

**The effects of three urban food garden projects on livelihoods and food security in Soweto, South Africa**

**by**

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## DECLARATION

I, Patience Annie Nyakata, declare that:

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Signature.....

Ms Patience Annie Nyakata

Date.....

## DEDICATION AND ACKNOWLEDGEMENTS

I dedicate this dissertation to my family.

To Almighty God, I say thank you Heavenly Father for all the strength, faith and patience you gave me throughout my studies. I would not have made it this far without You, my Lord. I know this research study is a contribution to my ministry and Christian leadership for sustainable infusion of Kingdom management principles and values into all sectors of society. I wish to extend my sincere gratitude to the following people and institutions for their contributions to this research dissertation. The greatest appreciation goes to my supervisor, Dr Joe Stevens, for his devotion in assisting me with patient guidance and encouragement throughout the study. Thank you, Dr Olwethu Loki and Dr Wegayehu Fitawek for tirelessly assisting me with extremely patient guidance.

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I also thank my husband Paul and our children for their support and patience during the entire study period.

## ABSTRACT

### **The effects of three urban food garden projects on livelihoods and food security in Soweto, South Africa**

**By**

**Nyakata Patience Annie**

**Degree:** MSc Agric (Agricultural Extension)

**Department:** Agricultural Economics, Extension and Rural Development

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The global population is projected to exceed nine billion by 2050, necessitating continued food production and buffered supply growth. To meet the rising demand, governments have started implementing countermeasures, such as home gardening projects, which are considered a strategy to improve household food and nutrition security. Similar to several other developing countries facing the challenge of food insecurity, the national government of South African has made considerable efforts. The situation of food insecurity is being improved through local food security initiatives, such as home gardening and food production at a massive scale. Despite these efforts, general household surveys report that countless South Africans remain in a vicious cycle of poverty. Unemployment and food insecurity are particularly affecting people residing in townships. This study aimed to assess the economic sustainability of three urban food garden projects in Soweto in terms of their effect on livelihoods and food security. A structured questionnaire was sent to 80 respondents from currently operational food gardens in the Moletsane and Tladi areas, comprising 20 cooperative participants, 20 group participants, and 40 individual backyard home gardeners. In addition, responses were obtained from fourteen key informants from nine key stakeholder organisations. These stakeholders comprised a municipality, four government departments, two universities, an NGO and a farmers' group in the area. A cross-sectional research design was employed to collect data from the 80 respondents, who were selected on a purposive basis. The targeted respondents were those currently practising food gardening. The results for and findings on the economic sustainability factors showed that the bulk of the food produced by the gardeners is consumed

at home. This implied that a significant percentage of respondents from all the case studies have indicated that participating households were better off. Participating households were better off in terms of food availability, use, access and stability (the pillars of food security), than were those not practising gardening. The second hypothesis of this study was accepted, namely that group, cooperative and individual home gardening households living in Moletsane and Tladi, Soweto, participating in food gardening were better off. The food gardening is economically sustainable, showing a difference in their socio-economic status. The challenges for and expectations of these small- scale home or community-based farmers should make allowance for institutional linkages for flexible agricultural service provision. Policy formulation and implementation should also be made possible, thereby creating an economic, social and environmental convergence sustainability zone.

**Keywords:** Backyard home gardeners, Cooperative, Group, Household food security, Sustainability, Urban agriculture, Urban food garden project

## LIST OF ACRONYMS

ABC	Agricultural Business Chamber
AFASA	African Farmers' Association of South Africa
AFSIC	Alternative Farming System Information Centre
AFSUN	African Food Security Urban Network
Agri BEE	Agricultural Black Economic Empowerment
Agri SA	Agriculture South Africa
AGRISETA	Agricultural Sector Training Authority
AGRITEX	Agricultural Technical and Extension Services
ARC	Agricultural Research Council
CAADP	Comprehensive Agriculture for Africa Development Programme
CASP	Comprehensive Agriculture Support Programme
CBD	Central Business District
DAFF	Department of Agriculture Forestry and Fisheries
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organisation
FEWSN	Famine Early Warning System Network
GCIS	Government Communication and Information System
GDACE	Gauteng Department of Agriculture Conservation and Environment
GDAD	Gauteng Department of Agricultural Development
GDARD	Gauteng Department of Agriculture and Rural Development
GDP	Gross Domestic Product
GEP	Gauteng Enterprise Propeller
GHS	General Household Survey
GVA	Gross Value Added

HDI	Human Development Index
H/h	Household
HSRC	Human Sciences Research Council
IDP	Integrated Development Plan
IDRC	International Development Research Centre
IFSNP	Integrated Food Security and Nutrition Programme
LEDP	Local Economic Development Programme
MAFISA	Micro Agricultural Financial Institutions of South Africa
NAFU	National African Farmers' Union of South Africa
NEPAD	New Partnerships for Africa's Development
NGO	Non-Governmental Organisation
RUAF	Resource Centre for Urban Agriculture and Forestry
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
Stats SA	Statistics South Africa
TAU SA	Transvaal Agricultural Union of South Africa
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USERS	United States Economic Research Services
VAC	Vulnerability Assessment Committees
WFP	World Food Programme
WHO	World Health Organisation

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## CHAPTER 1: INTRODUCTION

### 1.1. Background

The Food and Agriculture Organisation (FAO) of the United Nations (UN) estimates that rural migration has led to approximately one-quarter of people in the developing world living in cities and towns (FAO, 2019). In Latin America, approximately 50% of urban dwellers participate in urban farming for obtaining food and supplementing income (FAO, 2019). Similarly, in Africa, poverty, food insecurity, inequalities and unemployment have driven urban dwellers into practising urban farming (Charles, 2013). The author reiterates that rural African residents often think cities offer an escape from poverty or a better lifestyle, leading to countless people flocking to cities. This perception has not only substantially increased the urban population but has also plunged most rural migrants into poverty and hunger (FAO, 2020).

Approximately 40% of urban dwellers in Africa participate in urban food gardening, either by crop cultivation or livestock production (FAO, 2014). According to Statistics South Africa (Stats SA, 2017), rural to urban migration in South Africa has risen from 50% of the population living in cities in 1994 to over 67.35% living in cities in 2020 (Stats SA, 2020). The population of the Gauteng city region has increased from 1.4 million in 2001, including international immigrants, to an estimated 15.2 million in 2016.

Urban populations are burgeoning globally, with common attendant problems such as malnutrition, hunger, poverty and unemployment (FAO, 2019). This urban population growth often compels these people to grow their food to supplement their diets and small incomes (Luc, 2006). Municipal authorities are generally not willing to support urban food garden projects unless communities can prove that their projects are sustainable (Haysom, 2010). According to research conducted by the International Development Research Centre (IDRC, 2010) on the growth of cities, food gardens could be sustainable if effectively managed. The sustainability of professionally managed food gardens is based on providing employment, improving the environment and making use of vacant lands in cities (Luc, 2006).

The sustainability of urban food garden projects in terms of their contribution towards food security has been questioned worldwide in both developing and developed countries. Sustainability in terms of urban food garden projects is defined as balanced growth for an extended period. A sustainable system must be balanced economically, environmentally,

socially and personally (Zezza and Tasciotti, 2010). Sustainability is key to promoting a liveable future and could be achieved by prioritising ways of achieving the Sustainable Development Goals (SDGs) of the UN, among which the first three goals relate to food security and poverty alleviation (Siborurema, 2019).

To promote achieving these SDGs, the UN held its first Food Systems Summit in October 2019, dedicated to investigating dietary patterns to promote healthy and sustainable diets for member states. A second expert meeting was held in March 2021. The Food Systems Summit expects every member state to take action towards transforming the world's food systems to achieve the SDGs by 2030 (United Nations, 2021). The Food Systems Summit established seven principles to guide member states in leveraging the capacity of their food systems in support of the SDGs. The principles are as follows (FAO, 2020; UN, 2021; WFP, 2020; WHO, 2021). First, member states must recognise the utmost urgency of sustained and meaningful action at all levels for reaching the respective SDGs by 2030. Second, member states must commit to contribution to the vision, objectives and final outcomes of the Food Systems Summit. Third, member states must strive to promote food production and consumption policies, enhance resilient livelihoods and communities, and promote good stewardship of natural resources while respecting local cultures and contexts.

Fourth, member states should recognise that food systems are complex and closely connected, and affect human and animal health, land, water, climate, biodiversity, the economy and other systems; therefore, the transformation of food systems requires a systematic approach. Fifth, member states should support inclusive multi-stakeholder processes and approaches within governments and communities that bring diverse perspectives. Indigenous knowledge, cultural insights and science-based evidence enable stakeholders to design policy options that deliver against multiple public goods across the various systems.

Sixth, the Food Systems Summit recognises that several other global governance processes are dealing with issues related to food systems; therefore, duplication should be avoided in complementing the work of others. Seventh, member states should ensure that the Food Systems Summit and associated engagement process promote trust and increase motivation to participate by being evidence based, transparent and accessible in governance, decision-making, planning, engagement and implementation. The member states shall hold themselves accountable for commitments made, with mechanisms designed to uphold such accountability.

The above-mentioned principles will help member states contribute to the success of the SDGs for sustainable world food systems (United Nations, 2021).

Urban food gardening or backyard farming in South Africa is commonly practised in peri-urban areas, informal settlements, townships and high-density areas of large cities such as Cape Town, Johannesburg and Pretoria (Martin *et al.*, 2000). Several food garden projects are located on the Cape Flats of Cape Town City and informal settlements such as Crossroads, Nyanga, Gugulethu, Browns Farm and Philippi (Cross, 1999). Haysom (2010) revealed that approximately one-third of households on the Cape Flats participate in gardening activities, with spinach, cabbage and potatoes being the most popular crops. Haysom *et al.* (2017) reported that 200 community gardens are located in Cape Town City that benefit 1 849 people. Less-advantaged urban communities have resorted to backyard food gardens for their daily kitchen supplies and to supplement poor daily diets consisting mostly of junk food (Haysom, 2015a). Research conducted in Soweto (Johannesburg, South Africa) revealed the benefits of food gardens to households in urban high-density areas, comprising six people on average (OXFAM-GB-Southern Africa, 2017; Scott and Tibbo, 2006).

According to the OXFAM study, the benefits of food gardens include saving the household from having to buy vegetables, being a potential source of extra income, and supplementing the income of pensioners to cover minor household expenses. Moreover, food gardens practising organic farming contribute to healthy eating styles, while providing a source of extra income for minor expenses. Most important, food gardens enhance community and youth empowerment, build social capital, bring unity and social cohesion to communities and beautify city environments (Haysom *et al.*, 2017; OXFAM-GB Southern Africa, 2017; Siborurema, 2019).

A census report of Statistics South Africa (StatsSA, 2017) regarding commercial agriculture indicated that 40 122 farms were involved in the agriculture industry in 2017, with the largest proportion of these being livestock farming (13 639 or 33.9% of the total), followed by mixed farming (12 458 or 31.1% of the total) and 8 559 or 21,3% of the total being field crops. The province with the highest number of farms in 2017 was the Free State (7 951 farms or 19.8%), followed by the Western Cape (6 937 or 17.3%), North West (4 920 or 12.3%), Northern Cape (4 829 or 12%), Limpopo (3 054 or 7.6%), Mpumalanga (2 823 or 7%) and Gauteng (2 291 or 5.7%).

Nationally, 75.6% of households practising agriculture was striving to secure an additional source of food. In Gauteng, only 4% of households participated in agriculture (Stats SA, 2017). Nationally, 10.1% of households that practise agriculture does so on farmland, whereas 89.9% of such households' practise backyard farming. This information is significant in view of the results of the South African General Household Survey (GHS of 2019 by Stats SA), indicating that the percentage of persons experiencing hunger has decreased from 29.3% in 2002 to 11.3% in 2018. The percentage of households vulnerable to hunger showed a similar pattern, declining from 24.2% in 2002 to 9.7% in 2018 (Stats SA, 2019). The challenges faced by urban food gardeners in South African include expensive farming inputs, lack of coordination with and collaboration by farmers, farmers' groups, organisations and agricultural stakeholders, and lack of finance for projects (Siborurema, 2019). Moreover, municipal authorities are unwilling to formally support food gardens (Haysom, 2015a), and water supplies for cultivation are inconsistent in urban areas (Haysom, 2010; Nicolle, 2011). Further, municipal land rights and demarcation issues are common challenges in cities (Haysom, 2015b).

No external support is available in terms of agricultural extension advisory services (Luc, 2006; Haysom *et al.*, 2017), and urban dwellers are slow to adopt innovative research and new technology, preferring to pursue employment opportunities in the corporate world (Haysom, 2015b). Some of the opportunities offered by urban food gardens are community empowerment by developing social cohesion in communities, employment creation and attracting funding and agricultural extension support, beautification of city and town vacant spaces, establishing food gardening as a way of living and eating healthily, and poverty reduction (Nicolle, 2011; Siborurema, 2019).

## **1.2. Research problem**

Food insecurity is widespread in South Africa, obligating the food security sector and urban communities to determine and understand the contributing causes, e.g. social norms, individual behaviour, stages in the human life cycle, and food availability and quality. Enhanced understanding facilitates implementing comprehensive approaches to increase food security (Hendriks, 2015). In the post-apartheid period between 1994 and 2014, 169 sub-national food insecurity studies were conducted in South Africa, of which 13 were undertaken in urban and peri-urban settings (Misselhorn and Hendriks, 2017). For the past two decades, urban communities, particularly low-income groups and women in the high-density areas of Johannesburg have engaged in urban food gardening, but there has been no collaboration and



linkage mechanisms between communities and agricultural service providers (Haysom *et al.*, 2017; Marie, 2017; RUAF, 2019).

Urban food gardening could potentially contribute to nutrition and sustainable food security by reducing poverty and famine in developing countries (Kroll *et al.*, 2012). However, the lack of attention and support from communities, agricultural service providers, policy-makers and government departments to urban food gardening and nutrition-sensitive agriculture contributes to urban food insecurity (Marie, 2017).

According to Haysom (2010), Langa (2015), and Luc (2006), urban garden projects are not sustainable over the long-term owing to expensive farming inputs, complicated land issues and rights, water scarcity, lack of authentic coordination and collaboration by farmers' groups, organisations and other stakeholders, lack of funding by agricultural stakeholders and the lack of agricultural advisory support. Most municipal authorities are not willing to formally support urban farmers for various reasons, including, inconsistent water supplies (Haysom, 2010; Siborurema, 2019); municipal land rights and demarcation issues (Haysom, 2015a); lack of external support in terms of agricultural extension advisory service (Luc, 2006); slow adoption of innovative research and new technology by urban dwellers (Haysom, 2015b); no coordination and collaboration between agricultural stakeholders, service providers, or institutions for urban agricultural development (Freed and Maredia, 2013).

The socioeconomic factors influencing household food security in urban areas include insecure employment to generate income for food purchasing. Households characterised by few income earners and numerous dependants are, therefore, vulnerable to economic shocks (FAO, 2016). Household size, tenure status, marital status, educational level and gender are household socioeconomic characteristics that affect the sustainability of urban food garden projects (FAO, 2016; Haysom, 2015a; Siborurema, 2019). The high-density suburbs and informal settlements of most African cities, including Soweto, face challenges such as dense populations, poverty, crime, unemployment and violence. Vulnerabilities of groups of populations such as the elderly, women and children are also a challenge.

The differently abled, those living with HIV and Aids, child-headed households, orphans and widows are groups highly vulnerable to food security (Langa, 2015). According to Langa (2015) and Siborurema (2019), the problem of food insecurity and increased poverty in township households have led to increased hunger, violence and crime, and rising unemployment levels. Severe insufficient access to food is prevalent among households with

more than eight members. Child hunger remains a challenge in South Africa, with more than half a million households with children aged five years or younger experiencing hunger in 2017 (Siborurema, 2019).

Baiphethi and Jacobs (2009) indicated that although South Africa is self-sufficient in food production at the national level, a substantial number of people are vulnerable to food security at the household level. Approximately 20% of South African households had inadequate or severely inadequate access to food in 2017, varying by province, population group, or household head and household size. According to OXFAM-GB Southern Africa (2017), generally, 6.8 million South Africans have experienced hunger. Food inadequacy and hunger remain serious problems. People tend to purchase a large proportion of their daily requirements from markets, bringing about the move from production to consumption. However, poverty-stricken households lack money to buy food and cannot produce their food (Siborurema, 2019; Stats SA, 2018).

The sustainability of urban food garden projects in the SADC region depends highly on the sustained participation of farmers (Frayne, 2014; Luc 2006). Across the region, approximately 22% of households conventionally cultivate some of their food, whereas 78% obtain food from supermarkets and fast-food outlets. A research study in eleven southern African cities indicated that four cities, namely Blantyre (64%), Harare (60%), Maseru (47%) and Msunduzi (30%), have higher levels of urban household food production than the regional average of 22% (Frayne, 2014). There has been a growing tendency to legitimise urban cultivation in many southern African cities since the mid-1990s (Frayne, 2014). In Zimbabwe, for example, certain by-laws have been suspended, leading to the cessation of harassment of urban cultivators and the slashing of their crops (Martin *et al.*, 2000).

According to Frayne (2014), the sustainability of urban agriculture is considered to be determined by the level of income of each household to acquire gardening inputs and land holdings. Research studies on urban farming in eleven southern African cities in Zimbabwe, (Epworth and Porta farms in Harare) and South Africa (Mamelodi in Pretoria and the Cape Flats in Cape Town) revealed that land holding and access to land are critical factors, particularly for informal settlements. In Mamelodi, for instance, political leaders control the land (Frayne, 2014). A compounding problem is soil fertility issues in many informal settlements and high-density areas (Martin *et al.*, 2000). Governments and policy-makers must be cognisant of the current sustainability status of urban food garden projects before decisions

are taken on resource allocation and planning of food security intervention programmes (Nicolle, 2011).

The current study was conducted in the urban high-density suburb of Soweto with purposively selected food gardening project participants and was influenced by the problem of urban food insecurity. The study assessed the economic sustainability of urban food garden projects in the Moletsane and Tladi high-density areas in Soweto in contributing to household food security.

### **1.3. Objectives of the study**

The main objective of the study was to assess the economic sustainability of three selected urban food garden projects in Soweto, specifically, the effects on livelihoods and food security.

The sub-objectives were to:

- a. determine the socioeconomic factors influencing households to engage in urban foods garden projects,
- b. determine the economic sustainability of the food gardens on the socioeconomic status of participating households,
- c. assess the challenges facing the practising of urban gardening in Moletsane and Tladi, and
- d. assess institutional support for urban food garden projects.

### **1.4. Study hypotheses**

The following are the sub-hypotheses guiding this study:

1. There are differences in the socioeconomic factors influencing households to engage in urban food garden projects.
2. There are differences in the economic sustainability of the food gardens on the socioeconomic status of participating households.
3. There are differences in the challenges faced by group/cooperative and individual urban food garden projects.
4. There are differences in the role of agricultural support providers in providing institutional support to the establishment and funding of group/cooperative and individual urban food garden projects.

## **1.5. Significance of the study**

It seeks to determine whether community urban food gardens and individual backyard gardens contribute to sustainable household food security. This study will attempt to address the economic sustainability of community urban food gardens with regard to food availability, accessibility, utilisation and stability. As the study also seeks to identify the urban farmers' perceived challenges, opportunities and expectations from government, key role players in the establishment and support of urban community food gardens; it will better articulate their effectiveness in contributing to household food security. The expected results may also be of help to the municipality of Soweto and hopefully, other neighbouring municipalities to redraw their plans, policies and management strategies for the project; after referring to the analysis of data collected from the beneficiaries of these projects. The study will also help to fill the gap in literature for future research, contributing to literature for other researchers who might come up with new ideas at PhD level.

## **1.6. Structure of the Dissertation**

The dissertation is presented in book format and organised into six chapters. Chapter 1 covers the background and orientation of the study, problem statement, aim of the study, research objectives and hypotheses, limitations and structure of the study. Chapter 2 presents the literature review conducted before the study, with an overview of the food security status in Africa and South Africa, the contribution of urban agriculture to food security and an overview of urban agriculture in Africa and South Africa. Chapter 3 outlines the research design and methodology employed in conducting the study and also provides the description of the study area project sites. Chapter 4 covers the results and discussion for the study. Chapter 5 discusses the challenges facing the practice of urban food gardens and their institutional supporters in Moletsane and Tladi. Chapter 6 presents the synopsis, key conclusions derived from the findings and recommendations for improving the sustainability of food gardens.

## CHAPTER 2: LITERATURE REVIEW

### 2.1. Introduction

In this chapter, the literature on the economic sustainability of urban food gardening projects on household food security is discussed, providing a comprehensive literature review for the study. The purpose of this chapter is to provide an overview of urban agriculture in Africa and South Africa specifically Soweto in the Gauteng Province of South Africa (Brown, 2020; Haysom, 2010; Mahlombe, 2018; Nicolle, 2011; Olivier, 2018; Siborurema, 2019).

### 2.2. Definitions of key concepts

To enhance understanding of the nature of the selected urban food garden projects in this study, key concepts and words are defined, as follows.

#### **Backyard home gardeners**

Backyard home gardeners are defined as people who grow food and vegetables in their backyard spaces of different shapes, balconies and grow pots, and different types of containers (Armstrong, 2000; Haysom, 2010; Nicolle, 2011; Olivier, 2018; Siborurema, 2019).

#### **Cooperative**

A cooperative is defined as a private business organisation that is owned and controlled by people who use its products, supplies and services (Oxford Dictionary, 1997; RUAF Foundation 2019)).

#### **Group**

A group is defined as a deliberate formation with conscious and collective efforts to direct group members towards the accomplishment of organisational objectives (Oxford Dictionary, 1997; RUAF Foundation 2019).

#### **Household food security**

Household food security can be defined as a household having assured sets of entitlements from food production, cash income, reserves of food or assets and/or government assistance programmes such that in times of need they will be able to maintain sufficient nutritional intake for physical well-being (FAO, 2019)

Sustainability in terms of urban food garden projects is defined as growth that is balanced for a long time or in the long run. A sustainable system must be balanced economically, environmentally, socially and personally (Zezza and Tasciotti, 2010). Sustainability is key to promoting a liveable future, which could be achieved by prioritising ways of achieving the SDGs of the UN, among which the first three goals are related to food insecurity and poverty alleviation (Siborurema, 2019).

### **Urban agriculture**

Urban agriculture involves the practice of growing, processing and distributing food in or around urban areas. It can also involve livestock production, horticulture, aquaculture, hydroponics, agro forestry and urban bee keeping (Mougeot, 2000). According to Luc (2006), the concept of urban agriculture should be managed with greater civic society participation and involvement. The author indicated the key role players in urban agriculture initiatives, which are municipalities and provincial boards, farmers' groups, agricultural advisory services, research and extension institutions and academic agricultural institutions of higher learning, such as agricultural colleges and the faculties of agriculture at universities.

Haysom (2010) described urban agriculture as a city or town ecosystem that helps to manage and contain the urban environment management system by efficient recycling and reusing of wastewater and organic waste. Urban food gardening is growing edible plants in household backyards or places designated by municipalities. A food garden is a place where edible plants such as fruits and vegetables are grown. The plants are usually annuals, i.e., crops that die off after growing for a year or perennials that live for more than two years (Martin *et al.*, 2000).

### **Urban food garden project**

An urban food garden project is defined as a community plot of land in an urban area, cultivated either communally or individually to produce food (Armstrong, 2000).

### **2.3. Definition and pillars of food security**

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 i.e., the state of having access to sufficient affordable and nutritious food (FAO, 2019). At the 1974 World Food Conference, the term 'food security' was defined with an emphasis on supply. The definition states that "food security is the availability at all times

of adequate, nourishing, diverse, balanced and moderate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices (FAO, 2008). According to Du Toit (2009), the term ‘food security’ was originally used to describe whether a country had access to enough food to meet the dietary energy requirements of the population.

According to the 2015 report of the United Nations Development Programme (UNDP) and the 2016 report of the FAO, approximately 821.6 million people worldwide experience hunger, and approximately 2 billion people worldwide are malnourished, particularly children below the age of five and the elderly above 60 years of age (Jahan, 2016). According to the Forum for Food Security in Southern Africa, food security exists when food is available, households can access and use it efficiently, and there is guaranteed stability in the food supply, as reported by the Famine Early Warning System Network (FEWSN) and the Vulnerability Assessment Committees (VACs). Food security also exists when income to purchase food is available (FAO, 2020; OXFAM-GB Southern Africa, 2006; Scott and Tibbo, 2006; USAID, 2019).

Four pillars or components are used to describe food security namely availability, access, utilisation and stability (FAO, 2016). Food security is, therefore, a house standing on the three pillars of availability, access and utilisation, but the stability factor is the ground on which the three pillars are standing, lending continuous support to the house. These pillars are integral parts of food security (Barrett, 2010). The pillars of food security are:

- Availability of food is the ability to have it ready for consumption when required. Food availability comes from production and related aspects that sustain the desired food production level. Food availability is essential for ensuring food security (Barret, 2010; FAO, 2014; Jahan, 2016). According to the FAO (2008, 2014, 2016), food availability is essential to ensure a sustainable food security system. Aggregate food availability is a necessary condition for food security (Azzini, 2019).
- Access to food is the ability to have food or to obtain it. Access relates to food distribution. Accessibility ensures that the welfare of households or individuals is addressed. Physical and economic access to sufficient, safe and nutritious food is crucial for people to meet their dietary needs and food preferences, ensuring an active and healthy life (Azzini, 2019; Barrett, 2010; FAO, 2016).
- The utilisation of food relates to the number of meals per day principle, i.e., how households generally use or prioritise their eating habits on a daily, weekly or monthly

basis. Utilisation reflects concerns on whether individuals and households make effective use of the food to which they have access. Food utilisation also describes the ability of a household or individual to purchase food, store it and process it (Abdessalom, 2019; Jahan, 2016; UNICEF, 2008).

- Stability is the maintenance of availability, accessibility and utilisation. The role of price in determining access to food is crucial. Global food prices are indicators of the availability, access and utilisation of food (Jahan, 2016).

#### **2.4. Causes of food insecurity**

Food insecurity is a global problem which has created unprecedented food crisis proportions. About 828 million people globally are not sure of where their next meal is coming from. The scale of the current global food insecurity, has led to hunger and malnutrition. The high proportions of world food crisis require the world/nations to act now to save lives by investing in solutions that guarantee food security, stability and peace for all (Dodo, 2020; FAO, 2020; WFP, 2020).

The population of Africa reached 1.350 billion in 2020 and is expected to grow to approximately 1.7 billion by 2030, and approximately 2.5 billion by 2050. The African urban population numbered 560 million in 2020 and is expected to reach approximately 770 million in 2030 and 1.340 billion by 2050 (Dodo, 2020, FAO, 2020; USAID, 2020; WFP, 2020).). The World Bank (2018) has reported that most extremely poor people who experience severe food insecurity reside in low-income countries in sub-Saharan Africa, including countries such as the Democratic Republic of the Congo, Ethiopia, Madagascar, Tanzania and Uganda. The report also indicated an increase in the extremely poor people of sub-Saharan Africa from 276 million in 1990 to 413 million in 2015, meaning that 41% of the sub-Saharan population lives in abject poverty. The countries in Africa with food insecurity include Burkina Faso, Cameroon, South Sudan and Zimbabwe.

The causes of food insecurity in Africa include, firstly, a decline in food production and productivity, which are the most significant causes of food insecurity on the continent. Regional problems related to food access are caused mainly by the high demand. In addition, poverty, weak economic growth, unsuccessful macro-economic policies, the poor national balance of payments, and highly skewed income and wealth distribution patterns also cause food access problems (Barrett, 2010; Clover, 2003; Coates, 2013; Dodo, 2020; FAO, 2020).



Secondly, high rates of population growth and poverty also cause food insecurity (FAO, 2019; Jahan, 2016; WFP, 2020). Thirdly, food insecurity is exacerbated by political instability.

Longstanding political conflicts have disrupted the production of food in countries that include the Democratic Republic of Congo, Sudan, Yemen and Zimbabwe (FAO, 2019; Dodo, 2020). Fourthly, adverse weather conditions, such as droughts ascribed to climate change, have led to reduced food production, which also affects the distribution of and access to food (Dodo, 2020; UNICEF, 2020). Fifthly, economic crises, such as slowdowns and shutdowns have sabotaged food security in countries such as the Democratic Republic of Congo, Sudan, Yemen and Zimbabwe (UNICEF, 2020; WFP, 2020). Finally, a lack of agricultural inputs played a role in persistent food insecurity experienced during the years 2008 to 2014 (Azzini, 2019).

The FAO (2016) and Azzini (2019) have recommended methods to reduce food insecurity in Africa, which could boost investment in agriculture and enhance food security across the continent. These methods include implementing an effective regional mechanism for monitoring food security status to take timeous and appropriate counteractions and policies that focus on increasing food and agricultural productivity and food production through the development of agricultural market channels. Moreover, African governments need to promote agricultural transformative programmes to intensify value addition, diversify staple food production and ensure social and environmental sustainability.

Further, African countries need to expand policy-making in response to food insecurity by considering factors such as population growth and rapid urbanisation. Effective food security strategies should be built on elements such as increased productivity in agriculture, good governance, rural transformation, and resilient sustainable development. It is also necessary to encourage experience sharing and cooperation among African countries within the framework of Regional Economic Communities such as SADC and ECOWAS. Finally, African partners need to come forward to accomplish and comply with promised pledges and partnerships in support of the development and structural transformation of the food and agricultural systems in the affected region.

#### 2.4.1 Food security status in South Africa

Studies by the FAO (2019) in rural and urban South Africa through the universities of Cape Town, KwaZulu-Natal and Stellenbosch have shown that rural households in South Africa historically produced most of their food, whereas urban households purchased most of their food. This trend has changed over time, with most urban households producing some of their

food (Maxwell, 1998). The Constitution of the Republic of South Africa states in Chapter 2 (Bill of Rights), Section 27.1(b) that every citizen has the right to have access to food and water (Constitution of the Republic of South Africa, 1996). Accordingly, the South African government is responsible for ensuring that access to food is linked to the availability of food. The FAO has recommended that an urban food supply and distribution policy be established with set goals, objectives, strategies and programmes covering regional, provincial, metropolitan, urban and local areas (FAO, 2019).

According to Du Toit (2009) the term ‘food security’ was originally used to describe whether a country had access to enough food to meet dietary energy requirements. Since 1994, when South Africa became a constitutional democracy, ample focus has been placed on food security. The Bill of Rights conforms with the Sustainable Development Goals of the country, of which the aim was to reduce the proportion of people going hungry by 50% from 1990 to 2015 and reduce poverty and unemployment by 50% by 2014. However, these goals could not be reached and the unemployment rate remained high at 32.3% in 2020 (Stats SA, 2020). According to the Human Sciences Research Council (HSRC) (2009), South Africa was ranked as having the highest income inequality in the world. Altman *et al.* (2009), through the HSRC, revealed that while South Africa might be food secure as a country, large numbers of households are food insecure mainly because of poverty and low household incomes. Hart, *et al.*, (2009) supported the argument that South Africa appears food secure at the national level, but the same could not be said about households in urban high-density areas, informal settlements and rural areas.

The HSRC (2009) pointed out that food distribution and accessibility problems persisted in South Africa owing to poverty and unemployment, increasingly forcing poor households to allocate more significant proportions of their income to purchasing food. The unemployment rate in South Africa reached 42.6% of the population (11.1 million people) in 2020 (Stats SA, 2020).

#### 2.4.2 Factors affecting food security in African urban areas

Sustainability in urban food garden projects is defined as balanced growth for an extended time or in the long run. A sustainable system should be balanced economically, environmentally, socially and personally (Haysom, 2010; Nicolle, 2011; Olivier, 2018; Siborurema, 2019; Zezza and Tasciotti, 2010). Sustainability is key to promoting a liveable future, which could be attained by prioritising methods of achieving the SDGs, among which the first three goals relate to food insecurity and poverty alleviation, as mentioned already (FAO, 2016; Siborurema,

2019; UNDP, 2015). These first three SDGs are eradicating extreme poverty and hunger, achieving universal primary education, promoting gender equality and empowering women (FAO, 2016; Siborurema, 2019; UNDP, 2015).

Generally, aspects that affect the food security status in South African urban areas are food availability, utilization, accessibility and stability, policies, regulations and related issues. South African municipalities have no proper policies governing urban farming or land tenure and availability. Land availability is a crucial factor in food production and a lack of land significantly affects food security (Frayne, 2014; Haysom, 2010, RUAFA, 2019; Siborurema, 2019). Land tenure policies are crucial in the choice and practice of urban agriculture. Owing to a lack of arable land in cities, urban farmers resort to cultivating crops in their backyards, communities, schools, clinics, and vacant spaces, conventionally called state lands (Armstrong, 2000; Frayne, 2014, Nicolle, 2011; Olivier, 2018). However, to achieve food security, all urban planners and local authorities should ensure that free food-producing space is available for small-scale crop cultivation (Haysom, 2010; Nicolle, 2011; Richards and Taylor, 2012).

The funding of food garden projects by NGOs, donors and well-wishers affects sustainable food security. Therefore, individual small-scale farmers, e.g., “food growers/food gardeners/backyard farmers/small-scale crop growers”, farmers’ groups, farmer cooperatives and farmer organisations should be encouraged to approach the private sector, NGOs, banks, civil society, donors and well-wishers for funding to ensure sustainable food garden projects. Funding could be financed through loans and donations or by facilitating access to farming inputs (Charles, 2013; Haysom *et al.*, 2017; RUAFA, 2019; WFP, 2020). Similar to all other production factors, such as land and capital, access to agricultural inputs affects sustainable food security. Urban poor people usually need abundant support in terms of farming inputs such as seed, fertiliser, manure and pesticides. Small-scale farmers are often in desperate need because they do not have adequate access to such inputs (FAO, 2019; Haysom *et al.*, 2017; Siborurema, 2019; WFP, 2020).

Training programmes to improve the agricultural knowledge and skills of farmers are vital for successful urban agriculture projects. Agricultural advisors require appropriate information, knowledge and skills to help farmers make the right decisions and adopt new technologies (Charles, 2013; RUAFA, 2019). Armed with appropriate and sufficient knowledge and buffered by support, farmers could more easily secure responsive extension service provision from NGOs and farmer organisations, procure inputs and utilise resources. Extension workers find

it easier to conduct site demonstrations, field days and production training sessions with groups of farmers rather than with individuals. Moreover, farmers' groups help to create commodity-specific extensions and the organisation of commodity marketing. Accordingly, it is easy to create horticultural-specific extension and marketing organisations for produce (Davis and Terblanche, 2016; Olivier, 2018; Zwane, 2015).

Food security is affected by the size of the land (Siborurema, 2019). Different shapes and sizes of space affect the quantity of food produced — larger tracts of land can produce more food and vice versa. Municipal, council and other responsible authorities should provide designated lands for small-scale, group and cooperative-organised farming. Such designated lands would ensure that communities can practise legalised, well-regulated and well-organised farming (Haysom *et al.*, 2017). Land tenure issues must be addressed by the government and municipalities and must be considerate of the urban poor who do not have space for community farming (RUAFA, 2019; Siborurema, 2019).

Farming and irrigation methods also affect the sustainability of food garden projects. Different urban agriculture methods include open field, tunnel farming, hydroponics, aquaculture, pot and container (balcony farming), and vertical and rooftop farming (Armstrong, 2000; RUAFA, 2019; Siborurema, 2019). The more productive a farming method is, the more sustainable the food garden becomes. Irrigation methods include sprinklers, hosepipes, drip, furrows, and buckets. Again, the more effective and efficient an irrigation method is, the more sustainable the food garden becomes (Haysom *et al.*, 2017; RUAFA, 2019).

Some urban food gardens successfully operating for at least five years in Cape Town and Johannesburg have been proven more sustainable than those that have been running for less than five years (Haysom *et al.*, 2017; RUAFA, 2019). This finding implies that the longer a project has been running, the more productive and sustainable it becomes (FAO, 2020; Olivier, 2018). Farmers need to remain sustainable in seasons of food shortages, and different coping strategies are available for farmers and urban dwellers to supplement their income and food basket (Langa, 2015; Olivier, 2018). Assessing the welfare of agricultural households should, therefore, include considering the value of these other sources of income (Wye Group, 2011). The different coping strategies available to urban farmers include receiving cash remittances from family, friends and relatives locally and outside South Africa. Receiving food handouts from family, friends and relatives, and from donors, well-wishers and the government, receiving social grants from the government, donors, NGOs and well-wishers, barter trading

of their fresh produce and other are also coping strategies (Charles, 2013; Langa, 2015; Richards and Taylor, 2012; RUAF, 2019; Wye Group, 2011).

Natural disasters such as droughts, hailstorms, cyclones, heat waves, crop pests and diseases, and civil unrest and war affect the sustainability of food gardens (Crush *et al.*, 2011; Frayne, 2014; Haysom, 2015a; RUAF, 2019). Economic decline pushes people to move from production to consumption and poverty. Under such conditions, the means for production such as labour and capital are affected negatively and the sustainability of food gardens declines (Chen, 2010; Haysom *et al.*, 2017; Siborurema, 2019).

## **2.5. Urban agriculture in the world, Africa and South Africa**

According to the FAO (2016), much of the fruit and vegetables sold in urban markets are grown within or near the city. City farming has a long tradition in both Asia and Europe, and it is estimated that urban farming provides direct earnings for at least 100 million people worldwide. Approximately 800 million urban farmers are active globally, which is over one-third of the global population, with these urban farmers supplying food to approximately 1% of the global population (FAO, 2020).

Berlin, the capital of Germany, has become the European urban farming leader, with one hundred indoor and outdoor city farms. In the United States, urban farming has grown across the continent, with over 300 urban farms identified by the United States Department of Agriculture (USDA). In South and Central America, the FAO has been involved in launching urban micro-garden projects in several countries including Bolivia, Guatemala, Nicaragua and Venezuela (FAO, 2019a). Asian countries such as China and Thailand have invested significant amounts of money in urban farming technologies such as rooftop farming in the city of Bangkok. In Dakar, India, 7 500 households have micro-gardens (Wachholz, 2017).

In Africa, several micro-gardening and community food gardening projects have been set up and a wide range of urban farming methods is practised in the poorest countries, such as Malawi with 700 000 urban residents engaging in home gardening to meet their food needs (FAO, 2016). The importance of urban food gardening has escalated over the past 20 years on both the international development agenda and in terms of policy reworking and project enactment by national and city authorities, as well as NGOs (FAO, 2016).

The influence of urban agriculture in South Africa remains restricted, although there are large numbers of poor communities in urban areas (Lynch, 2001; Rogerson, 2003; Thornton, 2008; Webb, 1998). Thornton (2008) revealed that urban agriculture remained restricted owing to municipal and land policies in cities being unfavourable to the poor communities practising it.

### 2.5.1 Tendencies in the world and Africa on urban food gardens

Urban agriculture is an industry located within (intra-urban) or on the fringe (peri-urban) of a town, city or metropolis, where diverse food and non-food products are cultivated, raised or manufactured, processed and distributed. The urban agriculture sector uses human and material resources and products sourced in and around that urban area which, in addition, supply services to that urban area (Mougeot, 2000; RUAFA, 2019; Siborurema, 2019). According to De Zeeuw (1999), Drescher (1999), and Windberg (2001), urban city gardens are becoming common around the world, particularly in developing countries. As has been pointed out, access to land and water is crucial for potential financial returns from urban food gardening.

The high level of space shortage in urban areas is ascribed to urban agriculture, which is usually practised on marginal land. The lack of land and increase in urbanisation lead to vacant land in developing countries consistently being used to build shacks for renting out at a greater profit. However, urban food gardens assist urban residents in strengthening social networks, exercising social control and improving social connectedness (Kingsley and Townsend, 2006).

Community gardens are places where people can gather, network, identify as residents of a neighbourhood or community and strengthen their ties. Reports have presented evidence that community gardens play a role in health and social benefits, such as improved nutrition and greater physical activity (Armstrong, 2000; Twiss *et al.*, 2003; Wakefield, 2007). Moreover, social stability is improved through communal interaction, which contributes to the building of social capital (Holland, 2004).

A study by social researchers of an Australian urban garden community concluded that membership was associated with increased social capital (Holland, 2004). This study, through the selected cooperative and group food garden projects, revealed that forms of cooperation, bonding, and bridging are strong in building social capital in terms of social support, connections, and networking. In high-income countries, several health and social benefits have been noted in countries where most of the evidence on community gardens has been noted (Holland, 2004).

Data collected by the African Food Security Urban Network (AFSUN) (2012) on 6 453 households in eleven southern African cities has revealed that urban agriculture is practised at varying levels and in different ways among the cities. Approximately 22% of the surveyed households in these cities revealed a pattern of urban farming whereby more affluent households gain a greater portion of both the economic benefit (monetary value from selling the produce) and the tangible value of vegetable and fruit production. Poorer households gain less in terms of surplus to sell but can provide their daily table needs (Crush *et al.*, 2010).

Case studies conducted in the 1980s, 1990s and 2000s by the FAO and UNICEF suggested increasing participation in urban agriculture in several southern African cities, namely Gaborone, Harare, Johannesburg, Blantyre, Lusaka, Maputo and Windhoek (FAO, 2008; UNICEF 2014). In Zambia (Lusaka) and Zimbabwe (Harare), for example, increased household food production by urban households has grown between the early 2000s and 2010 (Crush *et al.*, 2011; Frayne, 2014). In Zimbabwe (Harare and Bulawayo), economic hardships after the implementation of the economic structural adjustment programme in 1995 forced many middle-income households to engage in food production on their plots, backyards, public open land, riverbanks, and along roadsides and railway lines (AGRITEX, 2001; Crush *et al.*, 2011; Frayne, 2014).

In Botswana, despite environmental constraints, there is evidence of expanding food production in Gaborone and Francistown. Approximately 60% of urban food production is practised on allocated plots of tribal land and in the Greater Gaborone area (FAO, 2014; Frayne, 2014). High-income earning people able to access more land and agricultural inputs dominate urban food production in Malawi (Blantyre), where, as elsewhere, urban food production is a source of both food and income (FAO, 2016; Frayne, 2014). The peri-urban area of colonial Mozambique (Maputo) has become a major site for vegetable and livestock production for the rapidly expanding city of Maputo (FAO, 2016; Frayne 2014).

Ideally, new housing development projects, slum and squatter camp upgrading schemes should allocate space specifically for community gardens. For example, community garden space had been allocated in Bulawayo (Zimbabwe), where World Vision Zimbabwe together with the Department of Agricultural Research and Extension Services (AGRITEX) and the Bulawayo city council have been actively involved since 2001.

A study by Frayne (2014) conducted in eleven southern African cities, namely Windhoek, Gaborone, Maseru, Manzini, Maputo, Blantyre, Lusaka, Harare, Cape Town, Msunduzi and



Johannesburg has shown that people living in cities and experiencing economic decline were more inclined to participate in urban farming. Urban food gardening projects in these specific cities surveyed, are mostly *'self-help'* projects at the household level, meaning that the gardening projects contribute to meeting basic household food security needs (Frayne, 2014; RUAF, 2019).

Frayne (2014) revealed that in Hammanskraal, South Africa, households participating in food gardening were better off than those not participating, although the sustainability of projects, in the long run, is a challenge as farmers often lack the energy and enthusiasm to continue. The agricultural sector has major social and economic importance in the SADC region, contributing between 4% and 27% to the gross domestic product (GDP) of the different member states. Approximately 70% of the population in the region depends on agriculture for food for own consumption, income from farm sales and formal employment (Crush et al., 2011; FAO, 2016; RUAF, 2019; Siborurema, 2019).

#### 2.5.2 Letsema principle in South Africa on community gardens

Integrated development planning (IDP), in South Africa is a co-ordinating synergistic legal instrument for municipal planning in South Africa which extends to the national and provincial spheres of government. It has been a key strategy for the evolution and development of the post 1994 local government dispensation (Ruysenaar, 2012). The aim of the integrated development planning (IDP) of Johannesburg (2012-2017), was to increase the integration of multi-sectors in terms of economic growth, poverty alleviation, strengthening food security, eradicating hunger, reducing unemployment and improving service delivery. There is a need for multi-sector collaboration and coordination across all spheres of government, also involving NGOs and parastatals.

Johannesburg considers urban agriculture as one of the ways for strengthening food security and eliminating hunger. Therefore, a comprehensive food security policy was launched, with the following aims (Richards and Taylor, 2012; Ruysenaar, 2012). First, launching macro-level agricultural support to all food-insecure areas to strengthen food security and eliminate hunger. Second, forming the hub-and-spoke (agri-parks) mode of food production cooperatives by combining the produce of several small-scale farmers into a single supply chain by 2015. Third, prioritising growth management areas, including Orange Farm, Alexandra, Diepsloot, Ivory Park and Soweto (Richards and Taylor, 2012).



In support of the IDP and local economic development (LED), the City of Johannesburg adopted the Letsema principle. This principle refers to a combined effort by multiple parties, including the Gauteng Department of Agricultural Development (GDAD), Government Communication and Information System (GCIS), Gauteng Department of Agriculture Conservation and Environment (GDACE) and the Gauteng Department of Agriculture and Rural Development (GDARD) to launch small-scale agriculture initiatives and provide funding for homestead/backyard and community gardens. This initiative was pursued during the period from 2008 to 2011.

The Letsema principle is aimed at promoting effective land use by allowing communities including urban communities to grow their food. The principal values are consulting, investment and foundations, with the philosophy and founding principle being a diverse family or household, initiating enduring collaborations and cooperation to create an African with global yearning, establishing a long-lasting institution and seriously considering business as a stimulant for social change (Ruysenaar, 2012).

The agricultural extension services mandate of GDARD is to provide crop and livestock production advisory services to home and community gardeners and small-scale farmers in and around the province (Olivier, 2018). Municipalities, city and town council authorities, as the policy-makers in urban areas, are responsible for boundary demarcation, water, rent, and rates, as well as the provision, billing and distribution of electricity. In addition, municipalities control urban amenities, recreational centres and central business districts, implying that adequate and appropriate support from such entities could facilitate sustainable urban food garden projects and ensure their long-term sustainability (Haysom, 2010).

## **2.6. Farming in Gauteng Province**

The Gauteng City-Region has several thriving community food gardens, schools and clinic projects, which provide food and seasonal employment, particularly through the agri-parks initiative of the South African government (Benn, 2020). Urban agriculture in Soweto, greater Johannesburg area, has come alive of late through academic intervention by the University of Johannesburg (Olivier, 2018). In July 2018, several lecturers from two departments started a dialogue with Soweto residents on urban food gardening, livestock production and land issues. A project 'Izindaba Zokudla' (food conversations) was established with key role players in urban farming and food gardeners from the suburbs of Soweto, which include Moletsane and

Tladi (Campbell and Naude, 2017). These authors indicated that “*The project would be an innovation in the food system of Soweto*”.

The vision of the Johannesburg IDP states “*A Joburg that works is a South Africa that works*”. Table 2.1 shows the demographic statistics and socioeconomic status of metropolitan Johannesburg, the largest metropolitan municipality in Gauteng. The Human Development Index (HDI) value for Johannesburg is 0.71, and the contribution of the city to the national GDP was approximately 14.9% in 2018. The population of Johannesburg was 2.13 million, and the unemployment rate was 26.5% (City of Johannesburg, 2017, 2020; HSRC, 2009; Stats SA, 2020).

Table 2.1 shows, among other factors, a value for the Physical Quality of Life Index of 6.27, a poverty rate of 37%, economic growth at 2.6, and access to essential services including dwelling (79.8%), water (98.5%), refuse collection (95.3), sanitation (95.8%), electricity (90%) and water quality based on the Blue Drop Index of the Department of Water Affairs (90.06%).

**Table 2.1:** City of Johannesburg IDP review 2012–2017

IDP item	Review results
Economic growth in the last ten years (GVA)	2.6%
Unemployment rate expanded to	32.3%
Youth unemployment	40%
Demographics	5.05 million people
GINI coefficient	0.63
HDI coefficient	0.71
Poverty rate	37.0%
Access to basic services:	
a) Dwelling	79.8%
b) Refuse collection	95.3%
c) Water	98.5%
d) Sanitation	95.8%
e) Electricity	90.0%
f) Water quality based on the Blue Drop Index	90.06%
Customer satisfaction index	61 points
Physical Quality of Life Index	6.27

*Source:* City of Johannesburg website, IDP review (2012–2017)

### **Gauteng Department of Agriculture food gardens programme in Soweto**

According to Martin *et al.* (2000), urban farming forms an integral part of people’s livelihood strategies in Mamelodi Township, Pretoria, which is located approximately 20 km to the east of the Pretoria Central Business District. Gardeners in Mamelodi have formed gardening project groups and been given access to land by town councils, schools or churches.

Approximately 63% of Mamelodi households engage in local urban food gardening or backyard gardening, growing crops such as maize and various vegetables (Kroll *et al.*, 2012).

According to Ruysenaar (2012), a home garden programme called Siyazondla (“we help ourselves”) was launched in 2004, funded through the Letsema budget under the Department of Rural Development and Land reform (currently the Department of Agriculture, Land Reform and Rural Development). In terms of the programme, Gauteng Province was divided into three broad administrative regions, namely Pretoria, Randfontein (West Rand District Municipality and Johannesburg City), Germiston (Ekurhuleni and Sedibeng) and Orange Farm. Another source of funding is the Comprehensive Agricultural Support Programme (CASP), which is aimed at reducing poverty through increased food production initiatives. The criteria for being selected as a potential beneficiary of the programme include being an unemployed South African citizen, with yard space and water availability. The programme provides beneficiary training and starter packs and conducts monitoring and evaluation, with evaluation having been conducted every year since its inception and launch in Gauteng Province in 2008. In addition, the Gauteng Department of Agriculture distributed 26 032 garden starter packs to 380 recipients, who also received gardening skills training (Kroll *et al.*, 2012).

A mid-term evaluation (2012) in Gauteng of the Siyazondla Homestead Food Gardens Programme conducted by the Siyakhana (*Siyakhana* in IsiZulu means “we build ourselves”) Initiative for Ecological Health and Food Security has revealed food gardens as one of the key drivers for ensuring the provision of quality food and acceptable levels of food security in communities in this province. Of the 380 households surveyed, 87% still practised gardening, with the majority (71%) having a garden at their home, while 9% and 7% have a garden on community land and vacant land, respectively. Of the households with gardens, 96% consume their produce, with 93% doing so at least once a week. Fewer than 20% of the households reported selling home-grown produce or saving significant money because of their garden (Nicolle, 2011).

The key findings expressed by the Siyakhana Initiative for Ecological Health and Food Security (2012) are:

- The benefits include the supplementary food the communities of the initiative received every week and the practical learning environment of the food garden,
- The Siyakhana group has become a conduit for inner-city community development through its connection with the Siyakhana initiative,

- Healthy and nutritious food from the garden could be shared with a range of stakeholders within the inner city, as well as the knowledge deriving from being involved in the initiative,
- The initiative embraces the concept of promoting ecological health through the distribution of food, training, awareness campaigns and mobilisation of farmers and
- Communities could be empowered through skills transfer, as they physically engaged in food production activities.

Residents from Soweto have benefited from food security programmes initiated by GDARD and the City of Johannesburg urban agriculture strategies, such as community gardens, provision of garden tools and others. However, the contribution of urban agriculture programmes to food security has not been evaluated thoroughly. Therefore, to bridge this research gap, a descriptive study was conducted to assess the sustainability of selected urban food garden projects in Soweto. The research conducted in this current study included investigating the contribution of such projects to sustainable food security, the reduction of poverty and nutrition at the household level.

## **2.7. Conceptual framework**

Agricultural programmes promote and boost food production to alleviate food insecurity (Bukusuba et al., 2007). Home gardens can improve household food security and are a possible solution to food insecurity, by alleviating malnutrition and promoting healthy eating. In addition, the pressure on household budgets is reduced (Schmidt, 2005). According to Mougeot (2000), urban food gardening is the growing, processing and distribution mainly of vegetables, fruits, food and non-food products. Urban food cultivation is conducted using human and material resources, products and services found in and around the urban area. In turn, human and material resources, products and services are supplied mainly to the same urban area. General types of urban agriculture are practised worldwide, namely (Mougeot, 2000; Siborurema, 2019):

- Micro-farming in and around the house, including all types of gardening, container gardening, raised gardening, raised beds, and traditional.
- Community gardens comprise plots of land used for growing food. These plots are located at a distance from the farmers' dwellings.

- Institutional gardens, which include schools, churches, prisons and any other institutions that grow food.
- Small-scale commercial farms, including horticultural-based farms, small-scale commercial livestock (chickens, goats, apiculture [beekeeping]), aquaculture (fish farming) and mushroom production.
- Large-scale agrobusiness, comprising popular agricultural activities that produce substantial amounts of food to be sold to dense urban populations through markets.
- Multi-functional farms are a mixture of different types of crops and products cultivated on one plot (flowers, vegetables, fruits, and the like).

Food gardens could be practical solutions, particularly, to hidden hunger, the first stage of food insecurity. This could be achieved by, firstly, increasing the productivity of staple crops such as high-yielding cereals (maize, wheat and sorghum) and increasing the production of micronutrient-rich non-staple foods such as vegetables and pulses. However, cereals and vegetables must be more affordable and the prices of micronutrient-rich foods must be more attractive to poor and hungry people (FAO, 2019; FAO, 2020). Secondly, diversifying diets ensures a healthy diet that contains a balanced and adequate combination of macronutrients (carbohydrates, fats and proteins) (Wakefield, 2007; FAO 2020). Urban food gardens should specialise in growing a variety of legumes, fruits, vegetables and animal-source foods, which are currently produced mostly by peri-urban farmers who own large plots of land suitable for crop and livestock production (FAO, 2016; Haysom et al., 2017; Richards and Taylor, 2012). Thirdly, fortification of commercial foods to add trace amounts of micronutrients to staple foods during processing helps consumers ingest the recommended levels of macronutrients (FAO, 2019; FAO, 2020; Wakefield, 2007). Bio-fortification is the fourth possible solution that involves breeding food crops using conventional or transgenic methods to increase their micronutrient content.

Plant breeders could improve the yield, pest resistance and consumption traits of crops, such as the taste and cooking times (FAO, 2016; UNICEF, 2014; Wakefield, 2007). Finally, supplementation, particularly of vitamin A, is the most cost-effective intervention for improving child survival. Programmes to supplement vitamin A are often integrated into national health policies, which are associated with a reduced risk of all-cause mortality and reduced incidence of diarrhoea (FAO, 2020; UNICEF, 2020).

Urban food gardens facilitate social cohesion of communities, the building of social capital and unity of purpose also benefit communities. City environments are transformed by using vacant space for organised urban farming. Social stability through communal interaction and social capital is formed through cooperation, bonding and bridging in terms of social support connections and networking (Kingsley and Townsend, 2006). Urban food gardening also impacts the different dietary habits and sociocultural environments of urban dwellers, which affect their food consumption patterns. The economic activities and lifestyles in urban areas point to what the urban communities consume. The food consumption trend in urban areas is generally a higher proportion of meat, meat products, vegetables, fruits, milk, milk products, rice, wheat, and wheat products such as bread. Highly refined and processed foods are also commonly consumed in urban areas (FAO, 2016). Physical and ecological sustainability is promoted by growing food (Holland, 2004). Farming remains vital for rural households, although farmers with access to land always seek opportunities to increase and stabilise their income to cushion themselves from the effects of unemployment and economic slowdown (Baiphethi and Jacobs, 2009; FAO, 2019).

Home gardens have the potential to contribute to household food security by providing people with direct access to food that could be harvested, prepared and readily consumed at home (Faber, 2002). The diet diversity of households participating in and benefiting from home gardening is also improved (Faber, 2002). A study in Eatonside, in the Vaal Triangle, Gauteng, has indicated the positive effect of home garden produce on the nutrition level of pre-schoolers (Selepe and Hendriks, 2014). According to Ruel (2017), existing knowledge has also been identified regarding pathways, mechanisms and contextual factors that affect where and how agriculture could improve nutritional outcomes for sustainable for security.

Home gardens influence nutrition-sensitive agriculture, maximising the effect of nutrition outcomes for the poor while minimising the unintended negative nutritional consequences of agricultural interventions and policies (Ruel, 2021). An increased intake of different vegetables is essential for food security, as it enhances food diversification, with diversification being a conventional food security measure (Gunaseena, 2007; Chadna and Oluoch, 2007; Knisley and Nyomora, 2007). Home gardens are not only a means to enhancing nutrition and promoting self-sufficiency to build up food security but also frequently a way of developing enterprises and agribusinesses; coupled with organic farming techniques, as a way of saving labour,

promoting enterprise, optimising nutrition, and self-sufficiency (Kaschula and Arbuckle, 2007).

The Alternative Farming Systems Information Center (AFSIC), founded in 1985, was one of the first USDA programs to focus on sustainable and organic agriculture. According to the United States Department of Agriculture Alternative Farming Systems Information Center (AFSIC, 2007), food gardens do increase food security, although they might not be sustainable in the long run. Food security is enhanced by improving access to food and increasing income, particularly for participating households, and saving money, particularly for poor households. Home and community-grown vegetables boost food availability, as vegetables, fruits and food become readily and locally available. Locally grown food is cheaper than food from designated markets. Calorie intake increases, micronutrient intake increases significantly, and a more balanced, healthy diet is available. Healthy eating facilitates an improvement in the nutrition status of household members, particularly children below the age of ten.

In addition, job training and skills development are provided. Skills acquired include shared decision-making among community members such as women and the youth, as these groups generally have a higher rate of participation in food gardening than men do. Technical knowledge and expertise are also gained through the growing of crops. Problem-solving and negotiation take place among gardeners, farmers' groups, farmer organisations and community leaders, thereby building a sense of social cohesion in communities. Prospective investors in the food garden projects could be attracted by farmers' groups and community members working together and coordinating.

## **2.8. Sustainability challenges of urban food garden projects**

The sustainability of urban food gardens is strongly influenced by the governance of municipal and provincial boards by establishing long-term strategies for successful, sustainable and viable urban food gardening projects and small-scale farming. Water availability, land rights, municipal coordination and collaboration with other stakeholders, farmers, farmers' groups and organisations, funding, affordable farming inputs, and agricultural advisory support all determine the sustainability and viability of food garden projects. Viability is related closely to the contributions of local authorities to the development of sustainable and resilient cities that are socially inclusive, food secure, productive and environmentally healthy (Haysom, 2010).



Land use could be promoted to be multifunctional, e.g., in a city park area with a small dam, space could be allocated for fish farming/aquaculture and a community garden. Factors crucial to urban community food gardeners and small-scale farmers include access to adequate water, agricultural inputs and basic infrastructure. Access to these elements could be promoted by training and extension services, which would enhance the production efficiency and economic viability of urban agriculture. School gardens and backyard home gardens are multifunctional spaces that require aid and support (Olivier, 2018).

In addition, opportunities for developing adequate technologies and infrastructure such as hydroponics and aquaponics using wastewater to reduce water pollution must be exploited. Direct marketing of food produced by communities must be facilitated, and support schemes for microenterprise development should be enforced. There is a need for coordination between health, agriculture and environmental departments to implement measures for reducing the health and environmental risks associated with urban agriculture. Such measures include educating farmers to manage health and environmental risks, such as avoiding stream bank cultivation. Additionally, vendors and consumers of food, vegetables, and fruit need training focusing on hygiene and healthy eating. Furthermore, industries and companies must have industrial pollution prevention programmes in place (FAO, 2016; Haysom et al., 2017).

The non-sustainability of urban food garden projects is ascribed to several factors, including:

- Municipal authorities are unwilling to formally support them,
- Inconsistent water supplies,
- Municipal land rights and demarcation issues,
- Expensive farming inputs,
- Lack of authentic coordination and collaboration between farmers,
- Lack of organised farmers' groups, organisations and agricultural stakeholders,
- Lack of financing for such projects and inconsistency,
- No external support in terms of agricultural extension advisory services,
- Slow adoption of innovative research and new technology by urban dwellers who prefer to pursue employment opportunities in the corporate world, (Charles 2013; Haysom, 2010; Luc, 2006; Olivier, 2018; Siborurema, 2019).

Despite government efforts to support urban communities with the establishment of urban food garden projects, little success has been achieved in addressing food security and the production of fresh vegetables (Haysom *et al.*, 2017).



## 2.9. Role of extension and support in establishing and sustaining food garden projects

Annan (2012) highlighted that extension officers in Africa are mandated to transfer proven and confirmed farming practices to farmers in a participatory manner. However, studies have shown that projects could fail owing to a lack of preparation, planning and participation (Zezza and Tasciotti, 2010; Zwane, 2015). Participation is a crucial factor in the success of any project. Participation could be viewed as the means to empower the significant society of poor people and the voiceless (Chambers, 1994).

According to Du Toit (2009) and Richards and Taylor (2012), the role of extension in farming includes to:

- Provide leadership and advisory services regarding policies and strategies for addressing poverty and food insecurity through building technical and indigenous knowledge capacity,
- Improve the entry levels of smallholder farmers into commercial agriculture and create space for smallholder farmers to grow their businesses,
- Identify food-insecure communities through knowledge and information management systems at all levels,
- Ensure qualitative and quantitative production of virtuous food commodities within identified food-insecure communities,
- Advise farmers to produce efficiently, sustainably and sufficiently for the domestic market,
- Ensure profitable production of priority commodities by ensuring that farmers are equipped with production knowledge for virtuous crops and livestock.

The role of agricultural extension advisors is to boost agricultural productivity and increase food security. Extension advisors help improve rural and urban livelihoods by promoting agriculture as an engine of pro-poor economic growth (Roling, 1998). Agricultural extension staff assist farmers through educational procedures and training. Farmers are trained to improve farming methods or/techniques and increase production and income in efficient and effective ways. These measures help farming communities improve their livelihoods, thereby raising their social, economic, technical, and indigenous knowledge capacity and educational standards. Agricultural extension could contribute to sustainable food security through knowledge dissemination to farmers to facilitate informed decision-making. The field of extension and rural development is a scientific discipline that should be developed through

stimulating thoughts, ideas, study, research and discussions to facilitate the exchange of knowledge. Knowledge dissemination should be done nationally and internationally.

Apart from on-the-job training of extension agents, personal development through further study through farm schools, agricultural colleges and universities should be encouraged and prioritised. Nagel (1997) and Zwane (2015) indicated the changing demands of extension service clients. Several tools of extension such as workshops, seminars, summits, conferences, field days and demonstrations could be employed to meet the changing demands of clients and farmers (De Satge *et al.*, 2008).

Institutions of higher learning should invest in education by playing a developmental role, which could be achieved by establishing linkages with research extension and farming communities. Such linkages would promote sustainable food security and increase the relevance of information and technology passed down to farmers (Zwane, 2015). A bottom-up approach to extension and rural development would ensure that training is responsive to the current needs of farmers.

Education processes mostly cover agriculture-related information relevant to development. Zwane (2015) has indicated that these services include the provision of relevant or/updated information, farming inputs and credit. Access to extension services for farmers and the competency of extension workers enable agriculture extension to contribute to sustainable food security. Knowledge dissemination to farmers and clients for informed decision-making also contributes to sustainable food security (De Satge *et al.*, 2008).

## **2.10. Role of government and NGOs in South Africa to improve the food security status**

Among other pressing issues of livelihood sustainability in South Africa, it is crucial to achieve the goals of reducing hunger, malnutrition, poverty, and unemployment. The South African government, in collaboration with the private sector, is engaged in equipping and funding several types of farmers (both urban and rural farmers) to ensure that investment in agricultural trade is increased (Olivier, 2018; Siborurema, 2019). For instance, the Siyazondla home garden programme aims to strategically bring farmers and the agribusiness sector together by transforming the current agricultural financing service.

A strategic grant fund has been established by the Siyazondla home garden programme, targeting cooperation between agribusinesses and smallholder farmers (Haysom *et al.*, 2017).

Further, strategic farming grants are available to farmers and agribusinesses through the Agricultural Business Chamber of South Africa. This organisation encourages the growing of staple food crops such as cereal grains including maize, wheat, barley, sorghum and millet. In addition, crop growing is encouraged by the provision of agricultural inputs. e.g., seed and fertilisers, as well as agricultural support services by financing crop and livestock production projects. Moreover, agricultural logistics, storage and marketing are funded (Olivier, 2018).

In the fight against hunger and poverty, households are provided with basic start-up inputs such as garden tools and seeds for food production projects and they are allowed to sell any surplus. In 2015, a team of approximately 120 graduates and youths has been employed to facilitate the success of the programme. Extension officers and crop specialists in the field and crop production agronomic sector are available to teach and train the farmers to achieve successful and sustainable vegetable production. Moreover, the Department of Education through school food gardens is ensuring that school learners have at least one meal during school hours to support effective learning (UNDP, 2015).

To achieve sustainable food security endeavours, GDARD has been collaborating with municipalities and government departments such as the Department of Social Development (DSD), the National Department of Health and the National Department of Basic Education. The GDARD definition of a food garden project is explained by four scenarios, namely community, household, school or clinic food gardens. The South African government ensures that both rural and urban economically and socially vulnerable people receive applicable monthly social grants to and food handouts. (Haysom, 2015a).

The role of the government in urban food gardening to improve the food security status is as follows (Faber, 2002; Freed and Maredia, 2013; Ruel, 2017; Ruel and Garrett, 1998). First, policy development by defining coherent and integrated urban agricultural strategies, regulation through institutional linkages and provision of sufficient financial incentives and controls to guarantee and enforce the new legislation. Second, facilitation by aligning with other government sectors and agencies and with other role players to enhance the sustainability of urban food gardening projects. Third, internal sustainability management through work principles, and stakeholder dialogue.

A survey conducted by Stats SA on the extent of food security in South Africa in 2017 indicated that 84% of households in Gauteng Province had adequate food access, 93.6% in Limpopo; 64% in North West, and 66.5% in the Northern Cape. As the results show, North West and

Northern Cape had the lowest percentages for access to food. Samples of the 2017 survey from Orange Farm and Alexandra (Johannesburg) revealed that although a large part of the population enjoyed food security, the tendency for food insecurity remained.

The roles of NGOs in South Africa in improving food security status are as follows (Faber, 2002; Haysom, 2010; RUAFA, 2019).

- a. NGOs are the greatest contributors of funding to urban food garden projects;
- b. Through social development and funding of food garden projects, NGOs strive to achieve sustainable community development and reach out to poor and disadvantaged communities, thereby establishing sustainable food security;
- c. NGOs strive to achieve the first Sustainable Development Goal, i.e., eradicating extreme poverty and hunger. This is done by promoting and supporting urban farmers and their urban food garden projects to achieve sustainable development;
- d. Promoting sustainable consumption by educating farmers and households in purchasing food;
- e. Engaging in legal urban farming to enable the participants to save money for purchasing food.

In 2011, the University of Pretoria formed a partnership with the United States Agency for International Development USAID to promote and boost food production through the Comprehensive African Agriculture Development Programme's (CAADP), Agenda 2063 continental initiative that aims to help African countries eliminate hunger and reduce poverty by raising economic growth through agriculture-led development. The aim was to train over 250 top government department officials, the private sector, NGOs and research organisations in ten African countries, including South Africa. This formed part of the New Partnerships for Africa's Development (NEPAD) initiative of 2016. The NEPAD initiative through CAADP enables the building of technical knowledge capacity and leadership skills in the Department of Agriculture, Fisheries and Forestry (DAFF), tabled in 2013.

CAADP provides a set of principles and broadly defined strategies to help countries increase investment opportunities in the agricultural sectors, job creation, food security, improved nutrition, boost the 6% annual growth of the agricultural GDP and strengthen resilience (FAO, 2016). Under this framework, local authorities guarantee inter-collaboration to provide inter-departmental access to vacant land to urban farmers from municipalities, as well as the integration of urban agriculture in urban land use planning and zoning.

According to the UN, approximately 40% of Africans were already living in cities in 2010, with a potential increase of another 20% by 2050 (Frayne, 2014). Amponsah (2018) suggested that city regulators and authorities consider acquiring land from private landowners and allocating it for urban agricultural usage. Other African cities, especially in SADC countries, which were surveyed on, government departments, universities, schools, clinics, land agencies, estate agencies, land developers, banks, NGOs and donors work closely with municipalities to make sure that urban food gardening and issues of controlling the legality of urban food farming are maintained (Frayne, 2014; Olivier, 2018).

The Department of Agriculture, Land Reform and Rural Development has developed a new strategic plan for farmer's organisations in 2018 and is urging all provinces in South Africa to ensure urban household food security. In Gauteng Province, the strategic plan functions like a farmer's organisation, and manages, e.g., reference to a farmers' market, land tenure issues in the city, technology development workshops and the creation of student opportunities to participate in the initiative by conducting academic research on aspects of sustainable food systems (Olivier, 2018).

This strategy for agriculture and sustainable food systems in South Africa was launched in 2018. The key role players are:

- Land and Agriculture Development Bank of South Africa
- Micro Agricultural Financial Institutions of South Africa (MAFISA)
- Agricultural Black Economic Empowerment Fund (AgriBEE Fund)
- Agriculture South Africa (Agri SA)
- Agricultural Business Chamber (ABC)
- Transvaal Agricultural Union of South Africa (TAU SA)
- National African Farmers Union of South Africa (NAFU SA)
- African Farmer's Association of South Africa (AFASA)
- Agricultural Research Council (ARC) (Olivier, 2018).

The Research Centre for Urban Agriculture and Forestry (RUAF, 2019) foundation has recommended municipal strategies for developing successful and sustainable urban farming. These strategies include interdepartmental coordination such as envisaged in Cape Town and established in 2002 to facilitate the sustainability of urban food gardens, which is a good example of creating an enabling environment.

## 2.11. Chapter summary

Countries worldwide, particularly developing countries where hunger and food scarcity are acute, need to intensify and strengthen local food production. Such actions would help mitigate the adverse effects of global food shocks and food price volatility. The United Nations Food Systems Summit (2021) is an example of global efforts to bring together different role players, countries, cities, communities, companies, civil society, and food producers for enabling sustainable food production (FAO, 2021).

Ample attention is being directed towards home gardens as a strategy to enhance household food security and nutrition (FAO, 2021; WHO, 2021). Recognising the value and potential of urban community home gardens for improving food security and livelihoods, city governments (local government authorities), NGOs and international organisations have launched numerous initiatives in several developing countries. These entities provide support and build local capacity to enhance productivity. The initiatives by city governments include scaling up of community garden activities (FAO, 2021; Freed and Maredia, 2013; United Nations, 2021).

## CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

### 3.1. Introduction

This chapter provides an overview of the methodology employed to obtain data from food gardeners and key informants in the Moletsane and Tladi areas of Soweto. Chapter three also provides the description of the study area project sites. Methodology refers to the body of methods used in a particular activity or research process (Babbie, 2014). The chapter focuses on a description of the population, research design and data collection instruments, the selection technique used to select respondents, the procedure and how it was drafted. In addition, pilot testing and data analysis methods are discussed.

### 3.2. Research project sites

The study was conducted in two suburbs of Soweto, a township of the City of Johannesburg Metropolitan Municipality in Gauteng Province, South Africa. Originally set aside in the 1930s by the South African white government for residence by Blacks (Black township), with approximately 35 suburbs called sub-economic townships, with high to medium-density populations. It adjoins the city of Johannesburg on the southwest; its name is an acronym derived from South-Western Townships. It is the country's largest Black urban complex. (Soweto Government Website, 2017).

Soweto is located to the southeast of Johannesburg, approximately 24.6 km from the Johannesburg city centre. The total population of Soweto is approximately 1 271 628 million people. Soweto covers an area of approximately 200.03 km<sup>2</sup>. The population density per square kilometre is approximately 6 400 people. The popularly spoken language is IsiZulu at 37.1%, followed by other languages at 25.7%, with the least spoken language being Sesotho. Other languages spoken in Soweto constitute 37.2%.

The average annual rainfall is 750 mm per annum. The mean temperature is 15.8 °C, with the average highest temperature at 22.7 °C and the lowest at 8.8 °C. The Tladi group and Moletsane Community, which are communal urban food garden projects, and individual backyard gardeners were selected purposively on a voluntary basis, i.e., group, cooperative or individual backyard home gardeners who were practising open-field gardening and tunnel gardening.

Figure 3.1 is a map image showing the location of Moletsane and Tladi and the locations of the food garden projects and the individual backyard gardeners.





**Legend:**

Scale 1:200

Moletsane cooperative

● Tladi group- Setlakalana Molepo Centre

**Figure 3.1: Location of the Tladi group and Moletsane Community and individual backyard food gardens**

Source: *Google Earth, 2020*

### 3.2.1. Tladi study area

Tladi is one of the sub-economic townships established in Soweto in 1956. The name Tladi originates from Northern Sotho and means “lightning”. The food garden in Tladi is called the Setlakalana food garden and is located at Setlakalana Molepo Community Education Centre (Figure 4.1). The area has a primary school, an adult community centre, a clinic and a secondary school. Tladi is located 28.2 km from Johannesburg city centre and approximately 2 km from Jabulani Civic Centre.

The neighbouring suburbs are Moletsane, Dube and Zola (Soweto Government Website, 2019). Tladi covers a total area of 1.35 km<sup>2</sup>, the total population is 14 435 people, the population per square kilometre is approximately 10 716 people and the total number of households is



approximately 4 222. The most popularly spoken language is Sesotho at 40.06%, followed by Setswana at 24.6% and the least spoken languages at 35.4% (Stats SA, 2011).

Justification that the researcher targeted group, cooperative and individual backyard gardeners (highlighted in yellow on each section).

The food garden project in Tladi comprises a group of seven original members, five elderly people from the Setlakalana Adult Centre and eight volunteers from the community. The group was started by a woman, a former supermarket employee, who naturally acts as the group chairperson. The area under vegetable production is an open-field school garden, approximately 50 m by 30 m in size. Each gardener grows food on an allocated portion of approximately 85 m<sup>2</sup>. The municipal water at the school is used for irrigation, with five taps located within the production area, as well as a sprinkler system (40%), hosepipes (40%) and buckets (20%). The types of vegetables grown include spinach, green beans, green pepper, butternut, brinjal, chillies, tomatoes, cabbage, kale, carrots and spring onion.

The objectives of the Tladi group are, first, to cushion the effects of rising unemployment. For instance, the Tladi food garden initiator is a former supermarket employee who lost her income when her contract expired. As she had no other source of income, she started the community food garden. Second, bringing unity and harmony among people with similar interests and a passion for gardening. Third, improving lives by supplementing daily diets with nutritious vegetables and herbs.

### 3.2.2. Moletsane study area

Moletsane is a high-density area in Soweto established in 1956. The name originates from a Bataung Chief. The community food garden of Moletsane is called Pitelemintha Cooperative, located at Dikwankwetla Primary School. The suburb is 28 km from Johannesburg city centre. The neighbouring suburbs are Tladi and Zola (Soweto Government Website, 2017). Moletsane covers a total area of 1.15 km<sup>2</sup>. The total population is 14 824 people, the population per square kilometre is approximately 12 838.66 people, and the total number of households is approximately 4 257.

The most popularly spoken language is Sesotho at 44.47%, followed by Setswana at 23.99% and the least spoken are other languages at 31.54% (Stats SA, 2014). The food garden at Moletsane is called Pitelemintha Cooperative, located at Dikwankwetla Primary School. The cooperative has twelve original members and eight volunteers. The cooperative was started in

July 2018 by a woman entrepreneur under the initiative of Umsizi Sustainable Social Solutions and the Gauteng Enterprise Propeller (GEP), the donors of steel poles for tunnel construction.

The cooperative uses municipal water on the school premises, employing drip irrigation (90%), hosepipes (5%) and buckets (5%). Vegetables are cultivated in tunnels, using trenches filled with soil, manure, compost and organic matter. Currently, crops are grown in 16 plastic tunnels of 6 m x 4 m and 10 plastic tunnels of 12 m x 4 m. The vegetables grown mainly include lettuce, onion, cabbage, and spinach, with some carrot, beetroot, green beans, turnip, potatoes, tomatoes and herbs such as parsley, coriander and dill. The vegetables are produced for own consumption and the school feeding scheme, with the surplus being sold.

The objectives of the cooperative are, first, to cushion the effects of rising unemployment. The cooperative started a Stokvel group (grocery and social club) seeking to boost their sources of income by diversification of the Stokvel with a community food garden. Second, to learn new farming technology such as drip irrigation in growth tunnels. Third, the initiators of the cooperative wanted to create unity and harmony among people with similar interests to combine effort and money and a passion for gardening. Finally, the aim was to improve lives by supplementing daily diets with nutritious vegetables and herbs.

### 3.2.3. Backyard food gardeners

The third case study comprises 20 backyard gardeners from Moletsane and 20 from Tladi, i.e. individual participants who cultivate vegetables and herbs for own consumption in their respective backyards. The crops are irrigated using bucket and hosepipe systems. The average size of the backyards is 8 m<sup>2</sup> (4 m by 2 m), with vegetable beds or small plastic tunnels. Approximately half of the 40 participants use grow pots/boxes, hessian sacks, old tyres and small plastic tunnels (4 m<sup>2</sup>) any method suitable for their small spaces. The crops are mainly cabbage, herbs, chilli, green pepper, tomatoes, kale, spinach, onion, sweet potatoes, lettuce, beetroot, brinjal and carrots.

### 3.3. Research approach

The study used a case study approach with both qualitative and quantitative approaches, to collect and analyse the data. Purposive sampling techniques was used to select sample respondents in the three categories of food garden projects. These categories of food gardeners (a cooperative food garden project, a purposively operating group, and individual backyard home gardeners), influenced the research design and strategy. The research strategy was also

influenced by the respondents of this study all being members of a Greater Soweto Farmers' Forum.

### 3.4. Sampling techniques

Evidence highlighted that there was no conflict of interest. The Izindaba Zokudla Food Network is a non-funded farmers' forum in the Greater Soweto area founded in 2017 by Professor Malan Naude of the Department of Anthropology and Development Studies at the University of Johannesburg. Izindaba Zokudla is an (isiZulu name for 'Conversations about Food'). This forum at the Soweto Campus of the University has brought together farmers for interactive training and learning purposes. The members of the network are also members of the Greater Soweto farmers' forum.

In 2018, the researcher provided information to the network about the study during a monthly meeting of the network and, in February 2020, the researcher invited members who were already practising food gardening to participate in the research study. These three purposively selected categories of gardeners (cooperative, group and individual backyard home gardeners in the Moletsane and Tladi areas volunteered to participate. After deliberation at that meeting of February 2020, eighty participants volunteered to participate, namely 20 Moletsane cooperative members who were practising plastic tunnel food gardening, all 20 Tladi group members who were practising open-field gardening and all 40 independent backyard gardeners.

Fourteen key informants/representatives were identified by the researcher during the initial meeting of 2018 with the Izindaba Zokudla Food Network. These informants represented key stakeholder groups and organisations (one municipality, four government departments, two universities, an NGO and a farmers' group) that were identified through the Izindaba Zokudla Food Network. The informants were selected in consideration of their relevance in the establishment and support of urban food garden projects in Moletsane and Tladi. All the participants (gardeners and key informants) were selected after volunteering through the Izindaba Zokudla Food Network. The study was explained during the monthly network meeting in February 2020 at the University of Johannesburg Soweto Campus. The discussion was on urban food gardening project establishment, support and improvement. The discussion was followed by the above-mentioned gardeners, volunteering to participate. The participants volunteered because they recognised the need to make themselves public to the agricultural

world to improve their food garden projects. They also pointed out the importance of collaboration in obtaining support for their projects from agricultural service providers.

### 3.5 Data collection and instrument

The semi-structured questionnaire developed for data collection was pre-tested at food garden sites in Moletsane/Tladi and the Soweto Campus in February 2020 before being administered to the respondents. Pilot testing with stakeholders was done on a purposive selection basis and was conducted by the enumerators soon after receiving their training. The selected groups of respondents included:

- a. Five respondents from the Tladi group
- b. Five respondents from the Moletsane cooperative
- c. Ten respondents from the backyard gardener group
- d. Three respondents from the key informant group

The researcher demonstrated and closely supervised the exercise to take note of the challenges. Each enumerator took notes of their observations during the exercise for feedback purposes. The questionnaire was later adjusted based on the pre-testing findings and data was collected using the final questionnaire. No major changes were done to the questionnaire after the pre-testing, that is why, the pre-test results were linked to the final questionnaire.

The study used primary and secondary data collected by the researcher and enumerators through a questionnaire of face-to-face interviews. The enumerators did not form part of the respondents to the questionnaire, but were other farmers from the large group of the farmers' network. They were people who understood the culture and could translate English and IsiZulu for during the interviews". They were not part of the Tladi/Moletsane group/cooperative/individual backyard gardeners. The face-to-face interview method was preferred for this study because it tends to maximize the response rates, enables more in-depth exploration of issues and facilitates the participation of illiterate members of the community (Babbie, 2014; Yin, 2003).

The primary data collected included demographic and economic information such as gender, marital status, education level, tenure status, employment status, and economic status (including how the respondents (cooperative and group), coped to supplement their monthly income and food basket, and selling surplus vegetables operational records of gardening projects, crop production and irrigation records.

Secondary data were collected as information for the theoretical foundation of the research study. The secondary data included, Moletsane and Tladi areas (Council meeting minutes), nutrition records of the Msizi, Gateway and Tladi clinics, Moletsane cooperative and Tladi group gardening project records. In addition, the minutes of previous meetings of the Izindaba Zokudla Food Network were also provided. Further, the 2018/19 and 2019/2020 Johannesburg City water tariff documents were included, as well as the Johannesburg IDP policy papers, organisational and departmental records and data originally collected by the universities of Johannesburg and the Witwatersrand for other research purposes.

One set of structured questionnaires was used to collect data from 80 selected participants from Moletsane and Tladi and to conduct focus group discussions with the 14 key informants. The set of questionnaires comprised two sections, with the first being for food gardener respondents and the second containing interview questions for the key informants (focus group discussions). The researcher and the enumerators were people who understood English and IsiZulu for translation during the interviews. The data were collected during the period 5–12 June 2020.

The group and cooperative respondents were met by the enumerators at their gardens (schools) and were interviewed face-to-face, individually, in turn. The 40 backyard gardeners were also interviewed individually and face-to-face at their places of residence. Follow-up questions were indicated on various open-ended main questions to ensure an improved understanding of the responses. Open-ended questions were included to accommodate respondents that might not have any opinion on specific issues. Interviews were also conducted based on the role played by all the identified departments and organisations in establishing and supporting urban food gardens. Fourteen representative participants/key informants were identified for participation in the interviews. The following organisations and government departments were interviewed:

- The City of Johannesburg Municipality (Soweto), which is responsible for water provision, with one representative from the municipality,
- Two universities, that are responsible for agricultural and farming skills training (two representatives, one each from the University of Johannesburg and the University of the Witwatersrand),
- Department of Education, which is responsible for land/space provision for schools (four representatives, two educators from each of the schools, namely Dikwankwetla Primary School and Setlakalana Molepo Education Centre,

- Department of Social Development (one representative from Jabulani Civic Centre Social Development office),
- Department of Health (two representatives, one nurse in charge of Tladi Clinic and one nurse in charge of Gateway Clinic in Moletsane),
- NGO(s)/donor(s) responsible for funding and farming skills training together with universities. Three representatives, one from each of the three NGOs, farmers' organisation and donor organisation (one from Umsizi Sustainable Social Solutions, one from Gauteng Enterprise Propeller and one from Izindaba Zokudla Food Network),
- Department of Agriculture, Forestry and Fisheries (one representative from Johannesburg City GDARD office).

### 3.6. Descriptive statistics

Objectives 1 to 4 were analysed using descriptive statistics.

After capturing and coding the primary data on a Microsoft Excel spreadsheet (Microsoft Corporation, Washington, United States), the data were analysed. Excel is a computer application that makes provision for calculating frequencies and descriptive statistics, such as means and standard deviations, as well as performing appropriate statistical tests and compiling computing graphs. Analysis of variance (ANOVA) and chi-square calculations of statistical difference were conducted on relevant variables. A one-way ANOVA analysis is used to compare means of more than two groups, while a chi-square test is used to explore the relationship between two categorical variables. Descriptive statistics such as frequencies and mean scores were also calculated.

### 3.7. Research ethics

An ethical clearance letter was obtained from the Research Ethics Committee of the University of Pretoria (reference number: NAS166/2021). Crossman (2019) stated that ethics are self-regulatory guidelines for making decisions and defining professions. Considerations that must be observed when undertaking a sociological survey include the professional competence of the researcher, integrity in conducting the research, professional and scientific responsibility, respect for people's rights, dignity and diversity and social responsibility. In respect of integrity, professional activities need to be honest, fair and respectful of others. As regards this

study, contact with farmers were solicited for access to food garden records and data collection while respecting their rights, dignity, diversity and social responsibility.

For professional competence and scientific responsibility, the researcher always introduced herself and displayed her university student identity card for identification by the community and stakeholders every time they were out in the field.

For integrity, the enumerators were trained and supervised by the researcher before and during the interviews. The enumerators were instructed to interview only the members of the households participating in the group, individual backyard farmers and key informants/representative officials representing their organisations and government departments. Tolerance of each other was practised consistently, and there was no discrimination or bias towards each other. To observe the above-mentioned ethical considerations during the COVID-19 period, the COVID protocol was followed by all those involved in the research study, including sanitising and washing hands regularly, avoiding handshakes, practising social distancing and always wearing masks.

Respondents were assured of the confidentiality of their responses before answering the questions, and the purpose and objectives of the study (i.e., all information required for voluntary participation) were explained clearly to them prior to the interviews. Participation in the survey was by voluntary consent and the respondents volunteered to participate because they recognised the need to market their food garden projects to prospective funders. The information on the consent forms (refer to Appendix) was read out aloud to the participants. This information states that the researcher was inviting people to voluntarily participate in an academic study conducted by the researcher, with the name of the researcher, course and name of the university included.

In addition, the purpose and objectives of the study were clearly stated to inform the respondents of important considerations. Anonymity (no names to appear on the questionnaire) and the strict confidentiality of the study were most important to the researcher and the university. Further, it was emphasised that participation was by choice and withdrawal from the study would have no negative consequences. In addition, the results would be used only in policy formulation and for academic purposes. Further information included instructions on answering the questionnaire and that the participants could request a summary of the findings.

### **3.8. Chapter summary**

In Chapter 3, the research design and methodology used in this study conducted in Soweto in the Tladi and Moletsane township areas were explained. The methodology was aimed at assessing the economic sustainability of selected urban community (group and cooperative) and individual backyard home food garden projects. The assessment was conducted by determining the demographic and socioeconomic factors influencing households to engage in urban food gardening projects and the elements that affect the sustainability of such projects.



## CHAPTER 4: RESULTS AND DISCUSSION

### 4.1. Introduction

In this chapter, the socioeconomic factors are discussed that influence households to engage in urban food garden projects, as well as the economic sustainability of these food gardens on the socioeconomic status of participating households.

### 4.2. Socioeconomic factors influencing households to engage in urban food garden projects

The socioeconomic factors influencing households to engage in urban food garden projects include demographic characteristics, household income, farming activities and institutional support.

#### 4.2.1 Demographic characteristics of respondents

The demographic characteristics of the respondents include gender, age, marital status, level of education and household composition and size. Table 4.1 provides an overview of the demographic characteristics of food gardeners in Tladi, Moletsane, and individual backyard gardeners.

#### Gender of respondents

In Tladi, there were more male gardeners (75%) than in Moletsane (35%) and backyard gardeners (15%). Female participation is high in Moletsane (65%) and the individual backyard gardeners' group (85%), probably because the project initiator of the Moletsane food garden is a female who strongly influenced other women to participate in the project. The findings of the current study were the opposite of those reported by Haysom *et al.* (2017) that male participation in urban farming is generally high. However, according to the Tladi male group members, urban farming has become a source of employment for them and they have been consistently engaged in the activity.

**Table 4.1:** Summary of demographic characteristics of respondents

Demographic variable	Category	Tladi		Moletsane		Individual backyard gardeners		Total	
		N	%	N	%	N	%	N	%
Age range	18 to 30 years	3	15	1	5	7	17	11	14
	31 to 60 years	6	30	10	50	5	123	21	26
	61 years+	11	55	9	45	28	70	18	60
Gender	Male	15	75	7	35	6	15	28	35
	Female	5	25	13	65	34	85	52	65
Marital status	Married	9	45	8	40	10	25	27	34
	Single	11	55	12	60	30	75	53	66
Household composition and size	1 to 5	12	60	14	70	18	45	44	55
	6 to 10	8	40	6	30	20	50	34	43
	11 to 15	-	-	-	-	2	5	2	2
Tenure status	Renting	6	30	3	15	4	10	13	16
	House owner	10	50	16	80	35	87.5	61	76
	Looking after someone else's house	4	20	1	5	1	2.5	6	8

*Source:* Author's field survey 2019/2020

### Age of respondents

The mean age of participation was 34 years. Overall, the group aged 61+ constituted the largest proportion (60.0%) of participation in the urban food garden projects, followed by the 31–60 years group (26%) and those younger than 30 years (14%). These results concur with those of Frayne (2014), who found that elderly people and pensioners tend to participate more in urban food gardening, as they have enough time to dedicate to the work. The ANOVA results indicated that the mean ages of respondents differed significantly across the three groups ( $F=1.5148$ ;  $df=5$ ;  $p=0.001$ ). Pensioners from the backyard gardeners' group pointed out that they could commit consistently to gardening, viewing it as a form of therapy and exercise for mind, body and soul.

### Marital status of respondents

Table 4.1 shows the variation of marital status among the three groups, indicating that most respondents were single (66%), i.e., mainly never married, divorced or widowed, single or living together. In agriculture, being married has its advantages. e.g., when one of the partners is indisposed, the other one could continue tending the garden. Married households also have more labour available that could play a role in tending the crops (Luwanda, 2015). However,

Nicole (2011) has indicated that single people are well organised and committed to pursuing poverty alleviation through community empowerment and social cohesion.

### **Level of education of respondents**

Their level of education influences the decision-making of individuals. According to Bembridge (1991), lack of knowledge from being uneducated could affect the adoption processes of new technologies and participation in projects. A study conducted by Majali (2012) found that although South African women are generally less educated than their male counterparts, they are good decision-makers. A relatively high percentage (51%) of the respondents had attained secondary and tertiary education, whereas 24% had no schooling. The results of the current study showed that the males in the three groups generally have higher levels of education than the females, with 86% males having attained schooling, in comparison with 54% of female respondents. Education level affects the potential participation of respondents and is crucial in the understanding of various technical messages, as well as the successful delivery of agricultural support and technical training (Luwanda, 2015).

### **Respondents' household composition and size**

In several ways, the household composition determines the potential household food security, potential labour, participation, decision-making, and how benefits are shared between the household members (Luwanda, 2015; Nicolle, 2011). The household size of the participating members varies between 1 and 15, with an average of approximately 6 members per household. These results support the findings of Martin *et al.* (2000) that the average size of households of people living in informal settlements and high-density suburbs is relatively high. However, large families could be associated generally with ample potential labour, which could affect factors such as the quality of crop management and the demand for food (Stevens, 2006).

The Moletsane group had the highest proportion of household heads (90%), backyard gardeners (82.5%) and Tladi (80%). Overall, 84% of household heads were also food gardeners and the household heads across the three groups pointed out that they were doing the gardening work. This finding indicated a direct relationship between household headship and decision-making in the home related to food security (Luwanda, 2015; Olivier, 2018).

### **Tenure status of respondents**

The tenure status of food gardeners represents the participants' access to land and accommodation (housing) across the three groups. Respondents owning houses constituted 76%, whereas the rest were either renting houses (16%) or looking after a community member's house (8%). The backyard gardeners' group had the highest percentage of house ownership (88%), i.e., their backyard farming practices were secure on their stands. Haysom (2015a) revealed that property owners could be influencers for the adoption of new technologies because they own land and can practise whatever projects they desire on their land.

#### 4.2.2 Main sources of household income of respondents

The employment status of a household determines the potential household income and its effect on the household's livelihood. Table 4.2 shows that Tladi has the highest unemployment rate (70%).

**Table 4.2:** Employment status of respondents

Occupation status	Tladi		Moletsane		Backyard gardeners		Total	
	N	%	N	%	N	%	N	%
Unemployed	14	70	11	55	19	47.5	44	55
Employed	5	25	9	45	16	40	30	37.5
Self-employed	1	5	-	-	5	12.5	6	7.5
<b>Total (N=80)</b>	<b>20</b>	<b>100</b>	<b>20</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>80</b>	<b>100</b>

*Source:* Author's field survey 2019/2020

Thirty-eight per cent of food gardeners were employed, including part-time, temporary, contract and full-time employment. The employed respondents were formally active in the private sector, government, and corporate sectors in and around Johannesburg and as far as Pretoria and Boksburg. Those who had part-time and temporary employment were involved in working during the summer periods (November to January) as part of their coping strategy when production in the food gardens was low. In Tladi, five per cent of respondents indicated that they were self-employed and involved in catering businesses. Twelve per cent of the backyard home gardeners were owners of tuck shops and tailoring businesses. The employment status of the three groups concurred with the general unemployment rate for Soweto and Johannesburg, which currently is 32.3% (StatsSA, 2019).

#### 4.2.3 Production methods and average size of food gardens of respondents

The following vegetable production methods are practised by the community (Table 4.3).

**Table 4.3:** Production methods used in food gardens

Production method	Tladi	Moletsane	Backyard gardeners	Average size of food garden (m <sup>2</sup> )	
	%	%	%		
Open-field Garden	90	5	55	<b>Tladi</b>	86
Tunnel garden	-	95	5		
Used tyres, hessian sacks and grow pots, boxes	5.0	-	40	<b>Moletsane</b>	102
<b>Total (N=80)</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>Backyard gardeners</b>	4

*Source: Author's field survey 2019/2020*

Table 4.3 shows that 40% of backyard gardeners use grow pots, hessian sacks and used tyres for vegetable production. Grow pots are used mainly for nursery production (seedling management) and for crops such as chilli, tomato, cucumber, pepper, brinjal and Irish potatoes. The results agree with the findings of Olivier (2018) on the Cape Flats and at the Nyanga people's garden in Cape Town, indicating the same crop-growing methods.

Some backyard gardeners (5%) have invested in small tunnels for crop growing. The Tladi group mainly cultivates crops in the open-field school garden (90%), with a few farmers using tunnels (5%), used tyres, hessian sacks and grow pots (5%). Most of the vegetable production (95%) of the Moletsane cooperative is done in plastic tunnels in the schoolyard. The average size of an individual open food plot in the Tladi group is 86 m<sup>2</sup>. The average size of an individual open food plot in the Moletsane cooperative is approximately 102 m<sup>2</sup>. Generally, herb gardens are the smallest at approximately 2 m by 2 m.

These urban food gardening findings concur with those for the Siyazondla programme for homestead food gardens (Kroll *et al.*, 2012). These results concur with the findings of Martin *et al.* (2000) that there is no need for big tracts of land to produce food and vegetables in urban areas.

#### 4.2.4 Irrigation methods used by respondents

This part of the study provides insight into the irrigation methods applied by the various groups. Food gardeners used various irrigation methods, as shown in Table 4.4, with 41% preferring the bucket system. This method is quite common in Tladi (20%) and amongst the backyard gardeners (70%), where mainly open-field cropping systems are practised. In Moletsane, drip

irrigation is dominant (90%), as most vegetable production was conducted in tunnels. The funding for the plastic tunnels and drip irrigation was donated through Msizi, an NGO funding the Moletsane cooperative. Other irrigation methods include using hosepipes (21%) and sprinkler irrigation (10%). A chi-square test revealed that the irrigation methods differed significantly across the three groups ( $X^2=8.4461$ ;  $df=6$ ;  $p=0.05$ ).

**Table 4.4:** Irrigation methods used by food gardeners

Irrigation method	Tladi		Moletsane		Backyard gardeners		Total	
	N	%	N	%	N	%	N	%
Hosepipe	8	40	1	5	8	20	17	21
Sprinkler	8	40	-	-	-	-	8	10
Bucket	4	20	1	5	28	70	33	41
Drip irrigation	-	-	18	90	4	10	22	28
<b>Total (N=80)</b>	<b>20</b>	<b>100</b>	<b>20</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>80</b>	<b>100</b>

*Source: Author's field survey 2019/2020*

Generally, the farmers considered water for their crops as an expensive production input cost. In Moletsane, the cooperative shares a borehole with the school from which they run their food garden project. The cooperative is responsible for the shared electricity cost for pumping irrigation water, but the water is free.

A powerful sense of community, social capital and belonging were evident in the Tladi group. This group contributes monthly to the school's water bill, and they have a memorandum of agreement (MOA) with the school to use the school's space for vegetable production as well as water. The monthly rates on water usage are based on the municipal monthly water tariffs (Table 4.5), i.e., the tariffs are proportional to the number of kilolitres used. Although the Tladi group uses more than 50 kL of water per month, they believe they are within the municipality's water charge limit exemptions set for the school.

**Table 4.5:** Domestic water tariffs for the City of Johannesburg (2018/2019 and 2019/2020)

Volume of water	2018/2019 (rand/kL) Excl. VAT	2019/2020 (rand/kL) Excl. VAT
0–6 kL	R8.28	R9.10
6–10 kL	R8.79	R9.66
10–15 kL	R15.00	R16.49
15–20 kL	R21.83	R23.99
20–30 kL	R29.98	R32.95
30–40 kL	R33.22	R36.51
40–50 kL	R42.42	R46.52
More than 50 kL	R45.19	R49.66

*Source: City of Johannesburg 2020 Water Tariff final document*

#### 4.2.5 Experience of respondents as food gardeners

Table 4.6 shows the experience of food gardeners across the three groups.

**Table 4.6:** Experience of respondents as food gardeners

Experience (years)	Tladi		Moletsane		Backyard gardeners		Total	
	N	%	N	%	N	%	N	%
1–3	2	2.5	17	21.2	3	3.8	22	27.5
4–7	4	5	3	3.75	32	40	38	48.8
8–10	14	17.5	-	-	5	6.25	20	23.7
Total (N=80)	<b>20</b>		<b>20</b>		<b>40</b>		<b>80</b>	<b>100</b>
<b>Mean</b>	<b>5</b>		<b>3</b>		<b>5</b>		<b>4</b>	

*Source: Author's field survey 2019/2020*

It was encouraging to note that 73% of the food gardeners have farming experience of four years or longer. The Moletsane cooperative is a fairly new venture, as, previously, the school had been growing vegetables not as a cooperative but with hired labour to produce food for the school feeding scheme.

These results support the findings of Haysom (2015a) indicating that the longer a food gardener had been participating successfully in food gardening, the higher the chances of boosting household food security. Urban agriculture has become a worldwide trend over the past two to three decades, since at least the 1990s and keeps developing, as new designs, policies, regulations and plans unfold. Urban agriculture has the potential of becoming a future urban food security strategy (Charles, 2013; Haysom, 2015).

#### 4.2.6 Proportion of time spent by respondents on food gardening

Table 4.7 shows the proportion of time spent (days per month) on gardening across the three categories of food gardeners.

**Table 4.7:** Proportion of time spent (days per month) tending food gardens

Time spent (days/month)	Tladi		Moletsane		Backyard		Total	
	N	%	N	%	N	%	N	%
1–5	2	3	4	5	5	6	11	14
6–10	5	6	3	4	10	12	18	22
11–15	3	4	8	10	10	12	21	26
16–20	10	12	5	6	15	20	30	38
Total (N=80)	<b>20</b>		<b>20</b>		<b>40</b>		<b>80</b>	<b>100</b>
<b>Mean</b>	<b>18</b>		<b>17</b>		<b>14</b>		<b>16</b>	

*Source: Author's field survey 2019/2020*

Table 4.7 shows that the mean number of days spent on gardening across the three groups is 16 days. The time spent per month by members of Moletsane and Tladi could be an indication that these gardeners do not reside at the place (schools) where the gardens are located and have to travel to their gardens. The Moletsane and Tladi gardeners pointed out that their operational time included the time they spent walking to and from their garden sites (a walking distance of approximately 1 km on average from their homes). The gardeners indicated that they did not usually work in the gardens every day and sometimes skipped one or two days per week even during harvesting periods and even on the irrigation of their crops. They indicated that there was no need for working every day, yet their harvests were still adequate. These findings agree with the findings of Frayne (2012) and Nicolle (2011) that there is no need to work daily in the gardens.

### **4.3. Socioeconomic factors influencing the economic sustainability of food gardens for participating households**

The socioeconomic factors influencing the economic sustainability of the food gardens on the socioeconomic status of participating households include food availability, utilisation, accessibility and stability. Implementing urban agriculture projects, either for sustaining livelihoods or mass urban food production, presents an alternative solution to the urban food crisis (Diga, 2016; FAO, 2012). Urban agriculture projects such as crop and livestock production and agro-processing are conducted at the community level, which includes farmers' groups, cooperatives and associations (Dean, 2018; Siborurema, 2019). However, the long-term sustainability of these projects is important to ensure sustainable food security and household income (Haysom, 2010; Kroll *et al.*, 2012; Nicolle, 2011; Olivier, 2018; RUAF, 2019; Ruysenaar, 2012).

#### **4.3.1 Food availability and utilisation by respondents**

Urban food gardens produce, in most cases, vegetables as additional sources of the minerals and vitamins required for a balanced diet for households. Food gardens also function as alternative sources of extra income through the selling of surplus vegetables (Dean, 2018; Diga, 2016; FAO, 2012; Haysom, 2015b; RUAF, 2019).



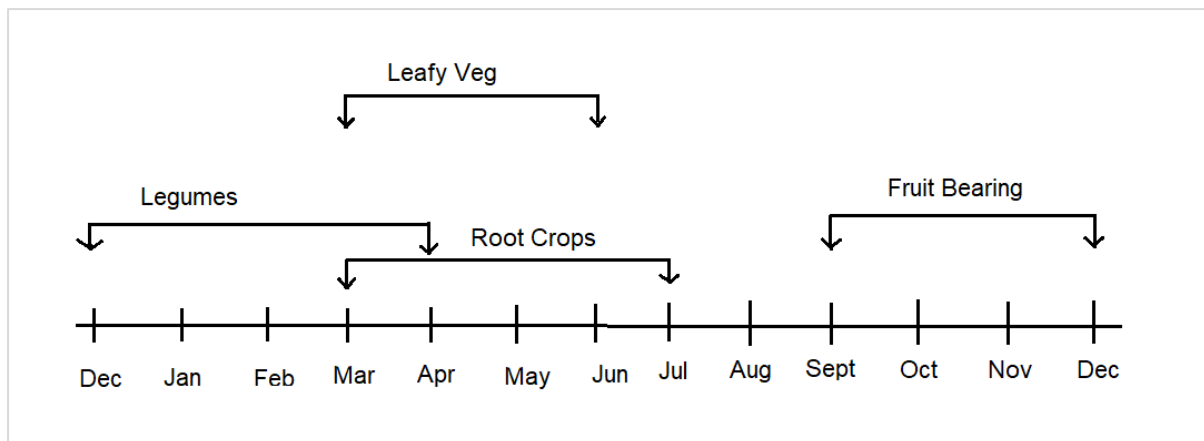
**Table 4.8:** Frequency of vegetables available to respondents

Crop category	Tladi respondents %	Moletsane respondents %	Backyard respondents %	Peak months of vegetables available	Average (%)
Fruit-bearing crops	75	70	12.5	September to December	52.5
Root crops	85	75	70	March to July	76.6
Legumes	95	40	50	December to April	61.7
Leafy vegetables	90	95	92.5	March to June	92.5

*Sources: Vegetable calendar for South Africa and author's field survey 2019/2020*

Table 4.8 shows that leafy vegetables such as spinach, cabbage, kale and lettuce are available from March to June to 92.5% of the respondents, whereas root crops such as onions, beetroot, potatoes and carrots are available from March to July to 76.6% of the respondents.

Figure 4.1 shows that respondents received vegetables every month from the community and individual backyard gardens, except in August.



**Figure 4.1:** Monthly availability of vegetables to respondents (N=80)

*Sources: Field survey 2019/2020*

The next section highlights the percentage of vegetables consumed (utilised) by the respondents (Table 4.9).

**Table 4.9:** Proportion of home consumption by respondents (%) per vegetable crop type

Vegetable crop type	Tladi respondents	Moletsane respondents	Backyard gardener respondents	Average	Standard deviation
	%	%	%	%	
Fruit-bearing crops	17	20	20	19	6.42
Root crops	34	27	29	30	13.2
Legumes	23	27	15	21.7	9.92
Leafy crops	26	26	36	29.3	13.6
<b>Mean</b>	<b>25</b>	<b>25</b>	<b>25</b>		

*Source:* Author's field survey 2019/2020

The results in Table 4.9 show that an average of 30.0% of the root crop and 29.3% of the leafy crop produced are consumed by the respondents. The standard deviation for the root and leafy crops ranged between 6.42 (lowest for fruit-bearing crops) and 13.6 (highest for leafy crops), from March to July. The results show that root and leaf crops are available within the same period, and fruit-bearing crops are not readily available between March and July.

Further, the results show that a third of the vegetables produced are consumed at home. This was evident from the findings that food gardens contributed to the availability of food and utilisation by beneficiaries. The ANOVA analysis ( $F= 2.485$ ;  $df=0$ ;  $p=0.001$ ) indicated that the consumption of specific vegetable crop types differed significantly between the three groups, thereby rejecting the null hypothesis. Tladi showed the highest consumption (34.0%) for root crops, and backyard gardeners had the highest consumption (36.0%) for leafy crops. Moletsane and the backyard gardeners had the same consumption (20.0%) for fruit-bearing crops.

#### 4.3.2 Food accessibility of respondents

The accessibility of food was measured by capturing the food insecurity levels (access) of households from the three groups. Respondents were asked to indicate whether they had experienced any food shortages during the 2017/18 and 2018/19 seasons (Table 4.10).

**Table 4.10:** Proportion of respondents experiencing food shortages during 2017/18 and 2018/19

Season	Tladi		Moletsane		Backyard gardeners	
	Yes	No	Yes	No	Yes	No
2017/18 (N)	11	9	3	17	15	25
(%)	55	45	15	85	37.5	62.5
2018/19 (N)	11	9	-	20	19	21
(%)	55	45	-	100	47.5	52.5

*Source:* Author's field survey 2019/2020

**Table 4.11:** Percentage of produce sold by Tladi and Moletsane respondents

Vegetable crop type	Tladi respondents	Moletsane respondents	Average
	%	%	%
Fruit-bearing crops	15	18	16.5
Root crops	32	23	27.5
Legume crops	15	15	15
Leafy crops	38	44	41
<b>Total (N=40)</b>	<b>100</b>	<b>100</b>	<b>100</b>

*Source:* Author's field survey 2019/2020

Only Tladi and Moletsane respondents indicated surplus produce that could be sold, and the backyard respondents used a proportion of vegetable produce (approximately 35%) not consumed for barter trading. Table 4.11 shows the importance of leafy (41%) and root (27.5%) vegetable crop types for selling. These findings concur with Haysom (2010) and Olivier (2018), who indicated the potential of food gardens to contribute to household income.

Table 4.10 shows that the accessibility of food (including all food types, not only vegetables) improved for Moletsane respondents from 85.0% during the 2017/18 season to 100% during 2018/19. However, the position of backyard respondents deteriorated from 2017/18 to 2018/19, and the percentage of respondents who experienced food shortages increased from 37.5% to 47.5%. It should be a significant concern for support providers to the Tladi community garden that the number of respondents experiencing food shortages during 2017/18 remained the same for the 2018/19 season.

The probable reasons for this tendency were the drought conditions experienced from 2017 to 2019, combined with the high maximum day temperatures, and high evaporation rates experienced on the open production fields. These findings clearly show that vegetable production under cover, as practised by the Moletsane group, is more conducive to stable vegetable production during challenging climatic conditions and winter periods.

Accessibility to additional food items apart from the vegetable crops produced depended on the proportion of household income available to obtain such food items. Accordingly, assessing the proportion of vegetable crops that were sold per production season was an important consideration for the current study. Table 4.11 shows the percentage of the vegetable crop types

sold per group of producers. Backyard gardeners do not have large spaces and cultivated four crop types mainly for home consumption and barter trading.

Table 4.12 shows the average household income (R/c) deriving from vegetable sales and the quantities of leaf and root vegetable crop types (kilogram) available for selling.

**Table 4.12:** Average food garden marketable quantities and seasonal household income of respondents

Category	Tladi	Moletsane
Vegetable crop types	Leaf, root, fruit and legume	Leaf, root, fruit and legume
Average quantity marketable/month (kg)	71	63
Average seasonal price/kg of vegetables (R/c)	8.00	8.00
Average seasonal income/h/h/month (R/c)	769.38	521.00

*Source:* Author's field survey 2020

Table 4.12 shows the potential average monthly income from vegetable sales for households participating in food gardening. The explanation for the relatively low household income in Moletsane is the MOU with Dikwankwetla Primary School, requiring a certain percentage of their vegetable produce to be donated to the school feeding programme.

These findings show that households participating in food garden projects could earn additional household income that could be allocated to purchasing the food items they were not producing. The findings on the availability of vegetables and selling of the surplus during peak months of the year concur with the findings of Kaschula and Arbuckle (2007), Faber (2002) and the RUA Foundation (2019). These investigations revealed that home gardening not only enhances nutrition and builds up food security but also is often a way of developing enterprises and agribusinesses and promoting self-sufficiency.

#### 4.3.3 Food stability of respondents

Food stability occurs when the other three pillars of food security (availability, accessibility and utilisation) are in balance (FAO, 2014; Jahan, 2016). In this study, the accessibility, utilisation and availability of food in Tladi, Moletsane and backyard gardens indicated that vegetable crops were available throughout the year, except in August.

### *Coping strategies of respondents during food shortages*

As reported in Section 4.2.2, respondents were asked whether they had experienced any food shortages during 2017/18 and 2018/19. This section highlights the coping strategies adopted by the respondents and the challenges and experiences of the food gardeners. Further, the section provides an overview of donations or giveaways to the community members to sustain food stability.

Respondents were asked to report the coping strategies they had adopted to supplement food security and Table 4.13 shows the strategies adopted by the three groups.

**Table 4.13:** Coping strategies to supplement household food security amongst the three groups

Coping strategy	Tladi		Moletsane		Backyard farmers		Average
	N	%	N	%	N	%	
Cash remittances from family, friends and relatives in South Africa	7	35	3	15	10	25	25
Cash remittances from family, friends, and relatives outside South Africa	-	-	6	30	6	15	15
Food handouts from family, friends, and relatives	10	50	5	25	15	37.5	37.5
Food handouts from government, donors and well-wishers	18	90	8	40	26	65	65
Social grants from government, donors, NGOs and well-wishers	13	65	15	75	28	70	70
Barter trading of vegetables for something else	11	55	3	15	14	35	35
Other coping strategies, such as piece jobs and selling second-hand clothes	17	85	6	30	23	57.5	57.5

*Source:* Author's field survey 2019/ 2020

Some of the coping strategies highlighted by respondents included piece jobs such as house cleaning or selling second-hand clothes, sweets, biscuits, and cigarettes. According to the Wye Group (2011), it is important to consider the value of other sources of income when assessing the welfare of agricultural households. These other sources have a marked significance in

developing food security. According to Richards and Taylor (2012), the cash remittances received either locally (25%) or outside South Africa (15%), as reported in this study as well, play a significant role in sustaining household food security and addressing poverty. Social grants (70%) for children, the elderly and pensioners are an important source of income on which respondents rely during food shortages. The major coping strategy for the participants of the Tladi community was food handouts from the government (90%), whereas the participants of the Moletsane (75%) community received social grants from the government and NGOs. In Moletsane, members of the cooperative started a highly successful *Stokvel* grocery initiative as a coping mechanism.

Receiving social grants was indicated as a particularly important strategy to cope with household food security. In Moletsane and amongst the backyard food gardeners, old age pension (social grants) was the main coping strategy, whereas amongst Tladi respondents other social grants such as child grants were more important. In Moletsane, a donor organisation called Msizi (meaning “helper”) played a significant role in supporting food gardeners.

The rate of barter trading of vegetables in exchange for other goods was the highest for the Tladi group (55%), followed by backyard gardeners (35%). The percentage of barter trading was relatively high in Tladi probably because a variety of vegetables is grown and available for selling or barter trading. In Moletsane, barter trading was low (15%), probably because they donate and give away their vegetables to the school nutrition programme. The ANOVA analysis ( $F=3.750$ ;  $df=2.643$ ;  $p=0.001$ ) revealed the different household coping strategies to sustain food security.

#### *Donations and giveaways of vegetables by respondents*

In attempts to sustain food security in the relevant communities where food gardens were practised, the following food donations and give-aways were made by the respondents. “Donations”, for this study means all vegetable produce donated when the community members were in need, whereas give-aways include surplus vegetables not included for selling. Table 4.14 shows the proportion of respondents who donated and gave away some of the vegetable crops they produced.

**Table 4.14:** Proportion of respondents who donate and give away vegetable crops in Tladi and Moletsane

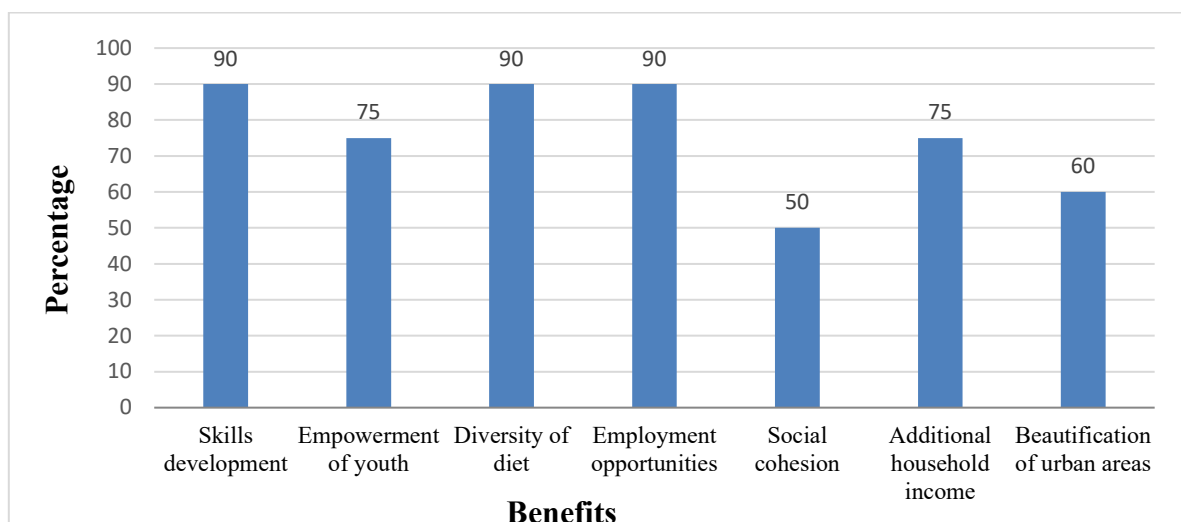
Respondent group		Donations			Giveaways		
		Friends	Relatives	School	Friends	Relatives	School
Tladi	N	2	4	5	2	5	2
	%	10	20	25	10	25	10
Moletsane	N	-	-	14	-	-	6
	%	-	-	70	-	-	30

*Source:* Author's field survey 2019/20

School donations in Moletsane (70%) were high because of the MOA to support the school's feeding programme. In terms of the agreement, the Dikwankwetla Primary School receives vegetables weekly from the cooperative. In Tladi, 25% of the crop is donated to the school in terms of the initial agreement with the school for using the land and water on the school premises. The giveaways to friends, neighbours, relatives and schools by the two community food garden groups illustrated the advantages of food gardens to sustain food security in communities vulnerable to food insecure situations.

#### *Advantages of food gardening*

Apart from donations and giveaways of vegetables to community members, friends and relatives, respondents also highlighted the following advantages they experienced by practising food gardening (Figure 4.2).



**Figure 4.2:** Advantages experienced by respondents practising food gardening.

*Source:* Author's field survey 2019/20

Figure 4.2 shows that skills development, diversity of diet and employment opportunities were perceived as the most popular benefits (90%) in practising food gardening. Youth empowerment and additional household income were cited by 75% of the respondents as significant advantages of food garden practices. These findings support those of Haysom (2015), Luc (2006), and Richards and Taylor (2012).

#### **4.4. Chapter Summary**

In this chapter, several study results were discussed, e.g., overall, female participation dominated across the three groups of food gardeners (65%). The mean age of respondents differed significantly across the three groups, with elderly people and pensioners having enough time to participate in and commit to gardening work. Most respondents (66%) were not married, including the divorced and widowed. Males (86%) generally had a higher level of education than female participants (54%) in the three groups. Household composition and size varied between 1 and 15 members, with an average of approximately 6 members per household. A higher proportion of respondents who were formally unemployed (37.5%) participated in the urban food garden projects.

The results on the demographic characteristics of respondents indicate that differences existed between age, gender, marital status, level of education and household composition and size of the respondents. These differences were ascribed to the differences between group, cooperative and individual operations of food garden projects. Group and cooperative projects were more highly organised than individual projects. The findings confirm the acceptance of the null hypothesis that there are no differences among the three categories as regards the socioeconomic factors influencing households to engage in urban food garden projects.

The tenure status showed that 76% of respondents were house owners.

Irrigation methods differed significantly across the three groups. The mean number of days spent tending to the food gardens across the three groups was 16 days per month.

These results imply that factors such as, tenure status, irrigation method, practical experience as food gardener and time spent tending food gardens of respondents, therefore, accepted the null hypothesis that no differences exist in the socioeconomic status of participating households.



The factors influencing the food security status in the three groups included food availability, utilisation, access, and stability. The seasonal household income was R769.38 for Tladi and R521.00 for Moletsane.

Food shortages in the Tladi group and individual backyard food gardeners were relatively high during both growing seasons (2017/18 and 2018/19) but low in the Moletsane cooperative for both seasons. The results also indicate that the bulk of food produced was consumed at home. The major coping strategy across all three groups was receiving grants from the government, donors, NGOs and well-wishers.

The study results indicate good food availability, utilisation, accessibility, and stability of all four types of vegetables produced throughout the year. The results also indicate that the bulk of food produced was consumed at home. Vegetables were readily available, accessible, well utilised, and stable throughout the year. Seasonal household income from vegetable sales differed between the Tladi group and Moletsane cooperative because of the high quantity of surplus vegetables for sale in Tladi.

The results of the assessment of the economic sustainability of the food gardens on the socioeconomic status of participating households accept the alternative hypothesis, i.e., there are differences in the economic sustainability of the food gardens which influenced the socioeconomic status of participating households. This finding indicates the rejection of the null hypothesis because the cooperative and group gardeners were better off in terms of economic sustainability.

## CHAPTER 5: CHALLENGES FACING THE PRACTICE OF URBAN FOOD GARDENS AND THEIR INSTITUTIONAL SUPPORTERS IN MOLETSANE AND TLADI

### 5.1. Introduction

In this chapter, an assessment is presented of the challenges the practice of urban food gardens in Moletsane and Tladi is facing, as well as the identification and assessment of key institutional service providers and their roles in establishing, supporting, and funding urban food gardens in the area.

### 5.2. Perceived challenges facing the practice of urban food gardens

Respondents were asked to reveal the challenges they faced in practising food gardening (Table 5.1).

**Table 5.1:** Perceived challenges of practising food gardening

Respondent group	Challenge	(N)	(%)
Backyard gardeners	1. Limited space	30	75
	2. Availability of municipal water not dependable	28	70
Moletsane community garden	1. Limited space for extension of project size	16	80
	2. Limited funding for infrastructure development such as tunnels	16	80
	3. Fluctuating vegetable production during the crop cycle	6	30
Tladi community garden	1. Stray dogs, particularly during drought periods	15	75
	2. Municipal water supply not trustworthy	12	60
	3. Pests such as aphids and rodents	10	50

*Source: Author's field survey 2019/20*

The most significant challenges according to the backyard gardeners were limited space to expand projects (75%) and unreliable municipal water supply (70%) for successful year-round vegetable production. Respondents from Moletsane indicated their main problems as limited

space (80%) and limited funding (80%) to expand the project and develop infrastructure such as tunnels.

Although vegetable production fluctuates during the crop cycle, this was not a serious challenge for the gardeners, as they could either increase or reduce production according to local supply and demand in neighbouring communities. The Tladi community group faced, in order of priority, the following hindrances, namely stray dogs (75%) that destroyed beds and crops. The municipal water supply in the area was not trustworthy (60%), especially during drought periods, making it difficult for the year-round production of vegetables. Pests such as aphids and rodents (50%) were a challenge.

### 5.3. Respondents' expectations for support

The role of government through the Provincial Department of Agriculture and Rural Development in Gauteng is critical in promoting food security. Respondents were asked to report their expectations of support from this provincial department and local municipalities for sustaining food gardens.

**Table 5.2:** Perceived expectations of respondents from GDARD

<b>Respondent group</b>	<b>Expectation (priority order)</b>	<b>(N)</b>	<b>(%)</b>
Backyard gardeners	GDARD should empower communities by offering free farming skills training programmes and agribusiness management skills to urban dwellers	32	80
	Land must be allocated to train people for practical purposes	32	80
	Municipalities should be involved in supporting gardeners to obtain farming skills	28	70
Moletsane cooperative	GDARD should intensify donations for growing tunnels, seeds, garden tools, and sinking of boreholes on state lands	19	95
	Allocation of arable land must be key to well-organised farming cooperatives	18	90
	Municipalities must support farmers by removing strict regulations on land allocation and leases	16	80
Tladi group	Land must be allocated to well-organised farmers' groups and boreholes must be sunk for water availability	18	90
	Municipalities must become key role players in land allocation and water provision	16	80
	GDARD agricultural advisory service must be intensified, and extension staff must be well-resourced in terms of transport and technical knowledge	12	60

*Source: Author's field survey 2019/2020*

As shown in Table 5.2, backyard gardeners expect the government to empower communities by offering free farming skills training and agribusiness management programmes (80%). Second, they expect that land must be allocated to trained people (80%). Municipalities should also be involved in supporting gardeners to obtain farming skills (70%). The Moletsane community expect GDARD to expand the donation of farming inputs (95%) and the land allocated to organised farmers' groups and cooperatives (90%). Further, municipalities are expected to support urban food farming by removing strict regulations of land tenure (80%).

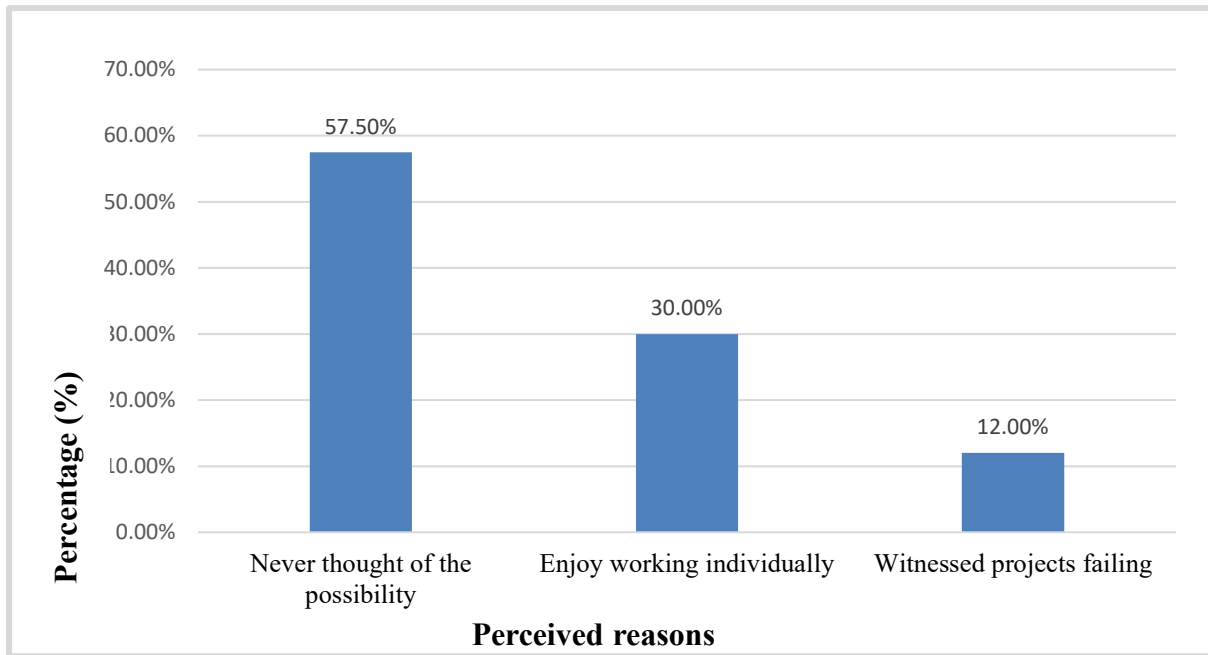
The Tladi group expected GDARD to allocate land to organised farmer organisations, groups and cooperatives (90%). In addition, municipalities are expected to become key role players in supporting urban agriculture through land allocation and water provision (80%). In addition, GDARD needed to expand agricultural extension advisory services in terms of providing transport, technical knowledge and skills training to ensure the competency and effectiveness of the extension service staff (60%).

The expectation of municipality involvement in supporting gardeners and land allocation to trained gardeners was high in both the Tladi group and the Moletsane cooperative. In this study, the respondents pointed out that their expectations from GDARD and municipalities were affected significantly by their zeal for urban food gardening. These results concur with the recommendations of Richards and Taylor (2012), who suggested the involvement of Johannesburg communities to cooperate with municipalities through the National Framework for Local Economic Development (LED) and the Integrated Development Plan.

#### **5.4. Perceptions of backyard gardening respondents on joining community projects**

Group formation carries some advantages, particularly in community food gardening. Forming a group creates opportunities for people to work together and learn from each other, and share resources such as land, water and funding. However, the negative implications of groups include personal clashes, differences in opinion, jealousy, discord and conflict (Annan, 2012; FAO, 2008; RUAFA, 2008).

Backyard respondents were asked to report possible reasons for preferring not to join the existing farmers' groups participating in food gardening (Figure 5.1).



**Figure 5.1:** Perceived reasons of backyard gardeners for not participating in community projects

*Source:* Author's field survey 2019/2020

Figure 5.1 shows that 57.5% of backyard home gardeners never believed that community food projects had any advantages, with 30% of respondents indicating that they enjoyed working individually. Twelve per cent of respondents perceived group or cooperative initiatives as failures and were, therefore, not interested in joining such groups. The respondents indicated that group projects mainly failed because of poor leadership and that some project agendas were politically motivated.

### **5.5. Key role players in establishing and supporting food gardens in Moletsane and Tladi**

Key role players resemble an important stakeholder linkage system in terms of project sustainability in an area (Annan, 2012; Charles; 2013; Puttick, 2008). The key role players identified in Soweto are nine stakeholder organisations playing a significant role in the establishment and support of food gardens in Moletsane and Tladi. Table 5.3 shows the key role players.

**Table 5.3:** Key role players in establishing and supporting food gardens in Moletsane and Tladi

<b>Key role player</b>	<b>Role</b>
City of Johannesburg Municipality	Provision of water for irrigation
Universities of the Witwatersrand and Johannesburg	Agricultural and farming skills training and horticulture production
Gauteng Department of Education	Providing land/space at Dikwankwetla Primary School and Setlakalana Molepo Community Education Centre
Gauteng Department of Social Development	Distributing, monitoring and evaluating social grants and programmes, and community empowerment of vulnerable groups such as women and the handicapped
The Gauteng Department of Health	Treating the sick and offering advice on nutrition for breastfeeding mothers, people living with HIV and AIDS, those receiving tuberculosis treatment, the elderly and children below the age of five at the Tladi and Gateway clinics
NGO(s)/donor(s) (Msizi Group and Gauteng Enterprise Propeller)	Funding, providing skills training and donating garden tunnels and drip irrigation kits, seeds, implements, fertiliser and other farming inputs
Izindaba Zokudla Food Network	Creating opportunities for urban agriculture in a sustainable food system in Soweto
Gauteng Department of Agriculture and Rural Development (GDARD)	Encouraging the establishment of individual homestead or backyard gardens to mainly serve resource-poor communities in the province

*Source: Author's field survey 2019/2020*

## **5.6. Role players in establishing and supporting food garden projects in Moletsane and Tladi**

The specific role players in establishing and funding food gardens in Moletsane and Tladi include the Department of Education through the provision of land/space at Dikwankwetla Primary School and Setlakalana Molepo Community Education Centre. At both schools, the tracts of land were not being used; however, these were officially soccer fields that were subsequently turned into food gardens. When the Moletsane cooperative was started in 2018, an MOA was signed between the cooperative and Dikwankwetla Primary School, which allowed the cooperative to use the school land and water in turn for support to the school nutrition programme through the weekly provision of vegetables.

NGOs are responsible for funding, providing skills training and donating garden tunnels and drip irrigation kits, seeds, farming implements, fertiliser and other farming inputs to the projects. The Msizi NGO provides funding to the Moletsane cooperative by supplying agricultural inputs and offering training in farming, as well as the drip irrigation kits for six plastic tunnels and funding for another ten tunnels in 2018. The Gauteng Enterprise Propeller

is a Gauteng-based NGO working with community-based organisations such as Msizi. This study found that the NGO acted as the umbrella organisation working together with the Moletsane Cooperative to fund Msizi.

One of the main activities of GDARD was to encourage the establishment of individual homestead or backyard gardens to mainly serve the province's resource-poor communities. The target groups included the elderly, unemployed, women, youth, people with disabilities and households affected/infected by HIV/AIDS. The role played by GDARD was implementing the establishment of food gardens through provincial programmes launched in 2004.

These provincial programmes included the Comprehensive Agriculture Support Programme (CASP), which is focused on the poorest communities and delivers a wide range of economic, social and environmental benefits. CASP aims to ensure the provision of quality food and acceptable levels of food security in communities in each province by establishing and supporting community, backyard and school food gardens. In this way, the entity made a substantial contribution to sustainable food security, reduction of poverty and adequate nutrition at the household level. The CASP was allocated three grants, namely conditional Grant 1 for CASP, a conditional Grant for Ilima or/Letsema and conditional Grant 3 for land care (Mofokeng and Mzini, 2021). The three Gauteng regions for the developmental mandate are the Germiston Region (Ekurhuleni Metropolitan and Sedibeng District Municipality), Randfontein Region (Johannesburg Metropolitan and West Rand District Municipality) and the Tshwane Region. The budget allocation reserved for food security projects (community food gardens) amounted to R3 million, which was allocated for awareness campaigns, feasibility studies, business plan development, farming implements and protective clothing (Mofokeng and Mzini, 2021). The Johannesburg Metropolitan and West Rand District Municipality are responsible for the Moletsane and Tladi farmers.

The GDARD works in close association with the Comprehensive Agriculture Support Programme regarding urban farming (Zwane, 2015). The Siyazondla Homestead Food Gardens Programme conducted by the Siyakhana Initiative for Ecological Health and Food Security has revealed food gardens as one of the key drivers for the provision of quality food and acceptable levels of food security in communities in the province (Ruysenaar, 2012). Agricultural

extension service officers are deployed in urban areas to strengthen the Comprehensive Agriculture Support Programme (Zwane, 2015).

However, farmers in high-density areas have revealed that the services of the GDARD extension officers to the residents of cities such as Johannesburg were limited (Campbell and Naude, 2017). Mechanisation programmes focus on providing farmers with farming implements, drilling of and equipment for boreholes, infrastructure and the supply of production inputs such as starter packs for community gardens (seeds, farming implements, 10 m hosepipes, watering cans, and garden forks), fertilisers, herbicides, and fuel. Training and capacity building also form part of the programme.

The Integrated Food Security and Nutrition Programme (IFSNP) — Food for All Roll-out Plan (2011). In 2011, the GDARD adopted a 20-year Food Security Plan for Gauteng to organize and direct food security interventions beyond the Gauteng IFSNP and Food for All Roll-out Plan (GDARD, 2011). The budget for this plan was R50 million per annum, with inflation variables from years 4 to 21. The IFSNP is a poverty-alleviation strategy striving to improve household food security and livelihoods by increasing the quantity and diversity of available food. In addition, IFSNP transforms the economy and provides a primary source of income for many of South Africa's poorest people.

As found in this study, the City of Johannesburg is responsible for Soweto, where the Tladi and Moletsane high-density suburbs are situated. Approximately five years ago, the City of Johannesburg realised that several families in the city were going hungry. Therefore, the Food Resilience Unit was established to promote sustainable agriculture that would curb hunger and malnutrition and create jobs. One of the action areas of the Food Resilience Unit was to improve the knowledge base of urban food growing, raise awareness and mobilise citizens to participate, similar to that of the United Nations Development Programme (UNDP, 2015).

The agriculture programme under the Food Resilience Unit has already established more than 300 cooperatives (Benn, 2020). The faculties of agriculture at the universities of Johannesburg and the Witwatersrand, respectively, have established some sections responsible for agricultural and farming skills training, especially for vegetable production and horticulture. The Soweto Campus of the University of Johannesburg provides the farmers' groups with a farmer's laboratory for demonstrations and dialogue. During these sessions, experts



demonstrate some of the processes involved in growing particular vegetables, and farmers can ask questions about aspects they do not understand. The University of the Witwatersrand (Horticulture Section) provides help to farmers on an ad-hoc basis.

Izindaba Zokudla Food Network draws many stakeholders together to create opportunities for urban agriculture and emerging and established entrepreneurs in a sustainable food system in Soweto. The initiative encourages the consumption of the food produced in or close to the communities where it is grown. The universities also offer free advice on horticulture production and help refer farmers to reputable agricultural input outlets (agricultural produce marketing information). In addition, Izindaba Zokudla Food Network also aims to create opportunities for urban agriculture in a sustainable food system in Soweto.

The project is managed by the University of Johannesburg and funded by the National Research Foundation of South Africa. This group is responsible for collaboration with the universities on farmer training meetings and dissemination of knowledge on crop and livestock production and marketing of agricultural produce. The Moletsane and Tladi food garden groups are beneficiaries of the training and collaboration obtained from the Izindaba Zokudla Food Network and the two universities.

The Department of Social Development is responsible for social grant distribution, monitoring and evaluation of social grant programmes and community empowerment through social development programmes for the youth and vulnerable groups (women and the handicapped). The department provides support to food garden projects through its social development programmes, which include funding for training in horticulture production, agribusiness management and small-scale agro-processing, run by the relevant universities and farmers' groups.

Other role players are the Gauteng Department of Health (Tladi and Gateway clinics). The department is responsible for the treatment of the sick and offering advice on nutrition for breastfeeding mothers, care for those living with HIV and AIDS, people receiving tuberculosis treatment, the elderly and children below the age of five. The nurses from the two local clinics also assist with technical support on healthy nutrition programmes. This information is applied at the Dikwankwetla Primary School feeding scheme and influences the crop types planted by the Moletsane cooperative.

## 5.7. Perceptions on support received by respondents from GDARD

In this section, the perceptions of farmers about the support received from GDARD and other support providers are discussed.

### 5.7.1 Contact of departmental extension staff and other service providers with farmers

Respondents were asked to reflect on the contact of GDARD extension staff with farmers (Table 5.4).

**Table 5.4:** Frequency of access by respondents to GDARD extension staff

Frequency		Tladi	Moletsane	Backyard gardeners	home
YES	(N)	16	3	4	
	(%)	80	15	10	
Frequency of contact		Once in three months	Once in four months	Once in four months	
NO	(N)	4	17	36	
	(%)	20	85	90	

*Source:* Author's field survey 2019/2020

Table 5.4 indicates an intervention frequency of once in four months for both Moletsane and backyard respondents, implying that the extension staff does not frequently visit food gardeners in the study area. This result probably indicates that the department is understaffed and the available employees are, therefore, unable to visit the farmers more frequently. According to Farmers' Weekly (2021), the current farmer-to-extension worker ratio in South Africa is 1:850, which makes it difficult for extension workers to offer efficient services to farmers.

The Tladi group (80%) is visited by extension workers on average once every three months, probably because this group is more familiar with the extension staff (80%) and the group has existed longer than the Moletsane cooperative. The Tladi/Moletsane individual backyard respondents are not quite familiar with extension workers. Only 15% of respondents from the Moletsane cooperative see extension workers once in four months, whereas only 10% of backyard home gardeners are visited by extension workers once in four months. This finding implies that 20% of the Tladi group, 85% of the Moletsane cooperative and 90% of backyard farmers did not receive visits from the extension workers.

The GDARD extension agents for Johannesburg Metropolitan Municipality indicated that the size and production of food gardeners in high-density areas such as Tladi and Moletsane do not

justify the active participation of agricultural extension advisors. However, this view is not aligned with the objectives of the department. One of the objectives of GDARD, as highlighted in the Annual Report of 2014/2015, is to encourage the establishment of individual homestead or backyard gardens to mainly serve resource-poor communities in the province.

Food gardeners were also requested to reflect on the frequency of visits by other service providers. All the respondents revealed that the departments of Education, Social Development and Health regularly visited them, ranging from once monthly to once in four months. Table 5.5 shows the results obtained of employing a Likert scale (1 = do not see them at all; 2 = see them once in four months; 3 = see them once in three months; 4 = see them every month) to measure the frequency of access to extension support.

**Table 5.5:** Perceived access by service providers to respondents

Service provider	Scale of frequency of access											
	Tladi				Moletsane				Backyard			
	1	2	3	4	1	2	3	4	1	2	3	4
City of Johannesburg (%)	-	100	-	-	-	100	-	-	-	100	-	-
Universities of Johannesburg and Witwatersrand (%)	-	100	-	-	-	100	-	-	-	100	-	-
Izindaba Zokudla Food Network (%)	-	100	-	-	-	100	-	-	-	100	-	-
NGO (Msizi) (%)	100	-	-	-	-	-	-	100	100	-	-	-
GDARD (%)	-	-	100					100	-	-	-	100

*Source: Author's field survey 2019/2020*

### 5.7.2 Perceived level of technical competency of GDARD extension staff

Respondents were asked to assess the technical competency of GDARD extension staff. Table 5.6 shows the respondents' perceived level of technical competency of extension staff. A three-point Likert Scale (1= Not competent, 2= Competent and 3= Very competent) was used.

Table 5.6 shows that 90% of farmers in the Tladi group, 70% in the Moletsane cooperative and 72.5% of individual backyard home gardeners view extension workers as not competent concerning technical knowledge. Only 10% of the Tladi group and 20% of the Moletsane cooperative view extension workers as competent in technical knowledge. As regards the

backyard farmers, 27.5% indicated that they were not aware of extension staff, probably because they do not participate in community projects.

**Table 5.6:** Perceived level of technical competency of GDARD staff

Competency level	Tladi group	Moletsane cooperative	Backyard home gardeners
	%	%	%
Not competent (1)	90	70	72.5
Competent (2)	10	20	27.5
Very competent (3)	-	10	-

*Source:* Author's field survey 2019/2020

In agreement with the respondents' views, the literature shows that large numbers of extension staff have not been trained in the management, marketing skills and strategies needed for economic growth and poverty alleviation for sustainable food security (Davis and Terblanche, 2016). The DAFF, therefore, should concentrate on the training of extension staff in market orientation and demand drive by establishing a multi-disciplinary curriculum (DAFF, 2016; Davis and Terblanche, 2016; Farmers' Weekly, 2021). Zwane (2015) pointed out that several tools of extension such as workshops, seminars, summits, conferences, field days and demonstrations could also be employed to meet the changing demands of clients and farmers.

### 5.7.3 Perceived collaboration between service providers

This study sought to identify the types of linkages between the different stakeholders and how they collaborate to improve food gardening in the study area. The information was obtained through focus group discussions with the 14 key informants representing the nine stakeholder organisations involved in establishing and supporting food gardening. Table 5.7 shows the level of operation, awareness level, perceived collaboration and the importance of service providers to urban farmers.

Table 5.7 shows that respondents from the universities of Johannesburg and the Witwatersrand were generally aware of other support providers such as GDARD, Johannesburg Municipality, farmer organisations, and NGOs. However, there is currently little collaboration with GDARD, Msizi and the Izindaba Zokudla Food Network or the other stakeholders. Respondents from NGOs were aware of other stakeholders but indicated that they had little collaboration with the universities and the Department of Education. However, there is prospective collaboration with the municipality, GDARD and the Gauteng Departments of Health and Social Development.

**Table 5.7:** Perceived collaboration between various service providers

<b>Service provider</b>	<b>Level of operation</b>	<b>Awareness</b>	<b>Official collaboration</b>	<b>Response</b>
City of Johannesburg Municipality	Local	Aware of other role players	No official collaboration	Important for urban farmers
Universities of Johannesburg and Witwatersrand	Provincial	Aware of other role players	Official collaboration with NGOs and GDARD	Important for urban farmers
Department of Education	Local	Aware of other role players	Little official collaboration with universities and NGOs	Important for urban farmers
Department of Social Development	Provincial and local	Aware of other role players	Little official collaboration with GDARD, and the departments of Education and Health	Important for urban farmers and pensioners
Department of Health	Local	Aware of other role players	Little collaboration with the Department of Education	Important for the entire community
Msizi and Izindaba Zokudla Food Network	Local	Aware of other role players	Little official collaboration between universities and the Department of Education	Important for urban farmers
GDARD	Provincial	Aware of other role players	No official collaboration	Important for urban farmers

*Source:* Author's field survey 2019/2020

Although respondents from the City of Johannesburg Municipality indicated that they were aware of the other stakeholders such as GDARD, schools, and clinics, there is currently no collaboration between the municipality and these stakeholders on food gardening. The municipality, however, views collaboration between all the stakeholders as important for successful urban farming projects. As regards GDARD, the respondents could identify other stakeholders such as the municipality, NGOs, and universities. However, there is currently no collaboration with these stakeholders, although there are efforts to initiate such collaboration through the universities. Respondents from the universities were aware of GDARD, the City of Johannesburg Municipality, some NGOs and farmer organisations and groups.

The respondents from schools were aware of the other stakeholders, such as the municipality, GDARD, departments of Health and Social Development, some NGOs, donors and universities. Currently, there is no collaboration between schools and other support providers, except for Msizi, which is funding the Moletsane cooperative for the Dikwankwetla Primary School feeding programme. The Department of Social Development has little collaboration with other government departments. Respondents from government departments pointed out that it was difficult to collaborate with NGOs, as the NGOs preferred to work directly with the farmers. The Department of Health does collaborate with local schools on nutrition-feeding programmes. However, this study found that awareness of other stakeholders had not resulted in much collaboration between such stakeholders.

### **5.8. Perceived challenges to the establishment and operation of food garden projects**

Service providers perceived the following challenges to the establishment and operation of food garden projects in Tladi and Moletsane. The land is controlled by the government and politicians and land regulations are perceived as distorted, as 86% of respondents confirmed. Although municipalities do want to help farmers to obtain land for farming, this is not easy. There are land disputes, which make it difficult for municipal authorities to intervene and could also make urban planning and land allocation difficult. The respondent from the municipality confirmed that the most common challenge was that land is controlled by the government and politicians and that land policies and regulations are distorted.

Another challenge, indicated by 86% of respondents, was the perceived corruption committed by certain service providers in the allocation of finances and resources. The general perception of the respondents was that those with close connections to government officials usually received funding for projects and other resources. Lack of farming skills among food garden group members was cited by 75% of respondents as a major challenge. According to key stakeholders of the Department of Education, there is a significant need for government to provide farming skills training and involve teachers to teach agriculture and farming in schools. The school curriculum should, ideally, include agriculture as a subject at the primary school level to create a passion for agriculture in learners and teachers. According to the university respondents, to bridge this knowledge gap, farmers were invited to campuses for free training sessions for farming, agribusiness management, agro-processing and agricultural skills.

According to 64% of respondents, there was no proper or formal coordination between service providers regarding urban gardening projects. The Department of Social Development appeared to be limiting service provision to social grants and was not necessarily focusing on methods, projects and programmes for alleviating poverty through sustainable urban livelihoods. Therefore, the communities came to rely on donor funding. Moreover, 57% of respondents revealed a lack of cooperation by farmers with other stakeholders and, in some cases, farmers failed to cooperate in the establishment and operations of food gardens, leading to the failure of community projects.

### **5.9. Perceived expectations of stakeholders regarding food garden projects**

The common expectations food gardeners have of GDARD range from land allocation to well-organised farmers' groups and farmer organisations (Tladi [90%], Moletsane [95%] and backyard gardeners [70%]). As regards the expectation for intensification of agricultural advisory and skills training, the values were Tladi (60%), Moletsane (95%) and backyard gardeners (80%). The values for intensification of municipality role-playing in support of urban food garden projects were Tladi (80%), Moletsane (80%) and backyard gardeners (70%). The stakeholders revealed their expectations from governments regarding food garden projects. These institutions expected government to intensify collaboration and coordination for sustainable food security. The expectations of the stakeholders are discussed below.

Respondents from the City of Johannesburg (Soweto Office) indicated that they wished to see improved collaboration from all involved government departments, municipalities and farmer organisations. The expectations for municipalities are for land tenure policies and regulations to be made flexible to ensure that urban communities could pursue successful urban agriculture to achieve sustainable food security.

The universities of Johannesburg and the Witwatersrand expect the Department of Education and relevant authorities to introduce self-help projects in schools through the curriculum and to provide training to teachers in agricultural/farming skills. Furthermore, they want the Agricultural Faculties of universities to work closely with the Department of Education in ensuring that basic education offers agricultural and farming skills training, starting at the primary school level.

Respondents from the Department of Education agreed that government should ensure that schoolchildren are taught farming/agriculture/gardening at an early age, essentially at the primary school level. A school head emphasised his wish to see teachers being involved in offering agriculture/farming/agribusiness as part of the syllabus. Agricultural skills training should include agribusiness management, mushroom production and beekeeping for the youth and school dropouts. Respondents from the department pointed out that such teaching and training could help to destroy the ‘donor funding syndrome’ in communities. Thereby, the Department of Social Development would be helped to successfully establish and support community empowerment and development projects for sustainable food security.

As regards clinics, they should allocate land for food production in support of nutrition and feeding programmes for the poor, sick, children under the age of five, pregnant women and the elderly. The respondents showed concern over the ignorance of the department regarding projects, programmes and ways of sustaining the sick and elderly in terms of supplementing their diets. One of the respondents said: *“The Department of Health seems to be focusing only on treatment of the sick without realising that eating healthily contributes to successful treatment”*.

The GDARD should encourage gardeners to cooperate, unite and form farmers’ groups for ease of reach by agricultural extension staff for assistance and farming skills training. Basic education curriculums should include agricultural, farming, horticultural and agro-processing skills training. Sufficient resources, such as transport, should be made available to the agricultural extension staff to facilitate more frequent visits to urban food gardeners.

Further, the GDARD would appreciate a more focused approach to collaboration between service providers regarding food gardens. One of the extension officers interviewed pointed out that the DAFF was previously responsible for assisting and advising rural, small-scale and commercial farmers before the introduction of the urban agriculture concept in the early 2000s through the launching of provincial departments such as the GDARD.



## 5.10. Chapter summary

The commonly perceived challenges of food gardeners across the three groups were ranked by priority, which were limited space for backyard gardeners and unreliable and unstable municipal water provision, notably for Tladi and backyard gardeners. The Moletsane group also cited limited funding for infrastructure development as a major challenge. The common expectations by food gardeners from GDARD ranged from land allocation to well-organised farmers' groups and farmer organisations for Moletsane and backyard gardeners. The intensification of agricultural advisory and skills training and intensification of municipality role-playing in supporting urban food garden projects were also common expectations.

To achieve the sustainability of urban food gardens, monitoring and supervision processes are required from the government, universities, municipalities, farmers' groups, donors, NGOs, land agencies and the private sector. Such actions would allow institutional linkages for flexible policy formulation, implementation, community awareness and youth empowerment motivation. Capacities and networks are required at all levels and environments of operation for strategic management functions (Puttick, 2008).

Government should intensify urban agricultural extension advisory services in terms of, e.g., making available adequate transport and the resourceful provision of skills training and technical knowledge to increase the competency and effectiveness of extension staff. Currently, extension workers only visit once in four months. Government should intensify urban agricultural extension advisory services in terms of, e.g., making available adequate transport and the resourceful provision of skills training and technical knowledge to increase the competency and effectiveness of extension staff. Currently, extension workers only visit the food gardeners, on average, once in four months. As regards the competency of extension staff, all three farmer categories viewed extension workers as not efficient in technical knowledge and competence. Regarding the current key role players of other support providers in Soweto, the representatives from the universities of Johannesburg and the Witwatersrand were highly aware of other support providers. In contrast, NGOs, farmer organisations, donors and well-wishers had the lowest awareness of other key role players in urban food gardening establishment and support in Soweto.

The level of operation for other stakeholders (nine organisations and government departments) was both provincial and local, whilst the two universities and the farmer organisations operated only locally. On perceived challenges, the control of land by government and politicians and distortion of land regulations, corruption and lack of transparency by service providers, were important challenges. Lack of farming skills, no proper coordination from service providers and lack of farmer cooperation were also important challenges.

Regarding the expectations of stakeholders from the government, the role players pointed out that the municipality (City of Johannesburg- Soweto office) wished to see collaboration between all involved government departments, municipalities and farmer organisations concerning land tenure policies. The GDARD expects more focused collaboration with other support providers on matters of urban agriculture for sustainable household food security. The universities expect the Department of Education and relevant authorities to introduce self-help projects in schools through the curriculum and training of teachers in agricultural/farming skills.

The Department of Education pointed out that government should allow children to learn about farming/agriculture/gardening at an early age, essentially at the primary school level. The Department of Social Development emphasised that agricultural skills training is essential, such as agribusiness management, mushroom production and beekeeping for the youth and school dropouts. The Department of Health wishes to see clinics allocating land for use to support the nutrition and feeding programmes for the poor, sick, children under the age of five, pregnant women and the elderly. The NGOs, donors and farmers' groups expect gardeners to cooperate, unite and form organisations for ease of reach by agricultural extension staff to render assistance and farming skills training.

The results, according to the ranking by the priority method used, indicate that the challenges facing the practising of urban food gardening in Moletsane and Tladi were similar across the three categories of farmers. The expectations of the farmers of government were also similar across the three farmer categories. These findings confirm the acceptance of the null hypothesis that there are no differences in the challenges faced by group/cooperative and individual urban food gardeners. The results of assessing institutional support for urban food garden projects in Moletsane and Tladi indicate that the different organisations and government departments played different roles in the establishment, support, operations and funding of urban food

gardens. The awareness status, collaboration and level of operation of the key role players indicated the differences in the roles played by each of them. The findings confirm the acceptance of the null hypothesis that there are no differences in the roles of agricultural support, establishment and funding of group, cooperative and individual urban food gardening projects.

## CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

In this chapter, a summary is presented of significant research findings, study conclusions, recommendations and contributions.

### 6.1. Study synopsis

The main objective of the study was to assess the economic sustainability of selected urban food garden projects in Soweto, specifically in the Moletsane and Tladi areas. Primary data were collected by employing a survey questionnaire through one-on-one interviews with gardeners and focus group discussion questions with key informants. Group, cooperative and individual backyard home gardeners were purposively selected. Descriptive statistics, chi-square tests, ANOVA analysis and qualitative methods were employed to analyse and describe the research data. Data collection took place in June 2020 and the study findings and recommendations remain limited to the data collection period.

The first specific objective was to determine the socioeconomic factors influencing household engagement in urban food garden projects. Cooperative, group and individual backyard home gardening projects were expected to have the same socioeconomic influencing factors for engaging in urban food gardens. Out of ten socioeconomic factors, the sex, age and educational status of the respondents determined engagement in urban food garden projects. The findings indicated that female participation (65%) was higher than that of males across the three categories of gardeners.

The mean age of gardeners across the three categories was 34 years. However, gardeners aged above 60 constituted the largest proportion (60%) of participation in the urban food garden projects. Regarding educational qualifications, males generally had higher levels of education than females, with 86% of males having attained schooling, compared with 54% of female respondents. These findings confirmed the acceptance of the null hypothesis that there are no differences among the three categories in terms of the socioeconomic factors influencing household engagement in urban food garden projects.

The second specific objective was to determine the economic sustainability of the food gardens on the socioeconomic status of participating households. Cooperative, group and individual backyard home gardening projects were expected to be equally economically sustainable. The

findings indicated that leafy-type vegetables were available during their peak months (March to June) to 92.5% of respondents and root-type vegetables during their peak months (March to July) to 76.6% of respondents. These results indicated that a third of the produced vegetables were consumed at home and the surpluses were sold by cooperative and group respondents. Individual backyard home gardeners did not have surpluses to sell. This finding indicates the rejection of the null hypothesis because the cooperative and group gardeners were better off in terms of economic sustainability. The findings confirm that food gardens contributed to food being available, accessible to and utilised by beneficiaries, as well as stability across the three categories. In addition, other benefits are associated with practising food gardens, i.e. diversifying the diet, employment opportunities and skills development of the beneficiaries.

The third specific objective was to assess the challenges facing the practice of urban gardens in Moletsane and Tladi. Cooperative, group and individual backyard home gardening projects were expected to face the same challenges. Out of the seven identified challenges, the most significant challenges perceived by the cooperative were limited space and funding (80%) to expand the project and develop infrastructure such as tunnels. Stray dogs, rodents and non-dependable municipal water were the main challenges for the group.

The main challenges for backyard gardeners were limited space to expand projects and the unstable municipal water supply, which hampered successful year-round vegetable production. Overall, the challenges across the three categories of respondents were not exactly similar. However, the cooperative and individual backyard gardeners faced a similar challenge in respect of non-competent and non-efficient GDARD extension workers. These findings confirm the rejection of the null hypothesis that there are no differences in the challenges faced by group/cooperative and individual urban food garden projects.

The fourth specific objective was to assess the institutional support for urban food garden projects. The identified and assessed key institutional service providers were expected to be the same in their roles of agricultural support, establishment and funding of group, cooperative and individual urban food garden projects. The four key institutional service providers identified in the area for all three categories were the City of Johannesburg Municipality (which provided water for irrigation), the Gauteng Department of Education (which provided land/space at the two schools), NGOs/donors (which funded and provided skills training and

donated garden tunnels and drip irrigation kits, seeds, hoes, fertiliser and other farming inputs), and farmers' groups (which created opportunities for urban agriculture in a sustainable food system in Soweto) and the universities of the Witwatersrand and Johannesburg for agricultural and farming skills training and horticulture production. The findings confirm the acceptance of the null hypothesis that there are no differences in the roles of agricultural support, establishment and funding of group, cooperative and individual urban food garden projects.

## **6.2. Conclusions**

The researcher concluded that urban food gardening contributed to food security by increasing food availability, accessibility, utilisation and the stability of beneficiaries of the cooperative, group and individual backyard gardeners. The bulk of the produce was consumed at home, which is an advantage of participating in food gardening.

In addition, cooperative and group gardeners enjoyed an economic advantage by selling their surplus produce. However, individual backyard gardeners cultivated crops for home consumption and did not have surplus produce for sale. More females than males participated in all three categories of gardeners. The level of education of women was lower than that of men.

The main challenges obstructing the expansion of urban food gardening projects were limited land space, non-dependable municipal water and access to extension services. Although access to extension services is essential for cooperative, group and individual gardeners for sustainable food gardening projects, such access was poor in the area.

The NGOs funded cooperative gardeners. Both the cooperative and group gardeners supported by the two schools and all three categories of gardeners benefited from the support and technical training provided by the universities and the Greater Soweto farmer network. All three categories of gardeners require improved access to agricultural extension services.

## **6.3. Recommendations**

Both government and NGOs should prioritise funding of the farmer cooperative and group formations and individual backyard gardeners, to enable urban food gardening projects to continue contributing to sustainable household food security. The NGOs should continue

funding the cooperative gardeners, and the two schools should continue supporting the cooperative and group gardeners.

Both universities and the Greater Soweto farmer network should continue their support and technical training to all three categories of gardeners. The group and cooperative approaches should be encouraged for cooperation between farmers with similar interests, to create a commodity-specific extension and commodity marketing organisation, and for more responsive extension service provision. Women should be encouraged to increase their level of education to improve their literacy levels, as education is crucial for understanding technical concepts and affects the success of the delivery of agricultural support and technical training.

Government and municipalities should address land tenure issues and consider the urban poor who do not have enough space for community farming. The local municipality office must be active in land and water issues for urban agriculture and food gardening in high-density areas. Service providers, such as the GDARD, should strive to be resource rich to enable extension staff to be effective, and efficient and to acquire competence in technical knowledge.

The extension staff should be more present and active in the field, which requires forming strong stakeholder linkages through the participatory extension approach, probably with the Land Bank to coordinate and collaborate on issues of urban food gardening. In addition, proper government and municipality interventions in land and water provision to communities should be well integrated.

#### **6.4. Contribution of the study to knowledge**

This study makes significant contributions to existing knowledge by making evidence-based information available to the government, policy dialogues, municipalities, donors, NGOs and well-wishers. The study results show that food garden projects could improve food availability, accessibility, utilisation, and stability in urban communities, as well as enhance the economic well-being of participating households. This study contributes towards an effective economic sustainability assessment of urban food gardens for sustainable urban household food security. It also contributes towards better and integrated service provision for urban food gardening establishment, funding and support for sustainable urban household food security.

## **6.5. Limitations of the study and recommendations for further research**

The study was limited to selected urban food garden projects in a part of Soweto (high-density areas). It is recommended that the entire Soweto and peri-urban farms in other provincial cities be assessed regarding food gardening. The research field of food security and studies within urban agriculture and nutrition-based agriculture are relatively recent additions in this country, presenting ample opportunity for further research. Accordingly, studies could be conducted to determine conclusively whether urban food gardening means better nutritional benefits at the household level.

Further research could be conducted with a specific focus on determining the strategies that could be employed to ensure the sustainability of food gardens in the area and to enhance their contribution to food security in Soweto. This study was based specifically on vegetable production projects. Projects such as apiculture and aquaculture could also be assessed. Instead of the purposive selection of a group and cooperative and use of focus group discussions for key informants, the focus of future study could be a random selection of individual farmers and one-on-one interviews for key informant representatives. Another focus could be comparing the economic sustainability of participating households in urban group and cooperative food gardening in different provincial cities of South Africa.



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## APPENDIX: LETTER OF CONSENT

Informed consent for participation in an academic study, Department of Agricultural Economics, Extension and Rural Development

### **THE ECONOMIC SUSTAINABILITY OF SELECTED URBAN FOOD GARDEN PROJECTS IN SOWETO, GAUTENG PROVINCE, SOUTH AFRICA**

Research conducted by Patience Nyakata (u17405484)

Cell: 0835185720

#### **Dear respondent**

You are invited to participate in an academic study conducted by Patience Nyakata, a master's student from the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria. The purpose of the study is to assess the economic sustainability of selected urban food garden projects in Soweto, Gauteng Province. The study will determine the following:

- a. Identify the influence of socioeconomic factors on individual and community food gardens,
- b. Determine the contribution of the food gardens regarding household food security and income,
- c. Determine perceptions of the main challenges and expectations regarding the support of food gardens in Soweto, and
- d. Identify the role of institutional support stakeholders in establishing and supporting food garden projects.

#### **Please note the following**

- This study involves an **anonymous** survey. Your name will not appear on the questionnaire and the answers you provide will be treated strictly **confidentially**. You cannot be identified in person based on the answers you provide.
- Your participation in this study is important to us. You may choose not to participate, and you may stop participating at any time without any negative consequences.
- Please answer the questions in the attached questionnaire as completely and **honestly** as possible. This should not take more than 30 minutes of your time.

- The results of the study will be used for policy formulation and academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings upon request.
- Please contact my supervisor, Dr Joe Stevens, at [joe.stevens@up.ac.za](mailto:joe.stevens@up.ac.za) if you have any questions or comments regarding the study. Please sign the form to indicate that:
- You have read and understood the information provided above.
- You provide your consent to participate in the study voluntarily.

Respondent signature.....

Date.....

## APPENDIX: QUESTIONNAIRE

**Questionnaire for urban food garden projects, group and cooperative participants, backyard home gardeners and key role players**

**Research topic: The economic sustainability of selected urban food garden projects in Soweto, Gauteng Province, South Africa**

### Instructions

Please answer all questions!

Tick where appropriate!

Date of interview.....

1. Name of area (**insert**) TLADI/MOLETSANE .....
2. Sex of participant – **Tick** Male/Female
3. Age of participant – **Tick** the appropriate box

18–30 years	31–60 years	61+ years

4. Marital status

Status	Tick
Single	
Married	
Divorced	
Widowed	
Living together	

5. Highest academic qualification

Qualification	Tick
No formal education	
Less than grade 7	
Grade 7	
Matric	
Certificate	
Diploma	
Degree+	

6. How many people are in your household?

Identification	Write the number of people
Children	
Adults	
Pensioners	

7. Are you the household head? – **Tick** Yes/No
8. Are you **renting, owning the house or looking after someone else’s house?** **Tick** where appropriate.
9. Employment status

Type of employment	Tick
Unemployed	
Contract	
Part-time	
Full time	
Temporary	

10. \_\_\_\_Age and size of food garden

Write the year in which the food garden was started	Write the size of the garden/backyard space in metres

11. Tick method of production to grow your crops

Open-field garden	Tunnel garden	Backyard garden

12. Write the type of crop and tick the method of irrigation/watering

Write the type of crop	Sprinkler only	Hosepipe only	Sprinkler + Hosepipe + Bucket	Bucket only	Bucket + Hosepipe	Bucket + Sprinkler	Drip irrigation only	Drip + Hosepipe

13. Sales and home consumption (not applicable to backyard gardeners)

Type of vegetable	Normal production season	Peak period	Percentage of home consumption/kilograms per month or growing season	Percentage sales/kilograms per month or growing season

14. Are you satisfied with the prices at which you are selling your produce? Yes or No

15. If no, explain why you are not satisfied.....

.....  
.....

16. Did you experience any food shortages during the past two seasons? **Tick Yes/No**

<b>2017/2018</b>	Yes/No
<b>2018/2019</b>	Yes/No

If yes to question 16, what were your coping strategies? State possibilities.....

.....

17. What caused the food shortages?

.....

.....

18. Do you donate or give away vegetables to relatives, friends, neighbours, or schools? **Tick in the appropriate box. Please note: (Donating is when you notice the need of the recipients for vegetables and you give them the produce. Giving away is giving vegetables to recipients out of your own will.)**

Relatives	Friends	Neighbours	School
Donate to	Donate to	Donate to	Donate to
Give away to	Give away to	Give away to	Give away to

19. Apart from benefiting from growing vegetables in the food garden, how else do you supplement your monthly household food basket? Tick as many coping strategies as possible that apply to your household.

<b>Coping strategy</b>	<b>Selection by ticking</b>
Receive cash remittances from family, relatives and friends locally in South Africa	
Receive cash remittances from family, relatives and friends from outside South Africa	
Receive food handouts from family, relatives and friends	
Receive food handouts from donors and well-wishers	
Receive food handouts from the government	
Receive a social grant from the government	
Receive a social grant from NGOs, well-wishers or donors	
Barter trading of vegetables for something else	
Other coping strategies	

20. Do you think your household food security status has improved or not compared with those who do not participate in food garden projects? Tick what applies to you.

<b>Statement and status</b>	<b>Participant in open-field garden</b>	<b>Participant in tunnel garden</b>	<b>Backyard gardener (non-participant)</b>
Strongly disagree that your household food security status has improved.			
Disagree that your household food security status has improved.			
Strongly agree that your household food security status has improved.			
Agree that your household food security status has improved.			

21. Are you satisfied with the benefits of food gardening? Write your main achievements.

.....  
 .....

22. What are your expectations from the government as food gardeners and community members of this area?

.....  
 .....

23. What are the challenges experienced by you as food gardeners whether you are participating in a cooperative, informal group or backyard farming?



.....  
.....

24. If you are practising backyard farming, why are you not participating in the cooperative or informally organised group? Give reasons.

.....  
.....

25. Do you have knowledge of any of the Department of Agriculture extension staff that assist in advising in your projects? **Tick** Yes/No

26. State how often (**frequency**), e.g. **within a growing season of about three months**, do the advisors visit to provide advice or help you with decision-making in your garden projects?

.....  
.....

27. **Tick** your rating on the efficiency of the agricultural extension staff and other service providers

Status	Open field farmer	Tunnel farmer	Backyard farmer
Efficient in technical competence and knowledge			
Not efficient in technical competence and knowledge			
Very efficient in technical competence and knowledge			
Do not know them			

28. Do you get assistance, funding, and advice from other organisations that are not the Department of Agriculture, Fisheries and Forestry? Tick Yes/No

29. If Yes, name them  
.....  
.....

**Stakeholders' questions**

30. What form of assistance do you give to the food gardeners, and have you achieved your organisational goals in assisting them?

.....  
.....

.....  
.....

31. Are you aware of any other stakeholders like you within the Soweto area and Gauteng Province? If you are aware of them, do you collaborate on urban food gardening project interventions?

.....  
.....

32. What are your challenges in urban food gardening projects?

.....  
.....

33. What are your expectations from the government as urban food garden projects' role players in trying to solve some of the problems?

.....  
.....

**THANK YOU ALL FOR YOUR COOPERATION!**



Faculty of Natural and Agricultural Sciences Ethics Committee

E-mail: [ethics.nas@up.ac.za](mailto:ethics.nas@up.ac.za)

24 July 2022

ETHICS SUBMISSION: LETTER OF APPROVAL

Mrs PA Nyakata

Department of Agricultural Economics Extension and Rural Development

Faculty of Natural and Agricultural Science

University of Pretoria

Reference number: NAS166/2021

Project title: The economic sustainability of selected urban food garden projects in Soweto, Gauteng Province, South Africa

Dear Mrs PA Nyakata,

We are pleased to inform you that your submission conforms to the requirements of the Faculty of Natural and Agricultural Sciences Research Ethics Committee.

Please note the following about your ethics approval:

- Please use your reference number (NAS166/2021) on any documents or correspondence with the Research Ethics Committee regarding your research.
- Please note that the Research Ethics Committee may ask further questions, seek additional information, require further modification, monitor the conduct of your research, or suspend or withdraw ethics approval.
- Please note that ethical approval is granted for the duration of the research (e.g. Honours studies: 1 year, Masters studies: two years, and PhD studies: three years) and should be extended when the approval period lapses.
- The digital archiving of data is a requirement of the University of Pretoria. The data should be accessible in the event of an enquiry or further analysis of the data.

Ethics approval is subject to the following:

- The ethics approval is conditional on the research being conducted as stipulated by the details of all documents submitted to the Committee. In the event that a further need arises to change who the investigators are, the methods or any other aspect, such changes must be submitted as an Amendment for approval by the Committee.
- If Applications using GM permits: If the GM permit expires before the end of the study, please make an amendment to the application with the new GM permit before the old one expires
- If Applications using Animals: NAS ethics recommendation does not imply that Animal Ethics Committee (AEC) approval is granted. The application has been pre-screened and recommended for review by the AEC. Research may not proceed until AEC approval is granted.

Post approval submissions including application for ethics extension and amendments to the approved application should be submitted online via the Ethics work centre.

We wish you the best with your research.

Yours sincerely,



Prof VJ Maharaj

Chairperson: NAS Ethics Committee