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Urban agriculture a livelihood strategy for food security in the Cape Flats: A case study of community-based and home food gardens in Khayelitsha, Cape Town

A mini-thesis submitted in partial fulfilment of the requirements for the degree of Master of Arts in Development Studies at the Institute for Social Development, Faculty of Economic and Management Sciences, University of the Western Cape.

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Abstract

Growing urban food insecurity has prompted many researchers, NGOs, international agencies and governments to advocate for urban agriculture as a livelihood strategy to improve the household food security of the urban poor. Urban agriculture is an instrument for ensuring greater food security and a livelihood strategy for urban households. In South Africa increased attention on urban agriculture is triggered by current trends of urbanization, economic instability, high unemployment rates among the urban poor, and high food prices. Unemployment and urban food insecurity are high in low-income areas. In the Cape Flats, households with no or little disposable income, are food insecure and vulnerable to food insecurity. Income and wage employment are the main determinants of food security in urban areas. However, urban agriculture projects by two NGOs assist communities to be resourceful. Abalimi Bezekhaya, an NGO assists individuals and communities to start and maintain their own community gardens while Soil for Life promotes home food gardens. Abalimi Bezekhaya and Soil for Life seek to address the urban challenge by promoting self-sustained agriculture for food security and livelihoods. There has, however, been little empirical evidence suggesting that urban agriculture projects improve the food security and livelihoods of participants. This study assessed the potential of urban agriculture to address food security, examined the ways in which agriculture is used as a livelihood strategy for household food security, determined other livelihood strategies and coping mechanisms assumed by gardeners to become food secure, and demonstrates the contribution of NGOs in promoting agriculture in poor urban areas. Furthermore, this study addressed the following research questions: do community and household gardens provide a way of improving food and nutrition security and in what way are these impacts observable within participating households.

The research followed a mixed-method methodology. The literature is mapped out using international and local papers and empirical evidence collected on the subject. This study used the sustainable livelihoods approach as the theoretical lens through which to analyse the ways in which urban agriculture can be used as a viable livelihood strategy by urban gardeners. It also classified the constraints and opportunities, assets accessible, policies and institutions that exist, livelihood strategies and outcomes of the urban gardeners.

The findings of the study reveal that community and home gardens contribute moderately to livelihoods and food security in Khayelitsha. The results also reveal that 85% of the gardeners were either moderately or severely food insecure. Furthermore, 76.67% of gardeners purchased

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their food from supermarkets and local shops. Urban agriculture therefore plays a supplementary role in addressing household food security in Khayelitsha. The potential of community and home gardens to contribute to urban household food security and livelihoods is limited access to land and government assistance. There is a need for the City of Cape Town and the Department of Agriculture to assist and strengthen the practice of community and home gardens in Khayelitsha.

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Declaration

I declare that *Urban agriculture a livelihood strategy for Food security in the Cape Flats: A case study of community-based and home food gardens in Khayelitsha, Cape Town* ,is my own work, that it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

Abongile Mfaku

Signed……

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Abbreviations and Acronyms

DFID	Department for International Development
ESAP	Economic Structural Adjustment Programme
FAO	Food and Agriculture Organization
NGOs	Non-Governmental Organizations
SLA	Sustainable Livelihoods Approach
SLF	Sustainable Livelihoods Framework
UA	Urban agriculture
UN	United Nations
WFS	World Food Summit

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CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1.Overview and rationale of the study

Food security is a growing concern worldwide. The Food and Agricultural organization (FAO, 2018) reports that in 2017 one in nine people, that is, 821 million people do not have access to sufficient food for a healthy life. Developed and especially developing countries are both confronted with the challenge of overcoming food insecurity. The extent to which food is accessed and utilized is often determined by a high dependency on purchased food items, low income and high unemployment. Food insecurity, a supposedly "rural problem," is now evident in urban areas (Maxwell, 1999; Crush and Frayne, 2010). Rapid urbanisation has meant that more people are living in cities than in rural areas, which calls for greater attention on the food security of urban dwellers. The rapid growth of urban centres has been accompanied by what some authors refer to as the urbanisation of poverty and food insecurity (Frayne et al., 2009).

South Africa is a country defined by poverty and inequality, where wealth is concentrated in a smaller group while the rest of the population is marginalised and deprived. Stats SA (2014) shows that in 2011, 45.5% of the population lived in poverty and 21.7 % of people lived below the food poverty line. The food poverty line states that, a South African will need R547 per month to afford the minimum required daily energy intake (StatsSA, 2018). This is often referred to as the "extreme" poverty line. The country's poor economic performance and review for downgrade to "junk status" means that poverty levels are likely to increase (World Bank, 2017). South Africa's unemployment rate is high (27.7%) and wealth distribution is highly unequal. Furthermore, the country's wealthiest 10% receives 55 – 60% of all income, the middle class earns 30-35% while the bottom 50% of the population earns just 10% of all income (Orthofer, 2016). One implication of these figures is food insecurity. At a national level, South Africa is 'food secure' but not at a household level. According to Oxfam (2014), 26% of the population fall victim to hunger regularly and the other half is at risk of hunger (36.1%). Household food security is a function not only of the availability of food, but of the purchasing power available to each household. Unemployment and low income mean that people will not be able to purchase basic food items and ultimately go with food of poor nutritional quality or do not have enough food to eat (Nicolson, 2015). Oxfam (2014) also states that even social grant beneficiaries (over

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15 million) cannot afford to buy enough food, leading Devereux and Waidler (2017:24) to state that "social grants are not high enough, and social grants alone are not enough".

South Africa is witnessing a high incidence of the 'urbanization of poverty' and food insecurity (South African Cities Network, 2015). Poor economic performance increases unemployment and low incomes, and those unable to purchase basic food items experience hunger or susceptible to food security. People with the lowest incomes experience the greatest levels of food insecurity; a trend in low-income communities around South Africa (Western Cape Government, 2016). The African Food Security Urban Network (AFSUN) conducted an 11-city study in 9 Southern African countries to appraise the extent of food insecurity. AFSUN concentrated on poor households as they tend to be more food insecure. In the Cape Town site, Khayelitsha, was the most food insecure, with severe and moderate food insecurity levels at 89%. The study shows the pervasiveness of the problem and the urgency of confronting what Crush and Frayne (2010) call the 'invisible crisis' of food insecurity among the urban poor. Consequently, investigating food insecurity at a household level in Khayelitsha becomes vital.

The growing challenge of urban food security seems to prompt many researchers, NGOs, international agencies and governments to advocate urban agriculture as a livelihood strategy that can improve the household food security of the urban poor. Urban agriculture has been identified as an instrument for ensuring greater food security and as a tool for generating income among the urban poor (Zezza & Tasciotti, 2010; Armar-Klemesu, 2000:103; Crush, Hovorka & Tevera, 2011:286). Urban agriculture affords the poor remedies for food insecurity and unemployment through both an individual and community-based response.

Households participate in three types of urban agriculture which are community, allotment and home gardening as they seek to improve their livelihoods. In Orange Farm, south of Johannesburg, households involved in urban farming produced 40% of their food in home gardens (Onyango, 2010). Another study in Pretoria found that home gardens were a source of western and traditional vegetables (Van Averbeke, 2007). The indication was that home cultivation neither implies consumption at sufficient levels, nor was the food produced consumed in a manner for effective nutrition (Webb, 2011). From a food security perspective, urban agriculture did ensure food availability, access and utilisation. Yet, urban agriculture does not impact food insecurity in a desired manner. In Cape Town, for instance, Reuther and Dewar (2005) found no evidence of an individual deriving a full income that is sufficient for subsistence

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in a community garden. There was evidence of social benefits materialising through community gardens (Battersby & Marshak 2013). Furthermore, Reuther and Dewar (2005) also proffer that most community gardens were dependent on NGOs for support and services. Measuring the impact of urban agriculture, Ruysenaar (2013) found that the benefits of urban agriculture depend on the type of agriculture followed, the dynamics of the household, and a range of other factors such as access to land, individual capabilities, etc. Local contexts and dynamics are thus important. There is, therefore, a necessity to investigate home and community gardens to assess the actual impact on household food and nutrition security in South Africa.

Altman et al. (2009) note that the food security status depends on the food distribution system and resources of a household, which determine access to food. The contribution of urban agriculture to household food security needs to be conceptualized within a Sustainable Livelihoods Approach (SLA). The sustainable livelihoods approach improves the understanding of the livelihoods of poor people. The SLA focuses on numerous factors, which can constrain or enhance poor people's ability to make a living (Krantz, 2001). Urban agriculture as a livelihood strategy takes different functions contingent on a household's ability and assets. Scoones (1998) further notes that a combination of assets and activities organise a sustainable livelihoods strategy.

Until now, the potential role of urban agriculture as a livelihood strategy is questioned. Proponents retain that urban agriculture is a viable livelihood strategy with the likelihood to provide food security and generate income (Lee-Smith and Lamba, 2015; Olivier, 2015). On the contrary, it is criticized on the basis of a lack of empirical evidence to endorse urban agriculture (Webb, 2011). Similarly, in spite of some constructive outcomes derived from international studies, the majority of South African studies have shown the limitations of urban agriculture in alleviating food insecurity. This study therefore examined the literature on food security and urban agriculture and investigated how urban agriculture can be adopted as a livelihood strategy. Furthermore, it explored the agricultural undertakings implemented by NGOs (Abalimi and Soil for Life) and how these impact on household food security. The study adopted a mixed-method orientated case study of gardeners in Khayelitsha, Cape Town. The significance of urban agriculture compels the research to explore both home and community gardens. Home and community gardens have personal and collective benefits (McVey, Nash and Stansbie, 2018). Gardens advocate healthier eating and increased exercise, and a source of livelihood for the

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urban poor. The findings of the study will be used to provide recommendations to government departments, policy makers, and other stakeholders on ways to strengthen the benefits of urban agriculture.

1.2. Background and Contextualization

1.2.1. Background to the Case Study Area

The Western Cape is renowned for its breath-taking scenery embraced by beautiful beaches and mountains. Beyond this attractiveness, however, poverty is the order of the day for many households. In 2011, 24.7% households were poor. People in the province were significantly poor when considering the unequal distribution of wealth within the Western Cape's population. As the population increases with urbanization, the transmission of rural poverty to urban areas is rising. Van Averbeke (2007:341) states that "when rural people migrate to urban areas they often become poor urban people, nonetheless their experience of poverty is different". This is equally true for the Western Cape as the 2011 Census reports an increase in population count, from 10.1% to 11.2% and a rise in household numbers. The number of households had reached 1 068 572 million, with an average household size of 3.50 (City of Cape Town, 2012:2).

Increased population growth often raises the number of economically active people that places additional pressure on the provincial labour market. In the fourth quarter of 2018, joblessness was sitting at 27.1% (StatsSA, 2019). Cape Town's unemployment rate is below the national average but still remains relatively high. The City of Cape Town's unemployment rate is at 21.7%, a decrease of 2.2% from the previous year (Capetownetc, 2018). Amongst those absorbed by the labour market, the majority is either working in low-skilled or semi-skilled occupations. The cost of living in cities is higher than in rural areas, and with limited economic opportunities, wages and incomes tend to be lower, and even with social grants people struggle to meet daily living expenses and food security. Income and wage employment are the main determinants of food security in urban areas (Crush & Caesar, 2014:168), and therefore households with no or little disposable income are vulnerable to food insecurity.

Swanepoel, Van Niekerk and D'Haese (2018) reported that 77.7% in the Cape Town Metropole experience severe food insecurity and only 8.6% are food secure. The Household Food Insecurity Access Scale (HFIAS) shows that 84.2% of households in Khayelitsha are severely and moderately food insecure. The General Household Survey (GHS) of 2012 also indicated that poor households spend most of their income on food (33.5%) compared to 10.8% by non-poor

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households (StatsSA, 2012). Even with poor households spending that proportion of their money on food, they still remain vulnerable and food insecure. Cities will have to search for alternative food sources besides food purchases to combat food insecurity and hunger (Frayne et al., 2009:9). Urban agriculture is just one of the livelihood diversification strategies that can potentially contribute to food supply.

Reuther and Dewar (2006) indicate that urban agriculture is a "survival strategy" adopted by poor households. It is usually micro-scale and profit is not always the primary motive. By growing their own food, households broaden their livelihood options, increase food security, and improve their nutritional intake, all of which are central to health. To realise this, the Western Cape Government (WCG) outlined a strategic framework for food and nutrition security in 2016 which to address the actual causes and challenges of food security and align these to the strategic approach (WCG, 2016). The framework further demonstrates six priority areas: food assistance, food awareness and safety, food sensitive planning, food resource management for the future, an inclusive food economy, and food governance (WCG, 2016:22). Programmes directed at urban areas such as Cape Town will focus on agricultural production. This strategy will be pivotal in analysing, understanding and finding resolutions to the food system that will subsidise food security. The province has an extensive agriculture history and has noted its contribution to the economy and the food security of its populace.

The City of Cape Town (CCT) has instigated a detailed Urban Agriculture Policy that "seeks to create an enabling environment where public, private and civil society agents cooperate to upsurge the scope and scale of urban agriculture in the city" (CCT, 2007:4). The policy considers the social, economic and ecological dimensions of urban agriculture. The social dimension refers to the subsistence agricultural actions that can potentially contribute to improved food security and nutrition in the City's poorest communities. On the economic dimension, the emphasis is on urban agriculture that generates employment, with the ultimate goal of establishing a productive city. Finally, the policy aims to build a 'green and healthy city' through the promotion of recreational services, recycling urban waste and urban greening (CCT, 2007:3).

The stated benefits will be achieved by several imperatives which comprise the assimilation of urban agriculture in spatial, human, environmental, community, economic and infrastructural planning. The City's institutional framework will be executed through the provision of production inputs and facilitation. The City of Cape Town has effectively legitimized urban

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agriculture, yet fails to protect it against other practices of urban development. The City of Cape Town's community survey predicted a population of 4 million people and 1.2 million households, projected at 4.2 million by 2023 (WCG, 2016:3).

The community survey also highlighted the variance between household incomes, distributing the categories into low, middle, and high income. Amongst the eight districts (Tygerberg, Blaauwberg, Northern, Khayelitsha and Mitchells Plain, Helderberg, Cape Flats, Table Bay, Southern) surveyed, Khayelitsha and Mitchells Plain had 63% household's fall between the low income bracket and 16.5% with no income (WCG, 2016:17). Concentrated in this district are black and coloured people, with a high percentage of female-headed households. The levels of poverty in Khayelitsha and Mitchells Plain afford the study an opportunity to substantiate the potential contribution of urban agriculture in enhancing and reducing household food security in Khayelitsha. The City of Cape Town values the contribution of civil society in ensuring that urban agriculture (UA) yields positive benefits and reaches the urban poor. Frayne et al. (2007:33) also ask a question, "How can state and civil society connect to improve food security for the urban poor?"

1.2.2. Case Study Organizations: Abalimi Bezekhaya and Soil for Life

Urban agriculture in Cape Town primarily occurs through the effort of NGOs. The support urban gardeners receive from NGOs include inputs, land access and training. Based on this fact, the focus of the study is on a selection of two key NGO's in the Cape Flats, Abalimi Bezekhaya and Soil for Life which promote urban agriculture and food security among the poor.

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Abalimi Bezekhaya

Urban agricultural programmes driven by non-governmental organisations (NGOs) existed long before it was institutionalised. For example, Abalimi Bezekhaya, an NGO operating in Cape Town, helps urban farmers to grow their own food to feed themselves. It develops all-inclusive services that motivate urban farmers to grow food for subsistence. This formula of agriculture similarly adopts organic principles and has the intention of combating poverty (Reuther & Dewar, 2006:98).

Abalimi Bezekhaya (hereafter Abalimi) was established in 1982; at a time of segregation and oppression of many black and coloured people. Peter Tempelton, Rob Small, Christina Kaba and Dave Golding saw the need to assist the marginalized population through the occupation of

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empty spaces for urban gardening in underprivileged communities (Spiro, 2016:1). Historically, the organisation has always worked with groups by establishing community gardens on empty land donated by clinics, schools, civic centres or wasteland (Breitenberg and Schuurman, 2013:2). The initial idea was to start community gardens to produce fresh food, mainly for consumption and to provide immediate relief to poor communities. Over the years, however, Abalimi has surpassed the production of 'fresh food' in community gardens and now aims to overcome poverty through both home and community gardens. This is attained through empowering the disadvantaged groups by providing them with UA and environmental programmes.

The target groups are supported through the provision of support services, namely, project implementation, agricultural and horticultural commodities, training, organisational building, and facilitation of partnerships, research and M&E. The services are open to individuals and community members of townships situated in the Cape Flats; Nyanga, Philippi, Khayelitsha, Crossroads and Gugulethu. Abalimi also assists the general public at "Abalimi Garden Centres". Breitenberg and Schuurman (2013) notes that individuals who visit these centres to purchase compost, seeds, and seedlings and to get advice on gardening activities. Employees, volunteers, partnerships with other NGOs, CBOs, government departments and private enterprises have contributed to the achievements of the organisation. In 2004, Abalimi serviced 59 community gardens, 42 greening projects, trained 300 people, and sold manure, seed and seedlings to over 2000 home gardens (Abalimi, 2004). Ten years later, in 2014, Abalimi supported 3 346 garden centre clients, and 4 543 micro farmers (Abalimi, 2014).

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Since its inception in the 1980's, Abalimi has evolved and created jobs, generated income for many households, and in the process rebuilt the natural environment. To ensure that its members are able to market their produce, Abalimi established "Harvest of Hope" in 2008. Through Harvest of Hope, Abalimi provides training on planting, composting, and pest management, and helps urban gardeners commercialise their produce to upper-middle class families, and restaurants in the suburbs of Cape Town. Connecting farmers with consumers, generates incomes for farmers in community gardens in Khayelitsha, Philippi and Nyanga. The organisation is evidence that urban agriculture can be sustainable and function as a livelihood strategy for the urban poor under certain conditions.

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Soil for Life

Soil for Life is another NGO, which, unlike Abalimi, exclusively supports home gardens. The organisation was established in 2002 in Constantia and works with low-income communities and assists them to overcome hunger, poverty and unemployment by establishing food gardens on household plots. The "organisation believes in growing people and endeavours to provide employment and further training opportunities" (Soil for Life, 2016:1).

Soil for Life runs a low cost intense three-month training course and provides basic gardening inputs to participants in the Cape Flats region: from Khayelitsha, Mitchells Plain, Gugulethu, Elsies River, Langa, Phillipi, Vrygrond and Seawinds (Battersby and Marshak, 2013). Participants are provided with inputs such as seedlings, potting soil, gardening equipment, recycled planting containers, etc. Training workshops are provided to groups linked by common area of residence (Battersby and Marshak, 2013). Moreover, the training course provides home gardeners with skills in making and preserving food, compost making, and selling organic vegetables. Soil for Life's main goal is to promote food and nutrition security by encouraging home gardeners to grow organic food and prepare nutritious meals.

Between 2006 and 2016, Soil for Life trained 3 930 gardeners in sixteen low-income areas of Cape Town (Soil for Life, 2016:1). Upon successfully completing training and establishing home gardens, "graduates" are allowed to become trainers, to pass on what they've learned to fellow community members, thereby growing the number of home gardeners. The organisation maintains contact with participants for four years after training, on condition that members are still actively gardening.

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1.3. Problem statement, Research questions, Aim and Objectives of the study

1.3.1. Problem statement

Food insecurity is a problem for many poor urbanites in South Africa. They are food insecure as they often experience hunger, are at risk of being hungry, and suffer from poor nutrition. Although there has been a dramatic fall in hunger since 2002 (Altman, Hart & Jacobs, 2009), under-nutrition remains a serious problem. The state of hunger and under-nutrition are equally consequences of a poor diet instigated by inadequate food intake (Oxfam, 2014). This is disturbing, as it is in the interest of our society to ensure that all citizens at all times have access to adequate nutritious food to reach food security. The majority of South Africans depend on the cash economy to purchase food. The poor performance of the economy to create employment

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has left without secure income and therefore, unable to their food needs. Urban agriculture has shown potential to address the problems of unemployment and income. According Nugent (2000:8), "urban farmers are simultaneously suppliers of labour to agriculture, and producers and consumers of food".

By engaging in urban agriculture, households minimize risk (by producing their own food) and can generate some income. However, the Western Cape Government (2016) notes that, the contribution of urban agriculture to food security is small and provision for this movement remains a priority. Frayne et al. (2009) assert that the urban food security strategy is enabled by a variety of factors in planning and policies. More so, sustaining urban agriculture requires the involvement of multiple stakeholders. NGOs, social movements and grassroots organisations have the capacity to foster greater participation in UA (Veenhuizen, 2006:21). NGOs such as Abalimi and Soil for Life are operational in impoverished areas (e.g. Khayelitsha and Mitchells Plain) of Cape Town, supports communities to initiate and sustain organic food growing for social and environmental benefits. These two NGOs promote projects that provide skills and assist households with strengthening livelihoods and ensuring food security. It becomes significant to question the extent to which the food security of households participating in these projects is achieved. For this reason, the study will explore the ways in which urban agriculture contributes to household food security.

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1.3.2. Research Questions

This study seeks to answer three research questions:

- Does UA have any impact on household food and nutrition security in Khayelitsha?
- In what way are these impacts observable within households participating in community and household garden projects supported by Abalimi and Soil for Life?
- Do community and household gardens provide a direct way of improving food and nutrition security?

1.3.3. Aims of the research

This research will explore urban agriculture and its impact on household food security in urban communities. The study will assess the role of Abalimi and Soil for Life in promoting and facilitating urban agricultural activities, and how this translates to improved livelihoods.

1.3.4. Objectives of the study

This research has a highlighted the objectives below:

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- To examine the literature on food security and urban agriculture, and investigate how UA can be adopted as a livelihood strategy.
- To explore the urban agricultural undertakings implemented by Abalimi and Soil for Life and how these impact on household food insecurity.
- To provide recommendation for government departments, policy makers, and other stakeholders on ways to improve urban agriculture through the provision of capitals (e.g. land, training, etc.).

1.4 Structure of the thesis

This research study is organized into six chapters. **Chapter one** is the introduction chapter of the study. The chapter highlights the background and contextualization of the research problem, objectives and questions.

Chapter two highlights relevant literature on urban agriculture and food security. The literature is allocated according to the main themes and trends in urban agriculture.

Chapter three focuses on the Sustainable Livelihoods Framework which is the theory supporting this study. The theory was applied in analysis to answer the research questions and objectives.

Chapter four outlines the research methodology followed in this study. The chapter explains and justifies the research design, population and sampling techniques which were implemented in order to answer the research questions.

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Chapter five is a data analysis, presentation and the discussion of findings chapter. The quantitative and qualitative data were analysed and presented accordingly.

Chapter six is a conclusion to the study. Recommendations and areas for further research are offered. The recommendations and areas for future research are based by the findings of the study.

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CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter examines the literature on food security and urban agriculture and investigates the extent to which urban agriculture can be adopted as a livelihood strategy. In doing so, I unpack research on the topic, provide perspective, establish various academic opinions and underline how I plan to contribute to existing knowledge. Urban agriculture is recognized as a feasible approach for the urban poor to grow their own food, earn additional income, and reduce reliance on a cash economy (Mkwambisi, Fraser and Dougill, 2011:183). It is promoted because of its contribution to livelihoods and food security; however, considerable literature indicate that these benefits are overstated. Research indicates that the extent to which urban agriculture provides income depends on material support, training and other intervening factors (Olivier, 2018). Moreover, the benefits of urban agriculture extend beyond livelihoods and food security. Against this backdrop, section 2.1 provides an overview of empirical studies in the field of urban agriculture and how it has been applied as a food security strategy. I begin with an overview of food security, the current state of food security, followed by a discussion on urban food insecurity in South Africa. I then explore the impact of home and community gardens on household food security in section 2.2 and section 2.3 summarizes the conclusion of the chapter.

2.1 An overview of food security

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2.1.1 Food security: the development of concepts and definitions

The food security of the world's population must be treated with the outmost urgency. As Armar-Klemesu (2000) observes, the concept of food security has been on the international agenda as far back as the 1940's. The earliest trepidations of food security can be traced back to the Hot Springs Conference of Food and Agriculture in 1943 when food security was accepted as "freedom of a secure, adequate, and suitable supply of food for everyone" (Napoli, 2011:8). After World War II developed countries disposed of agricultural surplus commodities in developing countries via food aid (FAO, 2006). According to Oxfam (2014), this kind of food aid impelled by the dumping of agricultural surpluses in developing countries and undermined agriculture their ability to address food insecurity and livelihoods.

By the 1960's food aid was recognised as unsustainable for self-sufficiency and thus the concept of 'food for development' was presented and institutionalized. The attitude transformed from 'surplus disposal' to consuming surpluses to meet nutritional needs and support economic

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development in developing countries (Shaw, 2007). Agriculture in developing countries was promoted to meet food security and improve livelihoods. Nonetheless, food security remained unpredictable and complex. The world food crisis of the early 1970's confirmed how quickly food security could change (Shaw, 2007). It was characterized by increasing prices of globally traded grains, fluctuating food supplies and hunger in Africa and Asia. What emerged from the food crisis was a drive for an international policy to solve world hunger through production (Gerlach, 2015).

Insurance schemes were set up to ensure international access to food and improve food security (Napoli, 2011). The concept of food security now comprised both the reduction of risks associated with food production and the endowment of mechanisms that ensure individual countries meet food shortages. At the 1974 World Food Conference in Rome it became clear that food security no longer concerned the developing world, but was also of interest to more advanced economies (De Ridder, 2011). The World Food Conference (1974) defined food security as the "availability at all times of adequate food supplies of basic food stuffs to sustain a steady expansion of food consumption to offset fluctuations in production and prices". From the 1940's until the 1970's, the focus was supply of food, national self-sufficiency and plans for world food frameworks (Maxwell, 1996).

The Green revolution of the 1980's saw the development of international and domestic food security (Shaw, 2007). The Green revolution increased food production and availability. However, the problem of hunger and famine continued to prevail. It was clear that widespread hunger could and did co-exist with adequate food supply at the international and national level. The Nobel Prize winner for Economics, Amartya Sen (1981) confers that the food insecurity of many people in the world was caused by limited access rather than the availability of food at a national level. The concept of food security was thus expanded to include "both physical and economic access to food" (Shetty, 2006:457). According to the Food and Agricultural Organization (FAO):

> Food security must now have three specific aims, namely ensuring **production** of adequate food supplies; maximizing **stability** in the movement of supplies; and securing **access** to available supplies on the part of those who need them. The definition of food security now valued the balance between the demand and supply of food, access to food and stability. When we speak of food security we pay attention to the problem of supply,

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and significance of access and entitlement. Therefore, the promise is to ensure "access of all people at all times to enough food for an active, healthy life" (FAO, 1983).

The definition of food security has dramatically evolved, developed and diversified during the last decades in theory and in practice (Maxwell, 1999; Gross et al., 2000). The most widely used definition of food security was coined at the 1996 World Food Summit, which states that "food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2018:1). The supply, access and consumption of food are seen as interrelated. From this definition four pillars of food security are identified: the physical availability of food, economic and physical access, food utilization, and stability of the three dimensions (FAO, 2008). Food security can only be realized when all four dimensions are achieved at the same time.

2.1.2 The Current State of Food security

As stated above, food insecurity is a state where the availability of safe and nutritious food required for an active and healthy life is inadequate. The 1996 World Food Summit professed the fight against food insecurity as one of its objectives. At the Summit a plan of action was to "eradicate hunger in all countries by reducing the number of undernourished people to half their present level no later than 2015" (Napoli, 2011: 9). A pledge, also reiterated in the first Millennium Development Goal, was to eradicate extreme poverty and hunger by the year 2015 (FAO, 2010; Crush and Frayne, 2011). Fast-forward to 2015 and the number of people who experience hunger remains considerably high. The FAO (2015) reports that 795 million people were undernourished between the period of 2014 and 2016: of this number, 779.9 million are from developing countries and only 14.7 million live in developed countries.

Food insecurity continues to be a major problem globally. However, Godfray et al. (2010) argue that the worst is yet to come, as the population continues to grow, so will the demand for access to food. The challenge will be to equate this rapidly changing demand for food to access. As it stands, many people around the world do not have enough safe and nutritious food and this negatively disturbs their livelihood. The FAO (2015:9) observes a significant decline in food insecurity in developed nations, but the same decline does not seem to materialize in developing regions. In sub-Saharan Africa, food insecurity is the highest when compared to other regions in the developing world. The FAO (2015) estimated that about 220 million people are

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undernourished and food insecure in sub-Saharan Africa. Across the South African border, in Zimbabwe, 1.5 million people are unable to meet their food needs (United Nations, 2015). In Lesotho, micronutrient deficiencies range from 39 to 65 percent, with an average of 44 percent and stunting (chronic malnutrition) affecting 32 to 52 percent of the population (World Food Programme, 2012). Furthermore, around 12.8 million people are severely food insecure in the 'Horn of Africa' (Somalia, Ethiopia, and Eritrea) with 1.9 billion dollars required in food assistance.

If we take into account the economic climate and political instability in the above examples, South Africa is unlikely to feature on the agenda at any global dialogue on food security (Koch, 2011). South Africa is nationally a "food-secure" country but the reality is that 26 percent of its population is food insecure and 36.1 percent at risk of hunger (Oxfam, 2014). While hunger has fallen, under-nutrition remains a serious problem (Altman, Hart and Jacobs, 2009). In this regard, De Klerk et al. (2004) argue that food insecurity, which is already prevalent and severe, is now also chronic. Food insecurity and hunger have many consequences for health and development. It is also inseparably linked to other social problems such as poverty and stress. Malnourishment increases the risk of child mortality. Undernourished children suffer from chronic malnutrition (stunting) that shortens their lives. These effects of food insecurity and hunger on children are not isolated from mothers. Maternal hunger has long-term effects on children's physical development and mental health. One can settle that more should be done to improve food security so that people have access to adequate food for meeting dietary needs to lead healthy and productive lives.

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2.1.3 Food insecurity: an urban issue

National food security and nutrition policies concentrate disproportionately on rural populations (Battersby and Marshak, 2013; Crush and Caesar, 2014). Food insecurity has historically been defined as a rural issue. While this characterization was understandable when society was largely rural, the rapid process of rural to urban migration in recent decades means that food insecurity is increasing becoming urbanized. This means that public policy needs to take cognizance of the 'urbanization of poverty and food insecurity. Increased food production for subsistence and sale between small farmers is advocated as a solution to 'rural' food insecurity (Altman, Hart and Jacobs, 2009). With more people living in African cities, provision for both rural and urban agriculture programmes will be crucial for food security and nutrition.

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The world's population is increasingly becoming more urbanized and rural-urban migration has become an everyday phenomena (Satterthwaite, McGranahan and Tacoli, 2010). Averbeke (2007:341) asserts that "when rural people migrate to urban areas they often become poor urban people, nonetheless their experience of poverty is different". For example, the pace of urbanization in sub-Saharan Africa (SSA) is twice that of the global average. The average rate of urbanization for SSA is almost four percent and is projected to persist for decades to come (Frayne et al., 2011). This rapid pace of urbanization in developing countries has resulted in the urbanization of poverty and food insecurity. According to Frayne, Crush & McLachlan (2014) when rapid urbanization and poverty combine, food and nutrition security in urban areas perpetuates and deepens.

Evidently, food insecurity is also an "urban problem" except it is surrounded by misconceptions (Maxwell, 1999). Maxwell attributes these misconceptions to three factors. Initially, food insecurity was associated with rural areas. As a result, major development interventions centred on food security concentrated on rural food security and the plight of the rural poor (Crush and Frayne, 2010). In a region undergoing rapid urbanization, a larger proportion of people migrate to cities and towns for their livelihoods. A concentration of people in urban areas and insufficient economic opportunities increases the vulnerability of the urban poor to food insecurity. Yet, the subject of urban food insecurity has been neglected. Secondly, food security in an urban context competes with more pressing problems such as unemployment, service delivery, poor infrastructure, and congestion (Crush & Frayne, 2011). Finally, "as long as food insecurity is a household problem and not a political problem, it did not attract political attention" and was thus overlooked at the national level (Maxwell, 1999:28). For example, at the national level South Africa is food secure but food insecurity is a great concern at the household level. Subsequently, urban food insecurity is dubbed an "invisible crisis" by international and local policy makers (Maxwell, 1999).

Food insecurity levels are high and pervasive in poor urban communities and hence can no longer be ignored (Frayne et al., 2009). Garrett and Ruel (1999) confer that international aid interventions, whose programmes traditionally concentrated on rural areas, are now moving steadily to develop strategies to improve urban livelihoods. It is also distinguished that the dynamics of food security among the urban poor are often economic. Food security regardless of location, hinges on food availability and a household's ability to access food is determined by

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income and food prices (Cohen and Garrett, 2010). The majority of urban inhabitants are reliant on salary and monetary income to attain food security. According to Armar-Klemesu (2010), people in cities are forced to purchase their food and this is dependent on commercial foods as dictated by the market system. The rising levels of urban poverty is aggravated by the cost of living in cities that is higher than rural areas; with limited economic opportunities, the ability of poor urban people to climb out of poverty remains constrained. As in a global economy, food is available in abundance in cities but accessibility and affordability are often linked to household income (Oxfam, 2014; Battersby, 2011).

When the measure of food insecurity takes into consideration both the share of budget spent on food and the calories available, more people are classified as food insecure and vulnerable to food insecurity (Maxwell et al., 2000). In addition to adequate calories, dietary diversity is essential to ensure sufficient nutrition. Diverse market systems, including supermarkets, bring a variety of foods which can be expensive and of low-quality (Oxfam, 2014). While hunger and undernutrition persist, Battersby (2013) observes a 'nutrition transition' which is connected to the intake of highly processed foods and the adoption of an inactive lifestyle. Presently, a diet high in saturated fats, refined foods, sugar and low in fibre is highly consumed in urban areas (Dinbabo et al., 2017). Food insecurity now contains 'undernutrition' caused by a low calorie intake, and 'over nutrition' which is a result of exceeding the required calories; both are a consequence of a poor diet. An extra expense is traveling costs to towns and cities, where large food retailers are located. Purchasing processed food influence poor dietary diversity, suggesting poor levels of nutrition (Frayne et al., 2009). Subsequently, Cohen and Garrett (2010) argue that urban food insecurity reflects distinct household conditions. Local contexts and dynamics therefore become important.

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2.2 Feeding the City through urban agriculture?

A general consensus is that a solution to food insecurity in the continent lies in investing in smallholder production. Smallholder agriculture is the substance of food security in many countries and an essential part of the socio-economic landscape in all countries (HLPE, 2013). Countries such as Cuba, Indonesia, and many more have successfully supported small scale production, as a partial supplier to household food baskets and livelihoods. Nowadays, urban agriculture is one of many livelihood strategies for household food security (Armar-Klemesu, 2000; Zezza and Tasciotti, 2010). According to Hendrickson and Porth (2012), urban agriculture is an appealing movement as it provides improved access to healthy nutritious and cheap food,

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while simultaneously lowering the effects of pollution from transportation and waste products. This is essential as it reduces the "dependency syndrome" on the state and promotes self-reliance.

Opitz et al. (2015) sustains that urban agriculture has always been pertinent in the developing world. The food crisis in the last 30 years and the period of structural adjustments in the 1980s in Africa led to the re-emergence of urban agriculture (Maxwell, 1995). The FAO (2013) estimated that 800 million people practice some form of urban agriculture worldwide by growing plants and raising livestock within and around cities for subsistence and additional income. Furthermore, households engaged in urban agriculture are more likely to enjoy a diverse diet, consume more calories and have access to basic staples, and fruits and vegetable products (Zezza and Tasciotti, 2010). With this in mind, urban agriculture has become an important focus of government policy, NGOs and corporate social investment programmes in many countries. Available evidence may suggest that urban agriculture contributes to livelihoods by creating jobs and generating income and household food security (Abdu-Raheem and Worth, 2011). However, there is little evidence to support the level of focus and investment.

Mkwambisi, Fraser and Dougill (2010) evaluated the relationship between urban food production, food security, employment and income in the cities of Lilongwe and Blantyre in Malawi. They found that households could support themselves on food produced on agricultural plots. The outcome of the study was that urban agriculture was the second greatest source of income for all households interviewed and provided employment for 52.2% of female-headed households. Female-headed households also obtained more income from urban agriculture than male-headed households. Urban agriculture is in fact a long-term adaptive strategy of women to protect the food security of their households (Maxwell, 1999). Urban agriculture production is essential in providing for vulnerable groups.

In Kenya, Kadenyaka, Omutimba and Harriet (2013) found that the production and marketing of horticultural crops are correlated. This means there was a mutual relationship between the production and marketing of produce. Sustainable livelihoods are influenced by both the producer and seller. More males were involved in producing, whereas more females did the selling. Sellers were also more food secure than producers, as they were able to practice diversification and endured their livelihoods even with constraints. The gender dynamic is evidence that females are mostly responsible for a household's food supplies. Child nutrition is

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also a significant outcome of food and nutritional security. Urban agriculture was found to have an impact on the nutritional status of children. Maxwell, Levin and Csete (1998) observe the nutritional status of children in farming households is significantly higher than those of children in non-farming households, with a higher percentage of undernourished children.

The association between urban agriculture, food access, and adequate nutritional status is palpable. In Malaysia, government institutions and organizations encourage urban residents to participate in urban agricultural activities. Rezai, Shamsudin and Mohamed (2016) estimate the potential of urban agriculture to food security in Malaysia and find that growing vegetables improves the daily intake of fresh food and nutritional status that results in individual food security. Also, the food bill is reduced and savings are spent on other household expenses. However, households with more income had more resources and experienced better food security. Noticeably, not only is income an objective of urban agriculture but it also determines the extent to which it is practiced. In Havana, Cuba, urban agriculture increased household savings up to 40% (Moskow, 1999). Money saved from gardening activities was used on other household's expenses such as education, transport, electricity, etc. In Altieri et al.'s (1999) study, urban agriculture in Havana also contributes to the ecological sustainability of urban centres. The Havana example proves that urban agriculture can be successful given active support from the state. The Cuban government was instrumental in the expansion of urban agriculture by creating an enabling environment and encouraging the sustainable use of resources.

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It is clear that urban agriculture can have significant economic benefits for participating households. Nevertheless, the extent to which urban agriculture is practiced, achieves suitable livelihoods, and improves food security varies across cities. Sceptics are not dismissive of the benefits of urban agriculture but are wary of the scale to which it reduces food insecurity and provides income (Crush, Hovorka and Tevera, 2001; Van Averbeke, 2007; Battersby, 2011; Webb, 2011). For example, Crush, Hovorka and Tevera (2001) and Battersby (2011) found that urban food production played a minor role in the food supply of many households in 11 SADC cities in 8 countries but had increased social and individual benefits. Individual benefits include exercise and spiritual well-being. The benefits of urban agriculture go beyond individual benefits. For example, Battersby (2011) also argues that urban gardening activities in Cape Town have a "collective benefit", as she found that urban gardening promotes "community development" and brought community members together in Cape Town. In developing

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themselves and their community, gardeners exchange knowledge and enhance their gardening skills (Olivier and Heinecken, 2017).

The benefits of urban agriculture extend beyond livelihoods and food security. Therefore, urban agriculture needs to be studied holistically. Economic, social and personal benefits are important components of livelihoods. A holistic approach will not only highlight all the benefits of urban agriculture but will also draw insights from other cities. Consequently, the study unpacks the "barriers constraining urban agriculture". For example, context is a determining factor in urban agriculture, while the amount of land and water services available, as well as training and material support are equally important (Prain and Lee-Smith, 2010; Olivier, 2018).

So why should urban agriculture be a priority in South Africa? Households engaging in urban agriculture experience several health benefits: (1) gardens are a source of employment, (2) people earn an income by selling their crops, and (3) people harvest fruit and vegetables for household consumption. However, evidence to support urban agriculture as a viable livelihood strategy for food security in South Africa remains limited

2.2.1 Urban Agriculture and food security in South Africa

As noted above urban agriculture is a strategy commonly practiced and may probably be one of the many responses of urban dwellers to balance the adverse impact of food prices and financial crisis. Urban agriculture has the potential to enhance livelihoods and improve household food production and consumption. Two decades ago Rogerson (1993) proclaimed urban agriculture as a solution to food insecurity in South Africa. He further argued that little was known on the implication of urban agriculture on food issues, and there was need to inspect its opportunities and threats on the asset base of the poor (Rogerson, 1993; Rogerson, 1998). Since then, much has changed. The provision of food all citizens is highlighted in Section 27 of the 1996 Constitution. Urban food insecurity receives increased attention and agriculture is stipulated in policies. Like other countries, the South African government wants to see greater levels of food security which can be achieved through productive use of urban natural resources (Prain and Lee-Smith, 2010).

Some cases of food insecurity in South Africa include lack of purchasing power, inadequate and unstable household food production, and poor nutritional status (South African Government, 2002). The assumption is that urban agriculture makes a valued contribution to food security, particularly at a household level. It makes an even more valuable contribution when stipulated in

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policy and executed accordingly (Maxwell, 1991). In 2002, the Department of Agriculture launched the Integrated Food Security Strategy (IFSS), which prioritized increased household food production, increased income opportunities, and improved nutritional status of its constituents (Du Toit, 2011). In 2013 the objectives of the IFSS were augmented with the Food and Nutritional Policy (Department of Agriculture, 2002). The Food and Nutritional Policy aims to increase social programmes which impact food security, increase food production and distribution by supporting community-based food production initiatives. The City of Cape Town adopted an Urban Agriculture Policy that "seeks to create an enabling environment where public, private and civil society agents cooperate to upsurge the scope and scale of urban agriculture in the city" (City of Cape Town, 2007:4). However, urban agriculture has been the focus of many NGOs before the emergence of local government policy. Abalimi Bezekhaya, a Cape-Flats based NGO was founded in 1980 and assists individuals and communities to start and maintain their own gardens; and Soil for Life, promotes home food gardens. These NGOs provide training, inputs for free or at a lower price, and access to market for urban gardeners. Together, state programmes and NGOs can facilitate access to resources and knowledge to the most vulnerable.

The institutionalisation of agriculture does not mean it is a common activity. The General Household Survey provided a general analysis of food security and agriculture for the period of 2002 – 2011 (StatsSA, 2012). The results showed that only 23% of households were involved in agriculture in South Africa. Highly urbanised provinces such as Gauteng (5.9%) and Western Cape (7.3%) had the lowest proportion of people participating in agricultural activities (StatsSA, 2012). When asked about their motives for participating in agricultural activities, the majority (84%) saw it as an extra source of food for the household, 5.1% as an extra source of income, and 4.2% as a hobby. Only 2.5% viewed it as the main source of income. This relates to the diversification of income sources to build livelihoods. Furthermore, households in urban areas facing inadequate access to food are more likely to participate in agriculture (StatsSA, 2012). Urban agriculture is practiced through home or community gardens. Home production can contribute to household consumption and income generation provided households produce a surplus and that they have easy access to markets to sell their produce (Faber, Witten and Drimie, 2011). Similarly, community gardens are also an important source of employment and income (Mkwambisi et al., 2011). The extent to which urban agriculture contributes to household food security in South Africa is open to scrutiny and it has become important to investigate.

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2.2.2 Home and Community gardens in South Africa: a livelihood strategy for food security?

Literature visited in this study focus exclusively on gardens as a livelihood strategy for food insecurity. The literature distinguishes between home gardens and community gardens. For example, Brown and Jameton (2000) notes that home gardeners opt to grow vegetables, fruits and eatable herbs – frequently with flowers – in plots around the homes. In contrast, a community garden is run by a collective who pledge support to a farm operation that becomes, the "community's farm". This section highlights the benefits associated with each gardening type, particularly on the food security of low-income communities.

As noted in preceding sections, urban agriculture is a livelihood strategy that contributes to food security. Onyango (2010) illustrates this argument with a study in Orange Farm, south of Johannesburg. His study shows that 89% of the households involved in home and community gardening had no members who were formerly employed and over a third of the households produced 40% of their food in home gardens. Van Averbeke (2007) also examines the contribution of urban agriculture on livelihoods and the impact on food and nutrition security of households engaged in urban farming projects in the township of Atteridgeville, on the outskirts of the City of Tshwane (formerly Pretoria). Households either had a home garden, a community garden, or used open spaces to produce crops. He found the contribution of gardening to household income to be modest. However, home gardens were popular and provided 6.7% of the vegetable intake of 810 grams per day for an average-sized household. Urban farming and food security had a positive correlation, although it was moderately low. The low contribution of urban agriculture to food security is also consistent with nutrition. So, from a nutritional outlook home gardening did not make an important contribution to household food security. The constraints affecting gardening include a lack of space and limited access to water. For Galhena, Freed and Maredia (2013), limited resources and institutional support also restrict the scale of urban farming. Despite these constraints, home gardens are a time-tested indigenous strategy used as a remedy to alleviate hunger. Likewise, Webb (2000) reviewed three case studies of home gardens: two in South Africa (in the Eastern Cape and North-west provinces), and Zimbabwe. He concluded that there was insufficient evidence to promote urban food gardens on nutritional grounds in the Eastern Cape and North-west.

Clearly, the impact of urban home gardens on the nutritional aspect of food security necessitate further investigation. For Maxwell (1995) home gardening as a food production activity is a

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combination of two factors; income, food and nutritional status. A deficiency in one of these elements is a sign of vulnerability to food security. On the other hand, Moyo (2013) denotes the small impact of home gardens on food security as restricted by space. In a case study of Bulawayo, in Zimbabwe, he found that challenges experienced by home gardens was limited space and limited access to water to cultivate bigger crops such as maize, pumpkins, sugar cane, green beans and sweet potatoes. These crops required larger tracts in order to get meaningful harvests. As a result, the economic benefits of urban agriculture such as saving on food produce and selling directly to markets is limited. Inadequate space on residential land does not allow medium to large scale production of crops that usually require cultivation on larger land. Access to additional cultivatable land is thus a requirement to produce more food. The growth of home gardens still should be encouraged to contribute to the food security of the urban poor, seeing that it includes vegetables a source of micronutrients such as vitamins, calcium and iron.

Ruysenaar (2013) witnesses that the impact of urban agriculture diverges between case studies based on other explanations. Ruysenaar (2013) describes the disparities as dependent on the dynamics of a household, a range of factors such as land access, individual capabilities, resources, etc. and the type of urban agriculture followed. On that note, gardening is also a community-based response in South Africa. 'Off-plot' urban agriculture is a growing phenomenon as it mitigates the challenge of land, resources, and institutional support in 'on-plot' gardens (Moyo, 2013). The nature of the urban food supply in the country is often explained through the promotion of urban agricultural activities by NGOs. Meadows (2000 as cited in Reuther and Dewar, 2005), for example, states that virtually all the community gardens in the Cape Flats are dependent on NGOs for support and services. Community-based agricultural interventions are used to address food and nutritional security at a household level.

Most urban agricultural projects are started as a coping or survival strategy for participating households (Reuther and Dewar, 2005; Ruysenaar, 2013). Community gardening programmes are at the forefront of ensuring the participation of many poor households. Like home gardens, community gardens can potentially increase the availability of food and improve income. Again, Van Averbeke's (2007) research indicates that community gardening supplied farming households in Atteridgeville with 6.85 kg of vegetables each month and 28% of the suggested consumption of vegetables for a household. This was similar to home cultivation, except that community gardens sold 22% of their produce to generate an income. In examining the Scaga

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garden projects in Khayelitsha, Cape Town, Reuther and Dewar (2005) determined the potential of urban agriculture on poverty alleviation as moderate. The researchers found no individual deriving income sufficient for subsistence from the community garden.

However, there is evidence that urban agricultural activities accrued to several social benefits besides food security (Reuther & Dewar, 2005). According to Glover (2004), community gardens are a source of social capital accessed and used by members. Through socialisation participants build relationships and networks that strengthen communities and families (Van Averbeke, 2007). Furthermore, research by Battersby and Marshak (2013) in the neighbourhoods of Vrygrond and Seawinds in Cape Town found that the support of NGOs such as "Soil for life" (which promotes home-based urban agriculture) did not translate into improved food security but home and community gardens built positive identity for groups for communities.

Urban food gardens are used for economic and non-economic aspects. Nevertheless, the critical focus of any urban agriculture intervention should remain on food security and nutrition. Home and community gardens can provide improved access to healthy food, fresh nutritious, cheap food and increases household incomes, while simultaneously lowering the effects of pollution from transportation and waste products (Shisanya and Hendriks, 2011; Hendrickson and Porth, 2012). In South Africa, the impact and incidence of urban agriculture appears to be limited. Ruysenaar (2013) argues that "the outcomes of urban agriculture are exaggerated" and is not a key economic activity as some of its promoters claim it to be (Zezza and Tasciotti, 2010). The 2009 AFSUN Urban Food Security survey in Brown's Farm, Philippi, the informal settlement of Enkanini and Kuyasa in Khayelitsha found that agricultural production does not improve food security of households. This is disturbing since Brown's Farm is in close proximity to the Philippi Horticultural Area and Abalimi Bezekhaya (Battersby, 2011). As emphasized by Crush, Horvorka and Tevera (2001) urban food production plays a fairly minor role in the food supply of most households. This interpretation supports the fact that urban food insecurity is due not to a lack of food, but the inability to access food.

In South Africa, there is a need of comprehensive evidence. Urban agriculture can be leveraged toward improved food security by understanding opportunities and obstacles in the context of food systems (White and Hamm, 2014). According to Pereira (2014), a food systems approach is

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established as means of understanding that food security is the outcome of a multifaceted articulation of numerous factors interacting across multiple levels. Therefore, if urban agriculture is an entry point to alleviate food insecurity, it needs to be regarded as part of the wider food system. It needs to address three outcomes: from "activities and processes in the food system", namely, a) food availability, b) food access, and c) food utilisation (Pereira, 2014:4). Battersby et al. (2015) also concede that the sole emphasis on urban production separates urban agriculture from the broader food system and this bounds it's potential.

Another argument Battersby et al. (2015) raise is that urban agriculture does not impact food insecurity in a desired manner due to structural challenges in the system. For instance, Altman, Hart and Jacobs (2009) found that home production did not necessarily imply improved food security. Crush, Hovorka and Tevera (2011) found that only a small minority practiced urban agriculture, particularly those with access to land and inputs, residents who lacked steady access to wage income, and those unable to purchase food to meet their needs. There are ways to advance the impact of urban agriculture on a household's food security; one is to direct policies that facilitate engagement in urban agriculture and partner with NGOs (The City of Cape Town, 2007:6). Reuther & Dewar (2005) also found no indication of improved household food security in community gardens around the Cape Flats irrespective of support from NGOs and resources from the City of Cape Town. As seen above, the question of whether home and community cultivation provide a direct way of improving food and nutrition security is still uncertain. Exploring urban agricultural undertakings in the context of NGOs is also paramount.

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2.2.3 Categorization of urban gardens

The literature emphasises household food consumption as one of the important reasons why urban dwellers participate in home and community gardens. Ruysenaar (2013:221) simply explains *"community or group gardens"* as "growing food communally in community gardens". Community gardens are a great investment in our society as they are seen as an important element of food and wealth creation among the poor. Generally, a community garden is run by a collective who pledge support to a farm operation that becomes, the "community's farm". The management of farming operations involve support of community members, who are the growers and consumers (AFSIC, 2000 cited in Shisanya and Hendriks 2011). Communal gardens are established in public spaces such as school grounds, libraries, clinics or unoccupied municipal land. They are publicly or privately owned and this determines the size. According to Mashinini (2011), communal gardens differ in size from one community to the next depending on land

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availability. This type of garden has tangible and intangible benefits such as producing and accessing fresh nutritious food, promotion of physical fitness, saving income, improved psychological well-being, and builds a sense of community (Parry et al., 2005). In South Africa, community gardens are mainly in the form of gardening projects initiated by a community itself, government or donor agencies. For example, Pick n Pay supports 242 community gardens around the country, producing fresh vegetables and fruits for over 4 600 people (Knopjes, 2015).

On the other hand, *"home gardens"* are informal and considered a common type of urban agriculture which grows vegetables, fruits and eatable herbs, frequently with flowers, in plots around their homes (Brown, 2002). Home gardens are an essential part of local food systems in developing countries. They are also accepted as a significant complementary source contributing to food and nutritional security and livelihoods (Galhena, Freed & Maredia, 2013). Gardens are cultivated privately by individuals in their own yards with a high variation in size and type of produce (Altieri, 1999). In private capacity, individuals are more likely to apply their best efforts, which maximize effectiveness, than they would within the context of communal ownership and use (Mashinini, 2011). South African research and development initiatives focus on home gardening as a food production action. Envisioned to grow and produce food items for household consumption, they can likewise be diversified to produce indigenous medicine for certain illnesses.

An *allotment gardens* is a form of community garden. According to Vitiello and Nairn (2009), allotment gardening provides city dwellers with opportunities to experience nature in their daily life. Allotment gardens are different to community and home gardens in that they are squatter gardens and farmers rent multiple plots within larger gardens. These types of gardens challenge the idea of space and of open design (Sousa & Batista, 2017). The ownership pattern of allotment gardens consists of a few or several individually cultivated plots. Allotment urban gardens provide nutritional and safety nets against unemployment or supplement incomes. The benefits accrued in other gardens also applies in allotment gardens. These include freshly produced vegetables and fruit and income. Gardens increase self-esteem, recovery from stress and fatigue, improved life satisfaction and better social networks (Soga et al., 2017).

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Table 2.1: A table of the different types of urban food gardens

	CHARACTERISTICS	REASONS/MOTIVATIONS
Home gardens	Located on privately owned land – in/near residential property Cultivated by individual Managed by individuals Small-scale subsistence Size of garden varies (smaller to larger hectares of land) Diverse plants – fruits, vegetables, medicinal plants Production is a supplement	For home consumption Obtain fresh food for household Access to food when needed Maintain physical and mental health
Community gardens	Located on state-owned land – on vacant municipal land, public spaces (schools, clinics, etc.) Cultivated by group gardening members Managed by group Larger hectares of land Production is a supplement	For home consumption and income Save on food expenditure Access to quality food at all times Supplement other sources of income
Allotment gardens	Mixed state and private ownership Located on vacant land – municipal land Cultivated by owner Managed by individual and group Located within larger hectares of land Production is a supplement	For home consumption and income Save on food expenditure Supplement other sources of income

Source: author's construction

Recent international and South African studies show the benefits specifically of home or community gardens on food security (Webb, 2000; Reuther & Dewar, 2005; Van Averbeke, 2007; Battersby & Marshak, 2013). The choice of one over the other can possibly be a contributory factor to the limited scope of urban agriculture or its limited capacity to comprehend household food security. However, the prospect of home and community gardens co-existing is not ruled out either. For instance, home gardens can be practiced in private capacity on small pieces of land to produce food for subsistence while community gardening projects can provide

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for household consumption and produce a greater quantity of fruits and vegetables to sell in markets toward income generation. My study will focus on both home and community gardens. There is a need to generate more inclusive information on urban food gardens and food security, and make informed inferences based on two urban agriculture typologies. Evidence needs to be gathered from different and reliable sources to construct a vivid representation of urban agriculture (WWF-SA, 2011).

2.4 Summary and Conclusion

Food security and urban agriculture are two important themes that cannot be disregarded. Literature demonstrates the ability and potential of urban agriculture. More significantly, it demonstrates the context within which urban agriculture exists, and defines how it is used, to what degree and by whom. The literature review provides us with a transitory background on the state of urban agriculture in South Africa. Apparent is the complex nature of urban food insecurity and context specific agricultural solutions. At this point there are two arguments for the role of urban agriculture in addressing food insecurity. First, it provides some form of livelihood for poor urban people. The second point relates to the extent to which the impact is observable within households participating in home and community gardens. The indication of whether these gardens provide a direct way of improving food and nutrition security requires further research. In Cape Town, the Urban Agricultural Policy and services provided by NGO's did not translate into food security for participating households. The role that NGO's play also needs to be addressed in order to improve gardening outcome. In light of the current levels of food insecurity and urban poverty in South Africa, the potential of urban agriculture as a livelihood strategy cannot be easily dismissed. Hence, a sustainable livelihoods approach will be used to explore more perspectives of urban agriculture.

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CHAPTER 3: THEORETICAL FRAMEWORK

3.0 Introduction

This chapter explains the impact of urban agriculture on food security using the sustainable livelihood approach. Sustainable livelihood approaches are standard in development to theorise the economic, social and cultural actions poor people assume. The sustainable livelihood approach (SLA) is applied in different contexts to examine the magnitude and mechanisms through which different types of livelihood strategies are able to help the poor (Adato & Meinzen-Dick, 2002). From the literature, it is patent that urban agriculture is a livelihood strategy and contributes to economic and social capital. Urban agriculture benefits the urban poor in several ways and can be a valuable strategy for promoting food security. The SLA concentrates on the vulnerability contexts and institutional settings within which poor people draw upon diverse assets to build a livelihood strategy (Norton & Foster, 2001). This strength is used to reflect the multifaceted range of assets and actions that people depend on for their livelihoods, and highlights the significance of assets the poor people do not own.

The role of urban agriculture as a livelihood and food security strategy can provide much-needed relief for poor people. Bremner (2012) expresses food security as a state of physical and economic well-being, where all people have access to adequate food to meet their nutritional needs for a productive and healthy life. To assess the impact of urban agriculture on household food security, I begin this chapter by providing an overview of the sustainable livelihoods approach, with specific reference to urban agriculture. Subsequently, I will outline and discuss the key elements of the framework. To conclude, the chapter shows why the sustainable livelihoods approach is the appropriate framework for analyzing urban agriculture.

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3.1 Theoretical Framework: The Sustainable Livelihoods Approach

The sustainable livelihoods approach is concerned with the tools that make positive living possible. According to Serrat (2010), the sustainable livelihoods approach (SLA) creates the link between people and the inclusive empowering environment that influences the outcomes of livelihood strategies. The SLA extends beyond theoretical descriptions to poverty reduction and adopts a holistic approach, focusing on numerous factors (e.g. livelihood assets, vulnerability contexts, institutions and policies), which can either constrain or enhance poor people's ability to make a living (Krantz, 2001). For Scoones (2009:172), the plea is simple: "look at the real world, and try to understand things from local perspectives".

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Sustainable livelihood approaches are entrenched in participatory approaches to development and impelled by concerns about the effectiveness of development activities, particularly among the poor (Ashley & Carney, 1999:5). Initially, it was generally applied and measured as a bottom-up approach that was compatible with rural development. Scoones (1998) was attentive to 'sustainable rural livelihoods' at a time when small-farm agriculture was considered the engine of growth and development. Small-scale farming suggests that agriculture plays a key role in overall economic growth (Ellis & Biggs, 2001). In a rural context, Scoones (1998) mentions three clusters of livelihood strategies that are open to rural people. These are, 'agricultural intensification/extensification', 'livelihood diversification' and 'migration'. Essentially, rural people choose to improve their livelihood from agriculture by intensification (investment and labour input), extensification (land availability), choose diversify income activities, or migrate, temporarily or permanently (Scoones, 1998). In an urban context, rural-urban interactions also include 'rural' activities occurring in urban centres, for example, urban agriculture.

If small-farm agriculture in rural areas is to redress poverty, it is significant to identify the resources or combinations of capitals needed for variety of livelihood strategy combinations. Capitals are assets that permit livelihood strategies constructed by individuals or households. The notion of assets is fundamental to the sustainable livelihoods approach. Rather than understanding poverty as an absence of income, the sustainable livelihoods approach reflects the assets that poor people need in order to sustain a sufficient income to live. The combination of assets and activities pursued are observed as 'livelihood portfolio's' that can be specialized to organize a sustainable livelihood strategy (Scoones, 1998; Ellis & Biggs, 2001).

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In current times the sustainable livelihoods approach is regarded as equally pertinent to both urban and rural survival strategies. For many poor rural households, farming on its own is insufficient for survival, so the tendency is to adopt different livelihood strategies (Ellis, 1999). Mkwambisi, Fraser & Dougill (2011), in their study of urban agriculture in Malawi, also identify links between rural and urban areas which have always existed in Africa and elsewhere. The implication is that when the SLA is applied in an urban context, the activities and outcomes slightly diverge. As discussed in the previous chapter, urban inhabitants are different from their rural counterparts as they primarily depend on wages and salaries to purchase food, rather than producing it. Therefore, the constraints and opportunities that shape livelihoods are different.

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A universally accepted definition of livelihoods, and one which is applied in this research, is provided by Chambers and Conway (1991:6), who state that:

> A livelihood comprises the capabilities, assets (resources, access, stores and claims) and activities necessary for a means of living: a livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at local and global levels in the short and long-term.

Livelihoods are critical for survival and Chambers and Conway (1991:6) suggest that a "livelihood is socially sustainable with the ability to cope and recover from shocks and stress and sustain future generations". Sustainable livelihoods thus require the involvement of different stakeholders and perspectives. Reuther and Dewar (2006) emphasize this by identifying urban agriculture as one of numerous livelihood strategies that empower households to tackle risk and lessen vulnerability. By producing their own food households are able to feed themselves in tough economic conditions (e.g. unemployment) and save money for other necessities. A livelihood embraces the notion of capabilities; being enabled to build your own opportunities with access to assets that sanction activities for a means of living (Chambers & Conway, 1991:4).

The livelihood approach also considers that livelihood strategies can be self-motivated and a reaction to people's flexible responses to shifting conditions (Alinovi et al., 2016:6). A household will diversify its livelihood strategies for survival and to improve their standard of living (Ellis, 1999). The motives to pursue diversification for households are often divided into necessity or choice (Ellis, 2000). According to Philander and Karriem (2016), diversifying a household's livelihood strategies increases the ability to survive unfavourable circumstances and concurrently tolerate shocks and stresses.

Households cannot attain livelihood outcomes without livelihood resources: that is, without the combination of different types of capital. Assets (e.g. human, financial, physical, natural, social) serve as inputs and are fundamental in livelihood frameworks. Providing poor people with access to tangible and intangible assets acts as a foundation for their livelihoods. A tangible asset includes resources and stores with a physical form such as equipment, land, water, cash and food stocks. The intangible assets of a household are support provided in many forms in claims and

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access such as food, work, NGOs, government, family, etc. (Chambers and Conway, 1992). Consequently, strengthening the assets of the poor counteracts susceptibility to poverty. Krantz (2001) and other scholars have applied the SLA to poverty reduction. Instead of providing solutions, the SLA explicitly underpins the constraints that prevent the poor from improving their outcome, so that interventions can be designed accordingly and reach target groups. For example, food security is a fundamental livelihood outcome, and if food security does not exist, other livelihood outcomes will most likely fail to be reached (Jessup-Varnum, 2018).

Food insecurity is complex and has different dimensions (Ellis & Sumberg, 1998). Many poor people use urban agriculture as a survival strategy, an aid for household food security, to generate additional income, as a substitute for cash purposes, a strategy to develop livelihood streams and commercial activities (Ellis & Sumberg, 1998). Urban agriculture as a livelihood strategy takes different functions contingent on a household's and individual's ability and assets. These determine the key elements of food security such as availability, access, utilisation and established food supply (Bremner, 2012:3; WCG, 2016:5). The SLA centres on communities and households as an entry-point for projects and intervention. In this paper, the SLA will be functional at a household level as recipients of urban agriculture projects initiated by NGOs such as Abalimi and Soil for Life.

3.2 The Sustainable Livelihoods Framework: Components and Applicability

The research adopts the sustainable livelihoods framework as a point of reference as it aims to: show the different livelihood strategies adopted by households to improve their standard of living, secure more income and be more food secure, and assess the influence of assets and capabilities of households on their livelihood strategies. The sustainable livelihoods framework does not signify reality but simplifies the understanding of the various factors involved in limiting or improving livelihood opportunities and how these communicate with each other. The framework provides a way of discerning various constraints and opportunities on livelihoods and ensuring that the essential elements are not neglected (Ashley & Carney, 1995:8). For a livelihood to be sustainable, it must be people-centred; receptive and participatory, multilevel and dynamic.

I apply the SLF by the Department for International Development (DFID, 2008). The framework is widely used by many in the development arena and has been applied in several contexts. For

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the purpose of this study, we will attempt to answer Scoones' (1998) question which is to be examined in any analysis of sustainable livelihoods:

> Given a particular context (of policy setting, politics, history, (…) and socio-economic conditions), what combination of livelihood resources (different types of capital) result in the ability to follow what combination of livelihood strategies (agricultural intensification/extensification, livelihood diversification, and migration) with what outcomes? Of particular interest in this framework are institutional processes (…) which mediate the ability to carry out such strategies and achieve (or not) such outcomes (Scoones, 1998:3).

The sustainable livelihood framework entrenches what has been highlighted in this thesis. According to DFID (2000), the SLF conceptualises how people function when confronted by a vulnerability that is caused by a range of factors such as constraints and opportunities, shocks and future trends. Primarily, this framework is concerned about the asset base and how it used in a setting of vulnerability, in diverse organisations, and by what means are the desired livelihood outcomes attained. Essentially, the SLF is a primary conceptual framework for analysing the causes of poverty, access to resources and peoples' diversification of livelihood activities. It is also a framework for assessing and prioritizing interventions (Adato and Meinzen-Dick, 2002).

Figure 3.1: Sustainable Livelihoods Framework

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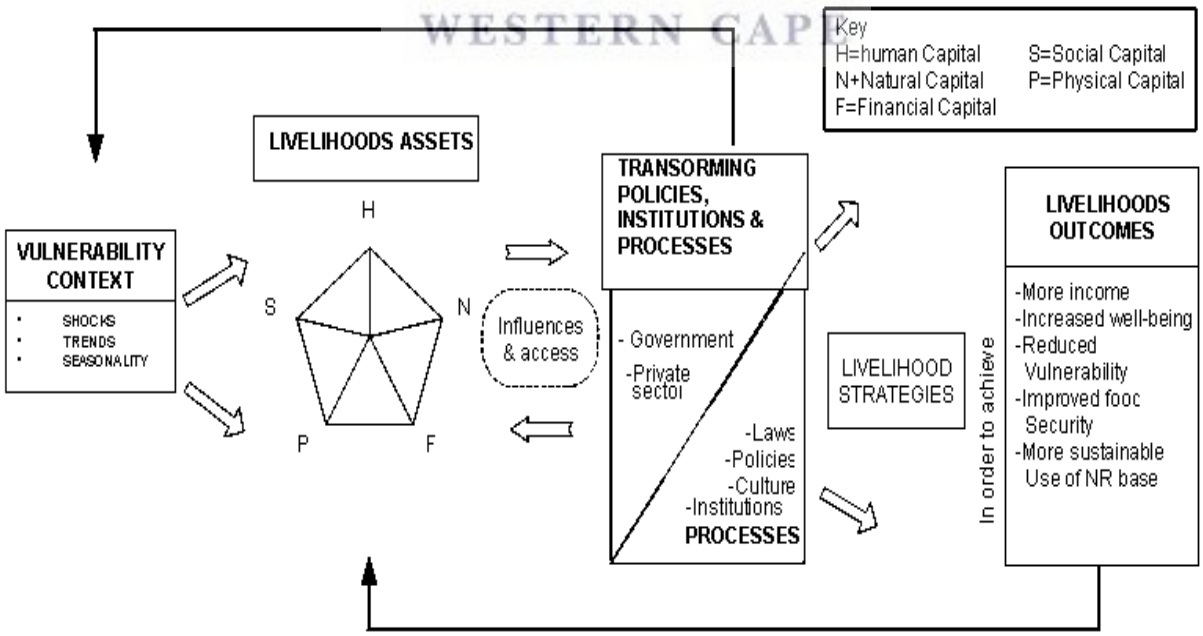

Source: DFID (2008)

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The above framework clearly presents its elements as the vulnerability context, livelihoods assets, transformation of policies, institutions and processes, livelihood strategies and livelihood outcomes.

3.2.1 The vulnerability context

The external environment that influences livelihood sustainability is referred to as the vulnerability context (Allison and Horemans, 2006). The SLF initially considers people to be living within a vulnerability context where they are exposed to risk (Brocklesby and Fisher, 2003). The vulnerability context is characterized by an individual, household's or community's insecurity in a state of change. It covers things that are outside people's control. The vulnerability context contains shocks, trends, and seasonality. Shocks are defined as abrupt pressures that are applied on the livelihoods such as a natural disaster that influences the availability of assets (DFID, 2000). Livelihoods are more or less vulnerable due to long-term trends. The trends can include increasing food prices, poor economic performance, rising unemployment rate, and other elements that indirectly impact on a households' livelihood. Likewise, seasonality refers to events that are predictable; for example, food availability, shifting prices and employment opportunities (DFID, 2000). The vulnerability context might be adverse, but it can also offer positive prospects. Adato and Meinzen-Dick (2002) emphasize this importance as perceived and actual vulnerability that determines people's livelihood strategies.

The vulnerability context reinforces why people slipped into poverty or remained poor (Weeratunge et al., 2014). Exposure to regular shocks and changes adversely impact the present vulnerability and reduce the ability of the poor to improve their situation, often perpetuating a cycle of poverty (Devereux, 2001). Reactive measures include diversifying a household's livelihood strategies (Ellis, 2000). Diverse livelihoods and assets increase the likelihood of coping with stressors. With respect to urban agriculture and food security in South Africa, the vulnerability context is characterised by rising food prices, poor economic growth, unemployment, and weak livelihood strategies. Consequently, considering the dimensions of vulnerability is important for understanding the significant role that livelihoods play in the accumulation of assets and accessing food (Hart, 2009). Vulnerability is a condition that confines goals and ambitions of individuals and households in the present and future, and it can be reduced by an enhancement in people's livelihood assets. By analysing the vulnerability context, the research looks at the shocks, trends and seasonality that affects the livelihoods of the urban gardeners.

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3.2.2 Livelihood assets

For household's asset accumulation is a consequence of a lack of access to resources and public and private sector services (DFID, 2000). Access to livelihood assets is also determined by ones historical, social and economic position in society (Mgquba and Vogel, 2004). For example, poverty circumstances may decrease the ability of households to accumulate assets. The poor typically have few financial and physical assets and low human capital, which controls livelihoods strategies and outcomes. The SLF incorporates the 'pentagon of five capital assets' that are available to individuals in the midst of vulnerability. Human, social, physical, financial and natural capital are tangible and intangible assets that represent strengths and positives (DFID, 2008). Human and social capital refers to knowledge, adaptive strategies, education, skills, decision-making power, and the social networks people possess. Physical capital comprises equipment, buildings, and transportation while natural capital includes land, water supply, the quality of soil etc. Lastly, financial capital comprises cash and savings.

Livelihood assets determine the livelihood strategies individuals and households pursue. Therefore, it is important to enhance the sustainability of these assets. We must also note that different choices often sacrifice one or another of these resources to build up another more suitable livelihood strategy. The asset base is defined by a household's sustained or increased access to all of the above (Bebbington, 1999). Livelihoods incorporating urban agriculture use a variety of available resources, which include natural and physical resources such as land, water sources, and climate. Human and social capital that include knowledge, skills, relationships and social networks. Lastly, financial capital in the form of remittances to attain income. A study by Olivier (2018) shows that urban agriculture can provide an income only with considerable material support and long-term training.

Community assets are an entry-point to sustainable livelihoods; without capitals, livelihood strategies are weakened. The study therefore develops an understanding of the different resources that households have access to and depend on. Human, natural, physical, social and financial assets are important to pursue urban agriculture as a livelihood strategy.

3.2.3 Transforming Policies, Institutions and Processes

The sustainable livelihoods framework also draws attention to the activities that occur within wider policy and institutional contexts and how they support or weaken livelihood strategies. Equally so, it is imperative to understand how individuals and households do well or fail in

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sustaining their livelihoods while vulnerable. This can promote designing policies and interventions that assist people's current coping and adaptive strategies (Allison and Horeman, 2006). In the SLF, the vulnerability context can be improved by activity at the level of "transforming policies, institutions and processes". These structures (government policies and departments, civil society, etc.) control who gains access to assets and decides the array of livelihoods that are open and consumable (Serrat, 2008:7). For example, in urban agriculture, we need to ask questions such as "which institutions are involved", "what national or local policies influence the practice of urban agriculture" and "how can policy and regulation be improved and agriculture institutionalized in local government" (Prain and Lee-Smith, 2010:14). For example, the City of Cape Town's agricultural policy aims to construct an enabling environment for the public, civil society and private agents to increase the scale and scope of urban agriculture in the city (CCT, 2007). The policy on agriculture working with civil society such as NGOs provides people with the services, resources and training to start and maintain their own gardens. Therefore, a resilient livelihood strategy has greater access to the five assets.

3.2.4 Livelihood strategies

Livelihood strategies that ensure households generate and accumulate assets and use services are shaped by the external environment in which people pursue their livelihoods. Livelihood strategies are a combination of choices and activities that people pursue in order to achieve their livelihood goals (DFID, 2008). Basically, it is what people do with what they have (assets). In the SLF, a livelihood strategy is not only determined by assets; it is also influenced by policies and institutions which are responsible for what people do with their assets. At any time, people choose or combine particular livelihood strategies which are temporal or permanent (Weeratunge et al., 2014). The SLF provides a useful lens through which to examine urban agriculture as livelihood strategy and how it is influenced by natural, physical, human, social and financial capital. Livelihood strategies can be diverse (Krantz, 2001). Hence, urban agriculture is often incorporated with other livelihood strategies such as migration, social grants, full-time and part-time work. In previous chapters it is argued that urban agriculture is undertaken by many poor households to substitute income and food supplies.

3.2.5 Livelihood outcomes

Lastly, livelihood outcomes are central to the SLF. Livelihood outcomes are the goals and achievements of people's livelihood strategies (Kappel et al., 2010). A livelihood is sustainable if it can reduce vulnerability to external shocks and trends, and maintains or improves the standard

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of living related to income, well-being, food security and empowerment. It also needs to ensure that the activities do not undermine the natural resource base. The intention of this study was to investigate how gardeners use urban agriculture as a livelihood strategy and how they are able to be more resilient and mitigate vulnerability through home and community gardening. It is through the analysis of various livelihood assets and activities that they have acquired the different livelihood outcomes.

In a nutshell, this framework illustrates with greater access to assets, people with a range of possibilities and capabilities can pursue multiple livelihood strategies to become more food secure and attain more income. I analyse the asset combination of Abalimi and Soil for Life gardeners to comprehend how their assets are assembled to succeed in urban agriculture. I also show how policies and NGOs create an enabling environment for gardeners to pursue urban agriculture as a livelihood strategy for food security. By doing this, other benefits associated with home and community gardens come to the fore. It is also important to note that low-income households are involved in more than one livelihood strategy. Therefore, other potential livelihood strategies are apprehended. However, in applying the SLF I also take note of the strengths and weaknesses of the SLA.

3.2.6 Strengths and Weaknesses of the Sustainable Livelihoods Approach

The sustainable livelihood approach is a good framework for analysing and altering the lives of people facing poverty. It is flexible and can be adapted to any context. For example, it has been used to understand the role of agriculture in growth and poverty reduction in rural and urban areas (Scoones, 1998). Cleary (2003) reviews various case-studies in India and Brazil where the SLA was used to implement and assess development projects. In recent times, it is not only applied in agriculture as seen in Kibwage, Odondo and Momanyi's (2009) study of households in tobacco production in Nyanza region in Kenya. They assess the livelihood assets and strategies of these households and how it improves their living standards. In urban agriculture, Olivier (2018) presents a paper analysing the benefits of gardening to livelihoods. The SLA permits a broad analysis of livelihoods as many poor people rely on various economic activities for their livelihoods. By drawing attention to the diversity of assets that people use to construct their livelihoods, the approach enables a realistic prediction of potential outcomes and impact. The bottom-up method of the SLA recognises that even the poorest of the poor have strengths and make choices about their livelihoods (Krantz, 2001). People are also motivated to pursue the same livelihood for different motivations. Hence, the SLA focuses on livelihood outcomes

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instead of objectives (Clearly, 2003). It distinguishes that all persons have capabilities and assets that can be developed to improve their livelihoods and outcomes.

However, there are significant challenges that impede the progress and effectiveness of sustainable livelihoods. Ashley and Carney (1999) note that it is important to identify where the challenges lie, which features are difficult, and where the sustainable livelihoods approach has not proved useful. For instance, livelihood approaches disregard distributional issues of resources. The food security of the poor remains a key concern and where urban agriculture is a livelihood strategy, access to capitals such as land, water, equipment, etc. needs to be consistent. One way to explore this is to look at the inputs one farmer has that another does not. Livelihood approaches understate the fact that increasing the livelihoods of one group can weaken those of another (Serrat, 2010). The tendency to also assume that capital assets can be expanded in a comprehensive and incremental approach is also a challenge (Serrat, 2010).

3.3 Summary and Conclusion

The SLF encourages dialogue and charting of solutions. Its value to urban agriculture and food security is obvious even though evidence to support this is deficient. The relationship between UA and food security is fairly well documented, but the constraints that hinder urban agriculture as a valuable livelihood strategy have not been well established. In this regard, the research design was designed to identify these challenges. Urban agriculture is a livelihood strategy that can be used for food security only if the appropriate capital is accessible and institutions and policies act as enablers by constructing a conducive environment. Institutions function at all levels of society, whether private or public they efficiently govern access to assets and livelihood strategies. In our perspective, the City of Cape Town's agricultural policy and NGOs (Abalimi and Soil for Life) will epitomize such institutions. An analysis of NGOs will inform whether people have access to capital required for sustainable urban agriculture that yields positive livelihood outcome and reduces food insecurity.

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CHAPTER 4: RESEARCH METHODOLOGY

4.0 Introduction

Research methodology is a way to systematically solve a research problem (Kothari, 2004). This chapter presents the research methodology followed in the study; it outlines the research instruments used for data collection, the sampling criteria applied to select the study population and the method followed in the data analysis. Subsequently, we indicate various steps taken to study the research problem. Finally, the ethical considerations followed by the researcher are presented.

4.1 Research design

According to Creswell (2008) and Harwell (2011) research needs to be embedded within a general framework that provides guidance on all the features of the study and discusses the methodology. In this study the research design expressed the methodology, data collection tools and data analysis. The research design integrates the different components of the study in a coherent way (Labaree, 2009). The choice of which research design to apply is subject to the nature of the problem posed by the research aims, questions, and objectives (Walliman, 2011). This provides the framework for the collection and analysis of data and subsequently which research methods are appropriate.

4.3 Research methodology

The research methodology provides the logic behind various steps taken in studying the research problem. It considers the context of the research problem and justifies the use of a particular technique. In research there are generally two research methodologies, namely, qualitative and quantitative. Qualitative research methodology entails discovery, a high level of detail, and the participant's viewpoint (Williams, 2007). While the qualitative approach reinforces a "thick description", the quantitative approach explains the phenomena using a numerical illustration and manipulation of interpretations of describing and explaining (Creswell, 2008). For the purpose of this study a mixed methodology of qualitative and quantitative research methods was followed. The motive for this is to compensate for the strengths and weaknesses of each method. For example, where quantitative research methods provide us with trends and relationships in numeric terms, qualitative methods are used to explain why these trends or relationships exist according to the lived experience of respondents.

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4.3.1 Qualitative research methodology

Qualitative research methods enable researchers to study social and cultural phenomena. The qualitative approach is used in observing and interpreting reality with the purpose of developing a theory that will describe what was experienced (Newman and Ridenour, 1998). In other words, qualitative research uses 'soft data' to get 'rich data' (Domegan and Fleming, 2007). It helps us understand the world we live in and why things are the way they are. Qualitative research covers a wide range of data collection techniques such as in-depth interviews, focus group discussions, and observations. However, it is much more than applying qualitative methods (Hennink, Hutter and Bailey, 2011). It incorporates the perspectives of the study participants and understand the interpretations they give to events and behaviour. It is therefore important that a qualitative researcher be open-minded, flexible and patient (Hill, 2007). In this study, qualitative research was beneficial in investigating the motives behind the practice of urban agriculture, the challenges urban gardeners encounter in Khayelitsha, and their perceptions on improving urban agriculture as a livelihood strategy. Although, qualitative research is helpful to understand why and how, it is criticized for being confined to a setting and lacks generalizability (Sullivan and Sargeant, 2011).

4.3.2 Quantitative research methodology

A quantitative approach is used to begin a theory and test for confirmation or disconfirmation of the hypothesis (Newman and Ridenair, 1998). The objectives of quantitative research are to quantify variation, describe socio-economic variables and determine cause-effect (Sullivan and Sargeant, 2011). It is about collecting numerical data to explain a particular phenomenon. The goal in conducting quantitative research is to determine the relationship between an independent variable and a dependent variable within a population. Therefore, quantitative methods use pre-constructed standardised instruments where varying perspectives and experiences are expected to fit (Laberee, 2009). The sample is usually randomly selected in order to generalise findings (Yilmaz, 2013). Quantitative research was useful in the assessment of socio-demographic data and their influence on household food security. However, quantitative research has a tendency of taking snapshots of a phenomena and does not account for how people interpret their actions and others (Rahman, 2017). Quantitative research also overlooks the experiences and perspectives of respondents. It is against this background that mixed methodology was used in this study to enable the strengths of qualitative and quantitative research to complement each other. The overall goal of mixed methods is to expand and strengthen the study's conclusions.

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4.3.3 Mixed methodology

Researchers use "quantitative methods when looking for breadth and qualitative methods to analyse depth and meaning" (Muijs, 2004:3). A mixed method methodology encompasses data collected qualitatively and quantitatively. Heyvaert, Maes and Onghena (2011) postulate that in a mixed methods study a researcher collects qualitative and quantitative data by observations, interviews, and questionnaires to combine data in a single study. By doing this, a mixed methodology heightens knowledge and the validity of a study.

The integration of qualitative and quantitative provides a better understanding of the research problem, while counterbalancing the weaknesses of each approach. This study combined a mixed method to statistically prove, explain and describe the correlation between different variables, such as employment, household monthly income and the relationship between urban agriculture and food security. A mixed method was advantageous as data is more comprehensive; the methods provide a stronger conclusion and increased the generalizability of the results. It is, however, criticised for being skill intensive in both qualitative and quantitative and time consuming. To compensate for time constraints, primary and secondary data was applied in various platforms of the research. As indicated by Hox and Boeije (2005), primary data is collected for a specific problem using explicit research methods that fit it best. Yet, the collection of primary data enhanced existing social knowledge created by other researchers.

4.4 Research participants and sampling criteria

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When embarking on data collection, two key concepts come up: population and sample. Holt et al. (2012) define a 'population' as consisting of all persons that we are concerned in drawing conclusions about, whereas, a 'sample' is a subset of individuals drawn from that population. "Choosing a study sample is an important step in any research project since it is rarely practical, efficient or ethical to study whole populations" (Marshall, 1996:552). The study makes inferences about a target group, i.e., low-income households partaking in community and home gardens in Khayelitsha. Therefore, a sample that possessed the required elements and characteristics was selected (participating in community or home gardens and poor).

There are categories of sampling techniques. Probability and non-probability sampling. Choosing which one to apply is dependent on the goal of the research (Latham and Locke, 2007:3). Probability sampling methods are mainly used in quantitative research; they select a large quantity of units from the population in a random manner (Teddlie & Yu, 2007:77). Simple

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random sampling is advantageous in that it is not subjective and the observations from the sample can be used for inferential purposes (Kothari, 2004). In this study, simple random sampling was an important source of the socio-economic data. It was applied to strictly reflect the characteristics of the target population. The sample size was calculated using the following formula:

$$SI = \sum_{i=1}^{n} X_i / 96$$

Where SI = the sampling interval, $\sum_{i=1}^{n} X_i$= the sum of the total population, and 96 = sample size required for the study. The sampling interval (SI) is calculated by dividing the total population by the sample size (N=96) which is standard (Nyariki, 2009). Considering a confidence level of 95%.

To complement the quantitative data, non-probability sampling techniques were used for the qualitative part of the research. Non-probability techniques are primarily used in qualitative studies and select a sample for a certain purpose. The study used purposive sampling. Purposive sampling is the process of selecting subjects on the basis of similar characteristics and the researchers own judgment (Etikan et al, 2016). The sample size is informed by the requirement for representativeness of findings and accuracy (Bryman & Bell, 2008). A "mixed methods sampling" consisting of simple random sampling for quantitative information and purposive sampling for qualitative data collection. Sixty questionnaires were administered in Khayelitsha and twenty gardeners participated in semi-structured interviews. To achieve the sample size of 60 units (30 community gardeners and 30 home gardeners) for the questionnaires, 30 gardeners were trained by Abalimi and 30 gardeners from Soil for Life. Similarly, 10 interviewees from each of the two NGOs were obtained.

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4.5 Data collection techniques

4.5.1 Quantitative data collection

4.5.1.2 Administered questionnaires

After a sample has been collected interviews can be carried out using a questionnaire. The questionnaire takes into account the objectives and research questions of the study. Bird (2009:1307) contends that a questionnaire is an instrument that obtains evidence on the "social characteristics of participants, present and past behaviour, standards of behaviour and their

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beliefs and reasons for action with regards to the topic under investigation". The questionnaire was employed to acquire information on the knowledge of urban agriculture in the perspective of community and home gardens. It is also a tool to acquire socio-demographic data, household properties, and income and food consumption habits. A short questionnaire devised of open and closed ended questions was conducted with participants in community and home gardens in Khayelitsha. Open-ended questions were used to discover the responses given spontaneously, and close ended questions to avoid bias that may result from suggesting responses to individuals (Reja et al., 2003:160). Administered questionnaires granted an opportunity to clarify aspects of the questionnaire for the respondent. By administering the questionnaires, it made it easier to gain further depth by asking probe questions. However, it was time-consuming and ran the risk of misquoting respondents (Laurie and Jensen, 2016). The researcher recorded interviews and transcribed open-ended questions to prevent misquoting respondents.

4.5.2 Qualitative data collection

4.5.2.1 Semi-structured interviews

To avoid snapshot data and results, semi-structured interviews were conducted with the gardeners and fieldworkers in Khayelitsha. Interviews offer in-depth data on the experience and perspectives of participants in a specified theme. Kajornboon (2008) postulates that interviews are a systematic way of conversing and listening to people to attain highly personalized data. The study conducted 10 interviews with community gardeners from Abalimi and 10 interviews with home gardeners trained by Soil for Life. The semi-structured interviews were based on key themes and captured the experiences of gardeners, as well as the perceptions of how the gardens have affected themselves and their households. Two semi-structured interviews were further conducted with one NGO official from Abalimi Bezekhaya and Soil for Life. The interview concentrated on key activities such as project implementation, training, organisational building, and research. The key informants were selected because they are familiar with the study area and had experience in working with the community in urban agriculture. Semi-structured interviews allowed intensive focus on an individual's perspective which made probing easier. The interviews encouraged respondents to be honest and open (Laurie and Jensen, 2016).

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4.5.2.2 Participant observation

Field visits at different times were instrumental in determining how participants interact with each other, who interacts with who and to observe situations informants have described in

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interviews. Observations complemented data collected through interviews and questionnaires. In this study, the researcher assumed different roles to collect data relevant to the problem being investigated (Baker, 2006:171). The observations were frequent during the data collection process. Field trips to the community and home gardens in Khayelitsha and observing operations at project sites were important in making participants aware of distortions or inaccuracies in their descriptions. Participant observations also provided the researcher with techniques to determine who interacts with whom, gather how participants communicate with each other and how much time was spent on various garden activities.

4.6 Data analysis

After the completion of questionnaires, interviews and observations the data were analysed and ready for interpretation. According to Bird (2009) the analysis of datasets obtained from a mixed method approach is referred to as triangulation. Qualitative and quantitative data were integrated to identify apparent themes. Triangulation "helps overcome inherent bias within a single-method, single-observer and single-theory studies thus offers greater validity" (Bird, 2009:1316). Data analysis can be complex and perplexing, particularly when using different data analysis techniques. Nevertheless, studies using mixed methods gain a deeper, broader understanding of the problem at hand. In this study, the data was connected as the quantitative phase helped inform the qualitative phase. Green, Caracelli and Graham (1989) refers to this as a "sequential explanatory design" since qualitative results complement quantitative outcomes.

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4.6.1 Quantitative data analysis

To code the data collected from questionnaires STATA 12.1 was used for analysis. STATA, is a statistical software package that helped us to explore, summarize, and analyse the data set. The data set contained numerous quantities of information known as variables. We chose STATA because it is fast and easy to learn and is known to produce reliable analysis. Furthermore, our findings from the analysis were conveyed via descriptive statistics. The data are illustrated in tables and graphs to summarize data and make use of measures of central tendency to refer to single numbers that describe the characteristics of the data set and use measures of variability (Pretorious, 2007:29). This permitted the researcher to visually associate the similarities and differences among the community and home gardeners.

4.6.2 Qualitative data analysis

The data generated from interviews consisted of written transcripts from different individuals. Narrative analysis was applied to archive people's experiences in textual form. This involved

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various stages; firstly, the data was understood by reading and re-reading the text; secondly, the analysis was focused by developing categories from coding the data (Powell & Renner, 2003). Themes or patterns were identified and organized into coherent categories. As the data were organized into categories, patterns and connections continued to be identified. The themes and connections are used to explain the findings. The following example show categories that were identified to sort responses to the questions.

Table 4.1: Categories generated from qualitative interviews

The table shows some of the questions and categories derived from the responses. Themes used to explain the findings were based on the relationship between codes, code frequencies and the underlying meaning across codes.

Question	**Categories** *Responses to the questions were sorted into:*
What motivated you to start gardening?	Unemployed (Ue), income (I), free time (Ft), food (Food), vegetables (Veg)
Are there any challenges you experience in carrying out garden activities?	Lack of income (not enough income), resources (Res), space and land (SL)

Source: Adapted from Powell & Renner (2003)

Upon identifying categories, the themes below have been identified as key to answering the research objectives and data analysed accordingly.

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Theme 1: Motivations behind the practice of urban agriculture

Theme 2: Community and home gardens as a livelihood strategy

Theme 3: Livelihood strategies and outcomes

Theme 4: Challenges experienced by urban gardeners

4.7 Ethical considerations

The research adhered to three core principles for ethical research (Hennink, Hutter and Bailey, 2011). The first one, entails the 'respect of persons'; the participant's welfare will take priority over the interests of the research. Secondly, as the researcher, I strived to maximize the benefits of the research to the wider society and minimize any potential risk to the participants. Lastly, the study upheld 'justice'; it ought to ensure procedures were administered in a fair, no-

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exploitative, and well-considered manner. The research was approved by the Senate and Economic and Management Sciences Higher Degrees Committees of the University of the Western Cape.

The phase of data collection was guided by informed consent. Individuals were advised on the content of the research, why it was conducted and they were assured that the findings were for the sole purpose of academic research. Participant's voluntary participated in the study and were informed that they could discontinue at any given time. They were informed that the right to not participate had no negative consequences. Lastly, anonymity and confidentiality were granted, their identities protected and the data records were kept confidential. Furthermore, there were no conflicts of interest and the independence of research was and is clear.

4.8 Summary

This chapter discussed the research participants and sample population. It also justifies why the researcher chose the data collection tools and how data was collected. The information on the sample. The chapter underlined how data will be analysed and further clarifies the ethical considerations. The following chapter concentrates on data analysis and presentation. The chapter discusses how the empirical data collected through the methods conversed in this chapter helps to address the research questions.

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CHAPTER FIVE: DATA PRESENTATION, INTERPRETATION AND ANALYSIS

5.0 Introduction

This chapter examines, interprets and presents the findings of the study. By answering the research questions, I demonstrate how urban agriculture is adopted as a livelihood strategy and how it contributes to food security, income generation, and overall well-being. A total number of 60 questionnaires were administered and 20 respondents participated in semi-structured qualitative interviews. In addition, two key informant interviews were also led with two NGO officials to provide more insight on the work of NGOs and urban agriculture as a livelihood strategy for gardeners.

This chapter presents the socio-economic characteristics of the respondents in the context of home and community gardens. This comprises gender, age, educational status, employment status and household monthly income. The study applied descriptive and inferential statistics to assess whether home and community gardens contribute to livelihood and food security and how this is observable within households. The chapter also elaborates the findings using thematic content analysis where I discuss the challenges gardeners face and ways to improve home and community gardens through the provision of capitals.

In Section 5.1 tables and graphs are used to describe the socio-economic characteristics of the study sample. In Section 5.2 I demonstrate how urban agriculture is adopted as a livelihood strategy and to what extent it contributes to household food security is elaborated in Section 5.3. Furthermore, Section 5.4 uses linear regression to determine the factors that influence food security and to what extent. Finally, the sustainable livelihoods framework (SLF) is used to describe the assets and strategies of the gardeners.

5.1 Socio-economic characteristics

Descriptive statistics describe the elementary features of the data and are used to provide simple summaries about the sample. Tables and graphs are used to condense and summarize data; it measures central tendency and provides an indication of how much scores vary from one another (Pretorius, 2007). The socio-economic characteristics are presented in percentiles and graphics to describe the gender of the respondents, their age, educational status, employment status, and household monthly income.

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5.1.1 Gender

The distribution of the sample in terms of gender is indicated in Table 5.1. It shows that the majority of the sample consisted of women (70%). Out of 60 urban gardeners, 42 were women and 18 were men. This indicates that more women than men participated in home and community gardens in Khayelitsha. This gendered breakdown of female and male participation in the case study is not a surprise as urban agriculture is dominated by females and is a trend reflected in many parts of Africa (Maxwell, 1995; Mkwambisi, Fraser and Dougill, 2010; Battersby, 2011).

Table 5.1 Distribution of gender in urban agriculture

Gender	Frequency	Percent
Female	**42**	**70**
Male	**18**	**30**
Total	**60**	**100**

Source: Authors compilation based on field survey, 2018

It is a well-known fact that women play an important role in their households, communities as well as in the economy. Gender analysis in urban agriculture is therefore important for programme planning and policy formulation (Moser, 1993). Van Averbeke' (2007) research in Atteridgeville found that women are central in urban farming as food production forms part of their traditional roles in family units. Women are the ones to assume the responsibility of providing food for their households. Besides, women experience long periods of unemployment which results in deprivation (Olivier, 2018). A study by Mkwambisi, Fraser and Dougill (2010) also shows that urban agriculture was the second greatest source of income for 52.2% of female-headed households in the cities of Lilongwe and Blantyre in Malawi. Hence, one could argue that home and community gardens are an adaptive strategy of women to protect the food security of their households and improve their social standing. In South Africa, the City of Cape Town's agricultural policy specifically targets women in the provision of inputs, equipment, infrastructure and skills development. However, there is a disconnect between the City's policy and views and practices of the urban farming community in Cape Town.

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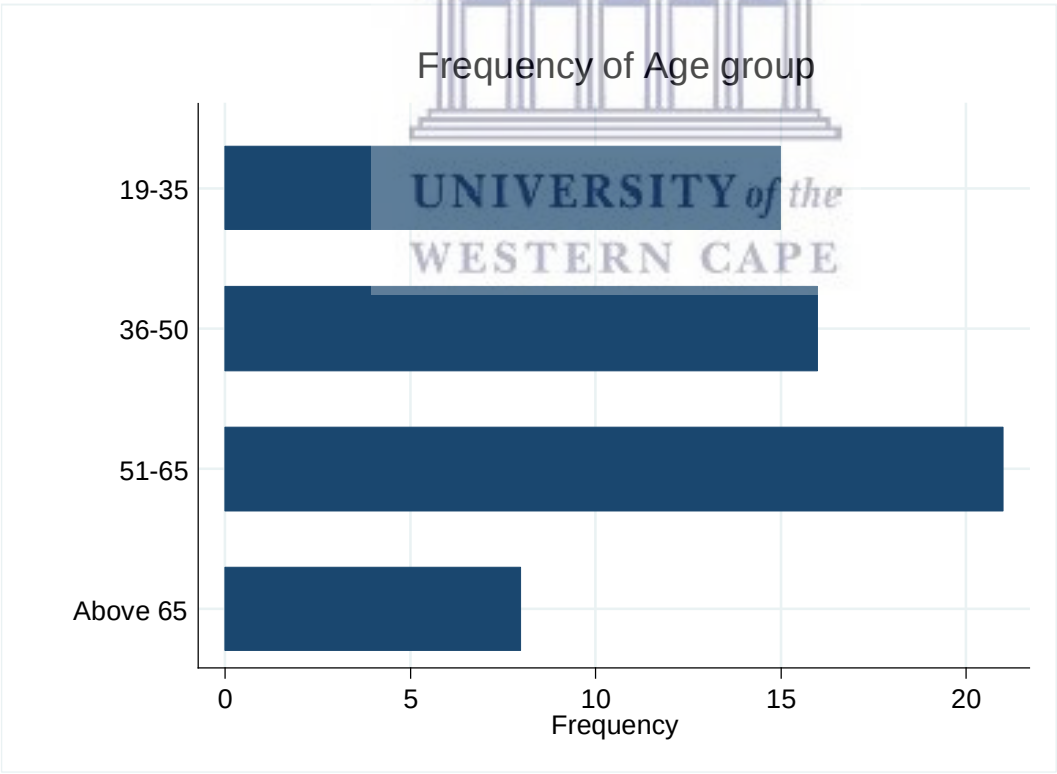
5.1.2 Age Distribution

Home and community gardening participation involves people from almost all age groups. However, the farming population is getting older and the average age is higher around the world (Gro Intelligence, 2016). The results presented in Figure 5.1 below show that participation in urban agriculture tends to rise with age until the 51-65 age group. Olivier and Heinecken (2017) also report that more than 74% of the sampled urban farmers in the Cape Flats were above 40 years old and only 15 were young people. Why is this important? The people most vulnerable to food insecurity are 1.2 billion youth between the ages of 15 and 24 with more than 85% living in developing countries (Cordeiro et al., 2015). Yet, few young people are directly involved in agriculture. For many young people urban agriculture is not seen as lucrative, as a result are engaged in economic viable options such seeking employment. Research indicates that urban agriculture might not be able to lift households out of poverty but will ensure the provision of some of their food needs. Young people need to tap into this potential as poverty and food insecurity jeopardize their chances of becoming healthy adults.

Figure 5.1: Age Distribution



Source: Authors compilation based on field survey, 2018

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5.1.3 Average Household size

The household size is measured by the number of members living in a household. The average household size for the 60 sampled households in Khayelitsha consists of 4.6 members per household. The household size reported by Swanepoel, Niekerk and Haese (2017) in the Cape Town Metropole area was higher in female-headed households. Urban farming households consisted of 4.17 while non-farming households had 4.56 members. However, Khayelitsha had the highest average household size with 5.29 members per household. In this study, the biggest household size consists of 15 members, and only one household consisted of 1 member. In this context, Young and Hamdok (1994) report that household size is important for two reasons. Firstly, as household size increases, the household is worse off in a financial sense. As a result, households experience the 'income effect', where expenditure on normal goods tends to be reduced (Young and Hamdok, 1994). This means that households with bigger families struggle to meet or enhance their food needs because income is stretched to other household expenses. Urban households constantly have to combine diverse income generating activities to meet better livelihood outcomes.

5.1.4 Employment status and household income

Out of the myriad potential benefits of urban agriculture is its ability to provide employment and generate income (Steel, Herrera and Porter, 2015). The contribution of urban agriculture to livelihoods cannot be ignored. The unemployment rate in South Africa rose to 27.5% in the third quarter of 2018 from 27.2% in the previous period (Trading economics, 2018). Figure 5.2 reflects that, of the 60 respondents that completed the questionnaire, 42 were unemployed (70%), 8 were self-employed (13%), and 5 were retired (8%). Only 5 people were employed on a permanent or temporary basis. Averbeke's (2007) study in Atteridgeville indicates a 15% unemployment rate that includes people actively looking for work. The respondents in this study are engaged in various income generating activities. Although 70% are unemployed, they are also involved in urban gardening as a means to generate some income and meet some of their food needs. It is evident that urban agriculture is a livelihood strategy for vulnerable households. It can be used to supplement food baskets and income. In Orange Farm, south of Johannesburg, 89% of households involved in home and community gardens were unemployed and over a third of the households produced 40% of their food in home gardens whereas community gardening supplied farming households with 6.85 kg of vegetables each month and 28% of the suggested consumption of vegetables for a household (Van Averbeke, 2007).

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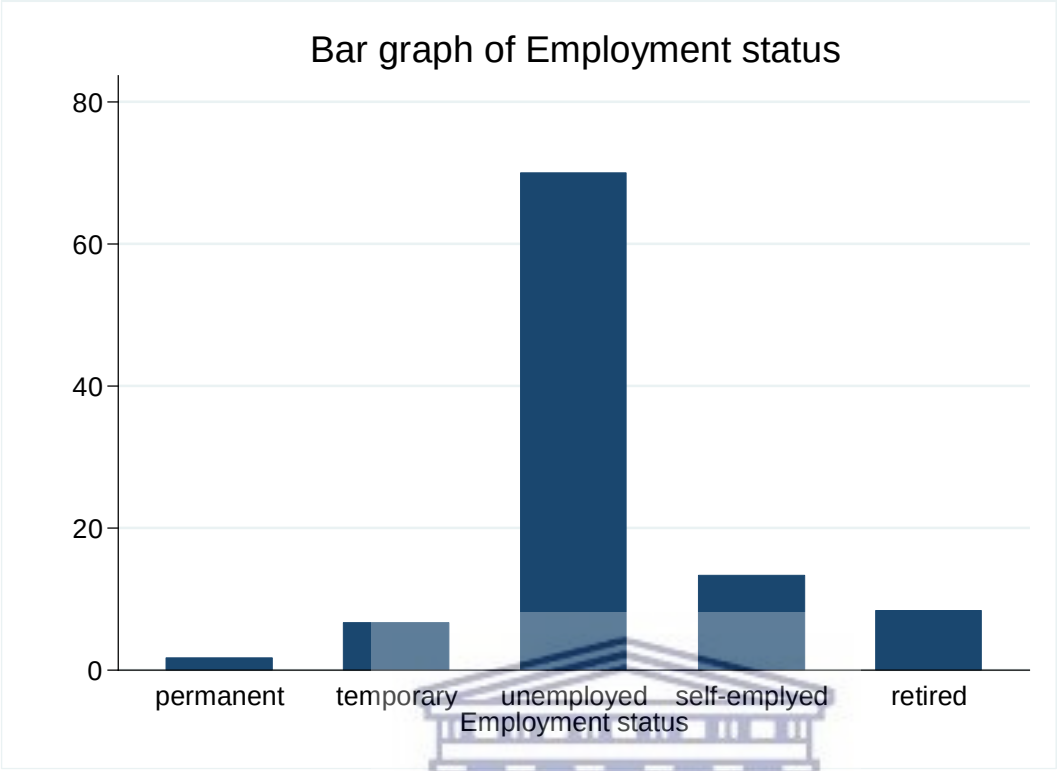
Figure 5.2: Employment status



Source: Authors compilation based on field survey, 2018

One key characteristic of unemployment is low household income. Households with low income are often vulnerable to food insecurity. If you have low income, you are unlikely to purchase sufficient quantity and quality of food. As indicated in Figure 5.3, only 4 respondents had a household monthly income less than R500. The majority (43) had an income between R500 and R2000 and only 13 had more than R2000. Overall, as can be seen in Figure 5.3 below, the study focus was on people with low-to-medium income levels. According to StatsSA (2015) guidelines, low income is between R1 and R19 200 and middle income between R19 201 and R307 200. Figure 5.3 spreads the household income in seven categories, reflecting the socio-economic characteristics of the community. Household income reflects consumption expenditure, access to resources and a consumer's opportunities. Therefore, households with low income often have a weak asset base, limited options to diversify their incomes and spend less on household necessities such as food. This further explains why food insecurity is prevalent in low income communities.

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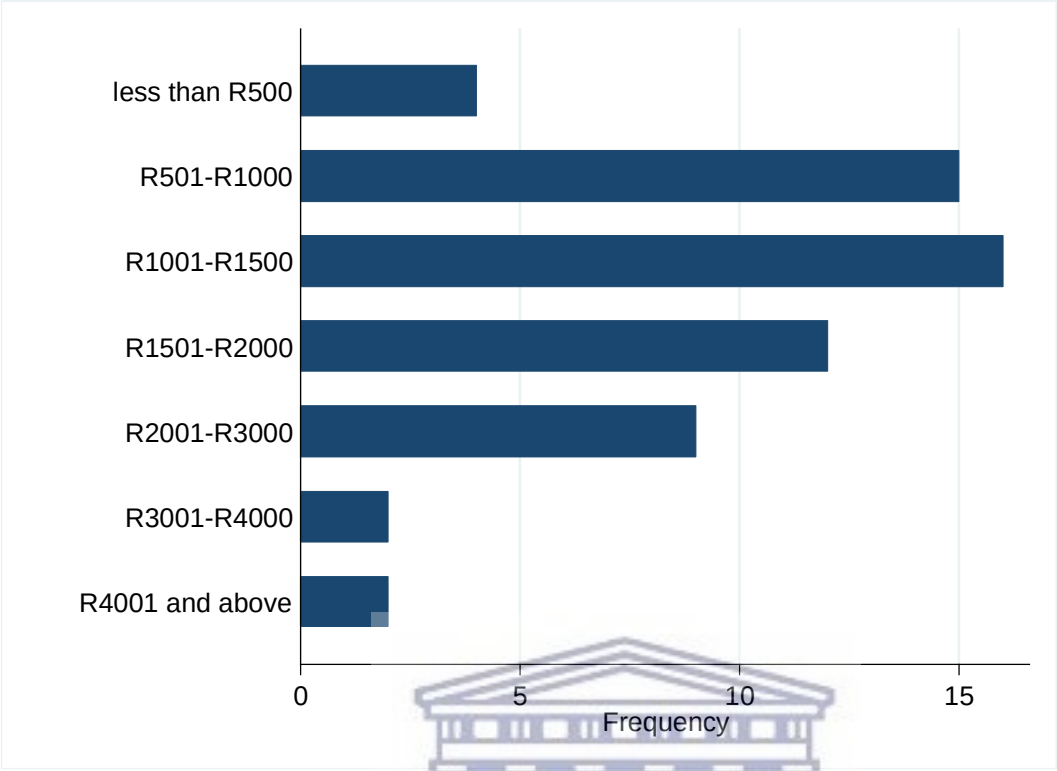
Figure 5.3: Household income per month



Source: Authors compilation based on field survey, 2018

5.1.5 Level of Education

Educational status is a prerequisite for improved livelihood outcomes. Higher levels of education increase the chances of finding employment and the prospects of a greater income (Van de Berg et al., 2011). The lower the education status the higher the chances of experiencing poverty and food insecurity. Most of the gardeners were elderly and had some form of basic education. Generally, 41.67% of households obtained some secondary education ranging from Grade 8 to Grade 11 and only 10% completed Grade 12. Primary school is completed by 31.67% with 6.67% never attending school. Table 5.2 below also shows that 6.67% of respondents (4) possess a technical/college qualification and 3.33% attained a diploma or degree. A study in the Cape Town Metropolitan Area showed that 40.1% of household heads involved in urban agriculture received secondary education and 16.2% completed matric, 5.4% have courses or certificates for formal training and another 3.6% completed university (Swanepoel, 2017). Education is a source of human capital, an important input into the economy. According to McGivney and Winthrop (2016) higher returns on education is reflected on labour productivity. This was equally true for farmers, where Eric, Prince and Aku Elfreda (2014) investigate the effects of

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education on agricultural productivity. The findings of the study indicate that as educational status increases, so does output. Farmers with secondary education had the highest returns on agricultural productivity (Eric, Prince and Aku Elfreda, 2014). The study concluded that education is important for the improvement of agricultural productivity. Education makes farmers easily receptive to new knowledge, keeps the farmer well-informed of technological innovations and share their experiences with other farmers (Eric, Prince and Aku Elfreda, 2014).

Table 5.2: Education status of respondents

Educational status	Frequency	Percent
No school	4	6.67
Primary school	19	31.67
Secondary	25	41.67
Grade 12	6	10.00
Technical/College	4	6.67
Tertiary	2	3.33
Total	**60**	**100**

Source: Author's compilation based on field survey, 2018

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5.2 Urban agriculture as a livelihood strategy for food security

To mitigate the effects of poverty and unemployment, households can adopt urban agriculture as a livelihood strategy. While urban agriculture cannot meet all the food requirements of the urban population, it can assist in providing some access to healthy and nutritious food through the provision of vegetables. This section makes an attempt to show the extent to which of urban agriculture contributes to food security and livelihoods in Khayelitsha, Cape Town.

5.2.1 Home and Community gardens

Community and home gardens are a source of income and fresh vegetables for many households. Respondents in this research were involved in either home or community gardens or participated in both gardens. Table 5.3 below indicates that 43.33% of respondents participated in home gardens, 43.33% in community gardens and 13.33% had a both. Only 13.33% had a home

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garden (on their property) and worked on a community garden (see Table 5.3). The benefits of participation in both (home and community gardens) compared to just one is debatable. The literature indicates that home gardens are used to grow vegetables, fruits and herbs for household consumption (Brown, 2002). While, community gardens produce vegetables and fruits, they tend to sell more and earn an income which compliments what they produce at home. Van Averbeke's (2007) research indicates that community gardens were a source of vegetables for households and sold 22% of their produce to generate income. Evidently, home and community gardens contribute to food and nutritional security as well as livelihoods (Galhena, Freed & Maredia, 2013). In Khayelitsha, 75% of the home and community gardeners believed that urban agriculture increased food availability in two ways: as a source of income and a source of vegetables for their households.

In a broader context, previous studies conclude that while home and community gardens add to the caloric quantity, they also supplement staple-based diets with minerals, protein and vitamins, which are essentials of a balanced diet (Galhena, Freed & Maredia, 2013).

Table 5.3: Participation in home and community gardens

Garden type	Frequency	Percent
Community garden	26	43.33
Home garden	26	43.33
Both	8	13.33
TOTAL	**60**	**100**

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Source: Authors compilation based on field survey, 2018

In addition to indicating their engagement in home and community gardens, participants were asked their motive for pursuing agricultural activities.

5.2.2 Motivation and benefits of home and community gardening

In a contextual sense, unemployment and income are barriers to a household's access to food. In a variety of locations communities are working to ensure sustainable use of resources, earn

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additional income and increase their food baskets (Pereira, 2014). Urban households accommodate urban agriculture in a variety of ways. Community gardens in Khayelitsha are located in public spaces such as school grounds and unoccupied municipal land. On the other hand, home gardens were cultivated in private yards and varied in size. The home and community gardens are seen as increasing access to fruits and vegetables, including community engagement, health and increased physical activities as will be outlined in this chapter.

The main motivation for practicing urban agriculture in Khayelitsha is to generate income. In the interviews, many respondents expressed that the need for income was a major driver for engaging in gardening. The objective is to earn income to support their families. For example, Nosisa a community gardener (female, unemployed) further explained:

> We live in difficult times; it is so hard to find a job. My children have tried everything and they are still unemployed. I worked as a domestic worker and the money was too little. So, working here in the garden helps my family a lot, the little money I get is used to buy small things around the house such as electricity and bread (Interviewee 4, October 2017).

Unemployment distresses many households, particularly in low-economic areas such as Khayelitsha. According to the City of Cape Town (2017), Khayelitsha recorded the highest unemployment rate in 2016. Seventy-four percent of households were unemployed and earned a monthly income of R3 200 or less. This further reiterates that households with low incomes are also vulnerable to food and livelihood insecurity. To buffer the effects of poverty, home and community gardens become a source of livelihood for many vulnerable households. For example, in Atteridgeville, the mean monthly income derived from urban agriculture represented 0.4% of the total monthly household income (Averbeke, 2007). This shows that, income derived from urban agriculture in Atteridgeville is modest. It does however, have additional food security benefits such as providing 6.7% of the vegetable intake of 810 grams per day. Kadenyeka, Omutimba and Harriet (2013) in their study in Eldoret, Kenya found that 65% of producers and 54% of sellers earned 100.76 Kenyan Shilling a day. This was insufficient as Kadenyeka, Omutimba and Harriet (2013) argue that producers meet their domestic needs before any sales, whereas sellers cater for domestic needs alongside their sales. In Khayelitsha, community gardens sell their produce and consume the surplus; on the other hand, home gardens exclusively cater for household consumption. The gardeners that sell their produce cultivated on public or

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municipal land and have access to markets through Harvest of Hope an NGO that helps farmers market their produce. Land is a form of natural capital and important in sustaining livelihoods.

Table 5.4: Motivation participating in home and community gardens

To sell		**To consume**	
Yes	50 %	**Yes**	95%
No	50%	**No**	5%

Source: Authors compilation based on field survey, 2018

For those who sell, the total average income from gardening activities ranges from less than R500 to R2000 per month. More than 46.67% of community gardeners earned less than R500 on a monthly basis, 26.67% received between R501 and R1000, and only 26.67% earned more than R1000 (see Table 5.5 below). In home gardens, selling was clearly not a motive for many; only 20% of home gardeners reported to be selling their produce and received between R501 and R1000 per month. Eighty percent of home gardeners acquired no income. This is consistent with Olivier's (2015) findings that home gardens grow crops for household consumption and what is sold brings in small amounts of cash.

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Table 5.5: Income derived from community and home gardens

Income per month	Community garden (%)	Home garden (%)
Less than R500	46.67	17.14
R501 – R1000	26.67	2.86
R1001 – R1500	16.67	0
R1501 – R2000	10.00	0
No income	0	80.00

Source: Authors compilation based on field survey, 2018

The reason for this difference is that community gardeners sell most of the surplus and earn a salary, while home gardeners rarely sell their produce. Income derived from gardening activities is not enough to sustain households in Khayelitsha. As noted in the previous paragraph, households in Khayelitsha adopt different sources of income and social grants are the main source of income. Income from the garden is an additional source. Kholiwe, a community gardener and old age grant recipient, responded by saying "I do not earn a lot from the garden but it is something. . . With the little I have I can buy groceries to feed my children and take them to school" (Interviewee 15, October 2017).

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Urban agriculture provides a viable source of income and assists poor people to cope with food scarcity and hunger. At a household level, income derived from urban agriculture is allocated to various household expenditures in order to maximize welfare within limited resources (Nugent, 2000). The income earned from the garden is spent on various household necessities such food, water and electricity, health and transport. In Khayelitsha, more money was allocated towards food (68.75%) – see Figure 5.4 below. Food is the largest expenditure for poor households, with 52% of the total household income spent on food. In South Africa, poor households spend more than a third of their income on staple foods such as bread, maize meal and rice (Kroll, 2016). In my study, almost all the households consumed rice (100%), maize meal (90%), bread (88.33%),

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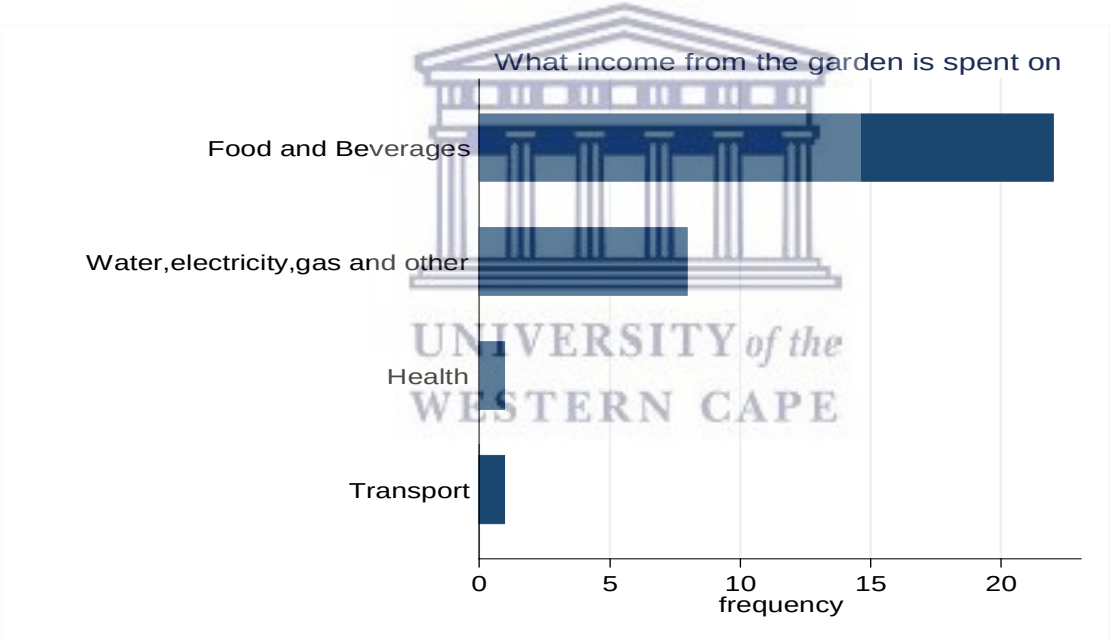
and fruits and vegetables (100%). Therefore, an increase in food costs imply a threat to food security.

The vulnerable groups are at greater risk of food insecurity, because income determines access to food. It is within this context that urban agriculture becomes important. Urban agriculture directly contributes to food security and livelihoods. Analysts agree that the contribution is small; however, support for this activity should be prioritized because the resilience of livelihoods is not only dependent on financial capital, but physical, human and social capital as well. The Western Cape Government Household Food and Nutrition Security Strategic Framework provincial government attempt to improve access to nutritious food to vulnerable groups, promote healthier behavior and access food through the informal and formal food economy. Moreover, the policy adopts a food systems approach to food insecurity (WCG, 2016).

Figure 5.4: How income derivded from the garden is spent



Source: Authors compilation based on field survey, 2018

The majority of the urban population rely on purchasing their food from formal and informal retailers. The study found that urban gardeners in Khayelitsha purchased their food from supermarkets or local shops. In Table 5.6, 76.67% of gardeners purchased their food from supermarkets and local shops, 20% grow their own food, and only 3.33% received food from non-governmental organizations. This further brings into light that the majority of urban

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inhabitants need financial capital such as salary and monetary income to meet their food security. There is consequently a clear correlation between income and food security. A higher income enables households to make choices on where and what to buy, and how much (SACN, 2015). One way of protecting households from food insecurity is improving household access to stable and sufficient income.

Table 5.6: Main source of food for households

Main source of Food	**Percentage (%)**
Grow own food	20
Purchase from supermarket or local shop	76.67
Food help and gifts from organizations	3.33
Total	100

Source: Authors compilation based on field survey, 2018

Money spent on food per month for those surveyed varied between less than R500 and R4000. The least spent on food was less than R500 and only one person spent more than R3000. However, there was an obvious disconnect between 91.67% of gardeners that spent less than R2000 on food per month and 8.34% who spent more than R2000 per month. This could be attributed to the difference in household income or the amount of food they are able to grow for themselves in their home and community garden. Furthermore, family size can influence household food expenditure as larger families normally require larger budgets (Sekhampu, 2012).

A household's ability to access food depends on income and food prices (Crush et al., 2011). Food security means that you have access to affordable, sufficient, safe and healthy food that meets dietary needs to lead an active and healthy lifestyle (FAO, 2015). In home and community gardens one can grow a range of vegetables that have essential nutrients. The nutritional aspect is also reinforced in training provided by Abalimi and Soil for Life who promote organic gardening. For example, Jack Nobanda, a pensioner provides multiple reasons for engaging in community gardens:

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> I love gardens very much. They make me feel very young. The vegetables I eat from my garden grow directly from the soil. I can see them grow and I know what I put into my mouth. I wish everyone can have a garden. It really helps (Interviewee 9, November 2017).

Community and home gardens not only supplement household income for many, but are also a source of food. Ninety-five percent of the gardeners consumed the produce. One of the young persons interviewed views urban agriculture as much more than a means to increase household income but as a tool that feeds families. At the SCAGA One Garden, Khuselwa Bebe, an unemployed youth states:

> I learnt everything I know about gardens at a very young age from my grandparents. I saw how we never ran out of food, from there I realized the importance of using my two hands. I started a garden to help support my family and feed my children. When you have a garden you have access to a variety of vegetables that are good for your health (Interviewee 7, October, 2017).

Eating healthy and increased access to vegetables is another motivation for gardening. This seemed to be a trend amongst home gardeners. Almost sixty percent of the respondents attribute their interest in gardening to health reasons. One of the home gardeners, Nosipho walked me through her garden and explained why she started her own garden. She says: "Every day I eat vegetables. I saw how my neighbor enjoyed having her own garden and I wanted the same". Nosipho is unemployed and survives on child support grants, stating that "Eating vegetables has become easy because I find them in my garden" (Interviewee 3, April 2018). Home gardens are a source of healthy vegetables and this is often a motivating factor. This was further confirmed during the participant observations in community gardens where gardeners would take frequent breaks to pick different vegetables for household consumption. This is one factor that shaped a household's utilization of food. In Table 5.7 below some of the respondents indicate that they eat a variety of vegetables from their home and community gardens. These included spinach an excellent source of vitamin A and C, and carrots which are good in fiber and potassium. Having a home and community garden arguably suggests an interest in improving one's diet (Blakstad et al., 2018).

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Table 5.7: What home and community gardeners eat from their garden

What do you eat from your garden?	
Nomfuneko (home gardener)	I eat everything in the garden, especially beans
Kholiswa (community gardener)	Cabbage, onions, beans, carrots, spinach
Nomkhonto (community gardener)	cabbage, spinach, spring onion, lettuce, beetroot
Masixole (community gardener)	Rocket, Potato, Spinach, Chives
Norman (home gardener)	Spinach and cabbage

Source: Authors compilation based on field survey, 2018

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Respondents were also asked about a change in the household diet. This was to assess if gardening activities introduced new vegetables and fruits to the household's diet. In Table 5.8, more than 50% of the gardeners introduced new food in the household diet. Community gardens grow a variety of vegetables such as raddish, turnip, aubergine/eggplant, and rocket for the higher-income market (Olivier, 2015). Gardeners were also including these commercial crops to the household diet. Masixole Qobo, an elderly community gardener, states that, "Me and my wife eat a variety of vegetables from the garden. I have also learnt how to eat Rocket and turnip. I love the rocket because I put it in my sandwich" (Interviewee 16, September 2017). Abalimi and Soil for Life are NGOs that support community and home gardeners in Khayelitsha and also provide workshops on creative ways to prepare vegetables. The workshops and training provided by NGOs bridge the knowledge gap, equip gardeners with information and ways to include foreign vegetables in their diets. Most importantly, NGOs such as Abalimi and Soil for Life

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mediate access to education that is relevant to UA via short courses. This improves the human capital aspect of gardeners whom have low educational levels. According to the SLA, human and social capital increase the resilience of urban agriculture as a livelihood strategy. This can be attributed to urban agricultures ability to impact dietary diversity, an important measure of food and nutrition security.

Table 5.8: New food in household diet

Since you started gardening have you introduced any new food in the household?	**Percentage (%)**
Yes	51.67%
No	48.33%

Source: Authors compilation based on field survey, 2018

Zezza and Tasciotti (2010) also found that urban agriculture does enhance dietary diversity in developing countries. Although gardeners appear to be eating a very diverse diet, it is still unclear whether it contributes to food security. As noted in the previous paragraph, gardeners purchase most of their food from supermarkets. It is therefore important to quantify the vegetables consumed from the home and community garden to make an informed analysis.

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A study by Alaimo et al. (2008) points out that individuals who participate in gardens consumed 1.4 times more fruit and vegetables and are 3.5 times more likely to consume fruits and vegetables five times a day. In Atteridgeville, home gardens provided 6.7% of the vegetable intake of 810 grams per day for an average-sized household (Van Averbeke, 2007). In Khayelitsha, access to healthy food in the form of fresh vegetables is minimal as many community gardeners sell the vegetables to restaurants in middle income areas and then use the income to purchase food from supermarkets. The question as to whether the food from the supermarkets is nutritious needs to be further explored. Therefore, the findings affirm that urban gardens contribute partially to food security. There is however evidence that suggests that participation in home and community gardens was linked to improved well-being. Assets such as empowerment and an enabling environment are shown to contribute to improved well-being (Browne, 2015). Moreover, well-being is found to have an impact on health, social relationships,

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environment and work. The gardeners shared similar sentiments that their health and overall well-being had improved through the gardening activities. For example, older people get physical activity by the work they do in the gardens, and increased physical activity improves the well-being of people in older people. Gardening is also a social activity that builds good relationships and networks (Browne, 2015; Olivier, 2015; Battersby and Marshak, 2013). In terms of networks, home and community gardens put you in contact with neighbours, NGOs and local government, which is beneficial for access to resources.

Besides growing crops for income and household consumption, some of the respondents participated in urban agriculture for leisure-related activities. This supports that participation in urban agriculture can benefit physical health (Olivier, 2015). The health of communities can be improved not only through increased intake of fresh fruit and vegetables but also by the physical activity needed to produce the food. Moderate intensity of physical activity promotes people's physical fitness and health and carries psychological benefits (Soga et al., 2017). The majority of the gardeners are elderly and more likely to experience chronic health conditions that require physical activity. Home and community gardens advocate healthy living, as Lindiwe Stofile a home gardener engaged in gardening to not only earn income but also to improve her health. She states:

> I have high blood pressure and diabetes and the nurses told me I had to eat healthy food and exercise … My garden is small but it keeps me busy … I work on my garden almost every day and it makes a difference to my body. Now I am healthier than before. (Interviewee 2, April 2018)

The gardeners empower themselves to take action to address their well-being, income and food security to enhance their nutrition and health. They do this in combination with other income-generating activities such social grants and employment. The findings emphasize the importance of diversifying income sources at household level to reduce risk. Mathebula (2017) supports this as he states that households in Southern Africa have multiple livelihood strategies and pursue opportunities whenever they arise. Diversification is important because a dependence on one income source is an indicator of income vulnerability (Maxwell et al., 2000).

5.2.3 Sources of Income

Urban agriculture can be a potential source of income and food for vulnerable households. Nonetheless, households engage in a variety of livelihood strategies to reduce their vulnerability

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to a lack of income and food insecurity. As in many other developing countries, livelihoods are under threat. Urbanization has meant that people seeking employment is expanding faster than growth in the labour market (Maxwell et al., 2000). Consequently, people have less options. The households in this study indicated that their main source of income came from social grants (61.67%), while 25% reported that some household members were formally employed and only 13.33% saw gardening activities as a source of income. Similarly, Crush and Battersby (2010) identify that social grants are the main contributors to household income in some low-income communities of Cape Town. In Crush and Battersby's (2010) study the empirical data shows that while social grants are the largest share of income in most households, it is not enough to meet the household's consumption requirements. Therefore, additional income comes from community gardens and employment.

Table 5.9: Household food sources

Main source of income	Frequency	Percent
Wage employment	15	25.00
Gardening activities	8	13.33
Social grants	37	61.67
Total	**60**	**100**

Source: Authors compilation based on field survey, 2018

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5.3 Household food security

The FAO (2006: 1) states that "Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". Hence, the four pillars of food security are the physical availability of food, economic and physical access, food utilization, and the stability of all three. It is important to determine the level of food security in Khayelitsha. By doing so we are able to determine to what extent urban agriculture contributes to household food security. This responds to the second research objective which was "to explore the urban agricultural undertakings implemented by Abalimi and Soil for Life and investigate how these impact household food security". This study adopts questions from the Household Food Insecurity Scale (HFIAS) to comprehend the reactions and responses to food security and analyzed the data using

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the Household Food Insecurity Access Prevalence (HFIAP) status indicator. The variation in HFIAP is also presented graphically in Figure 5.5 below. The HFIAP indicator assigns households into four levels of household food insecurity: Food secure, mild, moderately food insecure and severely food insecure. This will measure the influence of the "access" component of household food security (Coates et al., 2007).

In Table 5.10, occurrence questions were developed using the HFIAS and adapted to fit the particular context. This is followed by frequency occurrence questions to ask how often the condition occurred during the last 30 days (Ballard et al., 2011). Respondents were asked nine questions and a frequency follow-up question if the answer to an occurrence question was "yes". Table 5.10 exemplifies the answers to each of the occurrence questions. The highest share indicates that they 'do worry that food will run out' (93.33%). This is followed by those who 'eat a limited variety of food' and 'smaller meals than they felt they needed'. This means that for the majority food was always available even though the variety was limited and quantity was smaller. In the context of community gardens, a large share of the production was sold to purchase staple food in supermarkets. It is apparent that gardeners consumed only a small share of their produce, thus the limited dietary intake. Home gardeners consumed most of their produce but had limited vegetables in their gardens. Maxwell (1995) asserts that home gardening as a food production activity is a combination of two factors; income, food and nutritional status. A deficiency in one of these elements is a sign of vulnerability to food security. Urban farming and food security had a positive correlation, although it was moderately low. The low contribution of urban agriculture to food security is also consistent with nutrition. So, from a nutritional outlook home gardening did not make an important contribution to household food security. This is understandable, as food and nutrition security is a multifaceted issue which is not attained through a single approach – be it in the form of agricultural production or purchasing food.

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Table 5.10: Reactions and responses to household food insecurity

How food secure is your household?		Frequency	Percentage
1	Do you worry that food will run out?	**56**	**93.33%**
2	Did you or any household member not eat foods that you preferred because of a lack of money?	**15**	**25%**
3	Did you eat a limited variety of food?	**41**	**68.33%**
4	Did you or any household member eat food you did not like because there was no money?	**8**	**13.33%**
5	Did you eat smaller meals than you felt you needed?	**35**	**58.33%**
6	Did you eat a few meals in a day?	**17**	**28.3%**
7	Did food ever run out because of a lack of money?	**6**	**10%**
8	Did you or any household member go to sleep hungry at night due to a lack of food?	**9**	**15%**
9	Did you or any household member go a whole day and night without eating?	**7**	**11.67%**

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Source: Authors compilation based on field survey, 2018

The last three questions are key to capturing household food security as they indicate the severity of food insecurity. Food intake and physical consequences (Castells et al., 2015) are important components of 'undernutrition' and 'over nutrition'. Undernutrition is a result of a low calorie intake and over nutrition is caused by exceeding the required calories; both are a consequence of a poor diet. Dinbabo et al. (2017) observed an increasing westernized diet in Khayelitsha, which was made up of food items high in carbohydrates, sugar, salt and unhealthy fats. However, the majority consumed a diet rich in indigenous vegetables, low in protein and high in refined carbs. Food choice was determined by a household's income, the cost of food, availability and accessibility. Table 5.10 also shows that about 10% 'did run out of food because of a lack of money', 15% 'slept hungry at night due to a lack of food', and 11.67% went a whole day and

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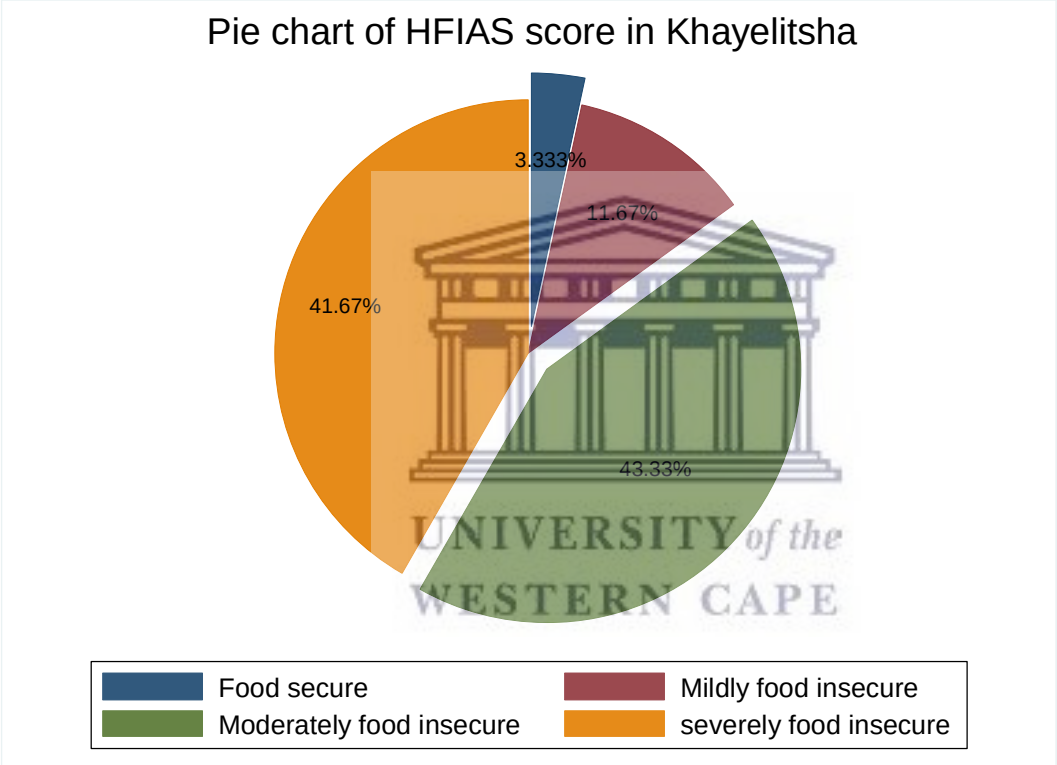
night without eating. Food security is dependent on access to adequate amounts of nutritious food. The lack of economic resources is the most common constraint to food access (Burns et al., 2011).

The food insecurity level was then calculated based on the distribution of the nine responses in Table 5.10. Using the categorical measure of HFIAP, four levels of food insecurity are identified: Food secure, mildly food insecure, moderately food insecure, and severely food insecure. Figure 4.5 shows the percentage of each HFIAP category.

Figure 5.5: Levels of Food insecurity among urban gardeners in Khayelitsha



Source: Authors compilation based on field survey, 2018

The study shows that only 3.33% of community and home gardeners experienced little to no hunger. About 3.33% of households had access to enough food for an active, healthy life in the previous 30 days from the date the study was conducted. Food secure households worried that food will run out, but rarely. The rest of the respondents were categorized into mildly food insecure (11.67%), moderately food insecure (43.33%), and severely food insecure (41.67%).

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Community and home gardens experienced similar levels of food insecurity as a large share was moderately and severely food insecure.

Mildly food insecure households were anxious about their ability to obtain food and did not have enough food. As a result, they were unable to eat desired foods and had smaller meals. However, 3.33% households had access to food and did not experience the condition of going to sleep hungry, and a whole day and night without eating. Many gardeners like Nomfuniso a home gardener (female, employed) indicate that "Although I do not have everything. I always make sure that I have food to feed my family" (Interviewee 8 April, 2018). A greater share (43.33%) of the respondents often sacrificed quality by eating smaller meals and less than 3 times a day (Coates et al., 2007). On certain days they had less desired meals because there was not enough food. This means that choice was limited and households consumed whatever was available. Nonetheless, they did not experience any of the last three conditions: food running out because there was no money, go to sleep hungry at night due to a lack of food, and go a whole day and night without eating. In Khayelitsha, 41.67% of households were severely food insecure. Some gardeners indicate that at times they were unable to acquire enough food for all household members as they lacked the means to do so. Khuselwa Bebe is part of a community garden and has her own home garden. She states:

> Money is never enough to cover all our needs. I have a big family and everything depends on me and my siblings. During tough times I always make sure that my children and mother eat first and my twin siblings always make a plan for themselves as they are old and I do not eat a lot (Interviewee 7, October 2017).

Reducing the size of meals and having less than 3 meals a day was an everyday phenomenon. The severe conditions (7, 8 and 9) conditions in Table 5.7 occurred on a regular basis for 11.67 % of households. These findings are supported by those of Battersby (2011) and Swanepoel and Van Niekerk (2018) in Cape Town, where the levels of food security where extremely high. The HFIAS score showed that 89% of households were either moderately or severely food insecure in Khayelitsha and less than 10% were classified as food secure in both Khayelitsha and Philippi. Evidence suggests that food insecurity in Cape Town is both severe and chronic. In Khayelitsha, gardeners were not better off than who did not participate in home and community gardens. It is clear that gardeners and non-gardeners experience similar economic circumstances. According to Battersby (2011) this is unlikely to change, in light of current joblessness and food prices.

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The results obtained also suggest that gender plays a vital role in enhancing household food security as food insecurity varies substantially between female and male gardeners. Food insecurity is mostly prevalent within female gardeners with mildly, moderately and severely food of 6.66%, 30.00% and 31.66%, respectively, than male gardeners of 5%, 13.33% and 10.00%. Male headed households experience low levels of food insecurity than female-headed households who are mostly responsible for feeding and caring for the family but do not have sufficient access to resources for production (Reddy, 2011). In Ethiopia, female headed households were found to be more vulnerable to food insecurity than those headed by males. In my study, more women (48.33%) were unemployed and participated in community and home gardens to supplement household income. Similarly, South Africa's General Household Survey (2012) female-headed households are not only more likely to have insufficient food but also more likely to run out of money to buy food compared to male-headed households.

Food insecurity further reveals limited dietary diversity. Dietary diversity as a proxy indicator describes unique foods consumed over a period of time (Hoddinot and Yohannes, 2002). Therefore, it is also a good measure for access. The participants were asked about particular food types consumed often to determine the popularity of food items. Table 5.11 provides the proportion of households which consumed the particular food item on a regular basis.

Table 5.11: Foods consumed by community and home gardeners in Khayelitsha

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Type of food	Percentage (%)
Rice	100
Maize	90
Bread	88.33
Vegetables and Fruit	100
Meat and chicken	98.33
Samp and beans	63.63

Source: Authors compilation based on field survey, 2018

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As shown in Table 5.11, a large share consumed starches. Rice was a staple food for a 100%, maize for 90% while 88.33% ate bread. Meat and chicken were part of the household diet for 98.33% of the gardeners with another portion including legumes such as samp and beans (63.33%). Furthermore,100% of the study sample ate vegetables and fruits. The question of how regularly households consumed meat and chicken and fruits and vegetables was not measured. However, the levels of food insecurity indicate that most community and home gardeners consume a type of food based on availability and affordability. This means that most households might afford to buy rice, maize and bread for daily consumption, and the diet lacks nutritional diversity. Households with poor dietary diversity do not consume fruit and vegetables in the required quantities for good nutrition.

Food consumption patterns have changed in South Africa over the past decades. According to Ronquest-Ross, Vink and Sigge (2014) and Dinbabo et al. (2017), South Africans are adopting a more westernized diet with nutritional consequences, thus contributing to non-communicable diseases and obesity. Consequently, gardeners are including meat and chicken and vegetables in the household diet but is poorly prepared or of poor quality. The problem of food insecurity rests with starch-based diets (Hendriks and McIntyre, 2016). Starch based diets lead to micronutrient deficiencies and increasing overweight and obesity. Diets high in saturated fats, sugar and low in fiber is frequently consumed in Khayelitsha here refer to the Dinbabo et al study. Over nutrition ensues as a result of exceeding the required calories. Households with low dietary diversity do not consume the quantities of fruit and vegetables required for good nutrition and are, therefore, food and nutritionally insecure (Hendriks and McIntyre, 2016). Oldewage-Theron, Dicks and Naiper (2006) found similar findings in the Vaal triangle, where the main source of nutrition was carbohydrate rich foods such as maize meal porridge. In our study, when some gardeners were asked “what do you eat for breakfast?” maize meal porridge comes up often. Nonetheless, this study does not explore dietary intake. It shows that poor dietary intake is a good indicator for household food insecurity in Khayelitsha.

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5.4 Factors that influence Food security

Given the broad definition of food security, it is important to consider the multidimensional characteristics that determine household food security (Nkunzimana and Habyarimana, 2017). The determinants of household food security include the availability of food, lack of access to food, and inadequate utilization (Abafita and Kim, 2012). In our case, an element of the availability component is education status, employment as a determinant of access to food, and

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expenditure on food as a component of utilization (Bashir and Shilizzi, 2013). Figure 5.6 shows that education status, employment, household income and expenditure on food influence food security levels of households in Khayelitsha. For this purpose, regression analysis is applied to describe the relationship among the dependent and independent variable. Food security, a dependent variable is then estimated from the observed values of the independent variable.

The testing results in Figure 5.6 indicate the R-squared value of the model is 0.2203 and the adjusted R-squared is 0.1481. This means the explanatory variables describe 4.81% of the dependent variable which is household food security. In other words, educational attainment, employment, household income, household size and expenditure on food describe household food security to some extent. The regression model has an F statistic of 3.05 and Prob > F= 0.0169 that is bigger than 0.05. Subsequently, the regression model cannot predict the dependent variable statistically. The five explanatory variables and the HFIAS score are described below.

Figure 5.6: The determinants of household food security

Source	SS	df	MS	Number of obs	=	60
				F(5, 54)	=	3.05
Model	8.09273867	5	1.61854773	Prob > F	=	0.0169
Residual	28.6405947	54	.530381383	R-squared	=	0.2203
				Adj R-squared	=	0.1481
Total	36.7333333	59	.62259887	Root MSE	=	.72827

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HFIASscore	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Educationalstatus	.0378496	.0865395	0.44	0.664	-.1356516	.2113508
Employmentstatus	.1667771	.1303298	1.28	0.206	-.0945184	.4280725
Householdsize	.0823396	.0428259	1.92	0.060	-.0035211	.1682003
Householdincome	-.2637865	.084793	-3.11	0.003	-.4337862	-.0937868
Howmuchisspentonfood	.0106273	.1055178	0.10	0.920	-.2009232	.2221778
_cons	3.068424	.5729516	5.36	0.000	1.919726	4.217123

5.4.1 Educational attainment

The coefficient for education is 0.378496. This shows that for every unit increase in education, a 0.378496-unit increase is predicated in household food security, on condition that all other variables remain constant. The higher the education level of the household head, the less food

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insecurity the household experience. Mutisya et al. (2016) calculate that household food security was significantly associated with educational achievement in Nairobi, Kenya. The study found that disparities exist in the food security status of poor urban households. Households with low educational attainment were more likely to be food insecure than those with a basic education (Mutisya et al., 2016). Therefore, a household's education decreased with food insecurity status. The sustainable livelihoods approach recognizes the role education plays in increasing capabilities of people and strengthening livelihoods. Investing in education translates into long-term dividends in efforts to reduce food security. However, the 0.378496 coefficient is not statistically significant at the 95% confidence interval as the p-value = 0.664 greater than 0.05. This means that education alone is not enough to improve household food security. Economic opportunities such as employment are equally important.

5.4.2 Employment status

Although unemployment is often associated with food insecurity, the degree to which it leads to food insecurity is less explored. The coefficient of employment status is 0.1667771 which indicates that an increase in employment would result in an increase in household food security. This relationship is anticipated. Figure 5.6 also depicts that the coefficient for employment (0.1667771) is not statistically significant at the 0.05 level as the p-value is 0.206 is greater than 0.05. Employment status is not the sole source of livelihoods. According to Crush and Frayne (2010) most poor households have more than one source of income. This is equally true for Khayelitsha as a large of the respondents are on social grants and informal work. Most individuals and households in Khayelitsha create a living from formal or informal employment, and transfers (social grants and remittances) (Dinbabo et al., 2017). People work in urban agriculture because of a lack of economic opportunities. A lack of economic opportunities explains low income.

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5.4.3 Household income

Household monthly income has a negative sign which indicates that a decrease in household income would result in a decrease in food security. In other words, the negative sign suggests that the probability of a household being food insecure decreases with an increase in household income. Figure 5.6 above depicts a coefficient at -0.2579829, so that for every unit decrease in the household income there is a 0.2579829 decrease in food insecurity. However, household income is statistically significant at the 0.05 level as the p-value is 0.003 is less than 0.005. Food is available in abundance in cities but accessibility and affordability are often linked to

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household income (Oxfam, 2014; Battersby, 2011). Food access is one of the pillars of food security whereas affordability determines access to food. Food affordability is dependent on the cost of food and disposable income that can spent on food. Increased household income means that one can afford to purchase food items and is less vulnerable to food insecurity. Higher incomes also increase the likelihood of consuming a more diverse diet. Dinbabo et al. (2017) also found that people with low incomes have limited choice concerning food. Essentially, people consume food items that are not nutritious because they cannot afford healthy food. Therefore, household income is an important determinant of household food security.

5.4.4 Household expenditure on Food

The share of the total household income spent on food is often used as an indicator of household food security (Smith and Subandoro, 2007). In South Africa, low-income communities spend a large share of the household budget on food. Nonetheless, food insecurity persists. In this study, the coefficient for household expenditure on food is 0.106273. For every unit increase in money spent on food, a 0.106273-unit increase in household food security is predicted, holding that all the other variables remain constant. Furthermore, the coefficient for household expenditure on food is not statistically significant at the 0.05 level because the p-value is 0.920, greater than 0.05.

5.5 Livelihood assets and strategies of gardeners

Livelihood assets and strategies indicate the challenges gardeners encounter and how they are able to make use of various strategies to maintain their households and alleviate food insecurity. Urban agriculture is a livelihood strategy and contributes to economic and social capital and, therefore, positive livelihood outcomes. The sustainable livelihoods approach focuses on the vulnerability context and institutional setting within which poor people pull upon diverse assets to implement a livelihood strategy (Norton and Foster, 2001). This section reflects on the range of assets and actions that people in Khayelitsha depend on for their livelihoods and illustrates the significance of the assets poor people do not own.

5.5.1 The Vulnerability context

The vulnerability context is described by an individual, a household's or a community's insecurity. Food insecurity is a reality in Khayelitsha (WCG, 2016). Likewise, Battersby (2011) found that according to the Household Food Insecurity Access Scale (HFIAS), 89% of households were either moderately or severely food insecure in Khayelitsha. This is consistent with my study, where more than 80% of the urban gardeners were either moderately or severely

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food insecure. Deprived households are often unemployed which hinders their ability to generate income. The lack of income affects people's capability to access nutritious food. Food security and nutrition was a common theme for participating in urban agriculture. Community and home gardens are a means through which people are able to reduce vulnerability to insecurity by increasing income and access to food. Nompilo Zenanzi, a single mother of four has been unemployed for a while now, and living in the informal settlement of Enkanini in Khayelitsha has not made life any easier. She was captured saying that "Gardening is a way of life for me.… I always have food at home and my children are never hungry. I am thankful that I can grow vegetables and not buy from the shops, it is very expensive" (Interviewee 17, October 2018). Nompilo's gardening activities supplement her household income and she is able to meet some of the household's basic needs. Urban agriculture as a livelihood strategy is important because Nompilo has basic education and is dependent on child support grants state how many. Nonetheless, Nompilo like many others is engaged in an activity with the lowest returns which means she has a less diversified income source.

The urban economy is a source of vulnerability in that a basic good such as food is bought through a market (Farrington, Ramasut and Walker, 2002). Poor men and women, therefore, need income to survive. Dependence on an income means that one of the calamitous events faced by poor households is the illness or loss of a major income earner. In Khayelitsha, 21% of the gardeners experienced health problems in the last six months 13% became jobless, 7% were affected by the drought, the rest were either affected by price fluctuations or other livelihood challenges. In the event of ill health, a non-labour response is through the disposable of household assets or credit, which further strains the resources of the family (Farrington, Ramasut and Walker, 2002). The gardeners therefore survive by pursuing a variety of income-generating activities such as wage employment, social grants, gardening, etc. The extent of vulnerability relates to both the level of external threats to a household's welfare and resilience resisting and recovering from these threats.

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5.5.2 Livelihood Assets

In Cape Town, urban agriculture is largely driven by NGOs. Abalimi Bezekhaya and Soil for Life are some of the NGOs operating in Cape Town that help urban farmers to grow their own food to feed themselves. They develop all-inclusive services that motivate urban farmers to grow food for subsistence and for some to sell the excess production. These organisations support community gardeners with training and garden inputs. Abalimi Bezekhaya runs several training

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programmes to enable the urban poor to become self-sufficient as gardeners. I attended one of the courses, the "Basic Training in Organic Urban Food Gardening," which was delivered by a passionate fieldworker who imparted theoretical and practical aspects of seedling production, soil preparation and composting. The three-day basic course is subsidized for unemployed people from Khayelistha and participants receive a certificate upon completion. A unit of Abalimi, Harvest of Hope, also helps gardener's access markets to sell their vegetables. Soil for Life, unlike Abalimi, exclusively supports home gardens. Soil for Life provides a low cost intense three-month training course and basic gardening inputs to participants from Khayelitsha. The support provided by the NGOs enhance the asset base of the gardeners. For example, training imparts knowledge and skills required for sustainable urban agriculture. The organization also mentors and trains gardeners on specific aspects of food gardening such as making compost, growing seedlings, and growing vegetables. According to Soil for Life, by further developing their skills in a specific area, gardeners identify a gap and can potentially generate income.

The assets available to a household enables them to cope with shocks and stresses (unemployment, high food prices, illness etc.) and build livelihoods. The asset pentagon is key to understanding the factors that constrain and improve home and community gardens in Khayelitsha. Galhena, Freed and Maredia (2013) observed home gardens in Sri Lanka and identified lack of space, limited water and resources as constraints affecting gardening. Table 4.9 presents the human, natural, social, physical and financial capitals at the disposal of community and home gardeners in Khayelitsha.

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Table 5.12: Livelihood assets that constrain or improve livelihoods in Khayelitsha

Livelihood Assets				
Human	**Natural**	**Social**	**Physical**	**Financial**
Knowledge and skills Education Training	Land Soil Water	Bonds Networks	Housing Infrastructure	Household income Income generated from community garden

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Source: Authors compilation based on field survey, 2018

Knowledge of farming contributed to the success of many gardens. Many individuals who participated in home and community gardening had the knowledge and skills inherited from their parents and gained through the support of NGOs. Through conversation with Olga, an elderly woman at the Scaga Garden, she comments:

> I was one of the first people to work at the Scaga garden in the nineties. Growing up, all we knew was farming and when I came to Cape Town in the seventies it was all lost. So, I am glad I can still use my knowledge. … I apply everything I know in the garden and it works (Interviewee 1, October 2017).

According to Olivier (2015), human capital increases with experience. As with Olga and many other elderly people, previous knowledge on farming has allowed her and others to continue gardening and earn additional income. This also explains why gardening was dominated by people between 51 and 65 years of age (35%) as they were born during a time when agriculture was the main activity in rural areas. Human capital is very important in livelihoods of individuals as it determines what livelihood strategies a person can employ. Therefore, there is a strong motivation for individuals to continuously improve themselves by participating in training programmes offered by Abalimi and Soil for life. When asked about the services Abalimi provides, one of the NGO representative stated that:

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> Abalimi Bezekhaya equips an ordinary person from the township with all the knowledge and skills they need for starting and maintaining a garden. We also offer constant support and monitor the progress of the gardens (Bulelwa, April, 2018).

Many gardeners had received some form of training from NGOs. Trainees are taught about organic principals of agriculture and are supported with services. Thousands of individuals visit the Abalimi garden centres to purchase compost, seeds, seedlings and to get advice on gardening activities (Breitenberg and Schuurman, 2013). In 2004, Abalimi had serviced 59 community gardens, 42 greening projects, trained 300 people, and sold manure, seed and seedling to over 2000 home gardens (Abalimi, 2004). Ten years later, in 2014, Abalimi supported 3 346 garden centre clients, and 4 543 micro farmers (Abalimi, 2014). On the other hand, Soil for Life trained 3 930 gardeners in sixteen low-income areas of Cape Town (Soil for Life, 2016). The training

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provided by Abalimi was also instrumental in maintaining a home garden. Jack Nobanda elaborates on the important role that NGOs exercise in building the human capital of urban gardeners: "Abalimi has taught me everything I need to know about gardening and how to maintain a garden . . . They also check up on us which helps our community and my home garden". (Interviewee 9, October 2017).

This is an indication that human capital plays an important role in the capabilities of poor people. Many of the gardeners did not complete matric (71.34%) and this is one contributing factor for the high incidence of unemployment in the area. The community and home gardens presented an opportunity to develop human capital by participating in training provided by NGOs. In addition, Olivier (2017) also recognizes the role that NGOs play in ensuring the sustainability of urban agriculture in Khayelitsha. For example, Abalimi and Soil for Life do not only training gardeners, they also offer advanced training to gardeners who want to train others. In this study, some gardeners only received basic training while others went for advanced courses which they share with other gardeners.

Community gardeners are in constant contact as they are within walking distance from each other. The exchange of knowledge through conversation promotes and sustains social capital. The success of community and home gardens is also due to the networks gardeners have developed. Jack Nobanda explains that the "Abalimi and the help other gardeners has been instrumental in ensuring his community garden lasts and continues to generate income" (Interviewee 9, October 2017). Social capital is an important in resource constrained communities because it provides trust, a building block for networks. In this regard, Wellman and Frank (2000: 437) state that "network capital refers to relations with friends, relatives, neighbours, and workmates that significantly provide companionship, goods and services, information, and a sense of belonging". Through participant observation during the field research, it was clear that information was constantly shared. Gardeners regularly paused to ask each other question and exchange knowledge related to their gardening activities. Knowledge exchange was continuous even when they went home. This was easy as many lived in the same area.

Soil for Life preferred to train people from the same area such as in the neighbourhood of Makhaza in Khayelitsha as it was easier to coordinate. Nomfusi, a Soil for Life trainer, says that "I find it very easy to train people from the same area, they know each other and can help one

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another when a problem arises. I stay in Crossroads [a neighborhood in Philippi] and I am not always around" (Interviewee 22, April 2018). Interpersonal action is key to broadening one's knowledge about gardening and keeps a gardener mobilized and motivated.

The findings from this study show how networks and relationships allow the circulation of information on what to plant, and how to deal with pests. Zinziswa, from a community garden in neighbourhood of Harare in Khayelitsha, explains how she landed in the community garden:

> I recently came from the Eastern Cape. I didn't have a job and my neighbour invited me to the garden. Whenever I need assistance she is always there to help. She is like my second mother (Interviewee 14, November 2017).

The possibilities to earn an income were high. Income from gardening varied depending on the size of land and the amount of services received. Allotment gardens which are squatter gardens within larger gardens challenged the idea of space and design (Sousa & Batista, 2017). The allotment gardens are a type of community garden where gardeners cultivate their own pieces of land. This enhanced urban agriculture in Khayelitsha as more people had access to a piece of land. Even so, access to more hectares of land came up as a constant challenge. Mzandile, a young person from Site C believed that "not having enough land constrained their ability to make more money" (Interviewee 20, November 2017). Access to larger pieces of land are a necessity for gardeners as this will allow them to grow more food and hence sell more produce and thereby earn more income to feed their families.

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On the other hand, home gardens are cultivated privately by individuals in their own yards. According to Mashinini (2011), individuals are more likely to apply their best efforts, which maximize effectiveness. For example, growing your own food gives you control over the products used in the growing process and gives instant access to fresh produce while saving money and time on traveling Home gardeners grow few crops due to limited space. Kholiwe, believes that:

> "If I had more space I would have a bigger garden and start selling my vegetables. Every time people walk past they want to buy. Unfortunately, I cannot sell since I only make enough to eat" (Interviewee 15, April 2018).

Home gardens are an essential part of local food systems in developing countries. They are also accepted as a significant complementary source that contribute to food and nutritional security as

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well as livelihoods (Galhena, Freed & Maredia, 2013). In Khayelitsha, home gardens are predominantly used for household consumption and only 20% earned an income from home gardening. As in community gardens, the income derived from home gardens was insufficient. Home gardens are also located on limited space and production is often constrained. The answer to whether additional space can possibly increase production and ultimately household consumption necessitates further research.

The aim to generate an income was popular both among community and home gardeners. However, access to land cultivate on is a major challenge. This is why Khuselwa Bebe used social capital to start a home garden in a neighbour's house. She says:

> I always wanted a garden at home but I do not have enough space. So I spoke to my neighbour who has land and we agreed to start a home garden. It is helping her more than it is helping me. I get money from the community garden and I get to pick any vegetable. So everyone is happy (Interviewee 7, September 2017).

Community and home gardeners have access to resources such as compost, seedlings, manure and the garden fence – all of which were subsidized by the NGOs. The training courses provided by Soil for Life and Abalimi also equips gardeners with knowledge and skills for sustainable agriculture. Cape Town is known for its sandy soils which makes urban agriculture difficult to pursue. Figure 5.7 below is a picture of a community garden known as Masakhane and 5.8 is a home garden in Makhaza. In the first picture the red arrow is pointed at the sandy soil observed in many community and home gardens around Khayelitsha. The second arrows points at the organic compost used to feed the soil.

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Figure 5.7: The soil at Masakhane garden in Section A of Khayelitsha

Source: Author, May 2017

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Figure 5.8: Mlamli's home garden in Makhaza

Source: Author, April 2018

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The soil requires a considerable amount of inputs before crops can start to grow. Organic compost and manure subsidized by Abalimi enable Masakhane and other community gardens to plant on poor soils. Soil for Life also provides compost and assists home gardeners to set up trench beds (see Figure 5. above). Gardeners are also innovative and plant in raised beds with more fertile soil (see Figure 5.9 below). The provision of inputs by NGOs helps gardeners sustain their livelihoods in difficult conditions. Essentially, Abalimi and Soil for Life equip low-income communities with the information required in order to practice urban agriculture in Cape Town, thus enhancing the human capital of the gardeners. Also, follow-up visits after training and advanced courses ensure that gardens continue to adopt techniques that are environmentally friendly. Human, social, and natural capitals often come at no cost to participants; this is a good strategy as many of the gardeners barely derive income to sustain themselves from gardening activities. Soil for Life goes the extra mile by providing home gardeners with a fence that is used to protect crops from animals. Clearly, starting a community or home garden can virtually cost nothing in the presence of NGOs. Institutions such as Abalimi and Soil for Life play an important role in mediating access to natural and social capital for urban agriculture. Depending on the vegetables you plant, you also save money on food itself. This contributes to meeting the food security needs of poor residents in Khayelitsha.

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Figure 5.9: Picture of a raised bed from Masakhane community garden

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Source: Author, May 2017

The lack of financial capital affected both the community and home gardens. In urban areas, financial capital is essential, as access to resources in cities is determined via the exchange of cash (Farrington et al., 2002). Employment and social grants can play a major role in bringing financial capital to residents in Khayelitsha. As noted earlier, unemployment is high and households are barely meeting their food needs. Income derived from community gardening did not improve the financial capital of households and financial challenges are an obstacle in promoting and expanding home gardening in Khayelitsha. To counter this, physical capital such as private property and public infrastructure can advance productivity (Department for International Development, 1999). For the urban poor, a 'formal owned dwelling' enables the opportunity to start a garden at low cost. Public infrastructure such as water contributes to the economic viability of urban agriculture.

Community assets are an entry-point to sustainable livelihoods; without capitals livelihood strategies are weakened. This study shows that the different resources that households have access to can either improve or constrain urban agriculture. It is therefore important to strengthen human, natural, physical, social and financial capital to realise the desired benefits of community and home gardening.

5.5.3 Transforming Policies, Institutions and Processes

The activities that occur within wider policy and institutional contexts can also support or weaken livelihood strategies. In the Khayelitsha context, it is important to understand how individuals and households sustain their livelihoods. According to Allison and Horemans (2006), understanding how livelihoods are sustained promotes policies and interventions that assist people to cope and adapt to vulnerability. Poor people are unable to access healthy and nutritious food which increases their vulnerability to food insecurity. In Cape Town, NGOs develop all-inclusive services that empower urban farmers to grow food for subsistence and sale. These NGOs are part of the institutional context. Abalimi Bezekhaya is an NGO that assists groups to occupy empty spaces in underprivileged communities for urban gardening. On the other hand, Soil for Life exclusively supports home gardens. An Abalimi representative states:

> Our only job as an organisation is to help communities use what they have. We provide training, workshops and resources to ensure that their gardens succeed. So far, we are the only people that offer this in Makhaza (Nomfuneko, April 2018).

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NGOs enable access to resources and services that are required for urban agriculture. Soil for Life provides resources at a low cost to trainees and this contributes to building human, natural and social capital among poor household members. Institutional structures are governed by institutional processes such as policies and laws (Scoones, 1998). In Cape Town, the City of Cape Town (CCT) has instigated a detailed Urban Agriculture Policy that "seeks to create an enabling environment where public, private and civil society agents cooperate to upsurge the scope and scale of urban agriculture in the city" (City of Cape Town, 2007:4). The CCT's Urban Agriculture Policy structures the way gardeners interact with the public sector and civil society. Although this is a move in right direction, Olivier (2015) contends that it is good on paper, but not in practice. Many gardeners concur with this view as a gardener trained by Abalimi responds:

> The government needs to help us with something. We went to their office's countless times, promises were made and they never deliver. I am just confused, what is the responsibility of the government? (Interviewee 7, October 2017).

The discontent with government departments is common in Khayelitsha. When asked whether gardeners receive support from the government, 88.33% said no and 11.67% receive some form of support from. In my sample, the only institutions that provided an enabling environment for community and home gardening were Abalimi Bezekhaya and Soil for life. These institutions supplied gardens with inputs, and gardeners with training and access to markets via Harvest of Hope which works with communities to sell their produce on local markets.

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5.5.4 Livelihood strategies

Livelihood strategies are a combination of choices and activities that people pursue in order to achieve their livelihood goals (DFID, 2008). Poor households survive in difficult socio-economic circumstances. As a result, they combine livelihood strategies which are temporal or permanent (Weeratunge et al., 2014). Temporal strategies can include migration or commuting to another town, whereas, permanent livelihood strategies are extensification and intensifying agricultural production, permanent out-migration, etc. Battersby (2011) and (StatstSA, 2013) show that poor South African depend on social grants and salaries. In my sample, most people were unemployed and social grants (61.67%) became the main contributor to household income. In previous chapters it is argued that urban agriculture is undertaken by many poor households to substitute income and food supplies. Lindiwe is a home gardener trained by Soil for Life who indicates that "We use other means to support our family … my son works and he assists with

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groceries every month. My daughter also earns child support grants for her children and that helps too" (Interviewee 19, April 2018).

Social grants are an important livelihood strategy for families because gardeners who make use of social grants reduced their vulnerability to food insecurity. Studies elsewhere indicate that urban agriculture is a livelihood strategy and a source of income for the urban poor. For example, in Lilongwe and Blantyre in Malawi, households could support themselves exclusively on food produced on agricultural plots (Mkwambisi, Fraser and Dougill, 2010). In Malaysia, growing basic vegetables, improves the daily intake of fresh food and nutritional status that results in individual food security (Rezai, Shamsudin and Mohamed, 2016). Urban agriculture is thus one of the many livelihood strategies that urban poor people pursue to reduce their vulnerability to various shocks (e.g. drought) and stresses (e.g. unemployment). In this research, respondents attribute their participation in community and home gardens to unemployment and lack of income.

5.5.5 Livelihood outcomes

Livelihood outcomes are goals and the achievements of people's livelihood strategies (Kappel et al., 2010). A livelihood is sustainable if it can reduce the vulnerability to external shocks and trends, maintain or improve the standard of living related to income, well-being, food security and empowerment. The main motivation behind urban agriculture was to earn additional income to support families. However, only 45% felt they had achieved this. The rest of the respondents felt that urban agriculture improved their household food security although more than 80% were observed to be food insecure. Furthermore, improved well-being was the most recorded livelihood outcome. Nomlindi Sishuba, an elderly community gardener, further explains:

> As you know my child, life can be very stressful. Every time I come to the garden I go home a different person. When I am here I completely forget about my stress. So yes, I can say it does improve my mental state (Interviewee 10, April 2018).

The garden had a positive health benefit. More than 57.63% of the home and community gardeners indicate that the work in the garden improves their health. They can increase access to fresh and nutritious vegetables, exercise and spiritual upliftment. While urban agriculture tends to be analysed largely via the lens of how it reduces food insecurity and increase income, it also has other benefits. Many of the participants are elderly and are prone to a wide range of health problems. The time spent at the garden keeps them moving and occupied and this reduces stress

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and anxiety. Similarly, Reuther and Dewar (2005) found that urban agriculture did not only have economic benefits but accrued to several social benefits besides food security. Through socialisation participants build relationships and networks that strengthen communities and families (Van Averbeke, 2007). Battersby and Marshak (2013), in the neighbourhoods of Vrygrond and Seawinds in Cape Town, found that home and community gardens built positive identity for communities. Essentially, urban agriculture also provided gardeners with self-confidence to participate with their community (Olivier, 2018).

5.6 Summary and conclusion

This chapter presented a thorough understanding of the findings gained from the questionnaires and interview process. It illustrates the potential of urban agriculture as a livelihood strategy cannot be easily dismissed. Urban agriculture is one of the many livelihood strategies that the urban poor pursue to reduce vulnerability and achieve improved livelihood outcomes. More than sixty percent of gardeners received some form of social grant (old age, child support grants) and in 25% of households, a household member was employed. Home and community gardens are a source of fresh vegetables and income for the urban poor in Khayelitsha. However, the impact of urban agriculture on food security is minimal. The Sustainable Livelihoods Approach, as a theoretical framework, was used to analyse the relationship between food security and urban agriculture. The chapter raised the importance of factors such as assets and strategies in understanding how gardeners were able to benefit from home and community gardens. Furthermore, the findings are analysed in great depth by drawing conclusions and providing recommendations.

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CHAPTER SIX: SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

6.0 Introduction

The aim of this study was to explore the potential of urban agriculture as a livelihood strategy for household food security. To do so, three research objectives were identified. First, we sought to examine the literature on food security and urban agriculture and investigate how urban agriculture can be adopted as a livelihood strategy. Secondly, the study also explores the urban agricultural undertakings implemented by Abalimi and Soil for Life. Finally, the last objective is to provide recommendation for government and policy makers on ways to improve urban agriculture through the provision of capitals. In the preceding chapter, the quantitative and qualitative data was described graphically and tabulated to demonstrate. Subsequently, regression analysis was employed to reflect the strength of the relationship between food security and urban agriculture. This chapter gives a summary of these findings in relation to the research objectives and questions.

6.1 Summary of Key Findings

6.1.1 Food security and urban agriculture as a livelihood strategy

Urban agriculture is an appealing movement as it provides improved access to healthy nutritious and cheap food (Hendrickson and Porth, 2012). Urban agriculture as a livelihood strategy for food security is well documented (Maxwell, 1995; Armar-Klemesu, 2000; Mkwambisi, Fraser and Dougill, 2010). However, evidence to support urban agriculture as a viable livelihood strategy for food security in South Africa needs to be developed. From the literature we observe that urban agriculture is employed in a number of ways: (1) gardens are a source of employment, (2) people earn an income by selling their crops, and (3) people harvest fruit and vegetables for household consumption.

Countries such as Cuba, Indonesia, and many more have successfully supported small scale urban production as a partial supplier to household food baskets and livelihoods. In Lilongwe and Blantyre in Malawi, urban agriculture was the second greatest source of income for all households. In Kenya, people who sold their produce were also more food secure than those who did not (Kadenyeka, Omutimbi and Harriet, 2013). Community and home production contributed to household consumption and income in cases where households produced a surplus. South African case studies presented similar findings.

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Onyango's (2010) study in Orange Farm, south of Johannesburg, shows that 89% of the households involved in home and community gardening were unemployed and over a third of the households produced 40% of their food in home gardens. Evidently, urban agriculture was used as an adaptive strategy to reduce vulnerability. Urban farming and food security had a positive correlation, although it was moderately low. The role of urban agriculture as a complimentary and supplementary source for food security is mixed in my study area. Almost all community gardens were a source of income with 45% indicating that it had improved household income. They earned as little as less than R500 and a few earned more than R1000 per month. In home gardens only 20% derived an income and had access to fresh vegetables.

Our findings indicate that urban agriculture is not a viable food strategy as it did not improve household food security. Only 3.33% of the households were food secure, 11.67% mildly food insecure and 85% moderately or severely food insecure. This supports Battersby (2012) contention that urban agriculture forms a minor part of a viable livelihood strategy for food security. Reuther and Dewar (2005) also determined urban agriculture's potential on poverty alleviation as moderate in Khayelitsha. The level of food insecurity can be expected since no individual derived sufficient income for subsistence from the community garden. For Olivier (2015) this might be true but it fails to capture the qualitative aspects. The qualitative aspect to food insecurity also relies on respondents themselves to evaluate household food insecurity by incorporating perceptions of food insecurity and hunger. Attitudes towards healthy eating and other individual and social benefits are also important. In Khayelitsha, 71.67% believed that their food security improved ever since they started gardening. The findings of this study also support those of other authors in terms of social and individual benefits.

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The research finds\\ that the benefits of home and community gardens cannot be generalised. The relationship between urban agriculture, income and food security was not a strong one. A holistic approach highlighted some benefits of urban agriculture and drew insights from other cities. In doing so, we identified the barriers constraining urban agriculture and asset accumulation as essential for sustainable livelihoods.

6.1.2 The urban agricultural undertakings implemented by Abalimi and Soil for Life and how these impact on household food security

The research discussed the vulnerability context, livelihood assets and strategies employed by gardeners. Yet, it is equally important to observe the institutional context and processes that

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influence livelihood strategies (Serrat, 2008). They develop wide-ranging services that motivate urban gardeners to grow their own food for income and subsistence. Abalimi Bezekhaya empowered people in Khayelitsha through training and skills development, and also provided resources such as compost, seeds and seedlings, manure, etc. at a subsidized price. Many of the respondents in community gardens attribute their continuation of urban agriculture to the work of these organizations. According to Abalimi, 3 346 gardens centers and 4 543 micro farmers were supported in 2014 (Abalimi, 2014). These numbers continued to grow as more people in Khayelitsha and surrounding areas are showing an interest. The fieldworker proclaims that "we would love to train more people all over Cape Town but our resources are constrained" (Nomfusi April, 2018).

Likewise, Soil for Life provides a low cost intense three-month training course and basic gardening inputs to participants from Khayelitsha, Mitchells Plain, Gugulethu, Elsies River, Langa and Philippi. However, they exclusively support home gardens. Home gardeners were located in the same area and this made it easy to coordinate. Upon interviewing the fieldworker from Abalimi, she recognised the importance of 'experiential learning' and noted that this is what kept the participants motivated and ensured that they continue with their home gardens.

It was evident that NGOs have the human, social, physical and financial capital to establish and maintain community and home gardens in Khayelitsha. The natural capital such as land for cultivation is facilitated by the Department of Agriculture and the City of Cape Town. Gardeners recognised limited space as a challenge. Home gardeners cultivated on their own land, whereas community gardeners used public and municipal land. For, home gardeners their yards were too small which limited the type and quantity of vegetables that were produced. Production on a larger scale is also a determinant of income. Community gardens required larger hectares of land to generate more income. This highlights a deeper concern for the lack of support by the City. Therefore, natural capital contributes considerably to the economic viability of urban agriculture in Cape Town. The NGOs in the present study required the partnership of government departments in order to assist gardeners efficiently.

Ultimately, home and community gardeners require much more than the assistance of NGOs. They need the City of Cape Town to translate its policy into action. One way is to improve its partnership with Abalimi Bezekhaya and Soil for Life. This will ensure increased availability and access to resources necessary for the success of home and community gardens. Institutional

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structures and process are important to urban agriculture because they contribute to the overall sustainability.

6.2 Recommendations

The relationship between urban agriculture, livelihoods and food security is evident. It is also evident that there is a need for support from the City of Cape Town and the Department of Agriculture. The economic rewards of home and community gardening hinges on institutional support and processes. It is recommended that municipal governments improve their partnership with NGOs in a number of ways:

1. On a policy level, the City of Cape Town's agricultural policy needs to act out what it stipulates. It should provide production inputs and facilitation and an enabling environment for civil society agents.

2. Urban Agriculture is ought to be assimilated in the planning processes. This will ensure that beneficiaries of home and community gardens are part of the decision-making process. All stakeholders should be consulted prior to the implementation of programmes.

3. The government also needs to provide an enabling environment for urban residents to start their own gardens. One way, is to lease land at an affordable rate and release some of the regulations on farming. Improving agriculture regulations in low income communities could go a long way towards feeding the growing population and improve livelihoods.

4. Assist with technological innovation to enhance the benefit of urban agriculture to household income and food security. Providing gardeners with information and resources is key to a more sustainable urban agriculture.

Food insecurity levels are high and pervasive in poor urban communities that it can no longer be ignored. Interventions are now moving steadily to develop strategies to improve urban livelihoods. Food security regardless of location, depends on food availability and a household's ability to access food. The consensus is that urban agriculture is one of the solutions to food insecurity. Urban agriculture provides improved access to healthy nutritious and cheap food. Households engaged in urban agriculture are more likely to enjoy a diverse diet, consume more calories and have access to basic staples, and fruits and vegetable products.

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Urban households in Khayelitsha have adopted urban agriculture as one of their numerous livelihood strategies. Home and community gardening are the most convenient types of urban agriculture that is being practiced in the area. Home and community gardening are predominantly practiced by elderly women between the ages of 51 and 65 years. They practice urban agriculture to generate income and ensure household food security. Urban agriculture is a source of employment for many households and plays an important role in improving healthy eating habits. The financial contribution of urban agriculture was substantial and not statistically significant to total household income. The income generated by selling agricultural produce was modest, as little as it was, it was used to purchase more food and meet other household expenses. This substantiates that urban households in Khayelitsha depend largely on purchasing food from the supermarkets and that urban agriculture plays an important but minor role. Therefore, the level of food insecurity in the community is widely determined by diverse livelihood strategies. There is also a strong dependence on NGO's for human, social, physical, natural and financial capitals.

The potential of home and community gardens to fully contribute to urban household food security and livelihoods is constrained by limited land, financial challenges and limited services. There is a need for collective responsibility by various stakeholders such as the City of Cape Town and Department of Agriculture to facilitate access to resources and services. Gardeners should be provided with the necessary skills and equipment to expand their agricultural production. By employing a sustainable livelihoods approach, this study has presented the contribution of urban agriculture to income, household food security and overall well-being. Even though such benefits appear to be minor, there is significant advances to valuing healthy food.

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APPENDICES

Appendix A Research Instruments

Appendix A1: Household Questionnaire
INSTITUTE FOR SOCIAL DEVELOPMENT

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PRIVATE BAG X 17

BELLVILLE, 7535

TEL: 021 959 3858

Dear Sir/Madam

Re: Questionnaire for Research on the contribution of community and home gardens on food security in Khayelitsha, Cape Town

My name is Abongile Mfaku and I am a final year Masters in Development Studies student at the University of the Western Cape. I am currently conducting research for my thesis on "Urban agriculture a livelihood strategy for Food security in the Cape Flats: A case study of community-based and home food gardens in Khayelitsha, Cape Town". As a gardener and community member of Khayelitsha, I would appreciate it if you would voluntarily participate in the study and complete the attached research questionnaire.

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Please note that all information will be preserved with strict confidentiality.

I appreciate your time and patience to complete the questionnaire.

Thank you.

Yours sincerely

---------- ----------

Abongile Mfaku (researcher) Dr A. Karriem (supervisor)

Section A: Socio-economic Data

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	Questions	Answer
1	**How old are you?** 1= 19 – 35 2= 36 - 50 3= 51 – 65 4= Above 65	
2	**Gender** 1= Female 2= Male	
3	**Educational Status** 1= No school 2= Primary School 3= Secondary School 4= Grade 12 5= Technical/College 6= Tertiary	
4	**What is your current employment status?** 1= Employed – permanent 2= Employed – temporary 3= Unemployed 4= Self-employed 5= Retired	
5	**The House you live in, is** 1= Formal owned dwelling 2= Formal renting dwelling 3= Informal/ shack in informal settlement 4= Informal/ shack in backyard 5= **Other** (specify)	
6	**How many people live in your household?**	
7	**What is the main source of income for your household?** 1= Wage employment (part-time/permanent) 2= Gardening activities 3= Social grants (child, old age, disability grant)	
8	**What is the household monthly income?** 1= Less than R500 2= Between R501 and R1000 3= Between R1001 and R1500 4= Between R1501 and R2000 5= Between R2001 and R3000 6= Between R3001 and R4000 7= R4001 and above	

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Section B: Community and Home gardens

9	**What type of garden do you have?** 1= Community garden 2= Home garden 3= Both		
10	**Do gardening activities increase food availability in the house?** 1= Yes 2= No		
11	**If yes in question 11, how?**		
12	**What are the three main products you cultivate?** **1.** **2.** **3.**		
13	**Why are these the main products?** *Please read options* **Multiple response (1=yes, 2=no)**		
13.1	To sell		
13.2	To consume		
13.3	To share		
14	**How much do you earn through your urban HH garden/community per month?** 1= Less than R500 2= Between R501 and R1000 3= Between R1001 and R1500 4= Between R1501 and R2000 5= Between R2001 and R3000 6= Between R3001 and R4000 7= R4001 and above	**Household Garden**	**Community Garden**
15	**What do you spend the money on?** 1= Food and Beverages 2= Clothing and Footwear 3= Water, Electricity, Gas and other fuels 4= Health 5= Transport 5= Other, specify		
16	**How much do you spend on food per month?** 1= Less than R500 2= Between R501 and R1000 3= Between R1001 and R1500		

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	4= Between R1501 and R2000 5= Between R2001 and R3000 6= Between R3001 and R4000 7= R4001 and above	
17	**What do you eat from your garden?**	
18	**Since you started gardening have you introduced any new food in the household?** (has your diet changed)	

Section C: Level of Food security

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	Questions	**Answer**
19	**What is the main source of food?** *Multiple response* 1= Grow own food 2= Purchasing from supermarket or local shop 3= Borrow or eat food with neighbour 4= Food help and gifts from organizations 5= Remittance from family 6= **Other** (specify)	
20	**What is your favourite meal?**	
21	**How many meals do you have in a day?**	
22	**Which food is frequently included in the household diet?** *Multiple response, **1=Yes, 2=No***	
22.1	1= Rice	
22.2	2= Maize	
22.3	3= Bread	
22.4	4= Vegetables and Fruit	
22.5	5= Meat and chicken	

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22.6	6= Other, s*pecify*	
	How food secure is your household (can be more than one answer) in the last month.	
23	Do you worry that food will run out? 1= Yes 2= No	
23a	How often did this happen? 1= Seldom 2= Sometimes 3= Often	
24	Did you eat a limited variety of food? 1= Yes 2= No	
24a	How often did this happen? 1= Seldom 2= Sometimes 3= Often	
25	Did you have to eat smaller meals than you felt you needed? 1= Yes 2= No	
25a	How often did this happen? 1= Seldom 2= Sometimes 3= Often	
26	Did you or any household member go to sleep hungry at night due to a lack of food?	
26a	How often did this happen? 1= Seldom 2= Sometimes 3= Often	
27	Do you or any household member go a whole day and night without eating because there was not enough food?	
27a	How often did this happen? 1= Seldom 2= Sometimes 3= Often	
28	Do you eat few meals in a day?	
28a	How often did this happen? 1= Seldom 2= Sometimes 3= Often	
29	Did you or any household member not eat foods your preferred because of lack of resources?	
29a	How often did this happen?	
30	Did you or any household member eat food that you did not like because of a lack of resources?	

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30a	How often did this happen?	
31	Did food ever run out because of a lack of resources?	
31a	How often did this happen?	
32	Did you or any household member eat less meals during the day because there was not enough food?	
32a	How often did this happen?	
	What do you mostly eat for:	
33	**Breakfast?**	
34	**Lunch?**	
35	**Supper?**	
	How often do you have the following meal?	
36	**Breakfast** 1= once a week 2= twice a week 3= three times a week 4= four to five times week 5= everyday	
37	**Lunch** 1= once a week 2= twice a week 3= three times a week 4= four to five times week 5= everyday	
38	**Supper** 1= once a week 2= twice a week 3= three times a week 4= four to five times week 5= everyday	

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Section D: Assets and Livelihoods of urban gardeners

39	**Did you or any household member experience any of the following in the last six months?** 1= Loss of employment	

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	2= Health problems 3= Drought 4= Price fluctuations of produce 5= Other **(specify)**	
40	**Did this affect your production in the garden?** 1= Yes 2= No	
41	**If yes, how?**	
42	**Please describe, how the water crisis affected your production?**	
43	**Have you had any training on agriculture?** 1= Yes 2= No	
44	**What was the content of the training?**	**Duration**
45	Do you receive follow up visits after training? 1= Yes 2= No	
46	**Do you receive support from an NGO?** 1= Yes 2= No	
47	**If yes, which one?**	
48	**If yes, what kind of support (e.g. seed, compost, fertilizer, tools etc.)?**	

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49	**Do you receive support from government?** 1= Yes 2= No	
50	**If yes, what kind of support (e.g. seed, compost, fertilizer, tools etc.)?**	
51	**How do you produce your crops?** *Multiple response*, **1=Yes, 2=No.**	
51.1	In the soil	
51.2	Container Garden	
52	**What problems do you face during production?** (other than water)	
53	**Does the work in the garden affect your health?** 1= Yes 2= No	
54	**If yes, in which way?**	
55	**Is your income sufficient to buy seedlings, seeds, compost, tools, etc.?** 1= Yes 2= No	
56	**Which other resources do you use to become more food secure?** 1= Family and Friends 2= Social grants 3= Associations 4= Other (specify)	
	Do you feel that engaging in urban agriculture has:	
57	**Increased household income?** 1= Yes 2= No	
58	**Improved well-being?** 1= Yes 2= No	
59	**Improved food security of household?** 1= Yes 2= No	

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60	**Other** (specify)	

Section E: Organization services and challenges

61	**What kind of services by the NGO do you take advantage of?**
62	**What challenges do you encounter in your gardening?**
63	**Do these challenges affect production?**

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Thank you for your participation. Do you have any questions?

Name of participant (optional)	
Contact details (optional)	

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Appendix A2: Community and home gardens Interview guide

Community-based and home gardens interview guide

1. What type of garden do you have? (community or home garden)
    - When did you start and how long have you had it?
2. What are the main sources of income in the household?
3. What motivated you to start a garden?
4. What do you grow and how much?
5. What is your favourite meal?
6. What do you eat from the garden?
    - Is there a difference between eating food grown from garden than the food purchased at the markets?
7. What do you enjoy about growing your own food?
8. What other means do you use to secure food for the household?
9. Are there any challenges you experience in carrying out gardening activities?
    - How do you address them?
10. What services provided by the NGO do you use to your advantage?
11. What suggestions, if any, do you have for improving urban food gardens?

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Appendix A3: Key Informant Interview Guide

Key stakeholders in urban food gardens interview questions (Abalimi and Soil for Life)

1. What services does the organization offer?
2. What are the activities that have been implemented so far by the organization?
    - To what extent have these activities had an impact on household food security?
3. Are there any plans to improve the services and activities?
4. How is urban agricultural food production in (community or home gardens) contributed to household food security in Khayelitsha?
    - What is your opinion on urban food gardens in general?
    - In what ways does the organization help uplift the community?
5. Are the services offered by the organization attracting potential gardeners in Khayelitsha?
    - Are there any strategies in place to encourage more people to participate in community or home gardens?
6. Is the organization working with other institutions in civil society and government departments?
7. Are there any challenges that reduce the organization's ability to meet the demand of services?

Appendix B: STATA DO-FILE

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label define Age 1"19-35"

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label define Age 1"19-35" 2"36-50" 3"51-65" 4"Above 65"

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label define Gender 1"Female" 2"Male"
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label value Gender Gender

tab Gender

tab Educational status

tab Educationalstatus

label define Educationalstatus 1"No school" 2"Primary School" 3"Secondary School" 4"Grade12" 5"Technical/College" 6"Tertiary"

label value Educationalstatus Educationalstatus

tab Educationalstatus

label define Employmentstatus 1"permanent" 2"temporary" 3"unemployed" 4"self-emplyed"

label value Employmentstatus

tab Employmentstatus

label define Employmentstatus 1"permanent" 2"temporary" 3"unemployed" 4"self-emplyed" 5"retired"

label define Employmentstatus 5 "retired", add

label value Employmentstatus Employmentstatus

tab Employmentstatus

tab Age Employmentstatus

tab Gender Employmentstatus

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tab Housingtype

label define Housingtype 1"Formal owned dwelling" 2"Formal renting dwelling" 3"Informal/shack in informal settlement" 4"Informal/shack in backyard"

label value Housingtype Housingtype

tab Housingtype

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label define MainSourceoffood

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label value Householdincome Householdincome

tab Householdincome

tab Gardentype

label define Gardentype 1"Community garden" 2"Home garden" 3"Both"

label value Gardentype

label value Gardentype Gardentype

tab Gardentype

tab Foodavailability

label define Foodavailability 1"Yes" 2"No"

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tab Communitygarden

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label value Communitygarden Communitygarden

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label define Communitygarden 1"less than R500" 2"R501-R1000" 3"R1001-R1500" 4"R1501-R2000" 5"2001-R3000" 6"R3001-R4000" 7"R4001 and above"

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tab Mainsourceofincome

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label define Mainsourceofincome 1"Wage employment" 2"Gardening activities" 3"Social grants"

label value Mainsourceofincome

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label value Mainsourceofincome Mainsourceofincome

tab Mainsourceofincome

gen HFIASscore=.

replace HFIASscore=1 if (F1a==0 |F1a==1) & F2a==0 & F3a==0 & F4a==0 & F5a==0 & F6==0 & F7a==0 & F8a==0 & F9a==0

replace HFIASscore=1 if F1a==2 |F1a==3 | F2a==1 | F2a==2 | F2a==3 | F3a==1 | F4a==1 & ( F5a==0 & F6==0 & F7a==0 & F8a==0 & F9a==0)

tab HFIASscore

replace HFIASscore=2 if F1a==2 |F1a==3 | F2a==1 | F2a==2 | F2a==3 | F3a==1 | F4a==1 & ( F5a==0 & F6==0 & F7a==0 & F8a==0 & F9a==2)
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tab HFIASscore

replace HFIASscore=3 if F3a==2 | F3a==3 | F4a==2 | F4a==3 | F5a==1 | F5a==2 | F6==1 | F6==2 & (F7a==0 & F8a==0 & F9a==0)

replace HFIASscore=4 if F5a==3 | F6==3 | F7a==1 | F7a==2 | F7a==3 |F8a==1 | F8a==2 | F8a==3 | F9a==1 | F9a==2 | F9a==3

tab HFIASscore

graph pie, over(HFIASscore) plabel(_all percent) title("Pie chart of HFIAS score in Khayelitsh", color(black))

label define HFIASscore 1"Food secure" 2"Mildly food insecure" 3"Moderately food insecure" 4"severely food insecure"

label value HFIASscore HFIASscore

graph pie, over(HFIASscore) pie(1, explode(large)) pie(4, explode) plabel(_all percent) title("Pie chart of HFIAS score in Khayelitsha", color(black))

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