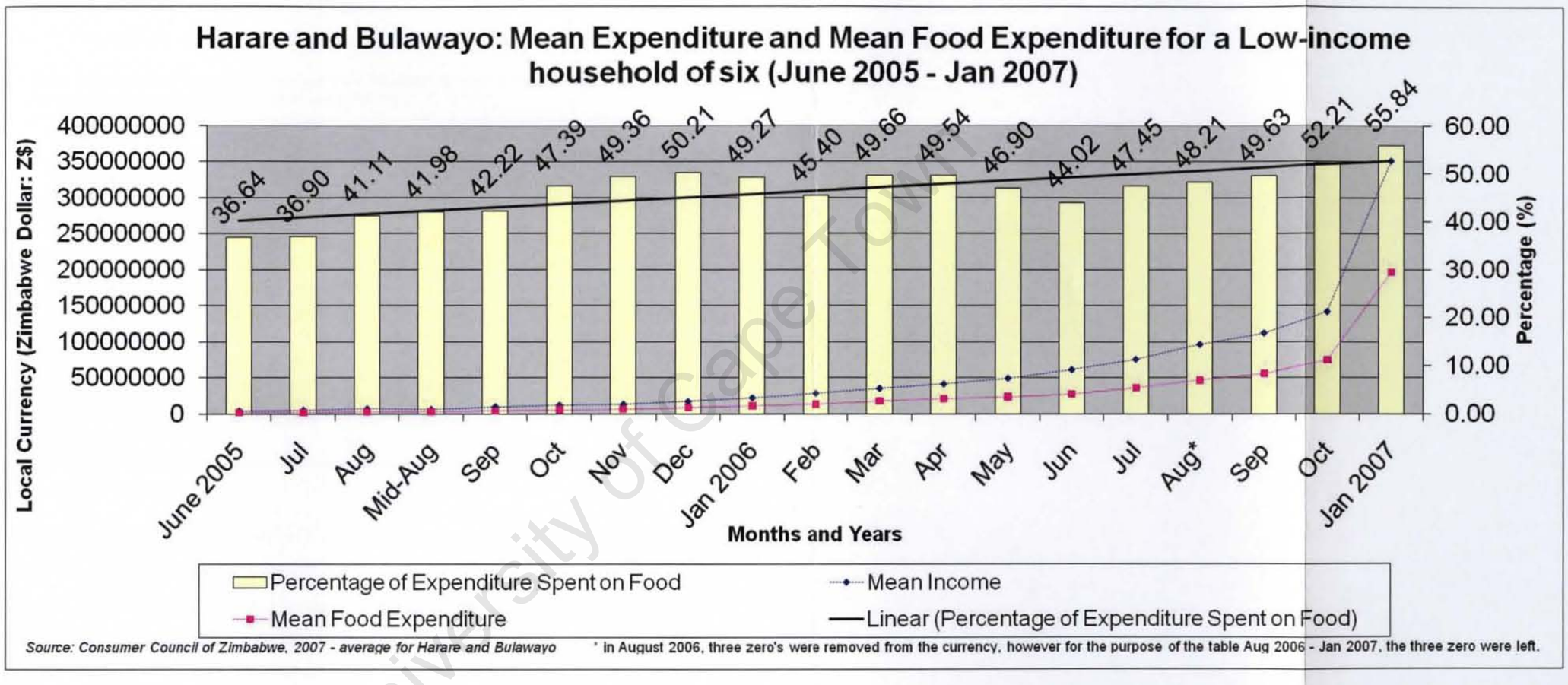
Source: SHIES 1995 (McDermott, 1997)

Graph 8 Zambia, Lusaka: Mean Income and Food Expenditure (1991 - 2004)



Source: (Chola, Kaputu, Kakungu and Nsemukila, 2006)

Graph 9 Zimbabwe, Harare and Bulawayo: Mean Expenditure and Mean Food Expenditure for a Low-income household of six (June 2005 - Jan 2007)



Source: Consumer Council of Zimbabwe, 2007 - average for Harare and Bulawayo * in August 2006, three zero's were removed from the currency, however for the purpose of the table Aug 2006 - Jan 2007, the three zero were left.

10.4 TRENDS IN THE SOUTHERN AFRICAN ACCESS DATA

The Southern Africa *access vulnerability* data indicates that generally all urban areas are seeing increases in levels of food insecurity. Table 21 shows access vulnerability trends for nine Southern African Study cities.

Table 21 A Table Showing and Comparing Trends of Nine Southern African Cities Average Food Access Vulnerability between two time periods 1993-1998 and 1999-2004

City	Country	Survey Years	Percentage (%) of Total Income or Expenditure Spent on Food		Percentage (%) Change
			93-98	02-04	
Gaborone	Botswana	93/94 & 02/03	16.3	19.8	+3.5
Maseru	Lesotho	94/95 & 02/03	26.8	34.9	+8.1
Blantyre	Malawi	97/98 & 04/05	41	42.9	+1.9
Maputo	Mozambique	96/97 & 02/03	70.7	21.1	-49.6
Windhoek	Namibia	93/94 & 03/04	17.5	32.6	+15.1
Manzini	Swaziland	95	18.29	-	-
Lusaka	Zambia	93,96,98 & 04	54.9[a]	65.3	+10.4
Harare & Bulawayo	Zimbabwe	June 05 – Jan 07	36.64[b]	55.84[c]	+19.2
Notes	a: mean percentage from survey years 93, 96 & 98. b: June 05 percentage c: Jan 07 percentage				

In general, I note that, with the exception of Maputo (discussed in 10.5), that Food *access vulnerability* trends are increasing in Southern African urban centres. This is true for all study cities between 1993/98 – 2002/04, all showing an aggregate increase in total expenditure spent on food, from Gaborone at 3.5% to Lusaka 10.4%.

Additionally only Gaborone, Maseru and Blantyre see single digit increases; otherwise, all the study cities household's experienced double-digit percentage increase in the amount of income devoted to food expenditure.

These simple and profound insights highlight the need for more research using available data and the need for agencies to profile urban areas in terms of targeting programmes at urban areas to help reduce factors such as hunger and the like.

Southern African data on food security has not significantly utilized household surveys to effectively analyse what is happening on the ground in urban areas in terms of food access. Household surveys seem to offer the possibility of gaining a far-reaching and thorough understanding of urban food security in Southern African cities. This is all the more pertinent when one takes into consideration that the major issue is the ability of the urban poor to access food. It is for these reasons that I advocate for greater use of available household surveys data in providing a more comprehensive understanding of urban food security.

The data illustrates variability in overall levels but a common trend of increasing *access vulnerability* of household in cities in Southern Africa.

10.5 Gaps and Shortcomings in the Southern African data

A general observation of Southern African data reveals that there are gaps and shortcomings, which need to be overcome in order to improve calculating and comparing urban food security levels in Southern Africa.

Seven initial gaps and shortcomings were identified in this respect. (1) Comparability between countries is complex. While most countries frequently collect data applicable for calculating access vulnerability, some have not, such as Swaziland (in discussion with Colin Tshabalala (Tshabalala and Hlophe, 2007), it was said that the Swaziland VAC was going to be collecting urban income and food expenditure data in the near future, which may act to fill the missing state data). (2) There are some methodological issues with the results from Mozambique. This issue was queried (Zacharias *et* al, 2007); however, I was assured that the data was right even though there was such a significant drop in access vulnerability in the region making the statistic questionable (from 70.7% down to 21.1%). A contributing factor may have been the fact that the civil war had just ended, still such a drastic change seems unlikely. (3) While a lot of food security data is available and a significant initial amount for Southern Africa is assembled here in graphs, there was reluctance/slowness in various governmental statistical agencies to send data (see table of communication in Chapter 5.1). (4) Discrepancies in the definition of a city region do differ from survey to survey and country to country (a challenge faced by the UN, World Bank and all comparing and

collecting urban data: implications of difference scales explored in Chapter 11). The definitional discrepancies as discussed in Chapter 4 can have major impacts on our understanding of the situation as different scales capture different lived experiences of households with in urban areas. (5) At this stage other food access variables are not as widely available. (6) The inability to easily determine individual household food security statistics, due to a lack of access to full survey datasets. Finally (7) Aggregate levels of income and food expenditure for cities are generally useful for high-level monitoring of goals and trends, but hide the complexity of inequality within cities, which is a significant issue within Southern African cities, again highlighting the need for good data for further internal city evaluation as demonstrated in Chapter 11.

Southern African household surveys are accessible, comparable, and insightful when the data is used to understand the urban context. This reveals that while Southern African cities food security status is highly variable, all are seeing increases in food *access vulnerability* as a greater share of household income is devoted to food over time. These 7 issues clearly indicate the need to more effectively utilize Southern African household datasets and the need for a databank of Southern African Food Access indicators.

This chapter demonstrates that there is the potential for developing a Southern Africa urban food security database using existing households to derive levels of *access vulnerability* as an indicator of food security. There are some key gaps and shortcoming to overcome but there is a high potential for urban food security data to be collected at a regional scale. The data in this chapter demonstrated that households in many cities are already spending high percentage of their income on food and that in the last two decades the majority of the study cities saw a double-digit growth in the amount of income dedicated to food. Thus indicating an increasing vulnerability to food insecurity within these cities.

CHAPTER ELEVEN: Urban Food Security (Access Vulnerability And Failure) in 3 South African Cities: demonstrating the importance of scale, using detailed datasets.

Urban food security is a significant issue in Southern Africa and as a part of the process of understanding the problem, three South African cities that had good data sets based on household surveys were chosen for analysis. In looking at these cities, we find that scale has a significant impact on *access vulnerability.* This chapter not only starts to present some statistical findings and compares variations between cities in South Africa, but it also starts to demonstrate the robustness and future use of the developed methodology.

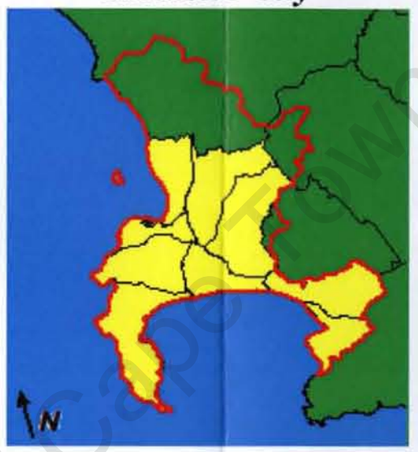
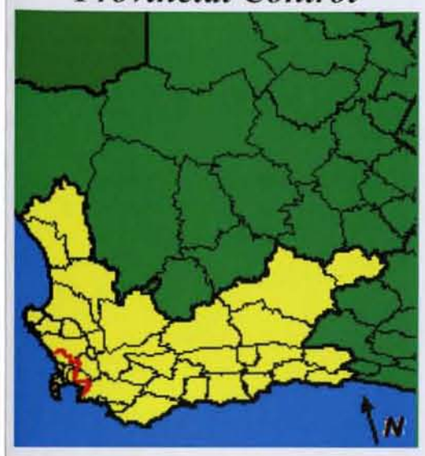
In the case of South Africa, full detailed household survey datasets allowed urban food security to be explored at various geographical scales of each city. The methodology for the selection and creation of these various city scales is found in Chapter 7. The findings from this exploration are quite remarkable: Firstly, they clearly demonstrate that the scale at which you define a city has a significant impact on the understanding of urban food security for that particular city and secondly, that urban food insecurity is indeed a major issue in South African Cities when measuring either *access vulnerability* or *access failure.*

The methodology used to establish food *access vulnerability* and food *access failure* is outlined in Chapters 6-8. This was based on using household survey data (discussed at length in Chapter 3) to derive food security indicators that best investigate urban food security (as established in chapter 3). Food *access vulnerability* and food *access failure* both were found to be good indicators of an urban household's food security situation. These indicators were then investigated at various geographical scales of three South African cities (Chapter 7-8). The exact geographical coverage and resulting statistics of each scale *Core City*, *Inclusive City* and *Agglomeration City* for the three South African cities are presented in an accompanying fold out, with the detailed discussion on the three cities below.

The literature on scale (see Chapter 4) indicates that various scales of a particular city can have a major impact on factors such as population size (as seen in tables on Cape Town, Johannesburg and Durban, for each scale). Additionally the literature indicates that differing cities' characteristics vary with the part of the city being investigated. Therefore, as the city's geographical scale is increased or decreased, certain areas are included or excluded, such as different population groups (by wealth, race...), food systems and housing types. These observations were found to hold true when investigating urban food security not just for particular areas of the city, but also when considering various geographical scales of a particular city. Indicating that it is not only how we measure, but also what we measure, that can affects our understanding of urban food security.

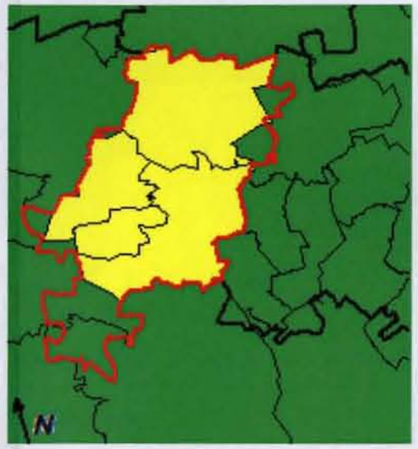
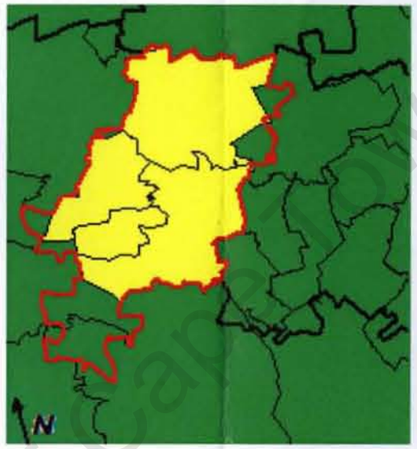
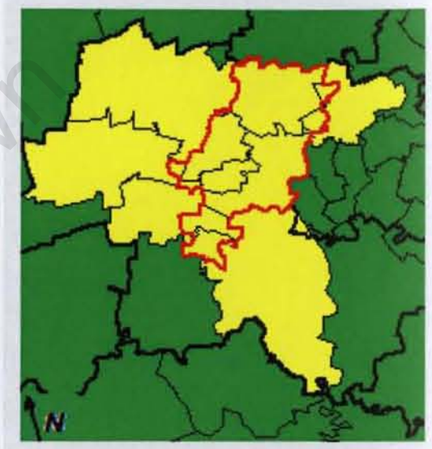
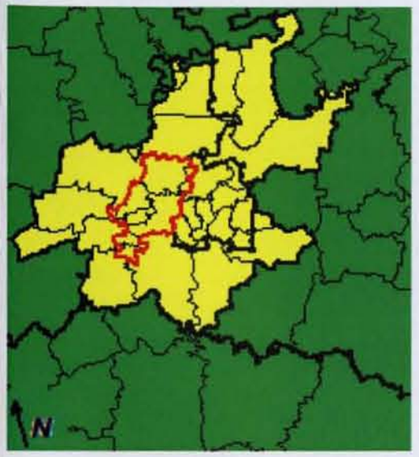
These findings on the importance of scale and the significant urban food security situation are explored below through the lens of *access vulnerability*, *access failure* and how the two measures interact.

Plate 1 Various Scales of Cape Town and Associated Variables

	Cape Town			
Urban Scale Geographic Area Coverage Key: Selected MDs Non-selected MDs City Boundries Ocean For selected city model.	***Core City*** 	***Inclusive City*** 	***Agglomeration City*** 	***Provincial Control*** 
Population[1]	2 677476	2 677476	3 090967	4 159730
Household Observations	1651	1651	1943	2826
Individual Observations	6291	6291	7538	11000
Households Access Failure (%)[2]	16.97 (13.64-20.9)	16.97 (13.64-20.9)	15.65 (12.68-19.17)	15.22 (12.79-18.01)
Individuals Access Failure (%)[2]	19.31 (15.66-23.58)	19.31 (15.66-23.58)	17.75 (14.5-21.55)	17.52 (14.83-20.58)
Household Access Vulnerable (%)[2,3]	7.66 (5.99-9.74)	7.66 (5.99-9.74)	8.34 (6.75-10.76)	9.61 (8.19-11.25)

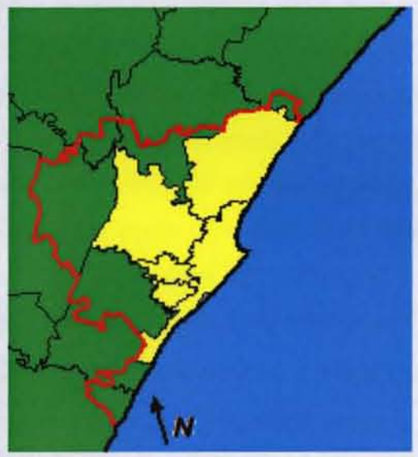
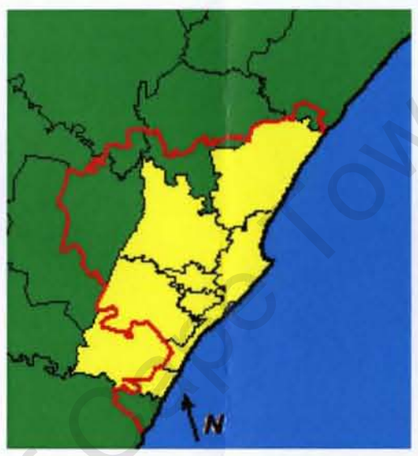
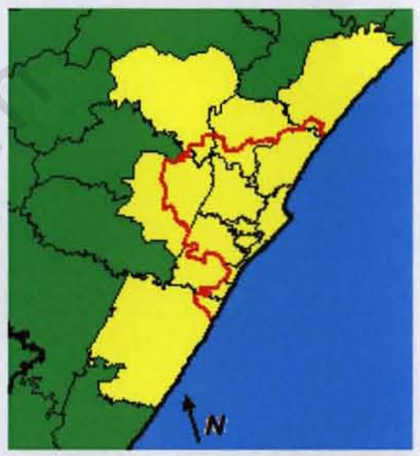
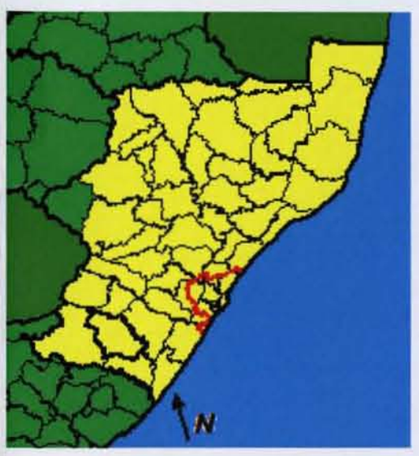
Note: 1) All population amounts were rounded to the nearest 1, as i.e. 0.5 of a person is not a good thing. Survey weights were used to
2) At the 95% Confidence Interval
3) Access vulnerable, where spent 60% or more, of total income on food expenditure

Plate 2 Various Scales of Johannesburg and Associated Variables

	Johannesburg			
Urban Scale Geographic Area Coverage Key: Selected MDs Non-selected MDs City Boundries Ocean	***Core City***	***Inclusive City***	***Agglomeration City***	***Provincial Control***
				
For selected city model.				
Population[1]	2 438749	2 438749	3 753153	7744438
Household Observations	1435	1435	2221	4335
Individual Observations	4916	4916	7412	14465
Households Access Failure (%)[2]	10.24 (8.45-12.36)	10.24 (8.45-12.36)	12.85 (10.79-15.24)	14.74 (13.08-16.58)
Individuals Access Failure (%)[2]	12.85 (10.36-15.82)	12.85 (10.36-15.82)	15.26 (12.88-17.98)	17.06 (15.14-19.17)
Household Access Vulnerable (%)[2,3]	7.79 (6.08-9.92)	7.79 (6.08-9.92)	7.32 (5.98-8.92)	7.84 (6.74-9.1)

Note: 1) All population amounts were rounded to the nearest 1, as i.e. 0.5 of a person is not a good thing. Survey weights were used to determine population size.
2) At the 95% Confidence Interval
3) Access vulnerable, where spent 60% or more, of total income on food expenditure

Plate 3 Various Scales of Durban and Associated Variables

	Durban			
Urban Scale Geographic Area Coverage Key: Selected MDs Non-selected MDs City Boundries Ocean For selected city model.	***"Core City"*** 	***"Inclusive City"*** 	***"Agglomeration City"*** 	***Provincial Proxy*** 
Population[1]	2 687757	2 842188	3 654653	8 977866
Household Observations	1299	1377	1745	4006
Individual Observations	4538	4963	6751	17932
Households Access Failure (%)[2]	23.66 (19.76-28.06)	25.15 (21.25-29.51)	25.41 (22.02-29.14)	27.92 (25.57-30.4)
Individuals Access Failure (%)[2]	26.38 (21.91-31.4)	28.85 (24.28-33.9)	29.13 (25.25-33.34)	32.05 (29.54-34.67)
Household Access Vulnerable (%)[2,3]	12.52 (10.26-15.19)	12.97 (10.65-15.71)	14.36 (12.05-17.02)	16.81 (14.92-18.89)

Note: 1) All population amounts were rounded to the nearest 1, as i.e. 0.5 of a person is not a good thing. Survey weights were used to determine population size.
2) At the 95% Confidence Interval
3) Access vulnerable, where spent 60% or more, of total income on food expenditure

11.1 Access Vulnerability in 3 South African Cities: demonstrating the importance of scale.

In investigating access vulnerability in the three South African cities, five essential findings are identified: (1) Scale has a significant impact on our understanding of each cities urban food security situation. (2) *Access vulnerability* indicates that urban food insecurity is an important issue for all 3 South African cities. (3) The choice to use total income or total expenditure when calculating access vulnerability has a major impact on our understanding of the percentage of *access vulnerable* within a city. (4) In both cases, whether using total income or total expenditure to calculate *access vulnerability*, the majority of those who are *access vulnerable* are not just vulnerable but extremely *access vulnerable* (above 80% spent on food expenditure), living on the edge. (5) The strength of good quality data is demonstrated in the detailed city level analysis. These findings are demonstrated in Table 22.

Table 21 Food Access Vulnerable in 3 South African Cities: demonstrating the importance of scale

		Total Income			*Total Expenditure*		
Urban Area	Urban Scales	*60%+ spent on food expenditure*	*80%+ spent on food expenditure*	*Sample size (households)*	*60%+ spent on food expenditure*	*80%+ spent on food expenditure*	*Sample size (households)*
Cape Town	*Core City*	7.66 (5.99-9.74)	3.54 (2.53-4.92)	1191	26.01 (22.98-29.29)	19.39 (16.49-22.65)	1483
	Inclusive City	7.66 (5.99-9.74)	3.54 (2.53-4.92)	1191	26.01 (22.98-29.29)	19.39 (16.49-22.65)	1483
	Agglomeration City	8.34 (6.75-10.26)	3.8 (2.82-5.1)	1427	25.99 (23.19-29.01)	19.42 (16.75-22.4)	1755
	Control: Western Cape	9.61 (8.19-11.25)	4.52 (3.63-5.62)	2165	26.64 (24.22-29.2)	20.53 (18.21-23.06)	2624
Johannesburg	*Core City*	7.79 (6.08-9.92)	4.57 (3.32-6.25)	1052	32.26 (28.35-36.43)	29.12 (25.16-33.42)	1338
	Inclusive City	7.79 (6.08-9.92)	4.57 (3.32-6.25)	1052	32.26 (28.35-36.43)	29.12 (25.16-33.42)	1338
	Agglomeration City	7.32 (5.98-8.92)	4.2 (3.23-5.46)	1633	36.61 (33.43-39.9)	33.73 (30.46-37.16)	2084
	Control: Gauteng	7.84 (6.74-9.1)	4.36 (3.62-5.25)	3006	35 (32.69-37.39)	32.67 (30.3-35.13)	3976
Durban	*Core City*	12.52 (10.26-15.19)	6.8 (5.31-8.77)	842	30.91 (26.82-35.31)	28.01 (23.86-32.57)	1119
	Inclusive City	12.97 (10.65-15.71)	7.31 (5.72-9.32)	872	31.09 (27.13-35.34)	28.23 (24.21-32.64)	1181
	Agglomeration City	14.36 (12.05-17.02)	8.79 (7.09-10.85)	1100	33.19 (29.73-36.84)	30.4 (26.89-34.15)	1528
	Control: Kwa-Zulu Natal	16.81 (14.92-18.89)	11.41 (9.9-13.12)	2292	37.46 (34.94-40.04)	35.36 (32.79-38.02)	3625
South Africa	National Level	13.18 (12.53-13.88)	8.86 (8.34-9.42)	15930	37.38 (36.41-38.35)	35.23 (34.25-36.22)	24019

Source: Own Calculations from 1999 OHS using STATA.

The Importance of Scale:

Scale has a significant impact on our understanding of each city's urban food security situation, as well as on sample size and slight changes in certainty of estimate (changing confidence interval). Table 22 shows that as scale increases (*Core City* to *Inclusive City* to *Agglomeration City*) so does *access vulnerability* increase in every city, at the 80% vulnerability level when using total income or total expenditure. Using expenditure at the 60% level I see the same pattern emerging, that as the city scale increases, so does food insecurity. For example, food *access vulnerability* in Durban at the *Core City* scale is 30.91% at the *Inclusive City* scale 31.09% and at the *Agglomeration City* scale 33.19%. Cape Town here is an exception, although the overlapping confidence interval indicates the pattern still may hold true in reality. In the case of using income at the 60% level, I see the same pattern emerge, as the city scale increases so does food insecurity. In this case, Johannesburg here is an exception, which also sees a slight drop in the estimate statistic, however its confidence interval indicates that the pattern may also remain true.

As scale increases so does the sample size (e.g. Cape Town *Core City* from 1191 to 2165 households observation at the *Agglomeration City* scale) and associated with the increasing sample size is a decrease in the confidence interval (i.e. decreasing certainty around the estimate). For example, the difference in the intervals went from 3.75% for the Cape Town *Core City* to 3.51% for the Cape Town *Agglomeration City* and 3.06% for the Provincial Control.

The Importance of Good Data:

The strength of good quality data is demonstrated in the detailed city level analysis. The depth of the data allows for the food security situation of household's and individual's *access vulnerability* to be calculated, as opposed to *access vulnerability* being selected only as a measure of mean total income/expenditure and mean food expenditure as done in Chapter 10. Additionally the data allowed for two percentages of income and two percentages of expenditure levels (60% and 80%) as indicators of household's *access vulnerability*. The deeper level of analysis was made possible by the larger sample sizes and location identifiers

being made available in the dataset (as discussed in Chapter 6-7). Furthermore, the data allowed for identification of the percentages of households in the various urban areas and scales that are food *access vulnerable* to be calculated. Finally, in the table I also see that all the provincial controls fall within the confidence interval of all their related *Agglomeration City* scales, with the exception in some cases of Kwa-Zulu Natal. These provincial controls acts as a check on the data integrity of the various city scales and seem to indicate that the STATA software commands (such as *svyset*) have successfully rescaled the data (as discussed in Chapter 7).

The Importance of the Results on our Understanding of Urban Food Security in Southern Africa:

The results have major impact on our understanding on urban food security. The levels of *access vulnerability* indicate that urban food insecurity is an important issue for all three South African cities.

The choice to use total income or total expenditure when calculating access vulnerability has a major impact on our understanding of the percentage of *access vulnerable* within a city. Table 22 reveals that the percentages of those who are *access vulnerable* at the 60% and/or 80% level or above increase drastically when using total expenditure instead of total income, for all cities and scales. There are a few possibilities why this could be: (1) the most probable reason is as Vermaak (2005) points out that the separate total monthly household expenditure question in the 1999 OHS is poorly framed and consequently poorly captures total expenditure thus artificially inflating *access vulnerability* or (2) it could be an indicator that households are saving, although this is doubtful in light of the next section 11.2. Thus, caution should be used when interpreting *access vulnerability* using food expenditure alone.

Whether using total income or total expenditure to calculate *access vulnerability*, the majority of those who are vulnerable are extremely vulnerable, (above 80% spent on food expenditure); thus, many live on the edge (with the exception of Cape Town when using income). The literature indicates that at this high level of food expenditure households are extremely sensitive to any financial shocks and might already be cutting back or going

without meals (explored more in section 11.3) as well as eating less nutritiously valuable food (reviewed in Section 2.3.3 and Ruel *et al*, 2010; Tabatabai, 1993; Maxwell *et al,* 2000). The majority of the *access vulnerable* are literally living on the breadline.

A few other key comparisons and implications for understanding urban food security in South Africa are necessary at the 60% level using total income. Cape Town and Johannesburg have very similar probabilities of having the same number of households who are food *access vulnerable* when taking into consideration the similarities of the confidence intervals at all scales. Durban however has a higher percentage than the other two cities for all scales that are *access vulnerable* (note: not even the confidence intervals overlap). This indicates that *access vulnerability* is significantly higher in Durban than in Cape Town and Johannesburg.

At the 60% level, using total expenditure, Cape Town, Johannesburg and Durban have similarities and confidence intervals overlap for all scales, except for Cape Town and Durban at the Agglomeration scale. Here, once again Durban is shown to have a high percentage of households that are *access vulnerable* at 33.19% followed by Cape Town at 25.99%.

Interestingly, the Durban Agglomeration scale (using total income) indicates that it is more likely that households will be food *access vulnerable* (14.36%) in Durban, than when looking at South Africa (13.18%) as a whole (including rural areas). While this was not true for other cities, it does demonstrate that in South Africa at least one city has a more significant food access issues than the country as a whole.

In summing up, I find that scale plays a vital part in food *access vulnerability.* As scale increases so does *access vulnerability.* Additionally I find that for some cities up to a third of the city's population are vulnerable to food insecurity.

11.2 Access Failure in 3 South African Cities: demonstrating the importance of scale.

In investigating *access failure* in the three South African cities, 5 essential findings are identified: (1) Scale has a significant impact on each cities urban food security situation. (2) *Access failure* indicates that urban food insecurity is an important issue for all three South African cities. (3) *Access failure* as an indicator effectively captures food access issues at the urban scale. (4) Up to 25% of households and 29% of individuals are experiencing food insecurity in cities. (5) Once again the strength of quality data is demonstrated in the detailed city level analysis.

The Table below (Table 23) "Food Access Failure in 3 South African Cities: demonstrating the importance of scale" demonstrates both the importance of scale and levels of food insecurity in three Southern African Cities.

Table 22 Food Access Failure in 3 South African Cities: demonstrating the importance of scale

		Food Access Failure		*Sample Size*	
Urban Area	Urban Scales	*Household Level (%)*[1]	*Individual Level (%)*[1]	*Households*	*Individuals*
Cape Town	*Core City*	16.97 (13.64-20.9)	19.31 (15.66-23.58)	1651	6291
	Inclusive City[2]	16.97 (13.64-20.9)	19.31 (15.66-23.58)	1651	6291
	Agglomeration City	15.65 (12.68-19.17)	17.75 (14.5-21.55)	1943	7538
	Control: Western Cape	15.22 (12.79-18.01)	17.52 (15.66-23.58)	2826	11000
Johannesburg	*Core City*	10.24 (8.45-12.36)	12.85 (10.36-15.82)	1435	4916
	Inclusive City[2]	10.24 (8.45-12.36)	12.85 (10.36-15.82)	1435	4916
	Agglomeration City	12.85 (10.79-15.24)	15.26 (12.88-17.98)	2221	7412
	Control: Gauteng	14.74 (13.08-16.58)	17.06 (15.14-19.17)	4335	14465
Durban	*Core City*	23.66 (19.76-28.06)	26.38 (21.91-31.4)	1299	4538
	Inclusive City	25.15 (21.25-29.51)	28.85 (24.28-33.9)	1377	4963
	Agglomeration City	25.41 (22.02-29.14)	29.13 (25.25-33.34)	1745	6751
	Control: Kwa-Zulu Natal	27.92 (25.57-30.4)	32.05 (29.54-34.67)	4006	17932

Notes:
1) All values calculated at the 95% confidence intervals.
2) The *Inclusive City* scale for Cape Town and Johannesburg have the same results as *Core City*, as methodologically (discussed in Chapter 7) resulting in the same number of MDs selected in both cases.
3) More extensive details on each urban area and access failure in tables below.

Source: Own Calculations from 1999 OHS using STATA.

The Importance of Scale:

Table 23 demonstrates that scale has a significant impact on the understanding of each cities urban food security situation, sample sizes and confidence intervals. Both Johannesburg (10.24% *Core City* to 12.85% *Agglomeration City* for households) and Durban's (23.66% *Core City* to 25.41% *Agglomeration City* for households) indicate a high chance that percentages of *access failure* increase as the city scale increases in spatial area. The literature (e.g. Satterthwaite, 2005) indicates that this may occur as different neighbourhoods and systems (such as food systems) are included in cities of larger scales. The results from Cape Town indicate that scale has an effect, with household *access failures* best estimate at 16.97% for the *Core City* and 15.22% for the *Agglomeration City*. For Cape Town, the individuals experiencing *access failure* follow the same minor trend. It is interesting to note that there seems to be similarities in trends when one compares *access vulnerability* statistics with *access failure* statistics. In other words, where we see an increase in *access failure,* we also see a similar increase in *access vulnerability*. These findings could then be useful when only one of the measures is available.

The Importance of Good Data:

Good datasets (in terms of samples sizes, sampling structure and relevant questionnaires) as demonstrated in the case of South Africa, allow for household and individual's food security to be determined at the city level (not at some mean level as in Chapter 10) and various scales of the city to be considered and understood.

The survey questionnaire asks the two questions identifying whether anyone in the household had missed a meal (unable to access) because of financial constraints (see Figure 14). Urban food security is seen mainly as an issue of financial access; the *access failure* indicator perfectly captures the concept of food access well and thus is a powerful indicator for this and other research. Additionally this demonstrates just how important the formulation of good questions is in giving us the data, which can be meaningfully interpreted to understand urban food security.

From Table 23 it is noted that the Durban *Agglomeration City* scale has a 25.41% of household and 29.13% of individuals who experienced food *access failure*. The *Provincial Control* was similar to the *Agglomeration City* with 27.92% of household and 32.05% of individuals who experienced *access failure*. As mentioned, this is an indicator that STATA *svyset* command and *subpop* options were able to adequately fit the statistical model for Durban survey data, thus allowing for meaningful analysis at the urban scales (this methodology is discussed further in Chapter 7.).

The Importance of the Results on our Understanding of Urban Food Security in Southern Africa:

Access failure indicates that urban food insecurity is an important issue for all three South African cities. The table effectively allows for comparisons between cities and various scales. It is noted that all the percentages indicate that a significant percentage of the urban population experience (anywhere from 12.85% for Johannesburg at the *Core City* scale to 29.13% for Durban at the *Agglomeration City* scale) food *access failure* (urban food insecurity) due to lack of financial resources to purchase food. Durban has the highest percentage of households at 25.41% and individuals at 29.13% who reported *access failure*, as well as the highest percentages compared to the other cities scales (indicating that urban food security is a major issue in South Africa). Up to a quarter of households in cities in South Africa, have to deal with food insecurity. Furthermore, there are a higher percentage of individuals experiencing *access failure* than households, indicating that on average the household size of those who are food insecure are generally larger than the households who are not food insecure.

11.3 Investigation as to How Access Vulnerability and Access Failure Relate in 3 South African Cities

The observations from section 11.1 and 11.2 would seem to show that the two measures, *access vulnerability* and *access failure*, follow the same pattern in terms of increasing and decreasing with scale. An important question would be to explore how these measures interact and to see if one can predict the other, or whether they are moderately related, or if they are very different measures of food access and have no apparent relationship. In order to

do this I created Table 24 using the OHS 1999 Dataset. The table below shows firstly, what percentage of households experience *access failure* when households are spending 60% or more of total income or total expenditure on food expenditure. Secondly it shows, where food *access failure* is present in a household, what percentage of those households are *access vulnerable* as well (spending 60% or more of total income or total expenditure on food expenditure).

Table 23 How Access Failure and Access Vulnerability Relate: In the Case of 3 South African Cities

	Where Food Access Vulnerable at 60%+ level				*Where Food Access Failure*			
	Total Income		*Total Expenditure*					
Urban Area	*Households who experienced access failure (%)*[3]	*obs*[1]	*Households who experienced access failure (%)*[3]	*obs*[1]	*Households who are access vulnerable at 60%+ level of Total Income (%)*[3]	*obs*[1]	*Households who are access vulnerable at 60%+ level of Total Expenditure (%)*[3]	*obs*[1]
Cape Town[2]	32.68 (23.56-43.32)	134	30.39 (25.07-36.29)	516	15.77 (11.68-20.95)	275	45.1 (38.89-51.46)	365
Johannesburg[2]	18.02 (12.09-25.99)	129	16.5 (13.03-20.67)	760	12.52 (08.41-18.23)	178	47.39 (40.53-54.35)	278
Durban[2]	33.66 (24.35-44.43)	167	36.28 (30.68-42.29)	532	22.15 (15.96-29.9)	238	46.7 (41.19-52.28)	411
Notes:	1 The number of observations (households) for where it is true. Not the total sample. 2 All cities were calculated using the *Agglomeration City* scale, for two key reasons: 1.) largest sample size, 2.) the administrative definitions neglect the fact that cities have grown beyond their administrative boundaries. 3 All values calculated at the 95% confidence intervals.							

Source: Own Calculations based on 1999 OHS using STATA

From Table 24 I find that approximately a third of households in Cape Town (32,65% of income, 30,39% of expenditure) and Durban (33,66% of income, 36,28% of expenditure) were spending 60% or more of their income or expenditure on food, failed to have sufficient income to purchase food and went hungry (experienced *access failure*). While in Johannesburg, it was only 18% who experienced *access failure* (half of Cape Town and Durban). These findings are interesting and tell us that a large number of households that are *access vulnerable* are also experiencing food *access failure* (approximately 30%).

At the 60% or higher level of total expenditure there is no significant difference between cities (all close to 46%) when it comes to households who experienced *access failure* and at the same time were *access vulnerable.* From Table 24 it is shown that 45.1% of Cape Town, 47.39% of Johannesburg and 46.7% of Durban households who experience *access failure*, were also *access vulnerable*. Furthermore when taking into account the confidence intervals anywhere between 38.9 to 54.35% of people who failed to access food, spent more than 60% of total expenditure on food.

However, the majority of those who are *access vulnerable* are not yet experiencing *access failure*, which may mean that *access vulnerability* is an indicator of the potential for the household to experience *access failure.* This would align with what we know from the literature, that households which spends a high percentage of income on food are at risk of becoming food insecure due to shocks other factors. In the case of the three South African Cities, there would seem to be some type of similarity, however certain households experiencing one measure and not the other, seeming to point to the fact there are other possible mechanisms at work. There may be other support mechanisms that prevented some households from all out failure, such as other sources of income not captured, social networks, food at school programmes or food for work, these themes are briefly explored in the data in Chapter 12.

In summing up, I have found that by comparing urban food security data from household survey datasets in three South African cities at various scales one can garner some key insights: (1) that the scale at which you define the urban area has a

major influence on understand urban food security. (2) Detailed household survey's datasets potentially allow for meaningful analysis of urban food security (3) That in the South African urban context, urban food insecurity is a major issue with up to 36.61% of households urban food insecurity identified by using *access vulnerability* and up to 25% of households and 29% of individuals are experiencing urban food insecurity identified by using *access failure* measures. (4) The choice of using total income or total expenditure when calculating *access vulnerability* can have an impact on our understanding *access vulnerable* within a city. (5) The majority of those who are *access vulnerable* in South African cities are extremely vulnerable (living on the edge) and are highly susceptible or are already food insecure (one third).

CHAPTER TWELVE: Comparison of Urban Food Security in 3 South African Cities: Factors that Influence Poor Household's Food Security

In this chapter, I intend to demonstrate what can be done with robust in-depth household survey datasets. The purpose of this chapter is not to interpret the findings but rather to demonstrate the power of the methodology and the possibilities for further research. However, as an output of this process, some initial findings are presented.

Urban food security while primarily influenced by income is not solely determined by financial constraints. In the case of Cape Town we find there are households who are food secure and above the poverty line (53.4%), those who are food secure and below the poverty line (27.5%), those who are food insecure and above the poverty line (8.8%) and 10.2% who are both food insecure and below the poverty line. While one might have expected the result of 53.4% and 10.2%, the result of 27.5% (food secure below poverty line) and 8.8% (food insecure above the poverty line) indicate there are other factors are at play that can influence household urban food security other than just income. The evidence from the literature (Chapter 2) and from findings in Chapter 10-11 show that for most households, it is income that is the key driver of food security or insecurity. There are a small percentage of households for whom other factors seem to keep them from becoming food insecure.

This idea couples well with the closing findings of the last chapter that; "...certain households experiencing one measure [of food security] and not the other, would seem to point to the fact there are other possible mechanisms which are at work".

In order to demonstrate the potential of the developed methodology of using robust in-depth datasets, one can explore the factors that are effecting certain household's urban food security situation. For example, factors such as the influence of (1) Female headed households, (2) Grants, (3) Received loans and from whom they were received, (4) Whether children receive food at school and (5) HIV and AIDS on urban

households and their food security status. All these factors can and should be explored when we have the appropriate data. Therefore, in order to give a glimpse of what can be done and expanded upon in future research I begin to show the impact these five factors seem to have on a household's food security situation. These and other factors can be seen for each city in the accompanying foldout.

The ability to investigate these influencing factors relies on in-depth household datasets, which are not always fully available. In the cases examined in Chapter 10, I demonstrated how mean data at a city level was valuable in comparing trends across cities, nations and the region. Therefore, I argued for a PAN-Southern African Data collection effort, which would lend valuable insight into the sorely lacking information on food access. In time, food access data will hopefully become more detailed and in-depth analysis of *access vulnerability* and *access failure* will be able to take place in the same fashion as in Chapter 11. It is the hope that finely detailed work as I suggest in this chapter will be able to be undertaken, so that other dynamics that influence urban food security can be understood in the future.

Although this type of analysis potentially offers great insight into urban food security, some caution is required when analysing the data at the level prepared below. While every effort has been made to reduce impact of survey design by using STATA *svyset*, caution is required in making use of the *Agglomeration City* scale (which was used as it has the largest sample size) as running any major analysis often results in reducing the number of variables in order to study a subsection of the dataset. Studying this data further subdivides the cities into food and poverty lines. I issue this caution in the same fashion as Aliber and Modiselle (2002:1) "the results, however engaging, must be interpreted with caution".

A key objective of this thesis was to develop a methodology for future research and as such, this chapter meets that objective by starting to ask the right questions of the data. In essence, it demonstrates what could be done on a bigger scale in the future to comprehend more about the nature of urban food security. The insights from the data are essential and insightful in understanding the urban food security situation in Southern Africa and allow us to start to present some initial results.

In order to do this, households were divided into quadrants based on the components of MDG 1: poverty and food security. I used the MDG poverty line and the household food security situation at the *Agglomeration Scale* for Cape Town, Johannesburg and Durban (as presented in the foldout: Household Cross-sections). The average characteristics were calculated for each quadrant to help identify other factors that might influence some household's urban food security. Immediately the Cross-sections demonstrated visually (1) that there are other factors influencing urban food security (2) what can be done with good data, even though weak and (3) some insights into the interaction between poverty and urban food security (breaking apart the components of MDG 1).

	Cape Town					
	Mean Household Head Characteristics					
	Food Insecure (access failure)			**Food Secure**		
Above	*Female:* 25.03%	*Household size:* 3.7 [2.01]	*Has no income:* 0%	*Female:* 22.01%	*Household size:* 3.46 [1.92]	*Has no income:* 0.34%
	Race: 1: 65.15% 2: 31.5% 4: 2.91% 5: 0.44%	*No. of adults:* 2.48 [1.24]		*Race:* 1: 16.87 2: 45.78 3: 1.18 4: 35.54 5: 0.64	*No. of adults:* 2.40 [1.21]	
MDG Poverty	*Age:* 37.27 [10.6]	*No. of children:* 1.22 [1.24]	*obs: 172*	*Age:* 40.89 [12.54]	*No. of children:* 1.07 [1.21]	*obs: 1039*
Line	*Female:* 45.12%	*Household size:* 4.40 [2.21]	*Has no income:* 47.14%	*Female:* 35.69%	*Household size:* 3.48 [2.31]	*Has no income:* 79.3%
	Race: 1: 66.68% 2: 28.18% 3: 0.42% 4: 4.72%	*No. of adults:* 2.63 [1.30]		*Race:* 1: 15.61% 2: 39.49% 3: 0.93% 4: 43.71% 5: 0.27%	*No. of adults:* 2.41 [1.38]	
Below	*Age:* 44.37 [13.73]	*No. of children:* 1.76 [1.51]	*Obs: 198*	*Age:* 51.87 [17.28]	*No. of children:* 1.09 [1.41]	*obs: 534*

	Cape Town					
	Household Income and Expenditure					
	Food Insecure (access failure)			**Food Secure**		
Above	*Total Income:* R 2582.58 [1793.09]	*Food expenditure:* R 590.45 [415.67]	*Food expenditure as a percentage of Total exp.:* 61.08% [51.27]	*Total Income:* R 10397.87 [33491.44]	*Food expenditure:* R 1139.17 [52135.50]	*Food expenditure as a percentage of Total exp.:* 41.76% [45.19]
	Per Capita Income: R 825.46 [692.82]	*Food expenditure per Capita:* R 196.78 [197.32]	*Received a grant:* 8.95% *Average no.:* 0.09 [0.31]	*Per Capita Income:* R 3749.22 [13256.65]	*Food expenditure per Capita:* R 401.85 [789.63]	*Received a grant:* 13.24 *Average no.:* 0.17 [0.49]
MDG Poverty Line	*Adjusted Income:* R 1258.78 [828.27]	*Food expenditure as a percentage income:* 27.6% [17.03]	*Received a loan:* 31% , **from** 3: 45.77%, 2: 12.52%, 1: 11.56%, 8: 10.5%, 10: 8.25%	*Adjusted Income:* R 5476.18 [17938.94]	*Food expenditure as a percentage income:* 22.63% [19.78]	*Received a loan:* 33.86% **from** 5: 43.16%, 3: 35.72%, 1: 5.13%, 10: 4.98%, 2: 4.7%
	Total Income: R 450.19 [551.23]	*Food expenditure:* R 369.87 [250.56]	*Food expenditure as a percentage of Total exp.:* 73.91% [37.13]	*Total Income:* R 198.05 [466.32]	*Food expenditure:* R 941.28 [2387.74]	*Food expenditure as a percentage of Total exp.:* 59.1% [50.58]
	Per Capita Income: R 84.85 [96.56]	*Food expenditure per Capita:* R 104.39 [93.57]	*Received a grant:* 44.21% *Average no.:* 0.58 [0.79]	*Per Capita Income:* R 36.13 [79.38]	*Food expenditure per Capita:* R 494.04 [2339.45]	*Received a grant:* 44.01% *Average no.:* 0.59 [0.79]
Below	*Adjusted Income:* R 162.78 [184.7]	*Food expenditure as a percentage income:* 68.08% [78.64]	*Received a loan:* 28.34% **from** 3: 35.41%, 2: 22.51%, 1: 18.21%, 10: 15.17%, 8: 2.96%	*Adjusted Income:* R 69.53 [154.03]	*Food expenditure as a percentage income:* 90.05% [145.19]	*Received a loan:* 18.55% **from** 3: 43.50%, 5: 26.36%, 1: 13%, 2: 11.05%, 10: 2.99%

	Cape Town					
	Other Characteristics					
	Food Insecure (access failure)			**Food Secure**		
Above	*Children receive food at school:* 70.16%	*Dwelling types:* 8: 44.66%, 1: 29.21%, 4: 9.06% 3: 9.04%,	*Feel have say in community:* 65.25%	*Children receive food at school:* 25.85%	*Dwelling type:* 1: 57.37%, 3: 13.91%, 4: 13.42%, 8: 7.48%	*Feel have say in community:* 48.7%
	Grow produce: 1.92%	*Top three Main source of cooking energy:* 1: 52.47%; 4: 43.55%, 3: 3.8%	*Perception of life compared to last year:* 1.Same 44.47% 2.Worse 36.26% 3.Improved 19.27%	*Grow produce:* 2.21%	*Main source of cooking energy:* 1: 88.06%, 4: 7.44%, 3: 3%	*Perception of life compared to last year:* 1.Same 49.03% 2.Improved 31.22% 3.Worse 19.42%
MDG Poverty	*Reason:* food (36.36%) leisure (23.46%)	*Affected by HIV:* 0.83%		*Reason:* 4: 42.87%, 3: 14.90%, 2:11.31%	*Affected by HIV:* 0.12%	
Line	*Children receive food at school:* 58.4 %	*Dwelling type:* 8: 43.34%, 1: 30.65%, 3: 12.8%, 4: 10.73%	*Feel have say in community:* 58.15%	*Children receive food at school:* 39.2 %	*Dwelling type:* 1: 57.32%, 3: 15.86%, 4: 11.5% ,8: 6.52%	*Feel have say in community:* 46.37%
	Grow produce: 3.42%	*Main source of cooking energy:* 1: 46.98%, 4: 47.43%, 3: 4.54%	*Perception of life compared to last year:* 1.Worse 59.47% 2.Same 33.23% 3.Improved 6.26%	*Grow produce:* 3.42%	*Main source of cooking energy:* 1: 85.75%, 4: 9.62%, 3: 3.57%	*Perception of life compared to last year:* 1.Same 52.18% 2.Worse 30.91% 3.Improved 16.91%
Below	*Reason:* 4: 21.98%, 3: 17.33%, 1: 7.82%	*Affected by HIV:* 1.31%		*Reason:* 4: 59.24%, 2: 8.95%, 1: 5.14%, 3: 3.29%	*Affected by HIV:* 0%	

	Johannesburg					
	Mean Household Head Characteristics					
	Food Insecure (access failure)			**Food Secure**		
Above	*Female:* 24.17%	*Household size:* 3.29 [2.16]	*Has no income:* 0%	*Female:* 20.49%	*Household size:* 2.79 [1.78]	*Has no income:* 0.17%
	Race: 1: 81.15% 2: 4.35% 3: 3.44% 4: 11.06%	*No. of adults:* 2.43 [1.43]		*Race:* 1: 67.56% 2: 3.74% 3: 2.54% 4: 26.06% 5: 0.10%	*No. of adults:* 2.13 [1.17]	
MDG Poverty	*Age:* 39.30 [12.3]	*No. of children:* 0.86 [1.13]	*obs: 112*	*Age:* 40.19 [11.80]	*No. of children:* 0.67 [1]	*obs: 1292*
Line	*Female:* 43.78%	*Household size:* 4.04 [3.05]	*Has no income:* 62.16%	*Female:* 36.12%	*Household size:* 3.75 [2.61]	*Has no income:* 70.1 %
	Race: 1: 96.57% 2: 2.44% 3: 0.67% 4: 0.32%	*No. of adults:* 2.64 [1.85]		*Race:* 1: 71.99% 2: 4.80% 3: 1.53% 4: 21.68%	*No. of adults:* 2.62 [1.6]	
Below	*Age:* 44.54 [15.93]	*No. of children:* 1.4 [1.77]	*obs: 189*	*Age:* 48.3 [17.37]	*No. of children:* 1.45 [1.49]	*obs: 628*

	Johannesburg					
	Household Income and Expenditure					
	Food Insecure (access failure)			**Food Secure**		
Above	*Total Income:* R 6755.99 [23716.92]	*Food expenditure:* R 532.57 [693.56]	*Food expenditure as a percentage of Total exp.:* 50.29% [62.16]	*Total Income:* R 12 218.86 [42765.39]	*Food expenditure:* R 792.96 [1910.54]	*Food expenditure as a percentage of Total exp.:* 49.83% [50.28]
	Per Capita Income: R 4101.91 [23440.47]	*Food expenditure per Capita:* R 201.69 [223.95]	*Received a grant:* 6.46% *Average no.:* 0.07 [0.28]	*Per Capita Income:* R 4874.44 [17904.25]	*Food expenditure per Capita:* R 323.48 [580.41]	*Received a grant:* 6.82% *Average no.:* 0.08 [0.33]
MDG Poverty	*Adjusted Income:* R 4791.78 [23455.69]	*Food expenditure as a percentage income:* 18.91% [16.34]	*Received a loan:* 41.57% **from** 2: 23.04%, 1: 16.74%, 5: 15.23%, 4: 14.98%, 10: 8.21%	*Adjusted Income:* R 6937.2 [24686.31]	*Food expenditure as a percentage income:* 20.27% [24.63]	*Received a loan:* 20.61% **from** 5: 34.75%, 1: 16.5%, 10: 8.84%, 4: 8.58%, 2: 7.92%
Line	*Total Income:* R 293.34 [514.07]	*Food expenditure:* R 270.52 [213.43]	*Food expenditure as a percentage of Total exp.:* 73.43% [34.53]	*Total Income:* R 257.78 [529.97]	*Food expenditure:* R 590.44 [2001.82]	*Food expenditure as a percentage of Total exp.:* 67.64% [44.27]
	Per Capita Income: R 53.87 [81.94]	*Food expenditure per Capita:* R 102.95 [88.44]	*Received a grant:* 42.04% *Average no.:* 0.53 [1.21]	*Per Capita Income:* R 49.38 [87.66]	*Food expenditure per Capita:* R 227.44 [607.5]	*Received a grant:* 42.19% *Average no.:* 0.57 [0.80]
Below	*Adjusted Income:* R 100.76 [155.91]	*Food expenditure as a percentage income:* 69.93% [89.45]	*Received a loan:* 35.61% **from** 1: 32.6%, 2: 29.26%, 3: 9.62%, 5: 8.57%, 4: 7.5%	*Adjusted Income:* R 90.67 [166.11]	*Food expenditure as a percentage income:* 68.2% [76.78]	*Received a loan:* 17.36% **from** 1: 34, 2: 21.18,% 5: 15.62%, 3: 10.60%, 4: 5.84%

	Johannesburg					
	Other Characteristics					
	Food Insecure (access failure)			**Food Secure**		
Above	*Children receive food at school:* 19.61%	*Dwelling type:* 1: 44.88%, 8: 13.8%, 11: 9.82%, 4: 8.07%	*Feel have say in community:* 50.21%	*Children receive food at school:* 9.8%	*Dwelling type:* 1: 50.5% 3: 9.63%, 11: 9.26%, 4: 8.53%	*Feel have say in community:* 41.06%
	Grow produce: 1.85%	*Main source of cooking energy:* 1: 67.11%, 3:1..36%, 4: 30.19%, 6:1.33%	*Perception of life compared to last year:* 1.Worse 41.61% 2.Same 33.61% 3.Improved 24.78%	*Grow produce:* 0.73%	*Main source of cooking energy:* 1: 89.21%, 4: 9.6%, 3: 0.48%, 6: 0.34%, 5: 0.26%, 2: 0.12%	*Perception of life compared to last year:* 1.Same 50.27% 2.Improved 30.54% 3.Worse 18.89%
MDG Poverty	*Reason:* 1: 72.08% 4: 27.92%	*Affected by HIV:* 0%		*Reason:* 4: 87.75 1: 12.25	*Affected by HIV:* 0%	
Line	*Children receive food at school:* 33.28%	*Dwelling type:* 1: 52.13%, 8: 20.05%, 11: 12.61%, 07: 5.96%	*Feel have say in community:* 49.92%	*Children receive food at school:* 12.99%	*Dwelling type:* 1: 60.74%, 8: 9.67%, 6: 7.10%, 3: 7.09%,	*Feel have say in community:* 33.39%
	Grow produce: 2.58%	*Main source of cooking energy:* 1: 52.1%, 4: 39.58%, 6: 4.52%	*Perception of life compared to last year:* 1.Worse 64.85% 2.Same 26.69% 3.Improved 8.46%	*Grow produce:* 3.54%	*Main source of cooking energy:* 1: 82.67%, 4: 14.11%, 6: 1.73	*Perception of life compared to last year:* 1.Same 47.93% 2.Worse 36.10% 3.Improved 15.97%
Below	*Reason:* 4: 84.5%, 1: 15.5%	*Affected by HIV:* 1.58%		*Reason:* 4: 64.69%, 1:26.10%,3:5.99%	*Affected by HIV:* 0.99%	

	Durban					
	Mean Household Head Characteristics					
	Food Insecure (access failure)			**Food Secure**		
Above	*Female:* 20.53%	*Household size:* 2.87 [2.1]	*Has no income:* 0%	*Female:* 22.43%	*Household size:* 3.14 [2.04]	*Has no income:* 0.08%
	Race: 1: 87.63% 2:1.93% 3: 5.99% 4: 4.45%	*No. of adults:* 2.14 [1.33]		*Race:* 1: 58.89% 2: 3.29% 3: 25.54% 4: 12.28%	*No. of adults:* 2.29 [1.35]	
MDG Poverty	*Age:* 37.54 [10.98]	*No. of children:* 0.76 [1.19]	*obs:* 127	*Age:* 39.96 [12]	*No. of children:* 0.86 [1.14]	*obs:* 683
Line	*Female:* 45.86%	*Household size:* 4.83 [3.47]	*Has no income:* 65.14%	*Female:* 39.33%	*Household size:* 3.94 [2.74]	*Has no income:* 67.23%
	Race: 1: 92% 2: 1.06% 3: 4.99% 4: 1.96%	*No. of adults:* 2.8 [1.89]		*Race:* 1: 63.43% 2: 1.47% 3: 14.77% 4: 20.18% 5: 0.15%	*No. of adults:* 2.59 [1.61]	
Below	*Age:* 45.53 [14.76]	*No. of children:* 2.05 [2.08]	*obs:* 331	*Age:* 49.15 [16.96]	*No. of children:* 1.38 [1.66]	*obs:* 604

	Durban					
	Household Income and Expenditure					
	Food Insecure (access failure)			**Food Secure**		
Above	*Total Income:* R 5556.35 [24444.75]	*Food expenditure:* R 571.19 [549.54]	*Food expenditure as a percentage of Total exp.:* 55.4% [37.53]	*Total Income:* R 5736.95 [17072.41]	*Food expenditure:* R 726.29 [736.25]	*Food expenditure as a percentage of Total exp.:* 45.24% [31.57]
	Per Capita Income: R 1786.83 [6090.75]	*Food expenditure per Capita:* R 267.38 [293.32]	*Received a grant:* 6.49% *Average no.:* 0.065 [0.25]	*Per Capita Income:* R 1929.84 [4286.26]	*Food expenditure per Capita:* R 267.12 [226.30]	*Received a grant:* 11.79% *Average no.:* 0.13 [0.37]
MDG Poverty	*Adjusted Income:* R 2834.15 [11596.8]	*Food expenditure as a percentage income:* 31.93% [27.8]	*Received a loan:* 46.96% **from** 2: 36.97%, 10: 18.17%, 3: 15.02%, 1: 8.15%, 6: 7.81%	*Adjusted Income:* R 2871.69 [7133.15]	*Food expenditure as a percentage income:* 25.89% [23.18]	*Received a loan:* 22.72% **from** 5: 44.07%, 3: 18.06%, 1: 10.56%, 2: 9.62%, 10: 5.85%
Line	*Total Income:* R 282.79 [585.83]	*Food expenditure:* R 357.14 [415.56]	*Food expenditure as a percentage of Total exp.:* 74.48% [59.83]	*Total Income:* R 257.18 [521.57]	*Food expenditure:* R 540.42 [563.11]	*Food expenditure as a percentage of Total exp.:* 60.5% [37.61]
	Per Capita Income: *R* 45.78 [76.63]	*Food expenditure per Capita:* R 112.2 [109.92]	*Received a grant:* 52.12% *Average no.:* 0.62 [0.72]	*Per Capita Income:* R 49.96 [83.3]	*Food expenditure per Capita:* R 200.09 [262.85]	*Received a grant:* 42.57% *Average no.:* 0.53 [0.7]
Below	*Adjusted Income:* R 88.5 [149.15]	*Food expenditure as a percentage income:* 89.01% [132.48]	*Received a loan:* 41.05% **from** 2: 49.48%, 3: 25.83%, 1:11.97%, 10: 4.52%, 4: 3.67%	*Adjusted Income:* R 91.02 [156.24]	*Food expenditure as a percentage income:* 92.39% [131.48]	*Received a loan:* 18.73% **from** 2: 24.05%, 1: 18.56%, 3: 16.85%, 8: 12.76%, 5: 12.41%

	Durban					
	Other Characteristics					
	Food Insecure (access failure)			**Food Secure**		
Above	*Children receive food at school:* 17.73%	*Dwelling type:* 1: 32.88%, 3: 19.18%, 9: 17.11%, 8: 12.85%	*Feel have say in community:* 30.35%	*Children receive food at school:* 26.05%	*Dwelling type:* 1: 42.78%, 3: 13.8%, 8: 10.06%, 4: 9.53%	*Feel have say in community:* 41.79%
	Grow produce: 10%	*Main source of cooking energy:* 1: 64.57%, 4: 31.32%, 5: 1.9%, 3: 1.16%, 11: 1.05%	*Perception of life compared to last year:* 1.Worse 53.29% 2.Same 34.84% 3.Improved 11.86%	*Grow produce:* 4.59%	*Main source of cooking energy:* 1: 81.11%, 4: 15.19%, 3: 2%, 5 :0.93%, 11: 0.39% ,2: 0.26%,	*Perception of life compared to last year:* 1.Same 50% 2.Improved 28.12% 3.Worse 21.74%
MDG Poverty	*Reason:* 1: 46.47%, 4: 37.88% , 2: 6.74%	*Affected by HIV:* 4.73%		*Reason:* 1: 50.89, 4: 24.38, 3: 13.86, 2: 8.77	*Affected by HIV:* 0%	
Line	*Children receive food at school:* 40.84%	*Dwelling type:* 1: 35.68%, 8: 21.23%, 2:13.69%, 9: 7.09%	*Feel have say in community:* 40.78%	*Children receive food at school:* 34.24%	*Dwelling type:* 1: 44.86%, 8: 13.54%, 3: 9.87%, 2: 9%	*Feel have say in community:* 36.82%
	Grow produce: 23.87%	*Main source of cooking energy:* 1: 46.53%, 4: 35.18%, 5: 15.46%	*Perception of life compared to last year:* 1.Worse 65.97% 2.Same 29.38% 3.Improved 4.65%	*Grow produce:* 17.33%	*Main source of cooking energy:* 1: 64.95%, 4: 22.27%, 5: 10.08%	*Perception of life compared to last year:* 1.Same 50.97% 2.Worse 35.60% 3.Improved 13.43%
Below	*Reason:* 1: 73.77%, 4: 20.08%, 2: 3.22%,	*Affected by HIV:* 2.64%		*Reason:* 1: 70.29%, 4: 18.46%, 3: 6%,	*Affected by HIV:* 0.53%	

The following five broad themes outlined above are briefly presented and discussed as a lens to view factors that influence urban food security and illustrate the potential for future research at the city level:

The Influence of Female Headed Households on Urban Food Security

The food security literature has for a long time identified female-headed households as more vulnerable to food insecurity (e.g. Musrove, 1988; Buvinić and Gupta 1997).

From the Cross-sections, we see how the developed methodology allows us to gain some initial insights into how household head's may influence and be influenced by urban food security. It is observed that female-headed households for Cape Town, Johannesburg and Durban greatly influence the urban food security status of a household. The *Household Cross-sections* show the highest percentage of female headed households for all cities are those who are food insecure and below the poverty line (Cape Town (CT): 45.12% female; Johannesburg (JBG): 43.78% female; Durban (DRB): 45.86% female). This is followed by those who are below the poverty line and are food secure (CT: 35.69% female; JBG: 36.12% female; DRB; 39.33% female), then those who are both above the poverty line and food secure have much lower percentages (e.g. CT: 22.01-25.03% female). The highest percentages of female headed households are those who in the quadrant that are both food insecure and in poverty. Durban has the highest percentage of female-headed households who are both poor and food insecure. This analysis demonstrates the utility and power of the methodology as well as the fact that where we find the greatest number of female headed households, we find that they are the households who are food insecure and below the poverty line.

The Influence of Grants on Urban Food Security

The methodology and dataset also allow us to explore the impact of grants on urban food security. Van der Berg *et al* (2005) and Altman *et al* (2009) argue that grants in South Africa are essential to understanding reduction in hunger and poverty.

Generally, the *Household Cross-sections* show that grants are effectively targeting those in poverty and those who are food insecure. The data would seem to show that relatively the same percentages of households who are receiving grants are also below the poverty line. Those who are food insecure and below the poverty line receive slightly more grants (CT: 44.21%; JBG 42.04%; DRB 52.12%) than those below the poverty line and who are food secure (CT: 44:01%; JBG 42.19%; DRB 42.57%). The Cross-sections are encouraging as they indicate that large percentages of the poor and food insecure are receiving grants. Thus, the grants seem to be effectively targeting those in need.

The average number of grants gives us an indication of whether grants are being targeted correctly. Those below the poverty line are clearly receiving the most grants per household. This demonstrates that the development of the methodology and the *access failure* indicator in this research could allow for some key insights to the impact of grants on urban food security.

The Influence of Loans on Urban Food Security

Another area that the methodology allows us to explore is who and from whom households receive loans. Loans were discussed in the literature review (e.g. Maxwell *et al*, 2000) and it has been shown they can have an impact on food security (as seen in the *Household Cross-sections*). We see from the data at these lower levels, that the highest percentage of households accessing loans, are the food insecure.

It is shown that 10%+ of those households, who are below the poverty line and food insecure, borrow more money than those below the poverty line and food secure. From the results of investigating the dataset we ascertain the largest percentage of those who are food insecure and below poverty line, tend to borrow money from 'family and neighbours' and then from local dealers. Those below the poverty line and food secure, borrow predominantly from banks or dealers, those who are food secure and above poverty line also borrow from banks or dealers, whereas those above the poverty line but food insecure borrow mostly from their neighbours. The finding that the majority of those who are food insecure and below poverty line tend to borrow money from family and neighbours might be an indicator that social

networks and capital can be important to the poor and hungry household's livelihoods. The study of loans and poverty is an in-depth field that is firstly much too large to deal with here and secondly outside of the scope of this thesis. However, again let me state, that these factors that are surfacing through the methods developed in this thesis, demonstrate the inherent potential of its methodological power for using available households surveys to better understand urban food security.

The Influence of Children Receiving Food at School on Urban Food Security

A significant amount of literature has focused on the nutritional importance of children receiving school lunches. This is especially true in the United States where the impact of school lunches on health and behaviour has been studied (e.g. Dunifon & Kowaleski-Jones, 2003). The data available through this thesis along with other household characteristics has the potential for some interesting analysis. From the *Household Cross-sections* we see that: Cape Town has successfully targeted the food insecure with 70.16% of those who are food insecure and above poverty line receiving food at school, while 58.4% of children living below the poverty line and food insecure receive a school lunch in Cape Town. In Johannesburg, only 19.61% of those above and 33% below the poverty line and food insecure are correctly targeted with a school lunch. While for Durban's poor and food insecure households only 40.84% of their children receive lunch at school. This indicates that Cape Town seems to most effectively target the food insecure with school lunch programmes. These findings again demonstrate the usefulness of the developed methodology into further exploring urban food security.

The Influence of HIV/AIDS on Urban Food Security

The final exploration, using the methodology and indicators developed in this thesis, is the influence of HIV/AIDS on urban food security. There is a growing amount of literature linking food security and HIV/AIDS (e.g. Gillespie and Kadiyala, 2005). From the 1999 OHS questionnaire question 6.28 (in Figure 15), I created one comprehensive indicator which was used if individuals responded 'yes' to any question relating to being affected by HIV/AIDS.

Figure 15 Questions on HIV/AIDS in the 1999 OHS

6.28 Is there any member of this household who is sick with AIDS?

☐ 1	YES
☐ 2	NO
☐ 3	DON'T KNOW

6.29 Is there any member of this household who you know is HIV positive but is not sick?

☐ 1	YES
☐ 2	NO
☐ 3	DON'T KNOW

6.30 Is there any member of this household who has died of AIDS?

☐ 1	YES
☐ 2	NO
☐ 3	DON'T KNOW

Source: 1999 OHS Questionnaire 6.28 (Stats SA, 1999)

This indicator was then used to identify whether a household had been affected by HIV/AIDS in some way. The indicator was calculated and then compared with those who went food insecure and/or above or below the poverty line. The highest responses for those affected by HIV and AIDS (using the new comprehensive indicator) were those in Durban, where 4.73% were food insecure and above poverty line, followed by Durban 2.64%, Johannesburg at 1.58% and then Cape Town at 1.31% who were all food insecure and below the poverty line. This reveals (1), that the datasets of household surveys potentially contain some data that helps in exploring HIV/AIDS and urban food security, (2) that the numbers who did respond to these questions was low, (3) that the top five highest percentages are households who are food insecure are also affected by HIV/AIDS.

These five broad themes of (1) Female headed households, (2) Grants, (3) Received loans and who from, (4) Whether children receive food at school and (5) HIV/AIDS are briefly presented and discussed as a lens for seeing factors that influence urban food security and illustrate the potential for future research at the city level. The study of each of these aspects could be a legitimate concern of a study in itself. Additionally, other factors (household size, age, grows produce etc.) can also be explored when in-depth household survey datasets are available. This demonstrates

the potential to not only determine overall households and individuals urban food security situation but also to investigate other factors influencing their food insecurity. The methodology and indicators developed in this thesis could be reconstructed and applied to explore future household's surveys.

CHAPTER THIRTEEN: CONCLUSION

The aim of this research was to better understand urban food security dynamics in Southern Africa. This was done through an extensive literature review and through identifying and analysing the available quantitative data. Three key questions were answered: Firstly, what is the best way to understand food security in an urban context? Secondly, what data and methods are available and appropriate for assessing urban food security? Thirdly, using the identified data and methods, what can be said about urban food security and its varying manifestations between different cities in Southern Africa?

The five research objectives which follow from these questions was to (1) identify concepts and instances under which concepts inform food security measurement in the urban context. Secondly (2) to identify indicators for concepts which inform food security measurement. Thirdly (3) to identify reliable data from which indicators can be derived for specific cities. Fourthly (4) to establish a methodology based on the identified concepts and indicators to investigate urban food security. The final objective (5) was to present and discuss statistical findings, explaining the situation as well as comparing variations between cities in Southern Africa.

In order to answer the first research question and first two objectives I undertook an extensive literature review on food security both historically and conceptually. I sought to identify under what conditions one could recognise food insecurity in the urban context. In examining how food security was defined, I found that far from it being narrow issue of availability, it rather conceptually had three distinct parts *access*, *availability* and *nutrition* divisions. It would seem that many institutions ignore these issues of access, availability and nutrition.

Overall, I found that the best way to define urban food security is that it is an issue of access. Many cities have abundant food but it is the accessing of that food which is the challenge. I thus found (and it was supported by the literature) that urban food security exists when one has access to food. There is also a strong consensus in the

literature that food access is directly related to financial mechanisms. My research indicates that food security is about food access, which in the urban context is directly related to income.

The next step was to identify indicators for urban food access. The literature indicated that the critical issue when considering food access is the "percentage of income spent on food". I formed the term *access vulnerability* as a good indicator of food access supported by work such as Sharma (1992), CFS (2000), FAO Statistics Division (2006d) and others. The second indicator I formed was *access failure.* This was identified when searching through household survey questionnaires, which captured urban access vulnerability due to well-framed questions in the household survey questionnaire, asking whether households actually failed to access food due to financial constraints.

I believe these two indicators (*access vulnerability* and *access failure*) are valuable contributions to the field of urban food security. *Access Vulnerability* I believe has potentially an important role as an indicator of urban food security with the development of a Southern Africa Food Security Databank argued for in Chapter 10.

In answering the second question of what reliable data was available for the identified indicators, I did an extensive search of databases (e.g. World Bank, DataFirst at UCT) of household surveys in Southern Africa which contained both food security data (data income, food expenditure, food failure) and urban identifiers as outlined in Chapter 5. The thesis was able to navigate complex methodologies of meta-analysis to identify 97 relevant household surveys from Southern Africa. This was then reduced down to 36 surveys, which were useful for studying cities containing urban food security data (access).

With South African survey data identified, I contacted each of the relevant national agencies and received mixed replies, some were excellent in their responses and others never responded despite numerous efforts from my side. Table 8 outlines the agencies that were contacted and their response or lack thereof. The lack of responsive communication is a weakness and a significant difficulty in doing research with some Southern African governments and national agencies. Accessing data was

thus a significant problem, a factor that needs to be born in mind for future similar research. The key household survey for the purpose of this thesis became the South African October Household Survey of 1999, which I scaled to various geographical city scales. The GIS scaling of data was to my mind a piece of innovation and the key to unlocking the datasets. I believe I have been able to develop a sophisticated methodology could be a useful contribution to the field of understanding urban food security.

The various constructed city scales allowed for the exploration of the impact of different geographical scales on the understanding of urban food security. In doing so, I found that how we define a city has considerable impact on our understanding of the food security situation. For example, when considering household food insecurity in terms of *access failure*, the City of Durban was defined at the smaller geographical scale - *Core City* scale resulting in it looking as if 23.66% of Durban was food insecure, but at the larger *Agglomeration City* scale, it looked like 25.41% of Durban were food insecure. Cape Town at the *Core City* scale reflected that 16.97% were food insecure and at the *Agglomeration City* scale, 15.65% were food insecure. Johannesburg at the *Core City* scale reflected that 23.66% were food insecure and at the *Agglomeration City* scale, 25.41% were food insecure. This demonstrates the fact that how we define a city geographically will affect our understanding of the city's food insecurity.

This thesis also found that significant amounts of urban residents in South African cities are food insecure. Up to a quarter of households in Johannesburg and Durban face food insecurity in terms of *access failure* and 16% of Cape Town households. Not only are these calculations illuminating in our understanding of urban food security in South African cities but furthermore they are important in creating a baseline in order to monitor and achieve food security goals such as the WFS goal and MDG 1.

I believe this thesis moreover establishes a sound methodology, which was based on the identified concepts, and indicators, which was then used to investigate urban food security. The findings relating to income and food expenditure are critical in

establishing whether an individual and/or household are food insecure. The available data validated the notions of *access vulnerability* and *access failure*.

When looking at the identified data, it becomes clear that South Africa has about a quarter of its households who are food insecure and more who are highly vulnerable to issues of pricing and other shock financial increases. This statistic is significant and notable. It is tragic that up to twenty-five percent of households in the cities of Cape Town, Durban and Johannesburg are constantly in doubt as to where their next meal will come from. It calls for significant social intervention strategies to be developed. We have a huge problem of food security in this country – little wonder that there is so much pleading for food and help. Some of the begging, which is often written off by the wealthy as conman tactics, are in fact, very genuine cries of desperate need.

The thesis found that in terms of food *access vulnerability* that the majority of those who are vulnerable (above 60% spent of income or expenditure on food expenditure) are actually extremely vulnerable, spending more than 80% of income or expenditure on food expenditure, thus many live on the edge of extreme poverty and hunger (with the exception of Cape Town when using income). The literature indicates at this high level of food expenditure households are extremely sensitive to any financial shocks and might already be cutting back or cutting out meals and eating less nutritiously valuable food. It was found that in terms of *access vulnerability,* Cape Town and Johannesburg have very similar probabilities of having the same number of households who are food *access vulnerable* when taking into consideration the similarities of the confidence intervals at all scales. Durban however has a higher percentage that is *access vulnerable* (when compared with Cape Town and Johannesburg for all scales, noting not even the confidence intervals overlap). When using total expenditure to calculate what percentage of household are *access vulnerability* at the *Agglomeration City* scale: Durban is at 33.19%, Cape Town at 25.99% and Johannesburg at 36.61% of total the total population. These levels are an urgent call for us to prevent those who are already vulnerable (mostly highly vulnerable) from slipping into total food insecurity.

I believe that in essence the research was successful and achieved the desired results of better understanding food security dynamics in Southern Africa. While research is

essentially academic, I believe reasonably conclusive data emerged through the scaling of the research data, which showed that food security in the urban context in South Africa is inextricably linked to financial instruments and the ability to generate some means of income. It also demonstrated that some in South African cities are extremely vulnerable in terms of food security. South African cities are not unique and so these findings probably have some global application. It is a pity that more applicable household surveys and their results are not available for Southern African cities which could then have further validated (or otherwise) my findings. It is my hope to see the potential of household survey data being used a lot more.

A key finding is that in general, Southern African food *access vulnerability* trends are increasing in urban centres. This was true for all study cities between 1993/98 – 2002/04, each showing an aggregate increase in total expenditure spent on food, from Gaborone at 3.5% to Lusaka 10.4%. Most study cities over this period saw double digit percentage growth in the amount of income dedicated to food, thus indicating an increasing vulnerability to food insecurity within these cities. It was found that some cities household *access vulnerability* was as high as 65.3% in Lusaka and 55.84% in Harare and Bulawayo.

The scaling up of household surveys (with appropriate questions) could add significant value to urban food security research. There is also potential from the existing available data for further research to be done on other factors, which influence poor household's food security situation. This was done in Chapter 12, demonstrating the strength and possibilities of using the developed methodology and indicators in future research. Five factors were used to demonstrate the usefulness of the developed methodology in exploring how other factors influence urban food security such as (1) Female headed households, (2) Grants, (3) Received loans and who from, (4) Whether children receive food at school and (5) HIV and AIDS. The research found that the methodologies and indicators developed have potential application for future studies of factors that influence household's urban food security. The results showed that the highest percentage of female headed households were also the households were food insecure and below the poverty line. Grants were shown to be effectively targeting the food insecure, but for some, the grant was not enough to pull them out of food insecurity. Loans for those who are food insecure

mostly came through social networks such as family and neighbours. In terms of children receiving food at school, it revealed that Cape Town most effectively targeted the food insecure children by feeding children at school. Finally, the households most affected by HIV/AIDS indicators were those who were also food insecure. These findings have very important implications when developing policies to target the food insecure. Overall however the findings, demonstrate the depth of urban food security insights available to us when using household surveys.

The conceptual formalization of *access vulnerability* and *access failure* are, I believe, useful indicators on which further research could be based. I would recommend that further research is done on these indicators to validate or otherwise my formulizations and findings. The joint publication of some articles drawn from this research may be of use and it is something that I am willing to contribute towards if deemed valuable. Submitting this thesis to organizations like FAO may also add awareness to decision makers and influencers of policy makers and civil society on the ground.

One looks forward to a day when poverty is history and every person has the fair chance of eating a balanced meal, which they are able to attain with a relative degree of ease. Until then food security will remain an issue and extends to one of the most basic rights of all, which is simply to have adequate food to eat. Every level of society and government needs to strive for the day when all will have access to the basic food they need for each day. May God help us achieve this.

CHAPTER FOURTEEN: REFERENCES

The references Chapter has been divided into two sections:
1. Primary Data Collections
2. Other Published Works

1. Primary Data Collections (by Country):

Botswana:

Botswana Central Statistics Office. 2006. *2002/03 Household Income and Expenditure Survey: Botswana* [Online]. Available: http://www.cso.gov.bw/images/stories/HouseHold/2002-03%20hies.pdf [Accessed: September 24, 2006].

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APPENDIX A: *Food Security Definitions, 1975 – 2005*

Largely extracted from Maxwell (1996) with the addition of definitions from FAO (1996 and 2005) and USDA (1990)

1. "Availability at all times of adequate world supplies of basic food-stuffs..., to sustain a steady expansion of food consumption . . . and to offset fluctuations in production and prices" (UN, 1975).

2. "A condition in which the probability of a country's citizens falling below a minimal level of food consumption is low" (Reutlinger and Knapp, 1980).

3. "The ability to meet target levels of consumption on a yearly basis" (Siamwalla and Valdes, 1980).

4. "Everyone has enough to eat at any time--enough for life, health and growth of the young, and for productive effort" (Kracht, 1981).

5. "The certain ability to finance needed imports to meet immediate targets for consumption levels" (Valdes and Konandreas, 1981).

6. "Freedom from food deprivation for all of the world's people all of the time" (Reutlinger, 1982).

7. "Ensuring that all people at all times have both physical and economic access to the basic food they need" (FAO, 1983).

8. "The stabilization of access, or of proportionate shortfalls in access, to calories by a population" (Heald and Lipton, 1984).

9. "A basket of food, nutritionally adequate, culturally acceptable, procured in keeping with human dignity and enduring over time" (Oshaug, 1985, in Eide *et al.*, 1985).

10. "Access by all people at all times to enough food for an active and healthy life" (Reutlinger, 1985).

11. "Access by all people at all times to enough food for an active, healthy life" (World Bank, 1986).

12. "Always having enough to eat" (Zipperer, 1987).

13. "An assured supply and distribution of food for all social groups and individuals adequate in quality and quantity to meet their nutritional needs" (Barraclough and Utting, 1987).

14. "Both physical and economic access to food for all citizens over both the short and the long run" (Falcon *et al.,* 1987).

15. "A country and people are food secure when their food system operates efficiently in such a way as to remove the fear that there will not be enough to eat" (Maxwell, 1988).

16. "Adequate food available to all people on a regular basis" (UN World Food Council, 1988).

17. "Adequate access to enough food to supply energy needed for all family members to live healthy, active and productive lives" (Sahn, 1989).

18. "Consumption of less than 80% of WHO average required daily caloric intake" (Reardon and Matlon, 1989).

19. "The ability . . . to satisfy adequately food consumption needs for a normal and healthy life at all times" (Sarris, 1989).

20. "Access to adequate food by and for households over time" (Eide, 1990).

21. "Food insecurity exists when members of a household have an inadequate diet for part or all of the year or face the possibility of an inadequate diet in the future" (Phillips and Taylor, 1990).

22. "The ability . . , to assure, on a long-term basis, that the food system provides the total population access to a timely, reliable and nutritionally adequate supply of food" (Staatz, 1990).

23. "The absence of hunger and malnutrition" (Kennes, 1990).

24. "The assurance of food to meet needs throughout every season of the year" (UNICEF, 1990).

23. "The inability . . . to purchase sufficient quantities of food from existing suppliers" (Mellor, 1990).

26. "The self-perceived ability of household members to provision themselves with adequate food through whatever means" (Gillespie and Mason, 1991).

27. "(Low) risk of on-going lack of access by people to the food they need to lead healthy lives" (von Braun, 1991).

28. "Security means an access by all people at all times to enough food for an active, healthy life. Food security includes at a minimum (1) the ready availability of

nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways (that is, without resorting to emergency food supplies, scavenging, stealing, or other coping strategies)"(USDA, 1990)

29. "A situation in which all individuals in a population possess the resources to assure access to enough food for an active and healthy life" (Weber and Jayne, 1991).

30. "Access to food, adequate in quantity and quality, to fulfill all nutritional requirements for all household members throughout the year" (Jonsson and Toole, 1991).

31. "Access to the food needed for a healthy life for all its members and.., not at undue risk of losing such access" (ACC/SCN, 1991).

32. "Enough food available to ensure a minimum necessary intake by all members" (Alamgir and Arora, 1991).

33. "The viability of the household as a productive and reproductive unit (not) threatened by food shortage" (Frankenberger and Goldstein, 1991).

34. "Food security, at the individual, household, national, regional and global levels is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996)

35. "Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2005)

APPENDIX B: HOUSEHOLD SURVEY DATA SOURCES

Source	*Address\Location*
African Union Statistical Unit	http://www.africa-union.org/root/au/OtherPages/EA/st/statistical.htm
Data - WDI and GDF Online WBank	http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/
Data Home DHS	http://www.measuredhs.com/accesssurveys/start.cfm
Economic Commission for Africa	http://www.uneca.org/
FAO Statistical Yearbook 2004_good for references	http://www.fao.org/statistics/yearbook/
FAOSTAT	http://faostat.fao.org/default.aspx
Food Security Statistics	http://www.fao.org/faostat/foodsecurity/index_en.htm
HDR - Statistics - Get Data - Advanced Search	http://hdr.undp.org/statistics/data/rc_2005.cfm
HDR - Statistics - Get Data	http://hdr.undp.org/statistics/data/
HNP-MDGs	http://devdata.worldbank.org/hnpstats/mdg.asp
Household Survey Data WB Ginis	http://www.worldbank.org/research/inequality/data.htm
IHSN - Information System on Household Surveys	http://www.internationalsurveynetwork.org/surveys/
International Household Survey Network - Home	http://www.internationalsurveynetwork.org/home/
LSMS The World Bank's Living Standards Measurement Study Household Surveys	http://www.worldbank.org/lsms/
Nutrition WHO Africa_no real data	http://afro.who.int/nut/index.html
Poverty Analysis - Data and Tools WBank	http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/
Poverty World Bank	http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/
World Bank Health, Nutration and Population Statistic Database	http://devdata.worldbank.org/hnpstats/
World Bank Development Data and Stats	http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/
World Bank - Africa Statistics	http://www4.worldbank.org/afr/stats/default.cfm
World Bank - Africa Poverty Monitoring - Survey Navigator	http://www4.worldbank.org/afr/poverty/databank/survnav/default.cfm

World Bank - Africa Household Survey Databank	http://www4.worldbank.org/afr/poverty/databank/default.cfm
WHO WHO Global Database on Child Growth and Malnutrition	http://www.who.int/nutgrowthdb/en/
WHO Global Database on National Nutrition Policies and Programmes	http://www.who.int/nutrition/databases/policies/en/
WFP - why food aid – subsidy	http://www.wfp.org/food_aid/introduction/index.asp
WFP United Nations World Food Programme - the UN food aid agency	http://www.wfp.org/english/
WB PovcalNet	http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp
United Nations Statistics Division- OTHER SOURCES	http://unstats.un.org/unsd/workpartner_ccsa.htm
United Nations Statistics Division - Demographic and Social Statistics	http://unstats.un.org/unsd/demographic/products/dyb/dyb2.htm
United Nations Statistics Division - Common Database	http://unstats.un.org/unsd/cdb/cdb_help/cdb_quick_start.asp
United Nations Economic Commission for Africa (UNECA)	http://www.uneca.org/eca_programmes/srdc/sa/default.htm
UN Millennium Project Reports	http://www.unmillenniumproject.org/reports/index.htm
UN Millennium Project Goals and Targets	http://www.unmillenniumproject.org/goals/goals02.htm#goal1
UN Millennium Project About the Goals	http://www.unmillenniumproject.org/goals/index.htm
UN Habitat – Statistics	http://ww2.unhabitat.org/programmes/guo/statistics.asp
Statistics - UNHabitat – cities	http://ww2.unhabitat.org/programmes/guo/statistics.asp
Statistical Agencies and Societies	http://isi.cbs.nl/directory.htm
Southern Africa Labour and Development Research Unit	http://www.saldru.uct.ac.za/index.html
SARPN - Poverty indicators	http://www.sarpn.org.za/regpov.php
SARPN - Policy issues Relief and development	http://www.sarpn.org.za/foodsecurity/rc_relief-develop.php
Research - Research Datasets WB	http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/

APPENDIX C: SOURCES OF FOOD SECURITY DATA AND SHORT REVIEWS OF EACH

A number of identified sources of Food Security data and a short review of each:

1) The World Banks LSMS[50] is potentially a good source of information. The major advantages of the LSMS is that they collect a wide range of variable relating to consumption, income, savings, employment, health, education, fertility, nutrition, housing and migration data. The data on Southern Africa currently available on request is for South Africa 1993[51] and Malawi 2004-5. Some of which can be investigated at the city level or a proxy thereof, such as a larger district. One of the other advantages is with the banks oversight the surveys data can be seen as largely of a good quality. The weakness with the LSMS is while they ask questions about which city a household is located, however this data is not directly available and has to be derived, for example The South African 1993 LSMS. Data used at the city level or some other sub-national level will also need to be tested to check for factors such as large enough sample sizes, weighting and sampling design factors.

2) UN-Habitat's latest version of UrbanInfo is a great collection of urban indicators however it has very few "food security" indicators. The UrbanInfo DVD is structured in such a way that the data can not be directly accessed. It has to accessed through a series of selection menus. One UrbanInfo's key weaknesses is that the data is only given at a national urban scale, in other words only urban data can only be accessed at a national level and no specific cities are identifiable. In terms of "food security" indicators it only has a few versions of "Prevalence of underweight (moderate and severe)" indices. In terms of Southern Africa it has theses indices for Namibia, Swaziland and Zambia as a single variable for the period of time 1995-2000, and for Botswana, Mozambique and Malawi as a single variable for the time period 2000-2005. The only reference for the data is UN-Habitat DHS. Also the data points are not for each year rather only a figure for the 5 year duration, further the data is not at any

[50] Available at: www.worldbank.org/lsms/
[51] Also refered to as the SALDRU 1993 Household Survey () ....

city levels but rather only records urban averages. It is hard to know if these data points are based on actual surveys or estimates based on some previous data. The UrbanInfo data from UN-Habitat can only give one an overview of selected nations with respect to some urban indicators and fall sadly short of any use at city levels.

3) Mozambique new ESDEM data bank is based on the same setup as UrbanInfo and has many of the same shortfalls, such as, variables loosely referenced over extended time periods and only capturing the same variables UrbanInfo did. It is also largely in Portuguese, thus making it not very accessible. City specific data is also not given.

4) The Afro-barometer is a survey that has been undertaken in Southern Africa over the last few years and it offers data on how people 'see and feel' they are with regards to many issues including their food situation. The advantages of this survey are that the data potentially could be divided up into areas (such as a particular city) as this data is recorded on each physical paper survey. Whether the location data is recorded in the database available at DataFirst (at the University of Cape Town) has not been checked, but there is the potential to get this data captured if needed. Assuming the department has retained all the actual physical surveys. The Disadvantages for this study is that sample sizes are relatively small and other than individuals perceived food situation, it captures little of food security indicators.

5) The South African Census 1996 and 2001 data is a great source on household data such as: general demographics, language, age, citizenship, education, employment, occupation, dwelling type, number of rooms in dwelling, household size and access to utilities to mention a few key aspects. Additionally the data is available in many cases down to the District Council level. However, its one shortcoming for this thesis is that no income or expenditure data is recorded.

6) Cape Area Panel Study[52] well designed primarily as "...a longitudinal study of the lives of youths and young adults in metropolitan Cape Town, South Africa" (Cape Area Panel Study, 2007:1), also captures all household members and from the Third wave household food expenditure is recorded as well as other household expenditure

[52] www.caps.uct.ac.za

(Cape Area Panel Study, 2005; Cape Area Panel Study, 2006). A great advantage is this data is publicly available. Wave 1 of the survey, contains a question if the household predominately buys food on cash or credit, otherwise (Cape Area Panel Study, 2002) Wave 1 and Wave 2's only other food related questions are about if payment is received in kind, such as food (Cape Area Panel Study, 2002; Cape Area Panel Study, 2003; Cape Area Panel Study, 2004). The major shortcoming is only from wave 3 is food expenditure recorded. This data is also only for Cape Town however has a good sample size to interpret situation at this scale (Cape Area Panel Study, 2007)

7) Statistics South Africa Income and Expenditure Surveys (IES). The IESs contain Advantages in-depth data on type of consumption and breakdown of exp (ref reports)(StatsSA Website)- . Also data collected over time, soon 2005 and after that at three year intervals (StatsSa website). However the large time gap (i.e. currently five year intervals) in collection of data limits the data's usefulness. Another major weakness is that the data is originally sampled and weighted at the provincial level so city scale analysis. Also the location codes (such as district council and magisterial district codes have changed over time so some standardised new boundaries will need to be constructed (evidence from Data, emails etc..) as .

8) October Household Surveys (OHS) available from Statistics South Africa (Stats SA). Advantage: in-depth source of yearly household data in South Africa between 1995 and 2000; the 1996 to 1999 OHS has income and household food expenditure data; the OHS also have location data recorded or can be derived from variables. Questionnaires from 1995 to 1999 include questions about having enough money to feed children. Disadvantages: location data needs to be derived in 1998 and 1999 from the Unique number that identifies households (Stats SA, 1998b; Stats SA 1999c), it was found that a large amount of data formatting conversion have to be made in places as data was not stored in the best fashion (Stats SA, 1), there was a change in the methodology by which the household data was collected from 1995, compared to 1993 and 1994. 1993 and 1994 never included the former Transkei, Bophuthatswana, Venda and Ciskei areas according the OHS 1996 Statistical Release (1999a). The survey was also plagued by funding shortages in 1995 the OHS surveyed 30 000 households in 1996 founding shortages only allowed 16 000

households to be surveyed, in 1997 30 000 households were again surveyed, financial cut backs in 1998 allowed for 20 000 households and in funding from the Department for International Development (DFID) of the United Kingdom allowed 1999 OHS to sample 30 000 households again (Stats SA, 1999a; Stats SA, 2000b). The implication of these funding shortages is that for years where funding was cut back sample sizes at sub-national are bound to be smaller and thus need to be subject to careful analysis.

9) General Households Surveys run yearly from 2002 until the present, currently up to 2005 is available. They are largely similar to the OHS in structure with some added questions. They also provide income and food expenditure data from 2004 and 2005. Another major advantage is that from 2005 (and is set to continue) households and individuals are associated with Metropolitan areas and districts councils allowing easy identification of who lives where, this promises to be extremely useful in the future when investigating sub-national queries. While a very promising source of information for the future, past surveys such as the 2002 and 2003 GHS seem to have a variety of different questions and do not ask about household food expenditure (Stats SA, 2004a; Stats SA, 2004b; Stats SA, 2005a; Stats SA, 2005b; Stats SA, 2005c; Stats SA, 2006).

10) Statsistics South Africa Community Survey

The Statsistics South Africa Community Survey only contains two qestions related to food (Stats SA, 2007b):

> P-30e) In the last 7 days, did (the person) do any work on his/her own or the household's plot,farm,foodgarden,cattlepostorkraal, or help in growing farm produce or in looking after animals for the household even for only one hour?
>
> P-30g) In the last 7 days, did (the person) catch any fish, prawns, shell fish, wild animals either as food for sale or for household use, even for only one hour?

It does not contain any income or expenditure information and is essentially a intermediate survey between census. Stats SA (2007c:1) explains is as follows, "The Community Survey (CS) is a large-scale household survey conducted by Statistics

South Africa to bridge the gap between censuses. Historically, the census took place at a 5 year interval (1996 and 2001), but this has been extended to a 10 – year interval. What is the purpose of the survey? The purpose of Community Survey 2007 is to collect information on the trends and level on demographic and socio-economic data; the extent of poor households; access to facilities and services; levels of employment/unemployment; in order to assist government and private sector in planning, evaluation and monitoring of programmes and policies. How many households will be enumerated? Approximately 280 000 households nationwide will be enumerated."

11) South African Labour Force Surveys

The Labour Force Surveys well containing a fair amount of household data do not contain any relevant food security data and thus is not useful for food security related endevours.

APPENDIX D: AN ABBREVIATED TABLE OF SOUTH AFRICAN HOUSEHOLD SURVEYS AND VARIOUS QUESTIONS RELATING TO URBAN FOOD SECURITY. FULL TABLE IS ON ACCOMPANYING DATA CD

SA Survey information relevent to Urban Food Security

				IES		OHS				GHS
Divisions	Concept	Var Type	Survey Questic	1995	2000	1996	1997	1998	1999	2004
INCOMES	hh gross income & all sources of in	con	(95=Qsum13)(99=Q6.3	(b89f068)/12	(TotalInc)/12	*****	*****	*****	CAT Q6_	*****
	indiv. Total Pay (employee) cat	cat	(96=Q3.17;97,98=Q3.19;99=Q3.20)(04=Q2.10)	*****	*****	EEINCOM	WHOWF	Q3_19C	Q3_20CE	Q210Salc (worker)
	indiv. Total Pay (employee) con	con	(95=S22Q1;00=P24)(97,98=Q3.19; 99=Q3.20)(04=Q2.8-9)	(b83f001 + b83f002 + b83f003)/12 OR...OR (b87f001 + b87f002 +	(P2401Q0101 + P2401Q0102 + P2401Q0103)/12 (person.dta)	*****	WSAL AMT & dep(W SALAV E)	Q3_19 AEM & dep(Q3 _19BE M)	Q3_20A EM & dep(Q3_ 20BEM) (worker.d	Q28Salto & dep(Q29Salpe) (worker)
	indiv. Total Pay (self employed)	cat	(96=Q3.23;97=Q3.25; 98,99=Q3.26)	*****	*****	EBUSSIN	WSERV	Q3_26C	Q3_26CS	Q210Salc (worker)
	indiv. (self employed) exp to earn total pay	con	(96=Q3.24;97,99=Q3.26;98=Q3.27)	*****	*****	EEEGOO DS (worker.d	WSPG DS + WSPS	Q3_27 AGO + Q3_27	*****	*****
	indiv. Tot Pay (self employed) con	con	(95=S22Q2;00=)(97=Q3.25;98=Q3.26)	(b83f005)/12 OR...OR (b87f005)/12	(P2401Q02)/12 (person.dta)	*****	WSER VSA1 &	Q3_26 ASE & dep(Q3	Q3_26A EM & dep(Q3_	Q28Salto & dep(Q29Salpe) (worker)
	indiv. Total inc, from all sources	con	99=Q4.13			*****	*****	*****	Q4_13TO	*****
	MONTHLY OTHER HH INCOME			-	-	-	-	-	-	-
	support from non-member	con	(96=Q7.1)	*****	*****	SUPPFAM	*****	*****	*****	*****
	state pension	con	(96=Q7.2)	*****	*****	SPENSIO	*****	*****	*****	*****
	private pension	con	(96=Q7.3)	*****	*****	PPENSNM	*****	*****	*****	*****
	social grant	con	(96=Q7.4)	*****	*****	GRANTIS	*****	*****	*****	*****
	other grant	con	(96=Q7.5)	*****	*****	OGRANTS	*****	*****	*****	*****
	gratuities	con	(96=Q7.6)	*****	*****	LUMPSUM	*****	*****	*****	*****
	unemployment benefits	con	(96=Q7.7)	*****	*****	UNEMPLY	*****	*****	*****	*****
	other income	con	(96=Q7.8)	*****	*****	OTHERSC	*****	*****	*****	*****
	ANNUAL OTHER HH INCOME			-	-	-	-	-	-	-
	gov pension	con	(97,98=Q4.1)	*****	*****	*****	WPNSA	Q4_1BA	*****	*****
	retirement pension	con	(97,98=Q4.2)	*****	*****	*****	WPNAM	Q4_2BA	*****	*****
	disability grant	con	(95=S22Q22.1; 00=P24	b83f013	P2401Q07302 (	*****	WDISSA	Q4_3BA	*****	*****
	workers compensation	con	(97,98=Q4.4)	*****	*****	*****	WCPAM	Q4_4BA	*****	*****
	state maintenance	con	(97,98=Q4.5)	*****	*****	*****	WMAMT	Q4_5BA	*****	*****

private maintainance	con	(97,98=Q4.6)	*****	*****	*****	*WPRIVA*	*Q4_6BA*	*****	*****
care dependancy grant	con	(97,98=Q4.7)	*****	*****	*****	*WCARE*	*Q4_7BA*	*****	*****
foster care grant	con	(97,98=Q4.8)	*****	*****	*****	*WFSTE*	*Q4_8BA*	*****	*****
UIF benefit amount	con	(97,98=Q4.9)	*****	*****	*****	*WUNAM*	*Q4_9BA*	*****	*****
support from relatives/persons	con	(95=S22Q22.1; 00=)(9	*b83f017*	*P2401Q09 (pers*	*****	*WSUPP*	*Q4_10B*	*****	*****
gratuities/lump sums	con	(97,98=Q4.11)	*****	*****	*****	*WGRAM*	*Q4_11B*	*****	*****
other income	con	(97,98=Q4.12)	*****	*****	*****	*WOTHA*	*Q4_12B*	*****	*****
Pension resulting from your employment before retirement	con	(95=S22Q22.1; 00=)	*b83f010*	*P2401Q0701 (p*	*****	*****	*****	*****	*****
Annuities and similar recurring receipts resulting from own investments	con	(95=S22Q22.1; 00=)	*b83f011*	*P2401Q0702 (p*	*****	*****	*****	*****	*****
Social pension(s) or allowances: Old age and war pensions	con	(95=S22Q22.1; 00=)	*b83f012*	*P2401Q070301*	*****	*****	*****	*****	*****
Family and other allowances (including state maintenance grant and child grants)	con	(95=S22Q22.1; 00=)	*b83f014*	*P2401Q070303*	*****	*****	*****	*****	*****
From the Workmen's Compensation, Unemployment Insurance, Pneumo-coniosis nad Silicoses Funds and similar funds	con	(95=S22Q22.1; 00=)	*b83f015*	*P2401Q0704 (p*	*****	*****	*****	*****	*****
Alimony, maintenance and similar allowances received from divorced spouse, family members, etc, living elsewhere	con	(95=S22Q22.1; 00=)	*b83f016*	*P2401Q08 (pers*	*****	*****	*****	*****	*****
hh food expenditure (by Month)	con	(95,00=Qsum)(96=Q1. 40;97,98=Q9.41 ;99=6.20)(04=Q4.72; 05=4.80d)	*b89f004 + b89f005 + b89f006 + b89f007 +b89f008 + b89f009 +b89f010 + b89f011 + b89f012 + b89f013 +b89f014 + b89f015*	*S0501 +S0502 +S0503 +S0504 +S0505 +S0506 +S0507 +S0508 +S0509 +S0510 +S0511 +S0512 +S0513 (general.dta)*	*MONEYF OO (house.dt a)*	*HHFDA MT (hhold. dta)*	*Q9_41 FOO (house. dta)*	***CAT*** *Q6_32F OO (house.dt a)*	*Q472Food (hhold.dta)*

EXPENDITURE	hh total expenditure (by Month)	con	(95,00=Qsum)(96=Q1.39;97,98=Q9.40;99=6.21)(04=Q4.71;05=Q4.79)	b89f065/12	TotalExp/12 (general.dta)	EMONEYPM (house.dta)	HHSPAMT (hhold.dta)	Q9_40TOT (house.dta)	CAT Q6_31TOT (house.dta)	CAT Q471tota (hhold.dta)
	hh unusual amount spent in past m	con	(96=Q1.42) (97=Q9.43)	*****	*****	PMAMOU	HHCAM	Q9_43A	*****	*****
	cost of housing, monthly	con	(95,00=Qsum)(04=Q4.72)	b89f001 check r	S0303 (general.	*****	*****	*****	*****	Q472Hous (hhold.dta)
	dwelling rent, past month	con	(95=S1Q1.1.1,00=P03)(96=Q1.7;97=Q9.6;98=Q9.7)(04,05=Q4.6)	b07f002	P0303Q0101 (general.dta)	THEAMOU	HHRAM	Q9_7RE	*****	Q4711Pai + Q471Extr (hhold.dta)
	dwelling levy, past month	con	(95=S1Q3,00=P03)(96=Q1.11b)(97,98=Q9.11b) 04=Q4.6; 05=Q4.9	b07f005	P0303Q03(general.dta)	LEVYPAID	HHLEVY	Q9_11B	*****	Q4123Lev
	dwelling bond payment, month	con	(95=S1Q5.1,00=P03)(96=Q1.12b)(97,98=Q9.12b)(04=Q4.12)	b07f007 + b07f008	P0303Q050101 + P0303Q050102 (general.dta)	AMOUNTIN (house.dta)	HHBNDAMT (hhold.dta)	Q9_12BBO (house.dta)	*****	q4121cap + Q4121int (hhold.dta)
	dwelling Boarding lodging paid	con	(95=S1Q4,00=P03)(04=Q4.6; 05=Q4.8)	b07f006	P0303Q04 (general.dta)	*****	*****	*****	*****	Q473Boar (hhold.dta)
	Total hh exp on transport?	con	(95,00=Qsum)(99=Q6.22)(04=Q4.72 ;05=Q4.80)	(??b89f044+b89f047+?? b89f045+b89f046)/12	(S150102 + S1502 + ??S150101 + S1504??)	*****	*****	*****	CAT * Q6_33TRA (house.dta)	Q472Tran(hhold.dta)
	Total hh exp on Clothing?	con	(95=Qsum)(04=Q4.72 ;05=Q4.80)	(?footwear?+b89f027 + b89f028 + b89f029 +b89f030 + b89f031)/12	(S1201 + S1203 + ?footwear?) /12 (general.dta)	*****	*****	*****	*****	Q472Clot (hhold.dta)
	Total hh exp on Personal appearance/care?	con	(95=Qsum)(04=Q4.72 ;05=Q4.80)	b89f021 check r	S0801(general.dta)	*****	*****	*****	*****	Q472Pers
	Total hh exp on Other?	con	(04=Q4.72 ;05=Q4.80)	*****	*****	*****	*****	*****	*****	Q472Othr
	EA		FLAP	c2	*****	EANUMBE	EANUM	*****	*****	*****

PLACE	District Council			*c1*	*derive (UqNr) (g*	*****	*****	*****	*****	*****
	Magestiral District		*FLAP*	*****	*****	*MDNUMB*	*MDNUM*	*derive(U*	*derive(UQ*	*derive(UQNR) (hhold.dta)*
	PSU			*****	*PSUNO (genera*	*****	*****	*****	*PSUNR (I*	*****
	Urban/rural	cat	*FLAP*	*c6* *	*P0101Q01 (gen*	*TYPE1 (hc*	*TYPE (h*	*EATYPE*	*EATYPE (*	*derive(Stratum)(house.dta)*
	Province		*FLAP*	*derive from (c1)*	*Prov (personal.dta) OR derive 1st*	*PROV (house.dta)*	*PROV (hhold.dta)*	*PROV (house.dta)*	*PROV (house.dta)*	*PROV (hhold.dta)*
	Visiting Point No		*FLAP*	*c3*	*****	*VPNUMBE*	*VPNUM*	*****	*****	*****
EMPLOYMENT INFO	Industry of Employee	code	(95=Q1)(96=3.12;97,9	*check professio*	*****	*ACTEMPL*	*WFRMA*	*Q3_14F*	*Q3_9FIR*	*Q27Indus (worker.dta)*
	Industry of Self-employed	code	(98=3.21; 99=3.22)	*****	*****	*****	*****	*Q3_21E*	*Q3_22EM*	*Q27Indus (worker.dta)*
	Occupation of Employee	code	(96=3.13;97,98=3.15;	*check professio*	*STCCode (pers*	*EJOBDES*	*WJOBT*	*Q3_15O*	*Q3_10OC*	*Q25Occup (worker.dta)*
	Occupation of Self-employed	code	(98=3.22; 99=3.23)	*****	*****	*****	*****	*Q3_22E*	*Q3_23EM*	*Q25Occup (worker.dta)*
	Economic Sector	code	(96,97,98,99,04=	*****	*****	*INDUST (*	*INDUST*	*INDUST*	*INDUST (*	*Indus (worker.dta)*
	District where works	code	(96,97,98=Q3.9)	*****	*****	*WORKMD*	*WDIST (*	*Q3_9WF*	*****	*****
HH Structure	hh size	continc	(96=)	*derive from (b02f001 to b02f010)*	*Nopersons (general.dta)*	*EPERSON*	*SPERSN*	***** *CAL*	***** *CAL?*	***** *CAL?*
	Population group of hh head	Ind	(96,97,98=*FLAP*)	*b03f001*	*popgroup (perso*	*POPGRO*	*PRACE*	*D_RACE*	*ind D_RA*	*Popgroup (hhold.dta)*
	gender each person			*derive from*	*Gender (person*	*EEGENDE*	*PGENDE*	*B_GEND*	*B_GENDE*	*Gender (person)*
	education? Whofor?			*****	*****	****	****	****	****	****
	No. employed in hh	con	(96=)	*derive from(b83f200 & ..& b87f200)*	*derive(JobCode) (person.dta)*	*STATUS (*	*STATUS*	***** *CAL*	***** *CAL?*	***** *CAL?*
	No. of People aged 15+	con	(96=)	*derive from (b02f001 to b02f010)*	*derive(Age)*	*SOVER15*	*SOVER*	***** *CAL*	***** *CAL?*	***** *CAL?*
	age of each indiv			*derive from (b02f001 to b02f010)*	*Age OR BIRTHYEAR (person.dta)*	*PERSON AG (person.dta)*	*PAGE (person.dta)*	*C_AGE (person.dta)*	**C1_AGE or C2_YEAR (person.dta)*	*Age (person.dta)*
	No. of Migrant Workers	con	(96=)	*****	*****	*SMIGW (h*	*MSIGW*	*****	*****	*****

OTHER FOOD Related Qs?	hh level.1.36 In the past year, was there ever a time when you could not afford to feed the children in the household?	cat	(96=Q1.36;97,98=Q9.37,99=Q6.34)(04=Q4.68)	*****	*****	*FEEDCHIL (house.dta)*	*HHNOFOOD (hhold.dta)*	*Q9_37NOF (house.dta)*	*Q6_34NOF (house.dta)*	** *Q468Hung (hhold.dta)*
	hh: Main Source of energy for cooking?	cat	(96=Q1.17;97,98=Q9.17;99=Q6.10)(04=Q4.42;05=Q4.46)	*see note*	*see note*	*ECOOKING (house.dta)*	*HHCOOK (hhold.dta)*	*Q9_17ACO (house.dta)*	*Q6_10ACO (house.dta)*	*Q442Coo (hhold.dta)*
	Indiv. School feeding: does the person get free food through school feeding scheme	cat (ye	(96=Q2.16;97,98=Q1.15;99=Q1.12)(04=Q1.20)	*****	*****	*FREEFOOD (person.dta)*	*PINSTFRF (person.dta)*	*Q1_15FRE (person.dta)*	*Q1_12FRE (person.dta)*	*Q120Free (person.dta)*
	hh: In the past year, was there ever a time (other)member of the household went hungry because there was not enough money to buy food?	cat	(99=Q6.35)(04=Q4.67)	*****	*****	*****	*****	*****	Q6_35NO	* *Q467Hung (hhold.dta)*
	Beg for money or food in public?	cat	(04=2.1h;05=Q2.2)	*****	*****	*****	*****	*****	*****	*Q21hBeg (worker.dta)*
	4.62 Does this household have access to land that is, or could be, used for agricultural purposes?		04=Q4.62	*****	*****	*****	*****	*****	*****	*Q462Agri*
	hh: Grow produce?	cat	(95=S20Q20.1;00=P22)(99=Q6.38)(04=Q2.1e; 05=Q2.2d)	*derive (if b72f100 = 0 & b76f100 = 0, then No else YES)*	*P2202Q01 & P2204Q04(produce.dta)*	*****	*****	*****	*Q6_42GRO (house.dta)*	*Q21eFarm (worker.dta)*
	hh: Why grow produce?	cat	99=Q6.44	*****	*****	*****	*****	*****	Q6_44WH	*****

SA Survey information relevent to Urban Food Security

				IES		OHS				GHS
Divisions	Concept	Var Type	Survey Questic	1995	2000	1996	1997	1998	1999	2004
	hh gross income & all sources of in	con	(95=Qsum13)(99=Q6.3	(b89f068)/12	(TotalInc)/12	*****	*****	*****	CAT Q6_	*****
	indiv. Total Pay (employee) cat	cat	(96=Q3.17;97,98=Q3. 19;99=Q3.20)(04=Q2. 10)	*****	*****	EEINCOM	WHOWI	Q3_19C	Q3_20CE	Q210Salc (worker)
	indiv. Total Pay (employee) con	con	(95=S22Q1;00=P24)(97,98=Q3.19; 99=Q3.20)(04=Q2.8-9)	(b83f001 + b83f002 + b83f003)/12 OR...OR (b87f001 + b87f002 +	(P2401Q0101 + P2401Q0102 + P2401Q0103)/12 (person.dta)	*****	WSAL AMT & dep(W SALAV E)	Q3_19 AEM & dep(Q3 _19BE M)	Q3_20A EM & dep(Q3_ 20BEM) (worker.d	Q28Salto & dep(Q29Salpe) (worker)
	indiv. Total Pay (self employed)	cat	(96=Q3.23;97=Q3.25; 98,99=Q3.26)	*****	*****	EBUSSIN	WSERV	Q3_26C	Q3_26CS	Q210Salc (worker)
	indiv. (self employed) exp to earn total pay	con	(96=Q3.24;97,99=Q3. 26;98=Q3.27)	*****	*****	EEEGOO DS (worker.d	WSPG DS + WSPS	Q3_27 AGO + Q3_27	*****	*****
	indiv. Tot Pay (self employed) con	con	(95=S22Q2;00=)(97= Q3.25;98=Q3.26)	(b83f005)/12 OR...OR (b87f005)/12	(P2401Q02)/1 2 (person.dta)	*****	WSER VSA1 &	Q3_26 ASE & dep(Q3	Q3_26A EM & dep(Q3_	Q28Salto & dep(Q29Salpe) (worker)
	indiv. Total inc, from all sources	con	99=Q4.13			*****	*****	*****	Q4_13TO	*****
	MONTHLY OTHER HH INCOME			-	-	-	-	-	-	-
	support from non-member	con	(96=Q7.1)	*****	*****	SUPPFAM	*****	*****	*****	*****
	state pension	con	(96=Q7.2)	*****	*****	SPENSIO	*****	*****	*****	*****
	private pension	con	(96=Q7.3)	*****	*****	PPENSNM	*****	*****	*****	*****
	social grant	con	(96=Q7.4)	*****	*****	GRANTIS	*****	*****	*****	*****
	other grant	con	(96=Q7.5)	*****	*****	OGRANTS	*****	*****	*****	*****
	gratuities	con	(96=Q7.6)	*****	*****	LUMPSUM	*****	*****	*****	*****
	unemployment benefits	con	(96=Q7.7)	*****	*****	UNEMPLY	*****	*****	*****	*****
	other income	con	(96=Q7.8)	*****	*****	OTHERSC	*****	*****	*****	*****
	ANNUAL OTHER HH INCOME			-	-	-	-	-	-	-
	gov pension	con	(97,98=Q4.1)	*****	*****	*****	WPNSA	Q4_1BA	*****	*****
	retirement pension	con	(97,98=Q4.2)	*****	*****	*****	WPNAM	Q4_2BA	*****	*****
	disability grant	con	(95=S22Q22.1; 00=P24	b83f013	P2401Q07302 (	*****	WDISSA	Q4_3BA	*****	*****
	workers compensation	con	(97,98=Q4.4)	*****	*****	*****	WCPAM	Q4_4BA	*****	*****
	state maintenance	con	(97,98=Q4.5)	*****	*****	*****	WMAMT	Q4_5BA	*****	*****
INCOMES										